Final

Subsequent Environmental Impact Report
for the
Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California (Wheeler North Reef Expansion Project)

State Clearinghouse No. 1998031027
CSLC EIR Number: 685; PRC 8097.1

Lead Agency:
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

January 2019

Established in 1938

MISSION STATEMENT

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

CEQA DOCUMENT WEBSITE

www.slc.ca.gov/Info/CEQA.html

Existing Wheeler North Reef Geographic Location

Latitude 33° 25' 01.7" North, Longitude 117° 37' 45.0" West

Latitude 33° 23' 15.2" North, Longitude 117° 36' 20.0" West

Latitude 33° 22' 57.6" North, Longitude 117° 36' 45.2" West

Latitude 33° 24' 47.3" North, Longitude 117° 38' 14.9" West

(North American Datum 1983)

Photo credit: Richard Herrmann

University of California, Santa Barbara diver measuring the size and density of giant kelp during annual performance monitoring at Wheeler North Reef (Source: http://marinemitigation.msi.ucsb.edu/mitigation_projects/artificial_reef/mitigation_phase/index.html)

Document prepared in coordination with:

DUDEK

TABLE OF CONTENTS

PART I. PREFACE TO THE FINAL SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

PART II. RESPONSES TO COMMENTS

PART III. REVISIONS TO DRAFT SEIR

APPENDICES

LIST OF FIGURES

LIST OF TABLES

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LIST OF ABBREVIATIONS AND ACRONYMS USED IN THIS DOCUMENT

	°C	degrees Celsius
	°F	degrees Fahrenheit
	μg/m^3	microgram per cubic meter
A	AB	Assembly Bill
	ACOE	U.S. Army Corps of Engineers
	ACS	American Community Survey
	amsl	above mean sea level
	APE	area of potential effects
	APM	Applicant-Proposed Measure
	AQMP	air quality management plan
B	BC	black carbon
C	CAAQS	California Ambient Air Quality Standards
	CalEEMod	California Emissions Estimator Model
	CalRecycle	California Department of Resources Recycling and Recovery
	Caltrans	California Department of Transportation
	CAP	Climate Action Plan
	CARB	California Air Resources Board
	CCC	California Coastal Commission
	CDFW	California Department of Fish and Wildlife
	CDP	coastal development permit
	CDPR	California Department of Parks and Recreation
	CEC	California Energy Commission
	CEQ	U.S. Council on Environmental Quality
	CEQA	California Environmental Quality Act
	CESA	California Endangered Species Act
	CFC	Chlorofluorocarbon
	CNDDB	California Natural Diversity Database
	CNEL	Community Noise Equivalent Level
	CNRA	California Natural Resources Agency
	CO	carbon monoxide
	CO_2	carbon dioxide
	CPS	coastal pelagic species
	CPUC	California Public Utilities Commission
	CRHR	California Register of Historical Resources
	CSLC	California State Lands Commission
D	dB	Decibel
	dBA	A-weighted decibel (adjusted for human frequencies)
	DPM	diesel particulate matter
	DPS	Distinct Population Segments
E	EFH	Essential Fish Habitat

	EIA	U.S. Energy Information Administration
	EIR	Environmental Impact Report
	EMFAC	CARB Mobile Source Emissions Inventory Model (EMissions FACtor)
	EO	Executive Order
	EPA	U.S. Environmental Protection Agency
	ESA	Endangered Species Act
F	FMP	fishery management plan
G	GWP	global warming potential
H	HAP	hazardous air pollutant
	HAPC	habitat area of particular concern
	HFC	Hydrofluorocarbon
	HMS	highly migratory species
I	I	Interstate
	IPCC	Intergovernmental Panel on Climate Change
L	LDA	light-duty automobiles
	LDT1	light-duty trucks 1
	LST	localized significance threshold
M	mg/m^3	milligrams per cubic meter
	MISP	Marine Invasive Species Program
	MM	mitigation measure
	MMO	marine mammal observers
	MMP	Mitigation Monitoring Program
	MMPA	Marine Mammal Protection Act
	MPA	Marine Protected Area
	MSA	Magnuson-Stevens Act
	MT CO_2e	metric tons of CO_2 equivalent
N	NAAQS	National Ambient Air Quality Standards
	NASA	National Aeronautics and Space Administration
	NF_3	nitrogen trifluoride
	NHTSA	National Highway Traffic Safety Administration
	NM	nautical mile
	NMFS	National Marine Fisheries Service
	NO	nitric oxide
	NOAA	National Oceanic and Atmospheric Administration
	NOP	Notice of Preparation
	NO_X	nitrogen oxides
	NO_2	nitrogen dioxide
	NRC	National Research Council
O	O_3	Ozone
P	Pb	Lead

	PCG	Pacific coast groundfish
	PCS	Pacific coast salmon
	PEIR	Programmatic Environmental Impact Report
	PFC	Perfluorocarbon
	PG&E	Pacific Gas & Electric
	$PM_{2.5}$	fine particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
	PM_{10}	coarse particulate matter with an aerodynamic diameter less than or equal to 10 microns
	POLB	Port of Long Beach
	Ppb	part per billion
	Ppm	part per million
R	RAQS	Regional Air Quality Strategy
	RCP	regional comprehensive plan
	RCP	representative concentration pathway
	ROG	reactive organic gas
	RPS	Renewables Portfolio Standard
	RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
	RWQCB	San Diego Regional Water Quality Control Board
S	SANDAG	San Diego Association of Governments
	SB	Senate Bill
	SCAB	South Coast Air Basin
	SCAG	Southern California Association of Governments
	SCAQMD	South Coast Air Quality Management District
	SCB	Southern California Bight
	SCE	Southern California Edison
	SDAB	San Diego Air Basin
	SDAPCD	San Diego Air Pollution Control District
	SDG&E	San Diego Gas & Electric
	SF_6	sulfur hexafluoride
	SFA	Sustainable Fisheries Act
	SIP	state implementation plan
	SLCP	short-lived climate pollutant
	SLR	sea-level rise
	SMK	San Mateo kelp
	SO_2	sulfur dioxide
	SoCalGas	Southern California Gas
	SONGS	San Onofre Nuclear Generating Station
	SRA	source-receptor area
T	TAC	toxic air contaminant
U	U.S.C.	United States Code

V	VMT	vehicle miles traveled
	VOC	volatile organic compound
Z	ZEV	zero-emissions vehicle

California State Lands Commission

PART I – PREFACE

Final Subsequent Environmental Impact Report for the Wheeler North Reef Expansion Project, January 2019

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PART I. PREFACE TO THE FINAL SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

PURPOSE

This document is the Final Subsequent Environmental Impact Report (SEIR) for the Wheeler North Reef Expansion Project (Project). The Final SEIR has been prepared for consideration by the California State Lands Commission (Commission or CSLC), as the lead agency for this Project, pursuant to the California Environmental Quality Act (CEQA) and in accordance with the State CEQA Guidelines (Pub. Resources Code, § 21000 et seq. and Cal. Code Regs., tit. 14, § 15000 et seq.).

ORANIZATION OF THE FINAL EIR

The Final SEIR, reproduced for convenience in one document, replaces the November 2018 Draft SEIR. Consistent with State CEQA Guidelines section 15132, the Final SEIR consists of the following elements:

- **Part I –** Preface
- **Part II –** Comments and Responses to Comments received on the Draft SEIR during the 45-day public comment period, including a list of persons, organizations, and public agencies that provided comments on the Draft SEIR
- **Part III –** Revisions to the Draft SEIR and any other information added to the SEIR by the CSLC as lead agency. Part III includes the entire text of the Draft SEIR, as revised, including revisions to the text of the Draft SEIR in response to comments received or for reasons that include: to update information; to refine discussions and resolve internal inconsistencies; and to make minor format changes. Some changes have resulted in a shifting of text from one page to another. Except for minor format changes, all revisions to the Draft EIR are shown as follows:
    - Additions to the text of the Draft EIR are <u>underlined</u>
    - Deletions of the text of the Draft EIR are shown as ~~strikeout~~

The Final EIR may be viewed at the following repository locations and on the CSLC website (http://www.slc.ca.gov/Info/CEQA/WheelerNorthReef.html).

Libraries:		
San Clemente Library	242 Avenida del Mar, San Clemente, CA 92672	(949) 492-3493
Dana Point Library	33841 Niguel Road, Dana Point, CA 92629	(949) 496-5517
CSLC Offices:		
	100 Howe Ave., Suite 100-South Sacramento, CA 95825 Attn: Sarah Mongano, (916) 574-1889	200 Oceangate, 12th Floor Long Beach, CA 90802 Attn: Mark LeClair, (562) 590-5266

PROJECT DESCRIPTION

In 1999, the Commission certified a Program EIR and issued Lease No. PRC 8097, a General Lease – Non-Income Producing, to Southern California Edison (SCE or Applicant) to build and maintain the Wheeler North Reef as mitigation for the loss of kelp forest resources resulting from once-through cooling at San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (Item 72 and Item 73, June 14, 1999). The reef, which was constructed in two phases in 1999 and 2008 (Phase 1, Experimental Reef, and Phase 2, Mitigation Reef), is located in water depths of about 38 to 49 feet, approximately 0.6 mile offshore of the city of San Clemente (City), Orange County (Figure ES-1). The San Clemente City Pier lies adjacent to the north end of the reef, and San Mateo Point is about 2.5 miles to the south. City and state beaches adjacent to the reef include Pier, T-Street, Lasuen, Riviera, Calafia (State Park), and San Clemente State Beaches, while Doheny State Beach and Dana Point Harbor are north of the Project site.

Southern California Edison (SCE or Applicant) has applied to the CSLC for a lease to expand the existing Wheeler North Reef (hereinafter Wheeler North Reef Expansion Project [Project]). **The reef expansion is required by the California Coastal Commission (CCC) pursuant to Coastal Development Permit (CDP) No. 6-81-370-A.** The full project description is provided in Section 2 of the SEIR.

DECISION-MAKING PROCESS

The State CEQA Guidelines stipulate that an EIR must be prepared for any project carried out or approved by a State or local public agency that may have a significant impact on the environment. CSLC has determined the following:

1) The Wheeler North Reef Expansion Project is a “project” as defined by the State CEQA Guidelines

2) The Project may have a significant impact on the environment

3) An SEIR to the Program EIR is required

The CSLC will use this Final SEIR as part of its review process, including determining whether or not to approve the Project. If the SEIR is certified and the Project approved, mitigation measures will be adopted as part of the approval and incorporated as conditions of Project implementation. The CSLC must certify that:

- The Final SEIR has been completed in compliance with CEQA

- The Final SEIR was presented to the CSLC in a public meeting and the CSLC reviewed and considered the information contained in the Final SEIR prior to considering the proposed Project

- The Final SEIR reflects the CSLC's independent judgment and analysis (State CEQA Guidelines, § 15090)

If the CSLC decides to certify the Final SEIR and approve the Project, the CSLC must make one or more written findings of fact for each significant environmental impact identified in the document. The possible findings are:

- The Project has been changed (including adoption of mitigation measures) to avoid or substantially reduce the magnitude of the impact
- Changes to the Project are within another agency's jurisdiction and have been or should be adopted by such other agency
- Specific considerations make mitigation measures or alternatives infeasible (State CEQA Guidelines, § 15091)

If any impacts identified in the SEIR cannot be reduced to a level that is less than significant, the CSLC may issue a Statement of Overriding Considerations for Project approval if specific social, economic, or other factors justify the Project's unavoidable adverse environmental effects. If the CSLC approves a project for which a Final SEIR has been prepared and certified, the CSLC will issue a Notice of Determination.

PROJECT CEQA CHRONOLOGY

The following is a brief chronology of the CEQA review process associated with the proposed Project (see also Part III, Section 1.2, Overview of the Environmental Review Process, of the Final SEIR).

January 19, 2018. The Notice of Preparation (NOP) and Notice of Public Scoping Meeting was published. The environmental setting existing at the time the NOP is published normally constitutes the baseline physical conditions by which a lead agency determines whether an impact is significant (State CEQA Guidelines, § 15125, subd. (a)). Seven written comment letters were received during the public review period.

February 6, 2018. A scoping meeting was held at 1:00 p.m. in the city of Dana Point. At this meeting, the public and interested agencies were informed about the proposed Project and had the opportunity to provide recommendations for the scope and content of the environmental analysis; three speakers provided comments at the meeting.

November 13, 2018 – December 28, 2018. The Draft SEIR was released for a 45-day public review with comments accepted by mail, email, and in person at a public meeting. Eleven (11) written comment letters were received.

December 5, 2018. A public meeting on the Draft SEIR was held at 2:00 p.m. in the city of Dana Point. At this meeting, attendees had the opportunity to ask questions about, and present oral or written testimony on, the Draft SEIR and its contents. Five speakers provided comments at the meeting.

January 2019. In preparing this Final SEIR, CSLC staff obtained additional information as needed to respond to comments, responded to all comments received, and revised the Draft SEIR (see Final SEIR Parts II and III). The CSLC hearing on the Final SEIR and action on the proposed Project is scheduled for February 4, 2019. (See www.slc.ca.gov for further information on meeting time and location when they become available.)

California State Lands Commission

PART II – RESPONSES TO COMMENTS

Final Subsequent Environmental Impact Report for the Wheeler North Reef Expansion Project, January 2019

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PART II. RESPONSES TO COMMENTS

Pursuant to State California Environmental Quality Act (CEQA) Guidelines section 15088, the California State Lands Commission (Commission or CSLC), as CEQA lead agency, is required to evaluate comments on environmental issues received from persons who reviewed the Draft Subsequent Environmental Impact Report (SEIR) prepared for the Wheeler North Reef Expansion Project (Project) and to prepare a written response. The lead agency must respond to comments that it received during the noticed comment period and may respond to late comments. The State CEQA Guidelines further require the lead agency to describe in its written response the disposition of significant environmental issues raised (e.g., revisions to the proposed Project to mitigate anticipated impacts or objections). If the lead agency's position varies from recommendations and objections raised in the comments, the agency must address the major environmental issues raised and give details why any specific comments and suggestions were not accepted.

Part II of this Final SEIR contains copies of comment letters and oral comment (excerpts from the transcripts of the public meeting) and the CSLC’s responses. Eleven written comment letters from nine commenters were submitted in response to the Draft SEIR during the public review period (Table II-1). Five speakers provided oral comments at a public meeting on the Draft SEIR held by CSLC staff on December 5, 2018 (Table II-2).

Subpart II.A provides the comment letters and responses to significant environmental issues raised in individual comments. Responses to comments are presented in the order listed in Table II-1 and Table II-2 and are organized as follows:

- Each commenter is given a unique comment set number and associated comment identification (ID) numbers for each specific comment. The comment set includes all written and/or oral comments provided by that commenter.

- Individual comments are numbered in the margins of each comment letter and/or oral comment transcript; correspondingly numbered responses follow each comment set.

Part III contains the complete EIR with revisions to the text of the Draft EIR shown in strikeout and underline that were made in response to comments that required changes or for the reasons stated on page I-1. The following conventions are used to indicate how the Draft SEIR text was changed during SEIR finalization in Part III of this Final SEIR:

- <u>Underlined text</u> represents text added to the SEIR (in some cases moved from another location in the document, in other cases new text).

- ~~Strikeout text~~ represents text removed from that location in the SEIR (in some cases moved elsewhere, in other cases removed entirely).

Table II-1 summarizes written comment sets submitted during the public comment period. Written comments are listed in the order received for each category.

Table II-1. Written Comments Provided on Draft SEIR and Comment Identification Numbers Used in this Final SEIR

Name of Commenter	Date	Comment at Public Meeting	Comment	
			Set #	ID #
Governmental Agencies				
South Coast Air Quality Management District (SCAQMD)	12/21/18	No	1	1-1 to 1-5
California Department of Fish and Wildlife (CDFW)	12/26/18	No	2	2-1 to 2-6
County of Orange Public Works	12/27/18	No	3	3-1
Groups / Organizations				
Surfrider	12/28/18	No	4	4-1 to 4-8
Public				
Jeff Crumley	11/13/18	Yes	5	5-1 to 5-4
Jeff Crumley	11/14/18	Yes	6	6-1
Matt Moldovan	12/6/18	No	7	7-1 to 7-10
David Ross	12/8/18	No	8	8-1
Kim Zetterberg	12/13/18	No	9	9-1 to 9-4
Jeff Crumley	12/28/18	Yes	10	10-1 to 10-34
Applicant				
Southern California Edison (SCE)	12/21/18	No	11	11-1 to 11-25

Table II-2 lists commenters who presented oral comments and provided from the meeting transcripts are in order of appearance at the public meeting.

Table II-2. Oral Comments Presented on Draft SEIR during December 5, 2018 Public Meeting and Comment Identification Numbers Used in this Final SEIR

Name of Commenter	Comment ID #
Public – Jeff Crumley	TI
Public – Ken Nielsen	T2
Public – Robert Moran	T3
Public – Frank Banda	T4
Public – Jim Dahl	T5

SUBPART II.A. INDIVIDUAL COMMENTS AND RESPONSES

COMMENT SET 1: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Comment Letter 1

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA E-MAIL AND USPS: December 21, 2018
CEQA.comments@slc.ca.gov
Sarah Mongano
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Draft Subsequent Environmental Impact Report (SEIR) for the Proposed Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The following comments are meant as guidance for the Lead Agency and should be incorporated into the Final SEIR.

SCAQMD Staff's Summary of Project Description

The Lead Agency proposes to expand the existing 175-acre Wheeler North Reef by depositing 175,000 tons of quarried rock to create 210 acres of additional kelp reef (Proposed Project). The Proposed Project is located on submerged lands offshore of the City of San Clemente, Orange County. The Proposed Project would be completed within 130 days[1].

SCAQMD Staff's Summary of Air Quality Analysis

In the Air Quality Section, the Lead Agency quantified the Proposed Project's construction emissions and compared those emissions to SCAQMD's recommended regional and localized air quality CEQA significance thresholds. Based on the analyses, the Lead Agency found that the Proposed Project's air quality impacts from construction activities would be less than significant after implementation of two mitigation measures. Mitigation Measure (MM) AQ-1a requires the use of tugboats that meet or exceed Tier 3 emission standards[2]. MM AQ-1b requires that NOx emission offset credits shall be purchased to offset the Proposed Project's NOx emissions to below SCAQMD's recommended regional CEQA construction threshold before the commencement of any construction activities[3]. 1-1

SCAQMD Staff's Comments

In the Air Quality Section, the Lead Agency relied on NOx emission offset credits to reduce 14.13 pounds per day and subsequently found that NOx emissions from the Proposed Project's construction activities would be mitigated to less than significant[4]. SCAQMD staff recommends that the Lead Agency provide additional information on NOx emission offset credits in the Final SEIR. First, it is recommended that the Lead Agency clarify if these credits are emission reduction credits (ERCs) or Regional Clean Air Incentives Market Emission (RECLAIM) trade credits (RTCs). ERCs are typically used to offset emissions from operation. RTCs allow RECLAIM participating facilities in the South Coast Air Basin to trade NOx and SOx emissions credits. Here, NOx emissions would be generated from the Proposed Project's construction activities. If NOx emission offset credits would be RTCs, there should be substantial evidence in the Final SEIR to show that there will be enough credits to cover the entire 130-day construction duration of the Proposed Project. 1-2 Second, it is recommended that the Lead Agency 1-3

[1] Draft SEIR. Section 4.3, *Air Quality*. Page 4.3-35.
[2] *Ibid*. Page 4.3-27.
[3] *Ibid*.
[4] *Ibid*. Table 4.3-7. Page 4.3-30.

Sarah Mongano December 21, 2018

clarify if NOx emission offset credits will be purchased from a third party or if Southern California Edison will surrender their own credits to offset NOx emissions for the Proposed Project. Third, it is recommended that the Lead Agency provide additional information on the mechanism and schedule for purchasing and implementing NOx emission offset credits in the Final SEIR. 1-3 Cont.

Conclusion

Pursuant to California Public Resources Code Section 21092.5(a) and CEQA Guidelines Section 15088(b), SCAQMD staff requests that the Lead Agency provide SCAQMD staff with written responses to all comments contained herein prior to the certification of the Final SEIR. In addition, issues raised in the comments should be addressed in detail giving reasons why specific comments and suggestions are not accepted. There should be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice (CEQA Guidelines Section 15088(c)). Conclusory statements do not facilitate the purpose and goal of CEQA on public disclosure and are not meaningful or useful to decision makers and to the public who are interested in the Proposed Project. 1-4

SCAQMD staff is available to work with the Lead Agency to address any air quality questions that may arise from this comment letter. Please contact me at lsun@aqmd.gov if you have any questions. 1-5

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
ORC181204-07
Control Number

2

RESPONSE TO COMMENT SET 1: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

1-1 Comment acknowledged.

1-2 To maximize flexibility for the applicant, the mitigation measures (MM) AQ-1b was written so that Southern California Edison (SCE) could mitigate oxides of nitrogen (NO_x) emissions by purchasing Regional Clean Air Incentives Market Emission (RECLAIM) trade credits (RTCs) or other offset approved in advance by CSLC staff and, if applicable, SCAQMD staff. A review of the RTC documentation on the SCAQMD website and discussions with SCAQMD staff indicates that there appears to be sufficient RTCs available for this Project to cover the entire 130-day construction duration of the Project; however, SCE is not restricted to only purchasing RTCs. Refer to revisions made to MM AQ-1b that clarify the process for calculating and purchasing credits

1-3 Under MM AQ-1b, the Applicant would calculate the emission estimates based upon the final equipment list and schedule; purchase the RTCs from a third party using a certified broker (or other offset approved by CSLC staff); obtain SCAQMD documentation of the trade; and submit that documentation to the CSLC 30 days prior to the start of construction. Refer to revisions made to MM AQ-1b that clarify the process for calculating and purchasing credits.

1-4 The Final SEIR, including responses to the SCAQMD comments, will be released for review prior to Commission review of the Project and consideration of the Final SEIR for certification.

1-5 Comment acknowledged.

COMMENT SET 2: CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Comment Letter 2

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Marine Region
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

December 26, 2018

Ms. Sarah Mongano
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, California 95825

Subject: Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project (SCH No. 1998031027)

Dear Ms. Mongano:

The California Department of Fish and Wildlife (Department) has reviewed the California State Lands Commission (CSLC) Draft Subsequent Environmental Impact Report (DEIR) for the Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project (Project). Southern California Edison (SCE) has applied to the CSLC to amend Lease No. PRC 8097 to expand the Wheeler North Reef mitigation project. In 1999, the California Coastal Commission issued a Coastal Development Permit for the operation of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. As a part of that CDP, construction, long-term monitoring, and evaluation of the Wheeler North Reef is required. In 2008, final construction of the Wheeler North Reef was completed in water depths of 38 to 49 feet. In order for SCE to receive mitigation credit, the reef must meet several performance standards. To date, the reef has not met the Fish Standing Stock performance standard. The purpose of the proposed Project is to ensure that Wheeler North Reef will meet all absolute and relative performance standards under the CCC's CDP. The proposed Project would expand the existing Wheeler North Reef by creating approximately 210 acres of additional low-relief reef from quarry rocks brought in from two different sites.

Department Jurisdiction

As a trustee for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection and management of fish, wildlife, and habitats necessary for biologically sustainable populations of those species (Fish and Game Code (FGC) Section 1802). In this capacity, the Department administers the California Endangered Species Act, the Native Plant Protection Act, and other provisions of the California Fish and Game Code that afford protection to the State's fish and wildlife resources. The Department is also responsible for marine biodiversity protection under the Marine Life Protection Act (MLPA) in coastal marine and estuarine waters of 2-1

Conserving California's Wildlife Since 1870

Ms. Mongano
December 26, 2018
Page **2** of **4**

California and is a "Trustee Agency" under the California Environmental Quality Act (CEQA) (Pub. Resources Code, Section 21000 et seq.; hereafter CEQA; Cal. Code Regs., Section 15000 et seq.; hereafter CEQA Guidelines). As a Trustee Agency, the Department is responsible for providing biological expertise to review and comment upon environmental documents and impacts arising from the Project activities (CEQA Guidelines, Section 15386; FGC, Section 1802). The Department has the following specific onshore and offshore-related comments and recommendations. 2-1 Cont.

Marine Biological Significance

The marine ecosystem of southern California provides nutrients, diverse habitats, and forage areas for thousands of species of marine plants, fish, invertebrates, seabirds, turtles and mammals. Many of these species are unique to southern California. Sensitive and/or important marine habitats potentially in the project area include rocky reef, seagrass and kelp beds, and soft bottom communities. These habitats are important for resident and transient fish and invertebrates for forage, reproduction, nursery grounds, and shelter with many of the species being important in contributing to the coastal economy through commercial and recreational fisheries. 2-2

California Artificial Reef Program

To address declines in various southern California marine species, in 1985, the Legislature enacted FGC Section 6420-6425 which requires the Department to administer the California Artificial Reef Program (CARP). The CARP is currently unfunded and has not been staffed since 2001. Despite the lack of funding, and in response to stakeholder interests, the Department has temporarily redirected staff to consider how to advance the CARP. Initial steps include the planning a baseline assessment of artificial reefs in California with the goal of creating a statewide scientifically based artificial reef plan. Before the Department can fully comment on an artificial reef, design and impacts, the Department needs to develop a statewide scientifically based artificial reef plan. 2-3

Performance Standards

The DEIR states that the purpose of the Project is to ensure that Wheeler North Reef will meet all absolute and relative performance standards under the CCC's CDP. The Department remains concerned that absolute performance standards will be difficult to achieve and recommends that the Final EIR better explain how the Project will accomplish the stated goal, including anticipated new fish standing stock estimates and new kelp canopy cover estimates. 2-4

In addition, the Final EIR should address how outside environmental impacts such as climate change or invasive species will affect the Projects ability to meet performance standards in the future. While Appendix B (2018 Monitoring Plan for the SONGS' Reef Mitigation Project) of the DEIR does lay out a process for poor unfavorable ocean conditions for the Kelp Bed performance standard, no process is listed for the fish 2-5

Ms. Mongano
December 26, 2018
Page **3** of **4**

performance standard. Assuming that absolute performance standards are not flexible, environmental factors could lead to the assumption that future expansion may be required when considering climate change and the number of mitigation years still required. 2-5 Cont.

Loss of Soft Bottom Habitats

Both the 1999 DEIR and the current Subsequent DEIR identify the loss of soft bottom habitats as less than significant. The Department agrees that most of the southern California Bight is comprised of soft sediment. However, the composition of those sediments is key, especially for various important commercial fisheries. Soft bottom habitats in the project area may be utilized by marine species as spawning grounds important to recreational and commercial fisheries. Specifically two key species, market squid (*Doryteuthis opalescens*) and barred sand bass (*Paralabrax nebulifer*), prefer soft bottom for spawning. The Final EIR should analyze what effect, if any, removing 200 acres of potential spawning grounds would have on these fisheries and the fish populations they rely on. Soft bottom habitats are also important for California halibut, and the DEIR does not address how the additional hard bottom would affect this species. The Department recommends that the Final EIR include an analysis detailing the methodology for deriving the percentage of soft bottom habitat that would be removed in the "study area". It is unclear in the DEIR how the value of 7% of soft bottom habitat was determined; specifically what depth ranges and alongshore extent the calculations considered to determine the 7% value. 2-6

Conclusion

The Department appreciates the opportunity to comment on the Draft Subsequent Environmental Impact Report for the Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project. If you have any questions, please contact Mr. Eric Wilkins, Senior Environmental Scientist Specialist, (805) 594-6172 or Eric.Wilkins@Wildlife.ca.gov; or Mr. Brian Owens, Senior Environmental Scientist Specialist, (650) 631-6786 or Brian.Owens@Wildlife.ca.gov.

Sincerely,

Craig Shuman, D. Env
Marine Regional Manager

ec: Becky Ota, Program Manager
Department of Fish and Wildlife
Becky.Ota@wildlife.ca.gov

Ms. Mongano
December 26, 2018
Page **4** of **4**

William Paznokas, Senior Environmental Scientist (Supervisor)
Department of Fish and Wildlife
William.Paznokas@wildife.ca.gov

Bryant Chesney
National Marine Fisheries Service
bryant.chesney@noaa.gov

Kate Huckelbridge
California Coastal Commission
Kate.Huckelbridge@coastal.ca.gov

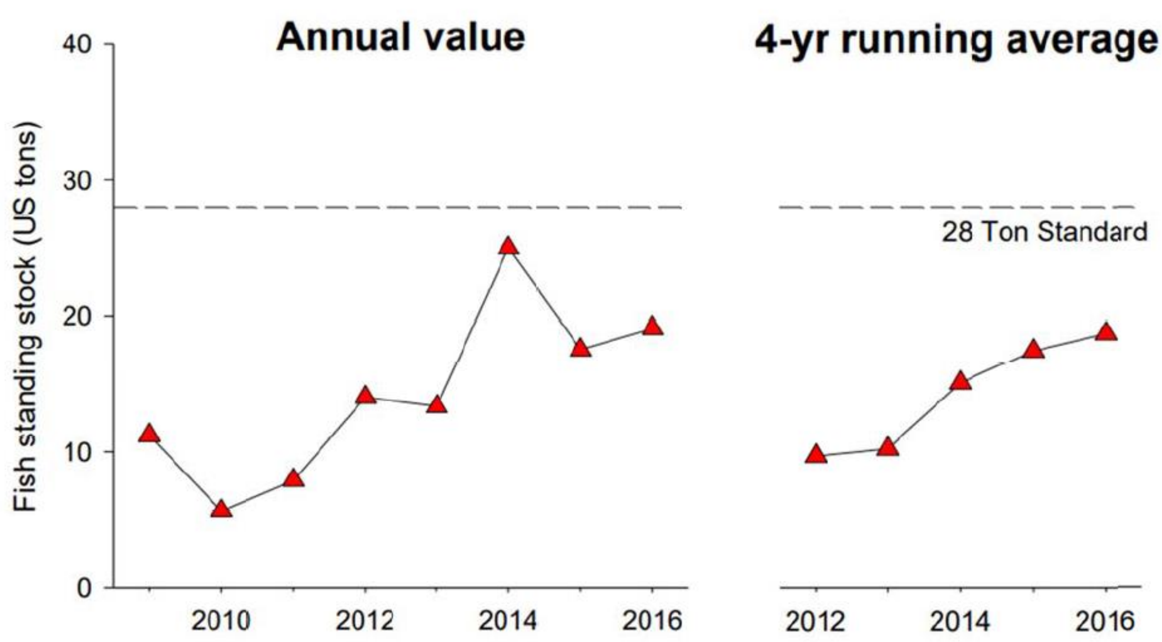
RESPONSE TO COMMENT SET 2: CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

2-1 CSLC staff recognizes CDFW's role as a trustee agency for the proposed Project.

2-2 The SEIR discusses the marine ecosystem in Section 4.1, and commercial fisheries are discussed in Section 8.1.

2-3 CSLC staff recognizes that CDFW is currently examining how to advance the California Artificial Reef Program and appreciates CDFW's comments.

2-4 The design and size of the proposed Project was based on monitoring data for the existing Wheeler North Reef. Below are the results from several years of monitoring that demonstrate the trend of increasing fish standing stock at the existing Wheeler North Reef, and performance relative to the existing standard. Because the Project would increase the size of Wheeler North Reef by 120%, fish standing stock is expected to increase by roughly a proportional amount after the reef has become established. Below is a plot of the compiled annual monitoring results and a 4-year running average for the fish standing stock, relative to the 28-ton absolute standard (Coastal Environments 2017b).



The evaluation of each absolute performance standard in any given year is based on the greater value obtained from either the data collected at Wheeler North Reef that year, or a four-year running average calculated from data collected at Wheeler North Reef that year and the three previous years. The running average accounts for short-term fluctuations in kelp forest biota that are normal, and is also used to allow credit for exceedance of the performance standard in past years to compensate for occasional years when values for the biota are slightly below that of the absolute standards. Note that the ability to use the four-year running average was added to the monitoring plan in 2013, and demonstrates how changes in the monitoring plan (not requiring changes to the CDP) can increase the likelihood of achieving the absolute performance standards. Based on analysis of the Wheeler North Reefmonitoring data and historic attainment of most performance standards by the existing reef, the Project designers calculated that the Project would meet the absolute and relative performance standards each year at a 95% confidence interval. That is, after the new reef is established, there is a 95% likelihood that in any given year all performance standards would be met. The use of a four-year rolling average would further increase the likelihood of meeting absolute performance standards for reef biota. For instance, in 2016 the existing Wheeler North Reef achieved a fish standing stock of approximately 18 tons, which is approximately 64% of the 28-ton absolute standard. If the performance of the existing Wheeler North Reef remained the same and the Project reef reached the same conditions of fish stock, the combined Wheeler North Reef would have a fish standing stock of approximately 39 tons, which is approximately 140% of the absolute requirement. This expected excess capacity, combined with the potential use of the 4-year running average, would allow the combined Wheeler North Reef to meet the absolute performance standard for fish standing stock even in years when oceanic conditions cause reduced productivity.

2-5 The commenter is correct in noting that there is no flexibility built into the absolute performance standard for fish standing stock. However, note the potential use of a four-year running average as described in Response to Comment 2-4. As stated in Response to Comment 2-4, the proposed Project was designed to meet performance standards at a 95% confidence interval, and assuming similar performance to the existing Wheeler North Reef in 2016 the combined reef would achieve a standing fish stock approximately 140% of the absolute standard. In this way, the theoretic excess capacity of the combined reef and the ability to use the four-year running average would minimize the potential for climate change or invasive species effects to interfere with achievement of the absolute performance standards during the approximately 30-year performance period.

2-6 Access to soft sediment habitat is highly unlikely to be a limiting factor in the regulation of populations of market squid and barred sand bass in southern California, including in the immediate area around Wheeler North Reef, due to the abundance of this type of habitat. However, as both species spawn in this habitat, displacement to adjacent areas would occur following establishment of the new sections of reef. However, this would not result in an impact to commercial fishing, as fishing effort would only be displaced a short distance relative to the distance fishermen would typically transit to a fishing ground for squid, barred sand bass, or other fisheries associated with sandy seabed areas. In the case of barred sand bass, the increase in overall production (in terms of locally produced biomass) is likely to result in a net benefit to this species and subsequently a potential increase in, or no net effect on, the fishing potential for this species in the local area surrounding the expanded reef.

In addition, Zeidberg et al. (2012) showed that market squid in southern California primarily spawn at depths from 20–70 m, which are deeper than most portions of the Wheeler North Reef. Although most of the spawning occurred on sand, spawning also occurred on low relief substrate similar to the type of habitat provided by the Wheeler North Reef. Therefore, the loss of soft bottom habitat due to the WNR is unlikely to affect spawning for market squid.

California halibut and other fishes such as barred sand bass are known to prefer soft bottom habitat that interfaces with rocks or other hard substrate (Love 2011). These areas probably provide greater prey diversity than more uniform soft bottom habitat. Therefore, while the expansion of the WNR will result in the loss of soft bottom habitat, the area with interfaces between soft and hard bottom substrates will increase, potentially benefitting species such as California halibut.

The percentage of the soft sediment habitat identified within the total area surveyed by Coastal Environments was 7.7%. Coastal Environments surveyed approximately 3,200 acres with ground-truthed sonar to identify soft and hard substrate. Within that area they identified approximately 615 acres of hard substrate. The remaining habitat within the survey area was soft sediment habitat. 200 acres were assumed in the calculation: 200 acres Project area/(3,200 acre survey area-615 acres hard substrate) * 100 = 7.7%

COMMENT SET 3: COUNTY OF ORANGE PUBLIC WORKS

Comment Letter 3

OC PublicWorks
Integrity, Accountability, Service, Trust
Shane L. Silsby, Director

COUNTY OF ORANGE CALIFORNIA

December 27, 2018 NCL-18-058

Sarah Mongano
California State lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Subject: Draft Subsequent Environmental Impact Report for Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project

Dear Ms. Sarah Mongano:

The County of Orange has reviewed the Draft Subsequent Environmental Impact Report for Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California: Wheeler North Reef Expansion Project and has no comments at this time. We would like to be advised of further developments on the project. Please continue to keep us on the distribution list for future notifications related to the project. 3-1

If you have any questions regarding these comments, please contact Cindy Salazar at (714) 667-8870 in OC Development Services.

Sincerely,

Cindy Salazar

For Richard Vuong, Manager, Planning Division
OC Public Works Service Area/OC Development Services
300 North Flower Street
Santa Ana, California 92702-4048
Richard.Vuong@ocpw.ocgov.com

300 N. Flower Street, Santa Ana, CA 92703
P.O. Box 4048, Santa Ana, CA 92702-4048
www.ocpublicworks.com
714.667.8800 | Info@OCPW.ocgov.com

RESPONSE TO COMMENT SET 3: COUNTY OF ORANGE PUBLIC WORKS

3-1 Comment acknowledged. The County of Orange Public Works will receive notice of further developments on the proposed Project.

COMMENT SET 4: SURFIDER FOUNDATION

Comment Letter 4

SURFRIDER FOUNDATION

December 28, 2018

Surfrider Foundation
PO Box 73550
San Clemente, CA
92673

Sarah Mongano
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Sent via email

Re: Wheeler North Reef Expansion Project Subsequent DEIR Comments

Dear Sarah Mongano,

The Surfrider Foundation (Surfrider) appreciates this opportunity to provide comments to the State Lands Commission (SLC) regarding the proposed expansion of Wheeler North Reef (Proposed Project).

Surfrider is a nonprofit environmental organization that engages a vast volunteer network of ocean users to protect the ocean, waves and beaches through conservation, activism, research, and education. We represent ocean recreation users from surfing to seabird watching and beach going, as well as the coastal communities and economies that rely on them nationwide. In Southern California, Surfrider has 26 volunteer-run chapters and students clubs working to protect their marine environments, quality of life, and coastal economies. In addition to general enjoyment and health benefits, the coastal recreation, tourism and living resources (fishing) sector directly contribute over $7 billion in national Gross Domestic Product and provide over 138 thousand jobs annually to Orange and San Diego counties.[1] These economic contributions depend significantly on the preservation and protection of recreational opportunities and coastal and ocean ecosystems. 4-1

As mitigation for the loss of kelp forest and fish biomass due to the construction and operation of the San Onofre Nuclear Generating Station, Southern California Edison (SCE) was required by the California Coastal Commission to build an artificial reef able to meet a range of environmental thresholds, as part of their Coastal Development Permit No. 6-81-370-A. Since the artificial reef was completed in 2008, it has been able to meet most of the absolute and relative standards, with the exception of the required standing fish stock of 28 tons, based on monitoring by UC Santa Barbara Marine Science Institute. SCE is proposing to expand the 174.4 acre-reef by another 210.6 acres, by placing 175,000 tons of quarry rock offshore of San Onofre, in an attempt to increase the habitat and therefore the standing fish stock. 4-2

[1] National Ocean Economics Program. "Ocean Economy Tourism and Recreation 2015". *Middlebury Institute of International Studies at Monterey Center for the Blue Economy.*

While the initial Wheeler North Reef project provided benefits to the nearshore marine habitat by reforming a functioning kelp forest, a more focused consideration of the efficacy of current fish-biomass monitoring and quantification protocols may be necessary before investing in a reef expansion. This consideration should include methods to effectively estimate the biomass of giant sea bass, impact of bottom-fish takes by active fishing, and the impact that the global decline of fish sizes could be having (200,000 fish today may not have the same estimated biomass of 200,000 fish in 1989). 4-2 Cont.

Sampling Methodology for Fish Stock Biomass Estimates

The current method of estimating annual fish stock at Wheeler North Reef has notable limitations, including difficulty with accurately calculating the mass of giant sea bass on the reef. Giant sea bass individuals can be up to 600 pounds each. There have been years that the sampling methodology has resulted in a known under-estimate of giant sea bass, with researchers physically seeing giant sea bass onsite, but not within established sample transects, so their mass estimates were not added to the overall standing fish stock. One method proposed by Dr. Mark Steele, a lead researcher on this effort, is to conduct spot-pattern recognition of known individuals to more accurately capture the biomass of this particular fish species. Results of a trial study using this quantification method at Wheeler North Reef has not yet been released. [2] Since this method could have a direct impact on the quantified fish biomass standing stock, and therefore on the ability of Wheeler North Reef to meet mitigation requirements, it should be reviewed and considered before implementing another reef construction project. 4-3

Additionally, Wheeler North Reef is actively fished. The amount of fish removed from Wheeler North Reef from recreational and commercial fisheries is not included in the standing stock biomass estimate, which could result in an underestimate of true standing stock. Local fisher takes of bottom-fish should be analyzed to assess whether it would have a significant impact on the biomass estimates. 4-4

Finally, the sampling protocol to estimate total fish biomass of only bottom-dwelling fish is consistent with the original analysis conducted by the Marine Review Committee (MRC) in 1989. The 1989 MRC study calculated an estimated loss of 200,000 individuals, or 28 tons, of "bottom fish" biomass as a result of SONGS discharge pipes. The MRC study estimated the loss of both bottom-dwelling and mid-water fish populations and found that only "bottom fish" showed a significant decline due to SONGS discharges, at 70% in abundance and 73% in biomass compared to reference reefs, translating to 28 tons.[3] The focus of sampling on bottom-dwelling fish is therefore considered appropriate, as long as it is following the original sampling methodology. 4-5

Marine Life Impacts

Further, section 4.1 of the SIER describes potential significant impacts to marine mammals and turtles by rockfall strike and shipstrike as a result of the Proposed Project. The SEIR recommends mitigation action; however, the mitigation requirements do not go far enough to ensure that impacts are mitigated to the maximum extent feasible. While the SEIR requires marine wildlife observers (MWO) within the rockfall exclusion zone, during construction to observe noise and during barge transportation, it is unclear 4-6

[2] Presentation by Dr. Mark Steele. "Challenges in estimating the standing stock of giant sea bass, 2017 Annual Review Workshop". California State University Northridge. http://marinemitigation.msi.ucsb.edu/documents/annual_review_workshops/artificial_reef/2017/2017-arw-giant-sea-bass-standing-stock.pdf

[3] Murdoch, W., Fay, R., & Mecalas, B. 1989. Final Report of the Marine Review Committee to the California Coastal Commission. http://marinemitigation.msi.ucsb.edu/documents/MRC_reports/final_report/mrc-final-rpt_to_ccc.pdf

whether they will be required to be present to monitor throughout the rockfall placement activities. MWOs are known to significantly reduce wildlife interference and should be fully utilized during construction. **Surfrider requests that, in additional to the current mitigation requirements, the MWOs remain onboard to monitor rock placement (as they are pushed overboard) in order to avoid strike by rockfall and to develop a plan for communication with construction crew to stop work if there is a risk that any marine mammals or sea turtles approach the construction site.** 4-6 Cont.

Impacts to Waves, Beaches and Surfing

The SEIR found that impacts are likely to be less than significant to beach erosion, surf characteristics and natural coastal processes. The SEIR sites a study by Elway et al. (1998a) that found that short-period, low-frequency "wind waves" will experience attenuation but concludes that short-period waves are not a significant contributor for recreational activities (surfing). Surfrider wholeheartedly disagrees. While "wind waves" are not always the preferred type of swell, they do represent a significant recreational opportunity, especially for beach breaks. The Proposed Project does have the potential to significantly impact surfing resources.

As such, Surfrider requests that a mitigation measure be required under Impact GEO-2 in the SEIR to avoid impacts to surfing. The mitigation should include a surf impact study that develops a methodology for monitoring surfing. The study should first set a baseline with one full year of surf monitoring before the Proposed Project and one full year after construction. During monitoring, if significant impacts are detected, additional mitigation or removal of the Proposed Project should be required. The surf monitoring should take place at the San Clemente Pier and/or the popular beach break known as T-Street. The California Coastal Commission has required extensive surf monitoring in other projects such as the San Diego County Regional Beach Sand Placement project and the San Elijo Lagoon Restoration project and we request a similar methodology as was required in those projects. Mitigation measures may include funding for managed retreat projects or other soft armoring or living shoreline solutions elsewhere, such as Capistrano Beach or San Clemente City Beach, that may restore surfing and/or recreational opportunities at presently eroded and otherwise armored beaches. 4-7

Greenhouse Gas Emissions

A new report, *Global Warming of 1.5°C* from the Intergovernmental Panel on Climate Change released its prognosis that we may have as little as 12 years to act on climate change and slash global emissions in order to avoid catastrophic effects of climate change. As we work to reduce emissions in California and beyond, it is important to take mitigation measures seriously.

According to the SIER, diesel fuel consumed by marine vessels transporting quarry rock and construction equipment and worker commutes would use petroleum. The Proposed Project would generate approximately 1,491 MT CO_2 emissions during one year of construction and 50MT annually for 30 years thereafter. Despite being a small percentage of California's daily petroleum consumption, we are living in a time when all greenhouse gas (GHG) emissions must be reduced, eliminated and mitigated where possible. Further, those estimates do not include emissions that would occur outside U.S. waters during the tugboat trips to and from the Ensenada, Mexico quarry and the Proposed Project. 4-8

California set clear goals to reduce GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. In addition, the City of San Clemente Climate Action Plan set forth target emission levels by 2030 of 38 percent below 2009 levels. In order to meet these goals, every source of emissions must be considered and eliminated where possible. **Surfrider requests that the SEIR, in Impact GHG-1, require the applicant to purchase and retire carbon offset credits to offset all greenhouse gas emissions related to construction activities.** 4-8 Cont.

Thank you for your consideration of Surfrider's comments regarding the necessity of adequate review of impacts associated with the Wheeler North Reef Expansion Project, and use of the most effective and accurate standing fish stock biomass estimation methods.

Sincerely,

A. Sackett

Amanda Sackett
California Policy Coordinator
Surfrider Foundation

Katie Day

Katie Day
Staff Scientist
Surfrider Foundation

RESPONSE TO COMMENT SET 4: SURFIDER FOUNDATION

4-1 Comment acknowledged.

4-2 Comment acknowledged.

4-3 The proposed Project does not include a change in the methodology for sampling of the standing fish stock or other monitoring methods. These methods are reviewed on a regular basis by California Coastal Commission and their effectiveness considered in annual reports prepared by the monitoring scientists. The monitoring plan is referred to in the plan itself as a "living document". For example, the monitoring plan provided in Appendix B of the SEIR was last changed in April 2017, but before that was revised in January 2015, March 2014, and February 2013.

4-4 See Response to Comment 4-3 above. In addition, the standing fish stock estimate for San Onofre Kelp Reef from which the performance standard was derived did not reduce the standing stock to account for fishing pressure on that reef; therefore, it would be inconsistent to reduce the standing stock performance standard for Wheeler North Reef.

4-5 See Response to Comment 4-3 above.

4-6 Mitigation Measure BIO-4 has been revised to clarify that Marine Wildlife Observers (MWO) be on board the derrick barge during rock placement to ensure that impacts to marine mammals and sea turtles do not occur. The commentor incorrectly notes that MWOs are required during barge transportation; however, as stated in the SEIR, "Due to the slow vessel speed of the barges, MWOs on board the transiting vessels would not be necessary."

4-7 The reef would be placed in more than 40 feet of water, and the hard substrate would extend no more than 3 feet above the seafloor. In the 1999 Program EIR, studies carried out by Elwany et al. (1998b) concluded that the experimental and mitigation reefs, and the resulting kelp forests, would create no measurable attenuation of height or energy of long-period swell waves, and would not affect the propagation or direction of swell waves. Since construction was completed on the existing experimental and mitigation reefs, no impacts to swell waves have been observed. Because the Project area and reef design for the Project is very similar to that analyzed in Elwany et al. (1998b), those same conclusions apply to the Project. These impacts are discussed in the SEIR as Impact GEO-2 (p. 4.6-7) and Impact REC-2 (p. 4.13-12).

4-8 As discussed in Impact GHG-1, the thresholds of significance for the Project are equivalent to the SCAQMD threshold of 3,000 MT CO_2e per year. As the commenter points out from Table 4.7-1 in the SEIR, Project construction GHG emissions would be 1,491 MT CO_2e, which is below the 3,000 MT threshold; therefore, the impact is less than significant and no mitigation is required. However, to clarify, the 50 MT annually is the Project construction GHG emissions amortized over the assumed 30-year operational life of the Project. As the SEIR states, “the Project is not anticipated to generate long-term, operational GHG emissions” following Project construction. Impact GHG-2 discusses conflict with local Climate Action Plans and the proposed Project was found not to be in conflict with the city of San Clemente’s Climate Action Plan; therefore, it is a less than significant impact.

COMMENT SET 5: JEFF CRUMLEY

Comment Letter 5

From: Jeff Crumley <jeff@jeffcrumley.com>
Sent: Tuesday, November 13, 2018 9:20 PM
To: Mongano, Sarah@SLC <Sarah.Mongano@slc.ca.gov>
Cc: Gillies, Eric@SLC <Eric.Gillies@slc.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>
Subject: Re: Wheeler North Reef Expansion Project Draft Subsequent EIR is available for public comment

Greetings Sarah,

I have a couple immediate concerns with the DEIR.

1. The information in figure 8-3, block 756 appears to show no urchin harvest. This is incorrect and we have log books from half dozen divers to prove it. 5-1
2. Table 8-5, fishery value... Is this DFW ex-vessel value? We have invoices that correlate to dive logs to indicate value of block 756. 5-2
3. The assessment of block value is bound by a four year span, 2012-2016. This leaves the assessment inaccurate due to cyclical oceanic conditions and circumstances of fisherman. The annual value of block 756 far exceeds this assessment. 5-3

Again, the urchin fishery was not contacted and is not being truthfully or, accurately represented.
From a stakeholder point of view, this is unacceptable.
No one seems to want to address the elephant in the room, where's the intellectual honesty?
Please respond with the intention of correcting your urchin data in the DEIR. 5-4

Thank You, respectfully,
Jeff Crumley

RESPONSE TO COMMENT SET 5: JEFF CRUMLEY

5-1 CDFW is the State agency chartered to collect, verify, and maintain recreational and commercial fisheries data. CSLC relied on CDFW data from landing receipts for catch blocks when preparing the SEIR. CDFW acquires data from mandatory reporting requirements on the commercial fishery pursuant to the Fish and Game Code (Sections 8043, 8046, 8046.1) and the California Code of Regulations (Title 14, Section 197). For commercial fisheries, landing data are recorded on receipts by fish dealers or processors at the time of delivery. Copies of these documents are sent to the CDFW. For each transaction, the dealer must provide data concerning the species, weight, and price paid to the fisherman. The date of the transaction, the fisherman's name, the fishing vessel registration number, and intended use for the fish (human food, bait, etc.) is also required. In addition, type of gear used and the area where the fish were caught is reported. Landings data are constantly being updated, and data sets are constantly modified. Summaries of these data are generated by CDFW and are made available to the public (e.g., see https://www.wildlife.ca.gov/Fishing/Commercial/Landings). Based on communications with CDFW, the information provided in the SEIR was the full extent of their data for catch block 756. CSLC, CDFW, and California Coastal Commission staff have not received log books or any other records showing CDFW's information is incorrect or misleading.

Please note that Section 8.3 of the SEIR, which discusses CDFW's commercial fishing data, provides information relevant to CSLC's consideration of the Project but outside the scope of CEQA review. CDFW's fisheries data are not the basis of any of the SEIR's significance findings under CEQA.

5-2 See Response to Comment 5-1.

5-3 See Response to Comment 5-1. The years 2012-2016 were selected because they represent a period after establishment of Marine Protected Areas in California state waters. Data prior to the broad establishment of MPAs would represent a very different pattern of fishing activity and the SEIR preparers determined that additional information would not clarify the fishing value of the catch block.

5-4 The Notice of Preparation for the Draft SEIR was distributed widely, including to the commenter. The commenters' comments on the Notice of Preparation were considered during preparation of the Draft SEIR. However, as noted in Response to Comment 1-1, CDFW indicates that the data you reference is not part of their database, and thus was not included in the analysis for that catch block (CDFW 2018f).

COMMENT SET 6: JEFF CRUMLEY

Comment Letter 6

From: Jeff Crumley <jeff@jeffcrumley.com>
Sent: Wednesday, November 14, 2018 3:47 PM
To: Mongano, Sarah@SLC <Sarah.Mongano@slc.ca.gov>
Cc: Gillies, Eric@SLC <Eric.Gillies@slc.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>; Taniguchi, Ian@Wildlife <Ian.Taniguchi@wildlife.ca.gov>; David Goldenberg <golden59@pacbell.net>; Dave Rudie <rudie.dave@gmail.com>
Subject: Re: Wheeler North Reef Expansion Project Draft Subsequent EIR is available for public comment

Hi again Sarah,
The information on landings from CF&W is incorrect (listed below).
This may be a problem with recording at CF&W. I have log books, landing receipts and processing invoices that accurately describe the value of block 756's red urchin harvest. The list provided below, year 2015, doesn't even account for the urchins I harvested...let alone a couple other divers.
The historic record for decades is preserved. Let's use it.

We need to sort this out with Ian and records asap. This project must be postponed until the record is corrected and the DEIR is adjusted to represent changes.

Respectfully, Jeff Crumley

Sea Urchin Landed in Wheeler Reef Blocks (2008-2017) 6-1

Year	756	757	Total
2008	13,070	122,256	135,326
2009	32,009	103,643	135,652
2010	11,054	93,256	104,310
2011	1,252	99,971	101,223
2012	1,854	104,036	105,890
2013	4,593	86,812	91,405
2014	2,769	127,671	130,440
2015	1,616	61,794	63,410
2016	1,495	3,540	5,035
2017	35	2,500	2,535
Grand Total	69,747	805,480	875,227

* Blocks include more area than Wheeler Reef
Preliminary DFW CFIS data extracted 2-20-18 DStein

RESPONSE TO COMMENT SET 6: JEFF CRUMLEY

6-1 See Response to Comment 5-1. The SEIR relied on catch block data available through CDFW's database.

COMMENT SET 7: MATT MOLDOVAN

Comment Letter 7

From: Matt Moldovan <mmoldovan@gmail.com>
Sent: Thursday, December 06, 2018 4:17 PM
To: Comments, CEQA@SLC <CEQA.Comments@slc.ca.gov>
Subject: Wheeler North Reef Expansion Project Draft SEIR comments

Good Afternoon,
I would like to submit the following questions regarding the Wheeler North Reef Expansion Project Draft EIR:

1. The GEO-2 impacts state that the surf characteristics impact would be less than significant. There is no mention of in-situ wave measurement or modeling based on the change in bathymetry. The effects on the surf breaks in San Clemente should be studied and quantified. These include the pier, T-street, and State Beach to name a few. 7-1

2. What is the proposed height of the project above the seabed? How will this be validated? 7-2

3. Is K-Rail going to be used for the construction of the reef? If so, what treatment is required prior to installation to remove paint and contaminants. 7-3

4. What is the effect of detiorating concrete on the local water quality including but not limited to pH and other contaminants that may be embedded in the concrete. 7-4

5. What scientific equipment is currently used and planned for long term monitoring of the site? Please provide equipment specifications, spaciotemporal density, and any other relevant materials. 7-5

6. What is the time period for "long term monitoring"? 7-6

7. What are the procedures for measuring in-water noise output during construction? 4.1-31 7-7

1

RESPONSE TO COMMENT SET 7: MATT MOLDOVAN

7-1 See Response to Comment 4-7.

7-2 As stated in Section 2.3.1 of the SEIR, the completed reef would be approximately 3 feet above the seafloor. The means of placement for the reef boulders ensures that the reef is low-relief, as evidenced by the profile of the existing Wheeler North Reef. A post-construction survey of the reef will be used to describe its profile and placement on the seafloor.

7-3 As stated in Section 2.3.1 and 2.3.2 of the SEIR, only quarry rock would be used for expansion of the reef.

7-4 See Response to Comment 7-3.

7-5 As described in Section 2.3.4 of the SEIR, long-term monitoring of the proposed reef expansion would be conducted according to the 2018 Monitoring Plan for the SONGS' Reef Mitigation Project (Appendix B to the SEIR), or any subsequent plans approved by the California Coastal Commission. The 2018 Monitoring Plan describes the methods currently being employed at the Wheeler North Reef; however, those methods could change in the future after Project consideration by the California Coastal Commission.

7-6 The required monitoring duration for the Wheeler North Reef is described in the SEIR in Section 2.3.4.3, Monitoring Duration.

7-7 The SEIR has been revised to eliminate the requirement for noise monitoring of rock placement, as such activities are not reasonably expected to exceed Level B harassment levels for marine mammals or sea turtles.

7-8 Areas offshore and adjacent to the northern portion of the existing Wheeler North Reef were surveyed by multibeam, side-scan sonar, and sub-bottom profiler in 2006. The remaining portion of the Project area was surveyed by multibeam, side-scan sonar, and sub-bottom profiler in 2017. Jet-probing was used to confirm the sediment thicknesses inferred from the remote sensing data.

7-9 Attainment of Project objectives will be determined through reef monitoring, as described in Appendix B or a subsequent monitoring plan developed by the California Coastal Commission.

7-10 See Response to Comment 7-9.

COMMENT SET 8: DAVID ROSS

Comment Letter 8

From: DAVID ROSS <d.ross1@cox.net>
Sent: Saturday, December 08, 2018 3:03 PM
To: Comments, CEQA@SLC <CEQA.Comments@slc.ca.gov>
Subject: Wheeler Reef

I am adamantly opposed to any extension of the existing Wheeler Reef. If the mitigation hasn't worked, doubling the size will not either. The only successful outcome of the current Reef is seaweed littering the ocean and beaches. There needs to be a solution to keeping the kelp beds from detaching from the reef or the fish population will not increase. I would further request that SCE provide beach cleanup when the detached seaweed ends up on the beach. 8-1

regards,

RESPONSE TO COMMENT SET 8: DAVID ROSS

8-1 The commenter's expression of opposition to the Project will be provided to the Commission for consideration in its decision-making process.

Some kelp detachment from the reef is a normal occurrence on a functional kelp reef and observations of kelp washing up on shore do not by themselves indicate a failure of the reef design. However, as discussed in Impact PUB-2 in the SEIR, monitoring of kelp wrack conducted following completion of Wheeler North Reef Phases 1 and 2 (Appendix F to the SEIR) determined that the existing Wheeler North Reef reef had not resulted in a significant increase in kelp wrack as compared to reference beaches. Refer also to Section 4.2.1 of the SEIR, which describes the city of San Clemente's Beach Ecology and Maintenance Policy. See also Response to Comment 2-4.

COMMENT SET 9: KIM ZETTERBERG

Comment Letter 9

-----Original Message-----
From: Kim Zetterberg <kimzetterberg@cox.net>
Sent: Thursday, December 13, 2018 11:16 AM
To: CSLC CommissionMeetings <CSLC.CommissionMeetings@slc.ca.gov>
Cc: Joe Austin <joewaustin@earthlink.net>; Kent Conklin <Kent_Conklin@yahoo.com>; Craig Cosbey <craigcosbey3@gmail.com>
Subject: Opposition to the Wheeler North Reef Expansion Project

Dear Sirs;

While it was hoped that our fishing would improve with the creation of the San Clemente artificial reef project; funded by SONGS; fish counts have declined steadily since its creation more than five years ago. 9-1

The structure and kelp growth parallel to the shoreline block much needed tidal and current flow to the beach, resulting in poorer water quality and visibility than ever before (as phosphate laden runoff and sewage amounts continue to increase due to development), and inshore species such as yellowfin croaker, barred surf perch, and halibut have all but moved to deeper water outside the reef where tidal exchange provides them with more nutrient-rich waters. Essentially the reef project pushed most of the fish to the outside of the reef, all but requiring a watercraft of some sort to access them, which most of the public does not have the luxury of having. In a nutshell, beach-restricted anglers are essentially cutoff from their sport, while bathers and surfers are rewarded with water quality levels that area far more tainted than ever before. 9-2

Extending this reef even further north would all but seal the fate of surf fishing in San Clemente. Where catch (and release) of fifty or more fish on an outing was once commonplace, fishless days now predominate our outings - this from data and logbook observations from several of us who have "pounded the sand" in San Clemente with rod and reel for more than twenty-five years. 9-3

If anything, opening up some current channels through the existing blocks (perpendicular to the beach) would be money far better spent. Thanks for the chance to provide input to the decision making process. 9-4

Kim L. Zetterberg
San Clemente resident, fishing guide

Sent from my iPad

RESPONSE TO COMMENT SET 9: KIM ZETTERBERG

9-1 It is unclear what fish count the commenter is referring to. Monitoring data for Wheeler North Reef (available at http://marinemitigation.msi.ucsb.edu/documents/artificial_reef/index.html) have shown fluctuations in fish populations consistent with fluctuations at reference reefs, but no decline specific to the Wheeler North Reef site.

9-2 Beach water quality inshore from the existing Wheeler North Reef is not substantially different from water quality elsewhere in the Capistrano Bight, based on monthly water quality data collected by the Orange County Health Care Agency (available at https://ocbeachinfo.com/data/). CSLC staff was unable to locate evidence to support the statement that Wheeler North Reef has made water quality inshore of the reef worse than it would be without the reef.

The effects of kelp at the Wheeler North Reef should be similar to the effects of kelp in other areas. Consequently, if the assertion in the comment were correct, water quality inshore of kelp beds would generally be poor relative to areas offshore of kelp beds or relative to inshore areas without kelp beds. CSLC staff is not aware of studies that demonstrate this, nor of evidence that the mentioned fish species have moved offshore to deeper water in response to the damping effects of kelp on tidal exchange and nutrients. Furthermore, if this were the case the fish species mentioned would be expected to be universally more abundant offshore where ever there are kelp beds, and common inshore in areas where kelp beds are absent. CSLC staff is not aware of studies that suggest that, and those that are available suggest the opposite is true (e.g., Bodkin 1988, Holbrook et al. 1990).

9-3 CSLC staff is not aware of studies demonstrating that the presence of offshore reefs adversely affect nearshore fish populations. It is important to note that monitoring of statewide fish populations have demonstrated substantial declines of most fish species and abalone throughout California, including nearshore fish species targeted by surf fishermen (e.g., Freiwald et al. 2013). That state-wide decline in fish populations may explain all or part of the changes cited in the comment.

9-4 Comment acknowledged; however, adding new gaps through the existing Wheeler North Reef would not achieve the Project objectives.

COMMENT SET 10:JEFF CRUMLEY

Comment Letter 10

From: Jeff Crumley <jeff@jeffcrumley.com>
Sent: Friday, December 28, 2018 12:18 PM
To: Comments, CEQA@SLC <CEQA.Comments@slc.ca.gov>
Subject: Wheeler North Reef Expansion Project Draft SEIR comments

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Comment by,
Jeff Crumley / Commercial Sea Urchin Diver
po box 2742
Capistrano Beach, CA. 92624

The failures of this project extend beyond lack of fish sufficient to meet the requirements. The failure is in the management and the politics of the "science." This is a serious accusation that I don't put forth lightly. The history, words and actions of those involved is an indictment of chicanery and shenanigans that warrant oversight. 10-1

The SEIR does not address my issues whatsoever. Instead, it doubles down with old science that can not answer my questions. Accretion and low density reef set in mud would require new studies from Elwany to incorporate new observations to determine an answer to my question of sand flow. The inshore reef observations are not addressed. 10-2

The SEIR lists false data from CDFW regarding urchin fishery data. The Permit and previous EIR list a reason for mitigation of SONGS being the urchin fishery and it's value. This was correct. The SEIR disparages the urchin fishery as not having value. This is false. Beyond this, the "science" has determined urchins as undesirable. The project is headed by one of the most prolific urchin scientists, Schroeter, to keep urchins off the reef. This project has now doubled the loss to the urchin fishery. 10-3

The lies and misinformation that have been exposed in this project are a problem. The political maneuvering throughout the history of this project has lead to many failures. The most of which is self awareness by the staff. Conversations by those involved express alarming impunity and hubris while taunting and even slightly threatening. The lack of public and stakeholder participation has lead to failure and degradation of resources and those who depend on them. 10-4

Attached is my report as is from last April 2018. I stand on every word in it. There are great plans for many artificial reefs throughout California. Just as WNR production must meet standards, so must any future projects. I think WNR is an example of how NOT to proceed. 10-5

You must answer all my questions and accusations. Some are beyond the scope of this SEIR and are cause for concern on ethical standards. Until these issues are considered and addressed I call this project a complete fraud on the public. The sooner CCC, SLC, Edison and all the "scientists" address this contradiction, the easier it will be to move forward. 10-6

Wheeler North Reef

Review & Analysis Report

By Jeff Crumley / Commercial Sea Urchin Diver
Capistrano Beach, CA.

Table of Contents:

(This report is incomplete due to the time allotted and the insurmountable information to be digested in this short period. The information presented here is intended to instigate a complete review of this project and seek an equitable solution)

Introduction

Wheeler North Reef has failed.

The failure is not only of the reef. The failure is also the erosion of public trust, degradation of the environment and produces scepticism of science.

The failure determination is a result of decades of research, planning and execution. Wheeler North Reef (WNR) is one of the largest and most studied artificial reefs (AR).

This project is in violation of permit 6-81-330-A with conditions (permit), Environmental Impact Report (EIR) criteria and the Coastal Act as a result of the failure designation, since the execution of the design. There is discrepancy in the language of the EIR and permit. 10-7

How and Why WNR is failing may seem complicated. It is not. All things are better understood in retrospect. This report explores the cause(s) of failure by analysing the history and sciences along with the purpose and directives prescribed in the permit, the EIR and the Coastal Act. It utilizes my personal observations and investigations to apply logic, reality and pose valid questions and hypotheses.

Is Wheeler North Reef actually a failure? I suggest it's just a stones throw from perfect.

"Time will tell" … and, it has.

1. Reef Design

Some key examples of AR literature were presented and compared at the Third International Artificial Reef Conference (IARC) in Newport Beach, CA. 1983 (of which Professor John Stephens was on the steering committee).

The criterion for AR's is highlighted on the cover of the program from this event and is threefold…

"Engineering Design, Biological Research and Productivity."

The reality of WNR does not meet the criteria. There is a plethora of research, a deficit of productivity, caused by a flawed design.

Identifying how things went awry… There is ample evidence that show beyond question the reef design flaw was in application. The focus drifted.

Social interactions between scientists throughout the history of the project are paramount to understanding the arbitrary nature of decisions made in the planning and execution of WNR. These interactions are often a window to the truth. I corresponded with John Stephens and spoke with Jake Patton (March 2018). 10-8

Jake Patton, WNR designer and part of John Stephens team, had suggested the best way to grow a sustainable kelp bed was on low relief reef near existing kelp. Kelp does not grow well on top of reefs rather, around the high spots. Being in the vicinity of existing kelp promotes sustainability through recruitment.

Stephens on the low relief concept - *"I have always thought that the low reefs were a bunch of crap even though it was first championed by one of my guys."* - referring to "Jake the Diver."

One flaw in the design was not enough consideration for the associated biota. Professor Stephens stated - *I didn't think the idea was great but other's picked it up and ran with it. My work was always in high relief because that's where there was abundance and diversity of fishes.*

Jake Patton said he - *"designed the reef to be placed on hard substrate, sand/silt is the wrong material."* - Jake's solution is to move the reef…"*It was built in the wrong place, there's no fish there. I think it needs to be moved… but, that won't go over very well."* Jake said... *"I never saw it after it was built."* 10-8 Cont.

Design and placement is very difficult due to the affected area at San Onofre being ancient riverbed (cobble). Cobble stones are small, smooth, round stones that fit together in a way that creates a unique habitat. The cobble at San Onofre is vast and consistent as is the complex ecosystem that resides within.

Construction materials, sunlight exposure and current are determining factors to how species can establish themselves. The difference in surface texture will dictate which species of algae can attach themselves. Light exposure and current affects the density and columns of algal turf. The reference reefs at Mateo and Barn display this. It is described in detail about Pendleton AR - (Carter, ET AL).

The literature presented at the IARC clearly and unanimously identifies location and design as critical factors for an AR to be successful and long lived. Eight mitigation alternatives were proposed (as shown in permit excerpt below). The preparations were detailed and there was plenty of published literature to form a basis.

Permit -2.7 Alternatives That Avoid Or Lessen Impacts Section 15126(d) of the CEQA Guidelines,
The Draft PEIR considered eight alternative experimental and mitigation reef proposals, which were suggested through the PEIR scoping process. These included alternative locations for the artificial reef, alternative designs, and decommissioning of SONGS ***. Five of these alternatives were not included for evaluation because they did not meet the SONGS Permit project objectives. These included: 1) an alternative reef site north of San Clemente Pier;*** *2) an alternative reef site farther offshore from the proposed project site at San Clemente; 3) compound reefs at Big Sycamore Canyon; 4) a kelp planting alternative; and 5) decommissioning SONGS.* 10-9

Some scientists in this project determined that thin sand over bedrock was the preferable substrate for performance. This design was described as a "Rock-N-Roll" reef whereas seasonal conditions would cause sandblasting and rolling rocks to prevent "*undesirables*" from overpopulating the reef. This was a controversial approach but, again, others ran with it. The prospective sites were determined by sonar survey which cannot determine subtle differences in sand constitution. The persistence of a low relief design on silt sediment bottom inherently created a flaw.

There are different types of sand. Typically, the further from the beach, the more silty/muddy the bottom becomes. This characteristic is well defined in the geography of south Orange County. The "kelp line" follows the "mud line." This silt sediment has different characteristics than the clean, gritty, flowing sand flats that migrate with tides and seasonal conditions found up to and upon the beach.

WNR sits just outside this natural line on mud, in around forty-five feet of water. There is no sand to blast and no rocks to roll. There is virtually no water action that could induce this activity even if the elements were there. 10-9 Cont.

The geographical characteristics from Dana Point to Oceanside are consistent. We have the Capistrano bight with San Mateo being the southern boundary (this area is unique and discussed later in "Outlying Reefs and Beaches.").

The design consists of multiple polygons of modules. They are inconsistent in design and interspersed. The rocks are scattered about in random, as one would expect from being dumped from a barge and falling 40-50 feet to the bottom. There is a center pile with rocks landing outward in singularity.

These modules have no connectivity. They are basically islands. Pendleton AR is actually a great example for this as the modules are connected by cobble pathways. Pendleton is a sophisticated design. Recent observations show diversity of species discounted in some previous literature. Some thought it "died" and no longer worked. Diversity, reproduction/recruitment are observed. 10-10

The majority of acreage at WNR lacks habitat for fish to reproduce, hide, or grow up...no relief. There are more hiding places in cobble than on WNR. On the same note, this means less food available. The elephant in the room is the high relief module(s) in WNR that are probably carrying the entire reefs ecological assessment. If the whole reef were built like these we wouldn't be talking about this. 10-11

The placement of WNR has been described as acceptable because of it's close proximity to existing natural reef (San Mateo kelp bed). Up to a point, there was no mention of Barge rock. Barge is a couple hundred feet south of the southernmost border of WNR. This was unknown to the scientists until Ken Nielsen educated them. Barge, too, has some medium relief and has the same characteristics as Mateo and Barn. 10-12

Another indicator of a flaw is the close proximity of WNR to Barge rock. Barge represents the northernmost edge of the ancient remanence of San Mateo Creek (cobblestone). WNR begins on the adjacent soft bottom. Overflow of fish would better occur if habitat would allow. Observation doesn't match the data.

The issue with reef location is ecological geography. There is a distinguishing pattern to the ecosystem that is governed by geography and the expectations/predictions for WNR don't fit the location. A square peg will never fit a round hole.

10-12 Cont.

2. Outlying Reefs & beaches

Nature will follow her own rules.
Long term observations raise questions that can only be answered through the scientific method. Do we know about the nearshore resource loss?... possible causes?... Effects of sand flow and current on natural reefs?... Geological transformation?... Changes to the trophic cascade?

There are several natural reefs nearby and inshore from WNR. West Reef just to the north of San Clemente pier, Seal Rock, Rudies Garden and the inside cobble at Nixon's. These reefs *were* outstanding specimens. They were biodiverse and prolific. We have harvested urchins from these reefs for decades
.

There has been a sand issue in San Clemente since 1983. Has WNR had any effects on current and sand distribution to exacerbate the existing issue?
I suggest it has, greatly.

These reefs began to change around the time of construction of WNR. The placement of the rocks increased turbidity, transporting muddy sediment. We didn't start diving there again until 2013. Life on these reefs was fading by this time. The kelp canopy on WNR had become magnificent. Sand was beginning to claim the natural grounds. The whole geography and environment had changed.

10-13

These observations raise questions that form some testable hypotheses. One of these questions was put to Patrick Tennant at his San Clemente City Council meeting Powerpoint presentation, October 2017. Steve Swartz asked if the reef would increase the shark presence. Tennant said they haven't seen an increase in sharks. We should be reminded of the shark activity over the last couple years. Tennant's response is

10-14

misleading at best. There are no studies on this and there is only one correct answer…"We don't know." 10-14 Cont.

This is where a great hypothesis is created…
"Does WNR affect the ecological geography which causes changes to the trophic cascade whereas juvenile white sharks have become more common because sand flats have increased and attract larger swarms of stingrays?"
This would be a valuable study for Dr. Chris Lowe to conduct.

Another question posed is... *"What are the effects of WNR kelp canopy on sand deposits/accumulation that have gathered from Mateo to north of the pier?"* 10-15

Yet another…*" Did the kelp canopy at WNR prevent zooplankton from propagating to the inshore reefs contributing to their demise?"* 10-16

I spoke with Dr. Lowe regarding my observations. Not only did he agree on the merit of my hypothesis and the need to test it, he said he has been trying to work with the project through Kim Anthony. She is no longer with the project/Edison.

I have recorded red sea urchin harvest from WNR. This harvest occurred between Aug. 2015 and Dec. 2016. There were no urchins on WNR before this period. As I harvested, I noted there was no recruitment. All of the urchins I observed were mature. This time period is when the El Nino event laid waste to everything out to 45+ feet in depth. WNR withstood some of this devastation. I suggest these urchins were the refugees of the population from the inshore reefs.

I sent an email to Steve Schroeter in an effort to communicate my observations. He seemed surprised that I had urchin landings from WNR. Steve abruptly ceased communicating when I expressed my concerns and asked for some understanding of the monitoring method. The event of harvesting urchins on WNR wasn't supposed to happen. Were the monitors aware of the urchins or me harvesting them?...I picked over 6,700lbs in this period, right in front of them. 10-17

The relevance, function and value of sea urchins and the sea urchin fishery is understated and under-represented in this project. This goes against the spirit of the project and the Coastal Act.

3. Mitigation of Resources

Seems the only resources benefiting from this project are kelp, lobsters and the money from Edison's customers going to science. Science is not a natural resource. 10-18

The design was directed to consist of like biota of the affected area. San Onofre kelp beds are an urchin hot spot. There is contradiction in the permit.

Permit - 4.0 CONSISTENCY WITH THE COASTAL ACT ***..."Moreover, giant kelp provides habitat and food for a diverse assemblage of animals, many of which also have high biological and economic importance.For example the red sea urchin fishery is one of the largest fisheries in California and is critically dependent on abundant kelp, which is the primary food of red sea urchins. "***

. Yet, in the permit/ conditions- ' ***important functions of the reef shall not be impaired by undesirable or invasive benthic species (e.g., sea urchins…"*** 10-19

The sea urchin resource and fishery meet the criteria for "Special Significance" as described in the Coastal act chapter 3 section 30230. In section 30234.5 the economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

The EIR listed a group of parties contacted. Fisherman, ENGO's and land based constituents but, no urchin divers. The California Sea Urchin Commission is a State entity under the Dept. of Agriculture. Was there no intention of including the urchin fishery in the design? 10-20

Steve Schroeter is an expert on sea urchins and the urchin fishery. He knows the vital role urchins play in the ecosystem as well as their potential devastating effects. This just adds more scepticism to the reasoning behind some decisions that were made.

The urchin fishery information used was the CDFG urchin landing receipts from block numbers. These blocks encompass several square miles each and provide no local data. I have daily log books that identify "dive spots" and pounds harvested. We know the bottom better than most. Our profession requires keen observing... "Fisherman's Ecological Knowledge." This is the inherent instinct from ancient hunter gatherers applied to quality and conservation. Science seems to exclude this expertise too often. 10-21

4. Monitoring

The decision for multiple individuals to avoid communication speaks volumes. I have simple, logical questions that need answers. In appearance, the monitoring method is a linear accumulation multiplied by acreage. Why?...the modules are circular and three dimensional.

I see the habitat and populations on the mods as a bullseye target. The yellow center of the target being the most habitable and productive. The red, blue and white rings being successively less habitable and populated. Seems a linear survey doesn't fit. 10-22

Monitoring is mentioned in the EIR, permit and described at length in *Compliance and Similarity Determination, CCC, Reed, Schroeter, ET AL-2007* is a hybrid methodology consisting of two statistical methods It is sold as a holistic form of assessment with broad allowances for the unknown.

This is a quantitative statistical method. In this mitigation project, the purpose is to enhance the marine environment. I argue that this method is insufficient. The importance of compliance to the Coastal Act reads as the need for a quality environment. There is a need for qualitative assessment. Quantitative and qualitative are symbiotic. 10-23

The lack of communication leaves us kind of incomplete here. So, I'll just list some questions and add to it as I proceed.

***Monitor report** - (note undesirables in PowerPoint)...*
http://marinemitigation.msi.ucsb.edu/documents/annual_review_workshops/artificial_reef/2017/2017_arw_performance-wheeler-north-reef.pdf

Questions:

1. How does the report justify performance standard success of "*undesirables*" when I picked 6,700lbs of urchins? Does the fish count need to be changed? Does this add to the failure?
2. Did the monitors even know of these urchins?...Schroeters surprise indicates not.
3. Where are the specs on transect lines?
4. Are transects on every module? 10-24

5. What modules are surveyed?
6. Where are the specs on reference reef transects?
7. Habitat for benthic species is dissimilar, were the trophic needs addressed?
8. Are Moon snails undesirable and what is the effect on the trophic cascade?
9. Why no urchins when they are a majority of biomass at SanO and vital to reef biota proliferation?
10. Is the entire water column counted?
11. Why are some species discounted? (black bass)
12. What species are counted?(lobster, moon snail, clam)
13. There seems to be some confusion as to what the public sees as 28 tons of fish biomass and what is actually considered...explain?
14. The monitoring is a hybrid of quantitative measurement, shouldn't qualitative assessment be used also?...aren't they "codependent?"
15. The relative performance standards do not match observations...where is this data?
16. Can transects be arranged in a way to cherry pick the most productive areas to compensate for the majority of the reef that is far below expectations?

10-24 Cont.

5. Summary

Wheeler North Reef design and application was perverted by others. Jake Patton's design was placed on unsuitable soft substrate (mud) and is preventing achievement of the designs intended goals. Jake designed this reef to be on hard bottom.
Who changed this? 10-25

The process for location was now flawed. The ecological geography at WNR was poorly assessed. From the setting in mud, to the possible effects on the surrounding environment. The trophic needs could never be achieved with this design on this bottom at this location. 10-26

Now the intention is to expand the reef, as permitted, if needed. It isn't needed. The proposed expansion is to be located on acreage that was deemed unsuitable in the permit. How is this possible? What has changed?
The success of existing high relief mods on WNR are proof of the need for high relief...not expansion. 10-27

The observation of collateral damage to the surrounding environment overwhelmingly suggests the need for immediate study. The amount of research done on this project leaves very little wiggle room for random explanation and creates a higher expectation for results.

The effects of the kelp have created a lagoon of sorts. The inside area from Mateo to the pier performs like and eddie accumulating sand. The massive kelp canopy acts like a curtain and prevents species proliferation. The inshore resources are dead. 10-28

The lack of consideration and involvement of the sea urchin fishery is not only a violation of the Coastal Act but, goes against the spirit of the project... mitigation. My resource loss from SONGS has doubled with WNR. Adding the recent marine protected area in Laguna, I have lost 40% of my range. This is unacceptable and must be mitigated. 10-29

Looking at this as a whole, indications are that there is more focus on having the biggest reef in the world than on the needs of the environment. The pattern of conduct by the scientists on this project paints a picture of arrogance. This is a public trust. The numerous violations and disregard for rules and the environment is unacceptable.

There is way too much AR literature and precedence to accept the mistakes that were made and the solution for this is too easy. The indications of ethical misconduct must be considered with the understanding of the people involved. We're not dealing with dummies so there is no excuse for the events as they have unfolded.
How many of the people have been diving on this reef? It doesn't look like what most think. 10-30

WNR is virtually unseen by the people, making it of the metaphysical. People only see a huge floating kelp canopy and immagine a BBC documentary of pristine Channel Islands kelp beds narrated by David Attenborough.

-" fate and metaphysical aid doth seem to have thee crown'd "
—William Shakespeare

There are serious implications as to the oversight and compliance on this project. There needs to be an inquiry. The permit must be reviewed. This project needs some new blood and needs to include the urchin diver.
At this point, economic concerns are trumped by environmental and legal requirements.
. 10-31

6. Recommendations

Equitable Solution

The reason we are at this juncture is because this project has failed. The cause is evident. Science must examine results, observations; deficiencies, trophic needs and apply deductions to a solution adapting a species specific engineering plan.

The solution proposed would provide a satisfactory result and a solid plan for the future. Of the four parties affected, The Environment, Community, Edison and Science, only science has benefited. With this proposed solution, Edison will achieve mitigation; biological research will expand; community will receive benefit; the Environment will suffer less negative effects.

My understanding of the local environment allows a unique vision. The ecological geography is key to understanding how things work at this location. With what has already been done, there is a simple solution. 10-32

Placing medium size rock strategically throughout the existing modules creating high relief in some areas and smaller rock by areas of existing high relief creating connectivity. Ultimately creating a consistent/connected substrate conducive to the habitat needs and giving consideration to the trophic needs.

The obvious questions are economics and effect on existing reef. This alternative may be more time consuming and require more material. Care of existing reef would surely be a factor.

Discussion

I am neither a professor or an investigative journalist. So, I'm gonna throw a twist on this report. This chapter is what the circumstances and my thought provoking investigation produced... questions and awareness. The reader, where applicable, should take note of a relevant point of view….public perception.

As usual, with the more I read, the more questions I find. I've come to the suspicion there is something more motivating to this project than is observable to outsiders. It doesn't pass the smell test. Science is s'posed to be the quest for truth, knowledge and understanding. This is a big deal. It defines us.

10-33

The following text is my search process to this point. This job isn't complete. It's a mix of copied text and my content. This is unabashed. If you don't get it, It doesn't matter... it isn't for you then. If it does ring a bell, maybe it will spark the dialog that needs to happen. There is a social problem, lack of communication and humbleness has society paralyzed.

Metaphysical aid

WNR is virtually unseen by the people, making it of the metaphysical. People only see a huge floating kelp canopy and immagine a BBC documentary of pristine Channel Islands kelp beds narrated by David Attenborough.

-" fate and metaphysical aid doth seem to have thee crown'd "
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Public Resource

Coastal Act clearly understands and expresses public resource and public participation. The CCC, SLC, UCSB, WNR and every entity under the state of California including the State itself is "Of, By and For the People."

***Who determines public involvement / participation and to what degree?*
I am a stakeholder in this project. I am more than just a concerned member of the public. I have reached out to SLC, Schroeter and Tennant. SLC (Chris Beckwith) was very nice on the phone and seemed concerned but, deflected to CEQA process. Schroeter engaged in 1st email then, cut off contact when I took him up on his offer to

10-34
part of
search
process

discuss my issues (by this time he prob saw my CEQA comment). No response from Tennant but, Kim Anthony responded cordially on LinkedIn informing she was no longer with Edison and would pass along my inquiry to them.

Contrary to some popular agenda driven opinions, Man is a natural part of the ecosystem. Man is an animal and consumes animals. He is part of the trophic cascade. He is as much of the marine trophic dynamics as many other marine animals. This is documented in the historic record.

Oversight

So, SCE wants nuke plant and needs enviro OK.
CCC determines mitigation due and creates vehicle for facilitating

The CCC hires its own scientists to steer project seeming to use best science. UCSB scientists are successful in creating worlds biggest reef. SCE raises rates and consumer foots bill. Science has perpetual research tool and fame. SLC and CCC cover the oversight and run roughshod. Reef failed and...well...just double it!!
This is playing out like a racketeering charade

Edison is being touted as the responsible party, spending millions and making things right. This may appear true but, obfuscates reality. Mitigation becomes a term of art and assumes a different profile. Edison meerley raises rates a couple pennies and overnight has millions and no one knew the difference. (Credibility, Ethics and Common Sense).

The profits for science and politics seems to be the only benefit here. SCE scores points for "attempted" compliance, CCC and SLC score points for authoritarian oversight and environmental protection while UCSB scores points for cutting edge research with an added bonus of perpetual resources for studies and grad student thesis material to aid in the exponential accumulation of redundant scientific verbiage.

Nullification.
EIR and permit "have enacted allowances which either nullify the Coastal Act or render useless any attempt to enforce it,"
Over time nature tends to correct itself, so does science.

*The EIR sets guidelines but seems to exempt, under circumstances, any actions that violate the permit and Coastal Act**Check the EIR for double standards… The EIR*

10-34 Cont. part of search process

seems to be a big bag of "CYA." The SLC has attys. Listed as contacts on the website right next to admins….HMM?

The mechanism for oversight is supposed to be the EIR and the permit. In fact these clear a path for violating the permit and Coastal Act. This creates a scenario of perpetual failure.

***Independent survey? Just exactly who is independant? Seems to be a relationship with CCC and UCSB / Reed & Schroeter...Nepotism?*
The perception is… OK, here's the rules but, they only apply on paper and, were gonna do what we want. We'll justify/explain away in retrospect with verbiage vomit.

Expansion...Carrot and a Stick

Lessons Learnt…
The perception of a carrot and a stick are overwhelming.
Research needs to be refocused and reconfigured to correctly match observations.
It now appears this project has reached a state of "Paralysis by Analysis." Studies that require studies to do studies upon studies with no end in sight and still a "Frankenstein" sitting on the ocean floor that no one but me seems to be aware. 10-34 Cont. part of search process
Schroter is an expert on sea urchins and urchin fisheries. Where was his expertise in the design phase? As an expert, he knows the pros & cons of urchin populations and the vital role urchins play in reef productivity.
New expansion would occupy acreage of ***alternative 1. Five of these alternatives were not included for evaluation because they did not meet the SONGS Permit project objectives.***

An article published in the San Clemente Patch 2013 …." - Schroeter said the team will do more analysis this year to try to understand why the reef isn't home to more fish whether its a natural phenomenon or some flaw inherent in the reef design.
"We will monitor Wheeler North much as we did last year," he told the crowd of about 50 people at the Ocean Institute. "We will conduct analysis to try to understand why the Wheeler North Reef consistently fails to meet the 28-ton fish biomass standard." -" This is a redundant talking point seen in multiple media articles.

If science desires to repeat the same, they must have looked at it, right?. What did you look at? If you're repeating the design, it must be OK, right?
To proceed with expansion. What/where are the applied studies that brought you to arrive at this decision?

The acreage affected in both SONGS and WNR now total 332+ acres (with the potential of more if the inshore reefs are considered). The new proposal by SCE adds ____ acres. This would consume a total of ____ acres.

The conditions, permit, monitoring and standards should have been set by statistical expectations from observed data. If this is the case, the failure of WNR appoints the acreage of the mitigation reef to the affected acreage at SONGS site. Thereby making it necessary to mitigate the mitigation reef. This is not possible with the proposal to expand. We now have the expectation for expansion acreage to mitigate the failure by the same failed standards and meet the standards of a now increased affected area. Simply put, it is expecting less acreage to produce better results by the same failed plan.

Falsifying the monitoring method as cherry picking produces a science conundrum. If method is falsified, science is forced to concede high relief as proven successful alternative. I question the monitoring method because of the species distribution and inconsistency of the modules. I want to see the data and compare it to my observations. At this time, I reject the monitoring data. I suggest the data does not represent the total acreage. Were mods counted individually or as a whole?...Individually they can be assessed by relief comparison. As a Whole, indicates higher relief compensating for low relief and skewing reality. Qualitative assessment is lacking. The linear method must be triangulated to form a 3D method by adding qualitative. 10-34 Cont. part of search process

I would go as far as describing some of these modules seemingly barren excepting for kelp. I'll go even further and suggest the performance standards assessment is overvalued by as much as 30% (observation opinion).
#showthefishcount I just don't see it...show the evidence. #openscience
Ask someone about my "bullseye" monitoring theory...someone must have thought of it before.

Ethics & Irony

- John Grant (CDFG) was also on this IARC steering committee. Grant initiated a confrontation with a guest of John Stephens at this symposium. Grant was perturbed that Stephens brought a member of the public (my teacher) to the event and tried to remove him. Grant was quoted as saying "the public shouldn't be allowed in here."

- Dr. Rimmon Fey worked on this project. He refused to sign onto the EIR without a disclaimer...Why?

***If a hypothesis fails a test, it cannot be true, and it must be modified or discarded. In science, if there is a conflict between observation and hypothesis, the hypothesis loses. It doesn't matter whose hypothesis it is or how famous they are - if the hypothesis does not conform to reality it must be rejected.*
Research must then be refocused and reconfigured to correctly match observations. That's how science is supposed to work.
What if two or more competing hypotheses both pass some initial tests - how do you choose between them?
Certainly, if the hypotheses generate different predictions it will be a simple matter to pick the best one - as long as it is feasible to carry out the experimental tests. What if the competing hypotheses don't give distinguishable, feasible predictions?
Enter Occam's Razor.

"Entities are not to be multiplied beyond necessity."- Doubling the reef will only meet the needs of quantitative statistics. You will still have an imbalance and incomplete ecosystem.

"The essence of dysfunction is to proceed against the basic laws of science. Empirical evidence is also required."-

"Scientists must use the simplest means of arriving at their results and exclude everything not perceived by the senses." - Ernst Mach

A good scientist will lay his work down to be tested.

Duplicity.
Nowadays, there is a struggle in the purity of science with financial needs and social desires seemingly taking precedence over truth and reality. This is made easier by the developed technical jargon that obfuscates the simplest of concepts. Science has been an elite group throughout history.

The evidence here seems to point toward "Adventures in Ethics and Science"... a very popular science blog that has a way with words and is worthy of dissemination…

-" Scientists are engaged in an endeavor where they're trying to figure out **what the data show** about the world, not just **what they want to see** in their experimental results. Ideally, scientists are making sure their data and conclusions can stand up to the toughest objections they can imagine being raised *before they even send their manuscripts off to the journal.* And, to the extent that

10-34 Cont. part of search process

science is a knowledge-building project where scientists need to be able to depend on the results communicated by other scientists, they know they should be striving for scrupulous honesty and utter clarity of language. Irony is not a literary device that ought to be getting a lot of use in scientific communication.

And yet, part of what drives the "humor" in the "translation guide" is that there are scientists who *do* engage in … what to call it? Putting the most favorable spin on their results? Stretching the meanings of the words as far as they can go without engaging in outright lies? It's not the kind of thing in which scientists are typically proud to engage, but when an experiment is being particularly cranky in year 7 of a graduate program, one can imagine that it might be a better option than saying, "I've got nothing." And certainly, one suspects that *other* scientists are engaging in scientific puffery.-

Janet D. Stemwedel on July 10, 2007.

10-34 Cont. part of search process

To what end?... Enough is Enough.

RESPONSE TO COMMENT SET 10: JEFF CRUMLEY

10-1 Comment acknowledged.

10-2 Regarding accretion behind the reef, monitors report that they generally do not see significant differences in accretion between the offshore, middle, and inshore areas of the reef. The one area of the reef that has shown some changes regarding burial are near the northeast corner of the reef (the area closest to the San Clemente Pier), in the vicinity of experimental modules 55 and 56. The area landward of the Wheeler North Reef is a dynamic area because it is in water depth less than the closure depth (about 10 meters [m]). In areas shallower than the closure depth, changes in the area bathymetry are generally due to waves rather than bottom currents. Natural changes in these areas landward of the reef are due to the dynamic movement of the sediment in water depth less 10 m, rather than the presence of Wheeler North Reef.

10-3 See Response to Comment 5-1 regarding the red urchin fishery data used in the SEIR analysis. Section 8.3 of the SEIR discusses the Project's potential effects on commercial fishing, which is relevant to CSLC's consideration of the Project but outside the scope of CEQA review. The SEIR notes in Section 8.3 that commercial harvest of red sea urchin does occur within the Project area catch blocks, and that this fishery is the second largest in the area. The SEIR concludes that the presence of the reef would not result in the loss of fishing grounds, including the red sea urchin fishery. This characterization of the red sea urchin fishery and Project impacts to the fishery are similar to what was presented in the 1999 Program EIR, Section 4.2.2.5.

10-4 Comment acknowledged. The SEIR has been circulated for public review according to the requirements of CEQA, including publication of a Notice of Preparation (NOP), 30-day comment period on the NOP, a public hearing on the NOP in Dana Point, 45-day public review period on the Draft SEIR, and public hearing on the Draft SEIR in Dana Point. The Final SEIR will be made available to the public prior to the Project's consideration by the CSLC and California Coastal Commission.

10-5 See Responses to Comments 10-8 through 10-34.

10-6 See Responses to Comments included in the commenter's April 2018 letter, as well as responses to the two other comment emails transmitted by the commenter (Comment Set 5 and 6).

10-7 See specific Responses to Comments below.

10-8 The design of the Project reef was based on a range of criteria as described in Section 2.3.1 of the SEIR, as well as the monitoring results gleaned from the existing Wheeler North Reef experimental modules and mitigation modules. The alternative of a compound reef including high- and low-relief segments was described in Section 5.3.4 of the SEIR and was eliminated from consideration based on the rationale in Section 5.3.4.2 of the SEIR.

10-9 As described in Section 5.3.2 of the SEIR, the 1999 Program EIR excluded an area north of San Clemente Pier for several reasons. Project scientists concluded at the time that kelp beds were less likely to be successful in this area because of the proximity to San Juan Creek, believing that sedimentation from the San Juan Creek would reduce the success for growing sustainable kelp in this location. That area also had more existing hard substrate that would need to be avoided by the new reef placement. In addition, there was concern regarding greater navigation hazards associated with the site due to the proximity of Dana Point Harbor and the use of the area by recreational boaters. These concerns are not as relevant for the Project, as it is approximately 4 kilometers from the mouth of San Juan Creek, hard substrate areas are being avoided, and navigation hazards are reduced through creation of channels through the Project reef, similar to what was done for the existing Wheeler North Reef.

The sediment depth for the proposed Project polygons was determined through a combination of side scan sonar, multibeam bathymetery, sub-bottom profiling, and manual jet probing to ground-truth the results of the remote sensing technology. Of 25 jet-probing locations throughout the proposed Project area, nine were a combination of sand and silt (36%), 14 were strictly sandy (56%), and the remaining two were rocky or rocky/sandy (8%). In general, there was good agreement between the jet-probing and the sub-bottom profiling results, with 19 of the 25 stations being less than 0.35 m different.

10-10 Comment acknowledged. See Response to Comment 10-8.

10-11 Comment acknowledged. The alternative of a compound reef including high- and low-relief segments was described in Section 5.3.4 of the SEIR and was eliminated from consideration based on the rationale in Section 5.3.4.2 of the SEIR.

10-12 Comment acknowledged. See Response to Comment 10-8. The commenter's mention of Barge Rock is unclear in how it relates to the proposed Project.

10-13 See Response to Comment 10-2.

10-14 Kelp reefs are home to smaller sharks such as horn sharks and swell sharks; however, these species pose no threat to humans. Adult great white sharks generally avoid kelp forests (e.g., Jewell et al 2014) and gather in areas hosting marine mammal populations far from the Project area (Ainley et al 1985), whereas juvenile great white sharks that are regularly observed along the coastline near the Project site have historically been seasonal residents of coastal Southern California waters (Klimley 1985). However, persistent warmer waters in Winter during El Nino periods have likely contributed to increased observations of juvenile great white sharks along the coastline near the Project area. Juvenile great white sharks prey mostly on sandy bottom and estuarine fish like halibut and small rays that are more abundant on sandy sediments (Tricas and McCosker 1984), and the Project's increase in hard substrate and kelp canopy would not be expected to provide a boost to juvenile great white shark populations. CSLC staff is unaware of any studies that have looked at changes in shark presence with and without artificial kelp reefs and did not conduct such a study given the lack of evidence suggesting the proposed Project could cause an environmental impact related to increased shark presence. CSLC staff is not required to conduct every recommended test and perform all recommended research demanded by commenters (State CEQA Guidelines § 15204, subd. (a)).

10-15 See Response to Comment 10-2.

10-16 Studies have demonstrated that kelp forests affect currents within the kelp forests, especially along-shore currents (e.g., Rosman et al. 2007). However, CSLC is unaware of any studies suggesting that kelp canopy or kelp reefs block larval transport landward of the reef. Conversely, studies are available that demonstrate the importance of kelp reefs for recruitment of reef fish (e.g., Carr 1994) and as a source for dispersal of larvae to other area reefs and hard substrate areas (e.g., Almanza et al. 2012).

10-17 According to monitoring data, red sea urchins have been present on the existing Wheeler North Reef beginning in 2010 and increasing to a density of approximately 45 urchins per 100 square meters in 2014, before decreasing in parallel with reference reefs to approximately 10 urchins per square meter in 2017, the last year for which monitoring data has been published. Contrary to the commenter's statement, there is no prohibition on harvest of red sea urchins from the existing Wheeler North Reef.

10-18 Comment acknowledged.

10-19 Comment acknowledged. The proposed Project does not include a change to the permit conditions.

10-20 At the time this comment was prepared, the Draft SEIR had not been released. Therefore, CSLC assumes this comment refers to the distribution list for the 1999 Program EIR. The Draft SEIR includes a different distribution list, and state entities such as the Department of Agriculture are noticed by the State Clearinghouse.

10-21 See Response to Comment 5-1.

10-22 The Project does not include changes to the monitoring methodology used at the Wheeler North Reef. The monitoring methods are dictated by the Monitoring Program and Annual Work Plan, which are subject to periodic review by the California Coastal Commission.

10-23 See Response to Comment 10-22.

10-24 See Response to Comment 10-22.

10-25 See Response to Comment 10-8.

10-26 See Responses to Comments 10-8 and 10-9.

10-27 See Response to Comment 10-9.

10-28 See Responses to Comments 10-2 and 10-16.

10-29 Comment acknowledged. However, the Project is intended to comply with Coastal Development Permit (CDP) conditions requiring replacement of kelp reef, and not to address any effects on fisheries that may have resulted from designation of Marine Protected Areas. No scientific evidence has been presented that documents adverse effects of Wheeler North Reef on regional abundance of sea urchins, and the comment letter documents your harvest of several thousand pounds of sea urchins from Wheeler North Reef.

10-30 Comment acknowledged.

10-31 Comment acknowledged.

10-32 Comment acknowledged. CSLC staff appreciates the commenter's perspective on the Project. Regarding the design of the Project, see Response to Comment 10-8.

10-33 Comment acknowledged.

10-34 Comment acknowledged. Where this comment references "the EIR," CSLC assumes the commenter is referring to the 1999 Program EIR for Wheeler North Reef, as the Draft SEIR for the Project was not released until several months after this letter was written. For details on the Monitoring Program for the existing Wheeler North Reef, which would not be changed under the Project, and for the qualifications of the scientific staff involved with monitoring of Wheeler North Reef, refer to Appendix B of the SEIR. Regarding the design of the Project reef, see also Responses to Comments 10-8 and 2-4.

COMMENT SET 11:SOUTHERN CALIFORNIA EDISON

Comment Letter 11

SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL® Company

December 21, 2018

VIA E-MAIL & OVERNIGHT DELIVERY

Sarah Mongano
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

CEQA.comments@slc.ca.gov

Re: Wheeler North Reef Expansion Project, Draft SEIR Comments

Dear Ms. Mongano:

Southern California Edison Company (SCE) respectfully submits the following comments on the Draft Subsequent Environmental Impact Report (DSEIR) for SCE's Wheeler North Reef Expansion Project (the Project), issued on November 9, 2018, by the California State Lands Commission (CSLC). Included with this letter, for convenient reference, is a table containing all of SCE's specific requested changes to the DSEIR, and summarizing the reasons for the requested changes (see **Attachment A** hereto). 11-1

As an initial, overarching comment, SCE notes that the DSEIR correctly and accurately incorporates and reflects a large amount of detailed, Project-related information that CSLC staff has inquired about or requested and SCE has provided during the course of this DSEIR preparation. SCE appreciates the very considerable CSLC effort and attention that has gone into this DSEIR, and we have no comments or only minimal comment on large portions of the DSEIR. In particular, while SCE does still have some specific comments (as shown on the attached table) related to the marine vessel usage that will be necessarily involved on a project of this nature, SCE appreciates that to a large extent the DSEIR accurately and adequately addresses this subject. 11-2
Related to this point, CSLC staff recently requested a supporting informational letter from SCE's project contractor regarding the tugboats that are required for this Project, and SCE provides letter this as **Attachment B** to this comment letter. Please do not hesitate to contact us if you have any further questions on this point. 11-3

Of the comments that SCE has on the DSEIR, three areas of comment stand out as most substantive and important. These three points and all of SCE's comments are, again, addressed in more detail in the attached table, but SCE also highlights these three main points here: 11-4

Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770

Mrs. Sarah Mongano
WNR Cultural MMs
Page 2 of 3

Marine Wildlife Monitoring Plan (MM BIO-3), regarding monitoring the noise levels generated by depositing the reef rocks into the water (see DSEIR Table 7-1 at page 7-6): As discussed further in the attached table, there is no realistic possibility of this activity -- the pushing of rocks from a barge into the ocean (approximately 6-8 rocks per pushed load) -- creating noise at a Level B harassment level. This noise monitoring requirement would entail a significant level of additional preparation effort and added cost for the Project, and it is not necessary or justified by the facts in this situation. SCE requests that this monitoring requirement be removed from the DSEIR. 11-5

Archeological and Tribal Monitoring (MM CR-1a), regarding daily archeological monitoring (see DSEIR Table 7-1 at page 7-10): The contemplated daily monitoring by an archeological monitor would serve no purpose in this Project, in which all the relevant Project activity will be taking place offshore. The area at issue for monitoring, the ocean floor, will not be visible from the surface. SCE requests that this requirement be removed and replaced with the much more appropriate and useful, cultural resources management plan that SCE describes in the attached table. For a further, more in-depth discussion on this point, please see also the letter to you of today's date from Adam Sriro of SCE, attached here as **Attachment C**. 11-6

Impact on paleontological resources and mitigation measures (Impact CR-2) (see pages 4.4-10, 11): As the DSEIR's own impact analysis indicates, there is no reason to expect any impact from the Project on paleontological resources. Similarly, the 1999 EIR for the original reef construction concluded that the reef would not damage paleontological or archeological resources, and any burial of any unknown resources by the reef construction would be a less than significant impact. There does not appear to be any reasonable justification for this mitigation measure, and SCE requests modification of this DSEIR language as discussed on the attached table. 11-7

Thank you very much for your consideration of these SCE comments on the DSEIR. If you have any questions about these SCE comments, or if you wish to discuss any other aspects of the Project, please contact Jenny McGee, SCE's project manager on this Project, at (626) 407-9656.

Very truly yours,

Ken Borngrebe
Principal Manager, Environmental Services Department
2244 Walnut Grove Ave, Rosemead, CA 91770

Mrs. Sarah Mongano
WNR Cultural MMs
Page 3 of 3

Enclosures

cc: Don Neal
Alisa Krisek
Jeff Sumner Koch
Jenny McGee

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR	
			Executive Summary and Project Description			
Executive Summary	Summary of Project Objectives	ES-5	Lines 26 through 28 state: "The Wheeler North Reef has not met both the absolute and the relative performance standards in any year; therefore, SCE has not yet received any mitigation credit for the reef (Table ES-1)."	Please revise as follows: Although t~~T~~he Wheeler North Reef meets multiple performance standards, the reef has not met both the absolute and the relative performance standards that requires a standing fish stock of 28 tons in any of the years it has been monitored (2009 to present)~~in any year~~; therefore, SCE has not yet received any mitigation credit for the reef (Table ES-1).	For consistency with Project Description Section 2.1	11-8
Project Description	Section 2.0	2-6	Lines 30 through 33 state: "It is anticipated that the quarry rock needed for the Project would be obtained from two quarries on Santa Catalina Island; however a portion of the quarried rock (up to 14 percent of the total needed) may need to be obtained from a quarry in Ensenada, Mexico."	Please revise as follows: It is anticipated that the quarry rock needed for the Project would be obtained from two quarries on Santa Catalina Island; however a portion of the quarried rock (up to ~~14~~ 20 percent of the total needed) may need to be obtained from a quarry in Ensenada, Mexico.	Estimated supply of rock to be obtained from the rock quarry in Ensenada, Mexico is 20 percent.	11-9
Project Description	Section 2.0 Table 2-2	2-7	The fifth row of the table states: "Number of Barge Trips: • 38 trips from Santa Catalina island quarries • 6 trips from Ensenada quarry"	Please revise as follows: Number of Barge Trips: • 38 trips from Santa Catalina island quarries • ~~6~~8 trips from Ensenada quarry	Eight trips are estimated for rock transport from the Ensenada quarry	11-10
			Biological Resources			
MMP BIO	Table 7-1	7-4	The first two bullets of MM **BIO-2** state: • "Originate from Oceanside Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay • Be continuously based out of Oceanside Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay since last dry docking"	Please revise as follows: • Originate from Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay • Be continuously based out of Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay since last dry docking	Clarification to include small craft out of Dana Point Harbor to transport personnel.	11-11

1 | Page

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR	
MMP BIO	Table 7-1	7-4	The third bullet of **MM BIO-2** states: "Have underwater surfaces cleaned before entering Southern California at vessel origination point and immediately prior to transiting to the Project site"	Please revise as follows: ~~Have underwater surfaces cleaned before entering Southern California at vessel origination point and immediately prior to transiting to the Project site~~ Underwater surfaces of barge vessels shall be subject to evaluation by California State Lands Commission (CSLC), through a Risk Assessment process and pre-construction survey prior to use for the construction. Should vessels fail to pass Risk Assessment or pre-construction survey screening as determined by CSLC, cleaning of vessels prior to construction may be required.	The suggested language meets the intent of the mitigation, while allowing for an alternative (i.e., risk assessment and pre-construction survey) to be implemented and minimize schedule delays. Hull washing every trip would pose a significant schedule impact on the proposed project. Additional points for consideration: Vessels will not remain at the ports for longer than 5 days, not sufficient time for nonindigenous species to become established on the vessel. The vessels will be in continuous use during the project. The hulls of the vessels to be used for the project are treated with paint, not bare hull. Note that SCE's construction contractor will only carry freshwater ballast in the derrick barge and material barges going to Ensenada carry no ballast water.	11-12
Biological Resources	4.1	4.1-28	Lines 13-16 state: "Vessel activity would increase in the area during project construction. Numerous barge trips are anticipated between ports and harbors from Los Angeles to Mexico, and many non-native species may be introduced either as organisms attached to the submerged parts of vessels or when ballast water is discharged from vessels."	Please revise as follows: Vessel activity would increase slightly in the area during project construction. ~~Numerous~~ Barge trips are anticipated to slightly increase between ports and harbors from Los Angeles to Mexico, and ~~many~~ non-native species may be introduced ~~either~~ as organisms attached to the submerged parts of vessels. ~~or when ballast water is discharged from vessels.~~	Project site is located in waters heavily used for recreational and light commercial boating and fishing. Navigational routes planned for use for the project material transport are heavily used by cruise ships, tour boats, ferries, commercial fisheries, and Naval ships. The estimated 46 barge trips over the construction period of 100 days during peak boating season is a minimal increase in vessel activity, and not enough to substantiate a significant impact to the waters. Note that SCE's construction contractor will only carry freshwater ballast in the derrick barge and material barges going to Ensenada carry no ballast water.	11-13

2 | Page

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR	
Biological Resources	4.1	4.1-33	Lines 8-9 state: "The consequence of a spill would result in the high likelihood of causing a substantial decline in the local population of listed species."	Please revise as follows: The consequence of a spill would result in the potential harm or mortality of localized individuals' ~~high likelihood of causing a substantial decline in the local population~~ of listed species.	Project vessels will not be storing sufficient hazardous materials to cause a "substantial decline in local population". The derrick barge will arrive at the project site with adequate fuel for the project. The fuel is contained in ABS certified tanks incorporated into the vessel. Tug boats will refuel at the harbor. Fueling onsite will be limited to fuels used for the front loader, which will use a wet hose with secondary containment and an automatic shut off valve.	11-14
MMP BIO	Table 7-1	7-6	The second and third bullet of **MM BIO-3** state: • Procedures for measuring in-water noise output from rocks being pushed into the water and landing on the seafloor during the first week of construction to determine if Level B harassment criteria are exceeded. • If Level B harassment thresholds are exceeded procedures to determine an appropriate zone of influence and subsequent radius for an exclusion zone, which in turn should be monitored by an MWO for the duration of construction activities.	Please revise as follows: • ~~Procedures for measuring in-water noise output from rocks being pushed into the water and landing on the seafloor during the first week of construction to determine if Level B harassment criteria are exceeded.~~ • ~~If Level B harassment thresholds are exceeded procedures to determine an appropriate zone of influence and subsequent radius for an exclusion zone, which in turn should be monitored by an MWO for the duration of construction activities.~~	Project noise is highly unlikely to exceed Level B harassment criteria. The noise which will be generated from the dropping of the small number of rocks (6 to 8 rocks) with each pushed load would not cause a high amplitude noise, it is like the sound of a splash of water and less amplitude than breaking waves. The noise generated is not the equivalent of very low frequency seismic surveys, or impact driven construction methods, so the necessity of measuring construction noise should not be necessary.	11-15
			Air Quality			
4.0 Environmental Impact Analysis AQ	Energy	4-7	In Table 4-2 Track Loader (1)	~~Track~~ Front End Loader (~~1~~ 2)	Change requested for consistency on equipment listed in Table 4-2 and Table 2-2.	11-16
4.3 Air Quality	4.3-4 Environmental Impact Analysis and Mitigation MMP Table 7	4.3-27 Line 5 7-8	MM AQ-1a states: "Nitrogen Oxides (NOX) Emissions Reduction. Prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that tugboats used for the project meet or exceed the Tier 3 emission standards."	Please revise as follows: MM AQ-1a: Nitrogen Oxides (NOX) Emissions Reduction. Prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that tugboats with the capabilities to construct ~~used~~ ~~for~~ the project meet or exceed the Tier 3 emission standards, if available. If Tier 3 compliant tugboats are unavailable, Tier 2 compliant tugboats would be utilized.	Tugboats used for the marine construction are highly specified (see Attachment A for description). Vessels appropriate and necessary for construction, equipped with Tier 3 engines may not be available for use.	11-17

3 | P a g e

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR	
MMP Air Quality	Table 7-1	7-8	MM AQ-1b states: "Prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that NOX emissions offset credits have been purchased to offset the Project's NOX emissions below the South Coast Air Quality Management District construction threshold for NOX."	Please revise as follows: ~~Prior to the commencement of any construction activities,~~ Within 60 days of construction completion, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that NOX emissions offset credits have been purchased to offset the Project's NOX emissions below the South Coast Air Quality Management District construction threshold for NOX.	Suggested language meets the intent of the mitigation, yet allows adequate time to secure purchase of offset credits.	11-18
4.3 Air Quality	4.3.4 Environmental Impact Analysis and Mitigation	4.3-27	See Appendix C for a description of the approach, methodology, and assumptions to estimate Project-generated criteria air pollutant emissions.	Please update Appendix C to include all spreadsheets used in the AQ calculations	Appendix C appears incomplete	11-19
Cultural and Paleontological Resources						
MMP CR	Table 7-1	7-10	**MM CR-1a** states: "Archeological and Tribal Monitoring. A California State Lands Commission (CSLC) staff-approved archaeological monitor that meets the Secretary of the Interior's Professional Qualifications Standards (as defined in 36 Code of Federal Regulations Part 61), and a tribal monitor that is culturally affiliated with the area may also be present during Project activities. The archaeological monitor shall complete daily monitoring forms and prepare a summary monitoring report to be submitted weekly to CSLC staff. The archaeological and Tribal monitors have the authority to increase or decrease the monitoring effort should the monitoring results indicate that a change is warranted."	SCE recommends replacing the entire mitigation measure language with the following: 1. The Applicant will conduct a post-reef expansion dive with tribes to re-assess the Project area and compare with data obtained from the eighteen reconnaissance survey dives; and, 2. Document AB52 consultation process and present as professional paper to benefit future submerged projects.	Regarding the MM CR-1a Tribal Monitoring requirement, in accordance with Public Resource Code §21080.3.1(a), SCE is not qualified to comment on the presence of tribal cultural resources in the Project area. However, in lieu of archaeological and tribal monitors, SCE respectfully proposes the following alternative Mitigation Measure language in the hopes of better aligning MMs with the Project environment and the limitations of traditional monitoring. The purpose of archaeological monitoring is to identify unanticipated cultural resource discoveries and help avoid impacts to those cultural resources during Project activities. Without the ability to visually inspect the seafloor before, during, and after daily Project activities, there are limitations with MMCR-1a (Archaeological and Tribal Monitoring) as it fails to consider the lack of visibility and the marine environment conditions of the Project. Further, as stated in the DEIR Section 4.4.2 "the presence of intact prehistoric cultural deposits within the Project area is very unlikely." See Attachment B for further discussion.	11-20

4 | Page

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR	
MMP CR	Table 7-1	7-10	MM CR-1b states: "If potentially significant archaeological or Tribal cultural resources are discovered during construction or monitoring activities, work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery. The Applicant shall notify California State Lands Commission (CSLC) staff and any local, state, or federal agency with approval or permitting authority over the Project that has requested/required notification within 48 hours of discovery, consistent with guidelines for Tribal involvement stated in the CSLC Tribal Policy (www.slc.ca.gov/About/Tribal.html). The Applicant shall retain a CSLC-approved archaeologist and request a culturally affiliated Tribal representative to evaluate the nature and significance of the discovery. In addition, the following shall apply…"	SCE recommends replacing the entire mitigation measure language with the following: The Applicant shall Develop a Cultural Resources Management Plan (CRMP), which will include: a. Specific discussion on the identification of unanticipated discoveries in a submerged context b. Discussion of the successful tribal cultural resource consultation process for future submerged project consultation efforts c. How unanticipated tribal cultural resources are identified during project activities, when the Project area is not visible	It would be difficult to determine whether potentially significant archaeological resources are discovered during construction due to the marine setting. Without visibly inspecting the seafloor, monitors cannot determine whether potentially significant archaeological resources are discovered during construction, or redirect work 100 feet from a discovery.	11-21
Cultural and Paleontological Resources	4.4	4.4-10 and 11	Lines 11-14 state: "Impact CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature The Project could directly or indirectly destroy a unique paleontological resource or unique geological feature (Less than Significant with Mitigation)." Lines 28 through 31 state: "In fact, placement of boulders would, in effect, cap and preserve in place any paleontological resources that may be present in the Capistrano Formation. The impact is considered less than significant with implementation of MM CR-2 to ensure proper treatment of unanticipated paleontological resources." MM CR-2 states: "Unanticipated Paleontological Resources. In the event unanticipated paleontological resources or unique geologic resources are encountered during **demolition** activities work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery until the Applicant retains a qualified paleontologist, who has demonstrated experience in carrying paleontological projects to completion, to evaluate the nature 1 and significance of the discovery. If the resource cannot be avoided, the paleontologist shall develop and implement a Paleontological Resources Management Plan for the proposed Project area that includes specimen identification to the lowest taxonomic level possible, analysis, curation, and the preparation of a final report. The plan shall be submitted to California State Lands Commission staff for review and approval prior to further disturbance of the area."	Please revise as follows: Impact CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature The Project could directly or indirectly destroy a unique paleontological resource or unique geological feature (Less than Significant ~~with Mitigation~~)." In fact, placement of boulders would, in effect, cap and preserve in place any paleontological resources that may be present in the Capistrano Formation. Therefore, the impact is considered less than significant. ~~with implementation of MM CR-2 to ensure proper treatment of unanticipated paleontological resources~~ ~~Unanticipated Paleontological Resources. In the event unanticipated paleontological resources or unique geologic resources are encountered during **demolition** activities work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery until the Applicant retains a qualified paleontologist, who has demonstrated experience in carrying paleontological projects to completion, to evaluate the nature 1 and significance of the discovery. If the resource cannot be avoided, the paleontologist shall develop and implement a Paleontological Resources Management Plan for the proposed Project area that includes specimen identification to the lowest taxonomic level possible, analysis, curation, and the preparation of a final report. The plan shall be submitted to California State Lands Commission staff for review and approval prior to further disturbance of the area.~~	The impact analysis discussion indicates that the Proposed Project would not disturb paleontological resources. The 1999 Program EIR determined that the placement of the reef would not damage any known or unknown paleontological or archeological resources on the seafloor and that burial of any unknown paleontological or archeological resources would be less than significant impact. Therefore, it is not clear what the source for the significant impact that would require mitigation and prompt the change in determination from the PEIR.	11-22

5 \| Page

11-23

Wheeler North Reef Expansion Project

DRAFT ENVIRONMENTAL IMPACT REPORT ~ SCE COMMENTS

Chapter	Section	Page	DEIR Language	SCE Recommended Language	Reason for Change in DEIR
			Applicant Proposed Measures		
MMP APM	Table 7-1	7-19	APM-1 States: "The Applicant shall prepare an Anchoring Plan to reduce impacts to sensitive marine areas. • Anchors should be designed to minimize drag on the seabed. Each anchor should be connected to a 10-ton concrete block located on the ocean floor. The cable to the barge would travel via a foam filled can (surge-can) to lift the anchor chains off the seafloor. • Anchors and concrete blocks should be placed on areas of seabed less than 30 percent hard substrate. • All anchoring hardware moves would be conducted with ocean-capable tugboats with sufficient capacity to remove anchors from the seafloor without causing drag damage. Anchors should be checked periodically to ensure movement has not occurred.	Please revise as follows: • Anchors should be designed to minimize drag on the seabed. Each anchor should be ~~connected to a 10-ton concrete block~~ located on the ocean floor. The cable to the barge would travel via a foam filled can (surge-can) to lift the anchor chains off the seafloor. • Anchors ~~and concrete blocks~~ should be placed on areas of seabed less than 30 percent hard substrate. • All anchoring hardware moves would be conducted with ocean-capable tugboats with sufficient capacity to remove anchors from the seafloor ~~without causing~~ to minimize drag damage. Anchors should be checked periodically to ensure movement has not occurred.	We will be using anchors, cables, surge cans and anchor chains.

CONNOLLY-PACIFIC CO.
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December 20, 2018

Southern California Edison Company
Environmental Services
2244 Walnut Grove Ave.
Rosemead, CA. 91770

Attention: Jenny McGee
Project Manager/ Edison Representative

Subject: Tugboat Requirements for the Wheeler North Reef Expansion Project

Ms. McGee,

The project tugboats required are designed and equipped for this specialized marine work. The following is a summary of boat configuration and requirements:

- When working in the nearshore region, the boat cannot draw too much water (i.e. not deep draft vessel).
- The boats need to have the capacity to lift 20,000 lb. crane barge (derrick barge) anchors and relocate; moving them without dragging on the sea bottom.
- Tugboats also need to be able to tandem tow material barges with winches design for this arrangement.
- The boats cannot be too long due to the open water & mooring conditions at the Catalina quarry sites (close to shore and limited water area). 11-24

In conjunction with the equipment requirement, having experienced boat captains/ crew that know the work and the vessel is essential. Understanding that sea conditions can change rapidly, the coordination with the crane barge and the tugboat is critical. The anchors are attached with large cable/ wire rope to the crane barge winches and moves must be executed safely. And without damaging the existing marine habitat.

This project will require over one hundred anchor moves. Using the proper vessel and manned with an experienced crew is a necessity. Please do not hesitate to contact me if you have any questions or comments regarding this letter.

Thank you,
CONNOLLY-PACIFIC CO.

Mike Ellis
Operations Manager

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December 20, 2018

Mrs. Sarah Mongano
California State Lands Commission
200 Oceangate #12
Long Beach, CA 90802

Subject: Proposal for Cultural Resource Mitigation Measure Alternatives

Dear Mrs. Sarah Mongano:

Introduction

Thank you for the opportunity to discuss the Wheeler North Reef (WNR) Draft Environmental Impact Report (DEIR) cultural/tribal mitigation measures (MMs). This proposal provides additional detail to our conference call (12/14/18) and hopes to further that discussion.

The WNR expansion project occurs in a very dynamic marine environment. All WNR project activities take place on the seafloor, will not be visible from the surface, and does not involve any excavation. The technical report results and DEIR Impact Assessment conclude there is a low potential for encountering unanticipated cultural resource discoveries. However, the Mitigation Measures (MM) as written require cultural and tribal monitors, and unanticipated discovery protocol. Given the lack of visibility impeding the identification of a tribal cultural resource, and the low risk of impacts, the prescriptions of the Measures are not aligned with the analysis. As a result, this proposal discusses the limitations of applying conventional monitoring as mitigation, traditionally associated with a terrestrial project, to a project in a submerged context, and presents alternative Mitigation Measure language.

Background Information

11-25

Dudek's technical report, ***Underwater Cultural Resources Investigation Report for the Wheeler North Reef Expansion Project, City of San Clemente, California,*** (Dudek, 2018) includes pre-field research, results of eighteen reconnaissance survey dives, and recommendations. Pre-field research suggests the most likely artifact and/or features the reconnaissance dive surveys will encounter are stone mortars and bedrock milling features; neither of which have the potential of floating to the surface during Project activities. Two objects (one shell and one rock) were brought to the surface for further analysis. Dudek's concluded both were determined to have no notable human patterns, and features on the shell and rock were from natural processes. The technical report's results and recommendations state, "The project, as currently designed, appears to have a low potential for impacting any undiscovered cultural resources." However, further inspection by native representatives revealed cultural origins of both objects.

The DEIR states in situ prehistoric remains are unlikely to occur in the Project environment. The proposed Project would be constructed in areas that are underlain by bedrock and thinly covered by sand (generally less than 3 inches), in a high-energy dynamic environment in which the thin cover of sand is readily moved by waves and currents. As a result of these physical

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2244 Walnut Grove Avenue
Rosemead, CA 91770

Mrs. Sarah Mongano
WNR Cultural MMs
Page 2 of 3

conditions, the presence of intact prehistoric cultural deposits within the Project area is very unlikely.

Conclusion and Recommendations

The purpose of archaeological monitoring is to identify unanticipated cultural resource discoveries and help avoid impacts to those cultural resources during Project activities. Without the ability to visually inspect the seafloor before, during, and after daily Project activities, there are limitations with MMCR-1a (Archaeological and Tribal Monitoring) as it fails to consider the lack of visibility and the marine environment conditions of the Project.

Regarding the MM CR-1a Tribal Monitoring requirement, in accordance with Public Resource Code §21080.3.1(a), SCE is not qualified to comment on the presence of tribal cultural resources in the Project area. However, in lieu of archaeological and tribal monitors, SCE respectfully proposes the following alternatives in the hopes of better aligning MMs with the Project environment and the limitations of traditional monitoring.

1. Post-reef expansion dive with tribes to re-assess the Project area and compare with data obtained from the eighteen reconnaissance survey dives.
2. Document AB52 consultation process and present as professional paper to benefit future submerged projects.

Similar limitations exist with MM CR-1b (Unanticipated Cultural/Tribal Resources). Without visibly inspecting the seafloor, monitors cannot determine whether potentially significant archaeological resources are discovered during construction, or redirect work 100 feet from a discovery. SCE recommends the following:

1. Develop a Cultural Resources Management Plan (CRMP), which will include:
    a. Specific discussion on the identification of unanticipated discoveries in a submerged context
    b. Discussion of the successful tribal cultural resource consultation process for future submerged project consultation efforts
    c. How unanticipated tribal cultural resources are identified during project activities, when the Project area is not visible

11-25 Cont.

SCE appreciates the opportunity to discuss alternative MM language on this project. We look forward to crafting revised language and feels this unique project requires unique MMs tailored to the Project's marine environment. Please do not hesitate to contact Jenny McGee (Jenny.McGee@sce.com) or Adam Sriro (Adam.Sriro@sce.com) with any questions.

Adam Sriro, M.A., RPA
Manager, Archaeology Program
Environmental Services
Southern California Edison

Mrs. Sarah Mongano
WNR Cultural MMs
Page 3 of 3

CC: Jenny McGee
Ken Borngrebe

RESPONSE TO COMMENT SET 11: SOUTHERN CALIFORNIA EDISON

11-1 Responses to the specific comments and requests included elsewhere in the comment letter and Attachment A are included below.

11-2 Comment acknowledged.

11-3 CSLC staff notes the information included in Attachment B and considered that information when responding to comments included in SCE's letter.

11-4 See responses to specific comments below.

11-5 See Response to Comment 11-15 below.

11-6 See Response to Comment 11-20 below.

11-7 See Response to Comment 11-22 below.

11-8 The suggested edit has been made to Page ES-5 in the Final SEIR.

11-9 The suggested edit has been made to Section 2.0 in the Final SEIR; however, the correct percentage is 18% and not 20% based on the trip numbers provided.

11-10 The suggested edit has been made to Table 2-2 in the Final SEIR; however, the number of trips from Catalina have been reduced by 2 so that the total number of trips is consistent with the number analyzed in the SEIR. This edit was confirmed by discussions with SCE staff after this comment was received as reflecting the correct number of barge trips at the time of Final SEIR publication.

11-11 The referenced text has been revised as suggested to reflect the use of Dana Point Harbor for small craft (crew boats) as analyzed elsewhere in the SEIR.

11-12 The referenced mitigation measure MM BIO-2 has been revised to require a Risk Assessment by CSLC and pre-construction inspection of all Project vessels, as suggested by the comment and consistent with direction provided by CSLC staff.

11-13 The referenced text has been revised to reflect the incremental change over existing conditions, and the assumption that ballast water will not be discharged from vessels aside from the freshwater ballast in the derrick barge.

11-14 The referenced text has been removed from the Final SEIR for consistency with the introductory text of other mitigation measures in the SEIR.

11-15 The referenced text in MM BIO-3 has been removed. The preparers of the SEIR agree with the commenter that the construction activities do not have the potential to exceed Level B harassment thresholds, and that noise monitoring does not need to be included in the Marine Wildlife Monitoring Plan. Other reef construction projects (e.g., the Palos Verdes Reef Restoration Project, the existing Wheeler North Reef construction) did not require such monitoring in their mitigation plans.

11-16 The term “front-end loader” has replaced “track loader” “front-end track loader,” and “tracked loader” in the Final SEIR.

11-17 The requested change has been made to the Final SEIR, based on the potential lack of specified Tier 3 tugboats with the necessary capabilities.

11-18 See revised MM AQ-1b as included in the Final SEIR. Due to SCAQMD policies, the request to change MM AQ-1b to allow purchase of credits after construction could not be accommodated.

11-19 Appendix C in the Final SEIR has been revised to include the missing pages of calculations for air emissions.

11-20 Comment acknowledged. The suggested revisions to CR-1a were considered by CSLC staff and incorporated into the revised measure CR-1a in the Final SEIR. Additional requirements were included related to tribal monitor presence during Project activities.

11-21 Comment acknowledged. The suggested revisions to CR-1b were considered by CSLC staff and incorporated into the revised measure CR-1b in the Final SEIR. The revised MM CR-1b includes details on the required content of the Cultural Resources Management Plan that were not included in the comment.

11-22 Impact CR-3 has been retained as less than significant with mitigation, due to the potential for undiscovered paleontological resources to be exposed during disturbance of the seafloor.

11-23 APM-1 has been revised in the Final SEIR as suggested in the comment.

11-24 The information presented in this comment supported changes to the Final SEIR referenced in Response to Comment 11-17.

11-25 The information presented in this comment supported changes to the Final SEIR referenced in Responses to Comments 11-20 and 11-21.

The following five comments are taken from the transcripts from the December 5, 2018, public hearing on the Draft SEIR in the city of Dana Point.

COMMENT T1: PUBLIC – JEFF CRUMLEY

Oral comments submitted at Public Meeting on Wheeler North Reef Expansion Project Draft SEIR, December 5, 2018

MR. CRUMLEY: My name is Jeff Crumley. I'm a commercial sea urchin diver, locally here. I'm new at this, so please bear with me. My name is Jeff Crumley. I'm a commercial sea urchin diver.

I'm really disappointed that there weren't more people here. I expected the monitor divers to be here and the professors to be here, because I have some things to refer to, especially what happened at the last meeting in April. T1-1

The last meeting in April, there was something very disturbing happened. I didn't really catch it until after the meeting and put it together. What happened was -- I've got everything written out so I don't waste any time. Prior to the last meeting, I had an email thread with Jonna Engel, the Coastal Commission representative for this project. And in the email thread, I was expressing my concerns about using local knowledge on the project, and some of my concerns were the science of this project. In the email reply that Jonna gave me, she told me that the monitored divers, that they were, quote, "trained scientific divers. They know the reefs and they are the locals," with an exclamation point. So at the last meeting, Chris Goldblatt from Sustainable -- Globally Sustainable Fisheries, he asked Professor Schroeter if they found any abalone on the reef. And Professor Schroeter quickly replied, "Yes, they had." I asked, "What kind of abalone was it?" The professor didn't have an answer. He referred to his divers. They didn't have an answer. Now, if you found an abalone on the reef, that would be a real big thing. And professional observers would document it, would know what kind it was, and would be able to have a response. They didn't. Professor Schroeter then said, "Well, it was probably a red." Well, so much for local knowledge. We don't have reds here. We have four kinds of abalone here. Red is not one of them. T1-2

Also, that brings me to the point, in the EIR, you guys have a section on white abalone. And the data on white abalone is flawed. This is white abalone. I found this shell three years ago diving off Bob's boat. It sat on the kelp bed in 50 feet of water. The EIR says that they only live in Santa Barbara and they live deep in 200 feet of water. That's incorrect. In fact, there is a man sitting right here that used to harvest white abalone at San Onofre and San Mateo in 50 feet of water. So that information is flawed. Also, this shell right here, you can tell --when you pick an abalone shell up off the bottom of the sea floor, you can tell how long it has been dead very easily, because there is a gloss inside of the shell. When the abalone dies, that gloss goes away really quick, gets pitted, turns foggy. This shell is fresh. This shell is probably only dead a week or two before I found it. T1-3

The mortality of the shell is very significant. There is a couple holes in here that indicate the cause of mortality, which is probably from a moon snail. Moon snails are a great big predator that live around here. And they were discovered by Meriwether Lewis in the Columbia River north of the Oregon/Washington border. This is a moon snail. They are a big snail. It's a predator. They have a little nose that comes out with a drill bit on the end of it and they drill holes through the shells and eat them. There is no mention of this in the EIR report, although there is mention of other mollusks in the EIR report. Inconclusive. Incomplete information. Okay. T1-3 cont.

–In the EIR, there are several things about the sea urchin fishery. Virtually all of the sea urchin data is flawed. Okay. The value of the sea urchin fishery is flawed, the block numbers that show the value of the sea urchin fishery have incorrect data in them from Fish and Game. And I've been trying to get that corrected with this process at Fish and Game. The overview of the sea urchin fishery that's printed out in the EIR is inaccurate. I think I recognize it because it looks like something that was in one of Professor Schroeter's papers that he wrote about 20 years ago. Talks about how the value of the urchin fishery is high in the winter. It's not that way anymore because of the Chinese New Year. Now we get paid on quality and most of our product stays local in the United States. And so we get paid on quality. And during the spawning time of the urchins is around June and July and that's when I get my highest price. So the information on the overview of the urchin fishery is incorrect. T1-4

Then I will get to the purpose of the mitigation of this reef in the first place. When this reef was first sold -- and the oldest article that I can find is from 2008. The reef was sold to the public as a mitigation reef necessary for the effects created by SONGS. 163 or something acres was affected and covered with sand in the prime urchin area. That was one of the selling points for the reef. Well, when they built Wheeler North Reef, they took the design from Jake Patton, who designed it to be on hard bottom, and they put it in the mud. That is not sand over hard bottom. It is mud. It is silt. This prevents a lot of production from what they're trying to achieve, prevents it from happening so the design – the placement of the design is very poor. Very poor. So the selling point: They designed the reef to have no urchins on it. Urchins are undesirable. So how can you mitigate sea urchin fishery and then say urchins are undesirable and not have them on the reef? In the process -- there is a process that happens when you build a reef -- and Chris Goldblatt is not here today. I wish he could help explain it. When you build an artificial reef, there is a process called accretion where the inside kind of creates a lagoon and the inside changes and gets sanded in. And this process appears to be happening down here. And it has ruined natural existing reefs that were very productive to Bob and I down there. We harvest about $10,000 a year off those reefs. And they're gone. They're covered with sand. And there is another reef that's covered. And then the inshore where all the pink coralline algae is in front of Nixon's house, that's all covered with sand now too. And I believe it is from accretion. T1-5

The EIR responded to some of my questions inaccurately. My questions were represented inaccurately. I'll do a better job in my report coming up. But what was I just saying? I forgot what I was saying. Anyway, that's about all I have to say right at the moment. I will be doing a full report to turn it in. I hope everybody can read it before anything goes on. T1-6

I want this project stopped. I'm requesting an oversight. I want to know who has oversight of the Coastal Commission, the State Lands Commission, Edison, everybody. I want to know who has oversight on this project because I'm requesting an investigation on a whole lot of things. T1-7

I believe that -- and my final statement here, does the means justify the end? There is a lot of things in this project that I've uncovered that are very wrong. The history and actions of this project are an indictment. There is either chicanery, coercion, taxation without representation, contempt for the Coastal Act, perjury, or the people running this project are inept. T1-8

RESPONSE TO COMMENT T1: PUBLIC – JEFF CRUMLEY

T1-1 Comment acknowledged.

T1-2 Abalone have been observed on Wheeler North Reef (Huang 2018). The species observed to date are green abalone (*Haliotis fulgens*), pinto abalone (*Haliotis kamtschatkana*), and red abalone (*Haliotis rufescens*). None of these species are listed under the federal or State Endangered Species Acts. The commenter's collection of an abalone shell is noted but does not demonstrate that white abalone are present on Wheeler North Reef or other nearby reefs.

T1-3 The information contained in the Draft SEIR regarding white abalone was not incorrect, as the species does usually occur at greater depths and most commonly at offshore reefs; however, it presented an incomplete description of the species habitat and range. The SEIR description of white abalone has been revised to include a more complete description of their habitat and range, including recent discoveries off mainland San Diego County and Los Angeles County that were included in the most recent Five-Year Review prepared by NMFS (2018m). Information regarding moon snail occurrence in the Project vicinity has also been added to the SEIR. Please note, however, that the SEIR description of existing setting is not meant to be an exhaustive description of the marine environment; instead, it is intended to provide the context for understanding the potential impacts of the proposed Project. The invertebrate species described in the SEIR were the most abundant species observed at San Mateo Kelp Reef and Wheeler North Reef.

T1-4 See Response to Comment 1-1 regarding catch data analyzed in the SEIR. CSLC staff appreciates the clarification related to the timing when sea urchin harvest is highest. This information has been added to the Final SEIR in Section 8.3.

T1-5 The existing Wheeler North Reef was placed on a similar substrate to the proposed Project area, which is a thin layer of soft bottom sediments overlying rocky substrate. The existing Wheeler North Reef has been successful in meeting most performance standards of the CDP, including extensive kelp growth. This performance suggests that the design and placement on that substrate are not fundamentally flawed. Regarding accretion behind the reef, see Response to Comment 11-2.

T1-6 Comment acknowledged. Responses to the commenter's subsequent letter are included in Comment Set 11.

T1-7 The Project falls under the jurisdiction of several agencies, but primary oversight is by California Coastal Commission.

T1-8 Comment acknowledged.

COMMENT T2: PUBLIC – KEN NIELSEN

Oral comments submitted at Public Meeting on Wheeler North Reef Expansion Project Draft SEIR, December 5, 2018

MR. NIELSEN: Hello. My name is Ken Nielsen. I'm a 71-year resident in San Clemente. I worked on the Unit 1 for San Onofre before it was Unit 1. I helped them do some mechanics there when they tried to decide where they were going to put the pipeline. I have been involved in San Onofre forever. I've been involved with San Onofre forever. I've worked for a lot of different consulting companies. I have a boat. And I take scientists out to do whatever they want to do. I worked for even Lockheed who used to do monitoring there. That's been the most steady area that I've ever known. T2-1

Anyway, going on further, I haven't missed a meeting for this kelp reef since they started meeting number one. I asked them, "Is there any way we can put some high relief rock on the outer edge of the reef for fish?" They go, "Oh, no. This is a kelp reef. We have to put low relief on rock that supports kelp. You cannot do anything for fish." Well, now we've got no standing stock for the fish. They can't meet the standing stock. So what are they going to do? They are going to build another low-relief reef, just like the other reef that failed for the fish. T2-2

Didn't fail for the kelp. Kelp is doing great there. There is nothing wrong with the kelp. When God wants the kelp to go away, it will go away. When he wants the kelp to come back, it will come back. That's the way it always is around here. I've seen the kelp come and go four times in my lifetime locally, four different times, gone and back so thick you're cussing at it because you can't drive your boat through it. We don't need any more kelp reef to support this kelp for this project. I think we need more high relief.

Right now there is a reef being proposed by NOAA. It's for the Montrose settlements. And it consists of high relief, low relief, middle relief and, to my surprise, Schroeter is on the scientific review board, but he's never mentioned any of this high relief stuff and the need for fish. And I think that's kind of ridiculous. I think they do need some high relief for fishing.

T2-2 cont.

The MLPAs have caused a huge problem for fishing areas because now everybody has to fish there. And there is no high relief. This is where the fish live. And we need high relief, period. There is nothing else to it. We don't need more low relief.

I know high relief is more expensive to build than low relief. We don't even need to build a new reef at all. We can do it outside the existing reef. If we put high relief areas along the reef that's already built, we can have areas that would support more fish, and boats that fish it could anchor in the sand and hang back to the area of the fish and they wouldn't be ripping the kelp out. I think that would be a big help for the kelp situation. Now, I think you get the gist of what I'm saying about high relief.

Another thing that really peeves me. How long did we study this? Eight years now? Is that correct? Isn't it eight years?

T2-3

AUDIENCE MEMBER: Seven.

MR. NIELSEN: No. The monitoring. I think we've monitored it for eight years. It cost close to $2 million a year to do the monitoring. And we haven't met one single thing that gives us credit. We have to get everything correct for 30 years before they quit doing the monitoring. It's costing a fortune for this monitoring. We have some professors that are running it and a bunch of college students doing the work. I'm not saying the college students don't do the work. I think they do their best. But they cost a fortune to do that. Why don't we take ten years off of the monitoring, give it a chance to come back. Maybe put some high relief on the outer edge of the existing reef and then come back ten years later and take a look at it. That's a lot of money that we could use for something good, not to study and count black-eyed gobies. That's a fish that's about that long. That does nothing for kelp. That's the main fish they find are black-eyed gobies. They don't count the fish up in the reef – up in the kelp where the fish live. They only go along one meter high. And they don't get the fish that are there. There is tons of fish on that reef. And I don't know. I think the whole plan is bogus. And we should cancel the monitoring for ten years and then come back and take a look and see what's going on. There ought to be no kelp there.

T2-3 cont.

Right now in North County San Diego, the kelp is gone. There is no kelp starting up until you get to La Jolla. Will it come back? Sure, it will come back. It will be so thick, you'll hate it. That's the way kelp is. Comes and goes. Whatever God wants. Anyway, let's think about that a lot. I know State Lands cares. They don't want to do something stupid. Thank you. T2-4

RESPONSE TO COMMENT T2: PUBLIC – KEN NIELSEN

T2-1 Comment acknowledged.

T2-2 See the rationale for eliminating the Compound Reef at San Clemente (Section 5.3.4.2 in the SEIR).

T2-3 See Response to Comment 7-5.

T2-4 Comment acknowledged.

COMMENT T3: PUBLIC – ROBERT MORAN

Oral comments submitted at Public Meeting on Wheeler North Reef Expansion Project Draft SEIR, December 5, 2018

MR. MORAN: Sure. I'm new at this right now, so excuse me. But all of a sudden -- hi. My name is Robert Moran. I'm a commercial sea urchin diver in the area. T3-1

The reality is, is what is this all about anyway? What are the long-term goals? You know, as a commercial fisherman in the area that I love so much and throughout the California coast, we, as fishermen, have lost at least 20 to 30 percent of our fishing locations due to MPAs. And, you know, we're fishermen. We're very concerned about the longevity of the fishery and whatnot, but at the same time, when you put so much pressure on limited areas, obviously it's going to be overfished. So I really don't think that the MPAs are really working, how that the view was anticipated. T3-2

But now what I see is new reef. What are the old long-term goals? Do they really want to plant this, put a lot of money into it, and then all of a sudden call it their marine reserve and actually close that area down too? Is that kind of -- why are we doing this? Like Ken said. T3-3

How about up in Laguna when they had all the people up there planting the kelp and they – for months, as El Nino came through, even the new fledgling kelp didn't take. It was nature that allowed it with the help of warming of the water, the cold of the water. And like Ken said, it's just a cyclical system that there is nothing that we can prevent or plan just based on the environment. So I don't know. I think that you just throw money at something that you really can't fix. And so I just -- hopefully this won't resort into losing one of our T3-4 most precious resources. This area has been so vital to my lifestyle and just being able to go down there. And there is plenty of kelp. Right now, though, there is no kelp. Nature. T3-4 cont.

Anyway, thank you.

RESPONSE TO COMMENT T3: PUBLIC – ROBERT MORAN

T3-1 Comment acknowledged.

T3-2 Comment acknowledged. The Project does not involve any changes to Marine Protected Areas.

T3-3 The Project does not include any designation as a marine reserve.

T3-4 Comment acknowledged.

COMMENT T4: PUBLIC – FRANK BANDA

Oral comments submitted at Public Meeting on Wheeler North Reef Expansion Project Draft SEIR, December 5, 2018

Thank you. My name is Frank Banda. I'm hearing this and -- I'm from San Juan Capistrano. You know, I was shocked at -- you know, all this is happening and along with the divers. You know, this is their life. And our ancestors are out here, I assume, and I'm just really disturbed that this is not making anything better. It's making it worse. So I just had to speak this out, because it hurts me to see this. You have guys that have been here -- this is their job. And to see this happening, you know, it's just really devastating to hear that this is not going nowhere. And I just wanted to comment on that. I'm not really here to bag this project. I think if it would be working, yeah, but it's not working. So I just want to mention that. T4-1

RESPONSE TO COMMENT T4: PUBLIC – FRANK BANDA

T4-1 Comment acknowledged.

COMMENT T5: PUBLIC – JIM DAHL

Hi. My name is Jim Dahl, former mayor of San Clemente, fisherman, and surfer. And over the years, you know, this experimental reef has come to be. I've watched it developing right out in front of my front window of my house. And I just don't understand why you're going to repeat the same thing over again. It just doesn't make any sense. T5-1

Seeing this Wheeler North Reef as it is right now hasn't met a standard -- doubling in size, still meets -- doesn't meet any greater standard. Doesn't make any sense. T5-2

Also, the rate payers. The poor folks that pay their electric bill every month, whether it is SDG&E or Southern California Edison. They're going to be paying for the research on this for the next 30 years. It makes no sense whatsoever. T5-3

Also, I was on the MLPA stakeholders group and that was a ramrod situation paid for by Mrs. Packard and the rest of her friends. I have a feeling that's exactly what's going to happen here, that just the researchers are getting all the money. It will go to the colleges. It won't go to the private industry that actually pays bills and makes a living for its workers, just whether you're a diver or a research company purveyor or whatever. T5-4

So I just think it is a waste of time and money. Let's just keep it where it is. In fact, you might want to just improve the one you have right now, just give it a little high relief so we can all benefit from it. Thank you. T5-5

RESPONSE TO COMMENT T5: PUBLIC – JIM DAHL

T5-1 Comment acknowledged.

T5-2 Comment acknowledged. See Responses to Comments 2-4 and 10-8 regarding the design of the Project reef.

T5-3 Comment acknowledged.

T5-4 Comment acknowledged.

T5-5 Comment acknowledged. See Response to Comment 10-11 regarding high relief and compound relief reef designs.

California State Lands Commission

PART III – REVISIONS TO DRAFT SEIR

Final Subsequent Environmental Impact Report for the Wheeler North Reef Expansion Project, January 2019

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BACKGROUND AND PROJECT LOCATION

Southern California Edison (SCE or Applicant) has applied to the California State Lands Commission (CSLC or Commission) for a lease to expand the existing Wheeler North Reef (hereinafter Wheeler North Reef Expansion Project [Project]). **The reef expansion is required by the California Coastal Commission (CCC) pursuant to Coastal Development Permit (CDP) No. 6-81-370-A**. The Commission, as lead agency under the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.) and State CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.), prepared this Subsequent Environmental Impact Report (EIR) to analyze the Project's potential significant impacts.

In 1999, the Commission certified a Program EIR and issued Lease No. PRC 8097, a General Lease – Non-Income Producing, to SCE to build and maintain the original reef as mitigation for the loss of kelp forest resources resulting from once-through cooling at San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (Item 72 and Item 73, June 14, 1999). The reef, which was constructed in two phases in 1999 and 2008 (Phase 1, Experimental Reef, and Phase 2, Mitigation Reef), is located in water depths of about 38 to 49 feet, approximately 0.6 mile offshore of the city of San Clemente (City), Orange County (Figure ES-1). The San Clemente City Pier lies adjacent to the north end of the reef, and San Mateo Point is about 2.5 miles to the south. City and state beaches adjacent to the reef include Pier, T-Street, Lasuen, Riviera, Calafia (State Park), and San Clemente State Beaches, while Doheny State Beach and Dana Point Harbor are north of the Project site.

PROJECT DESCRIPTION

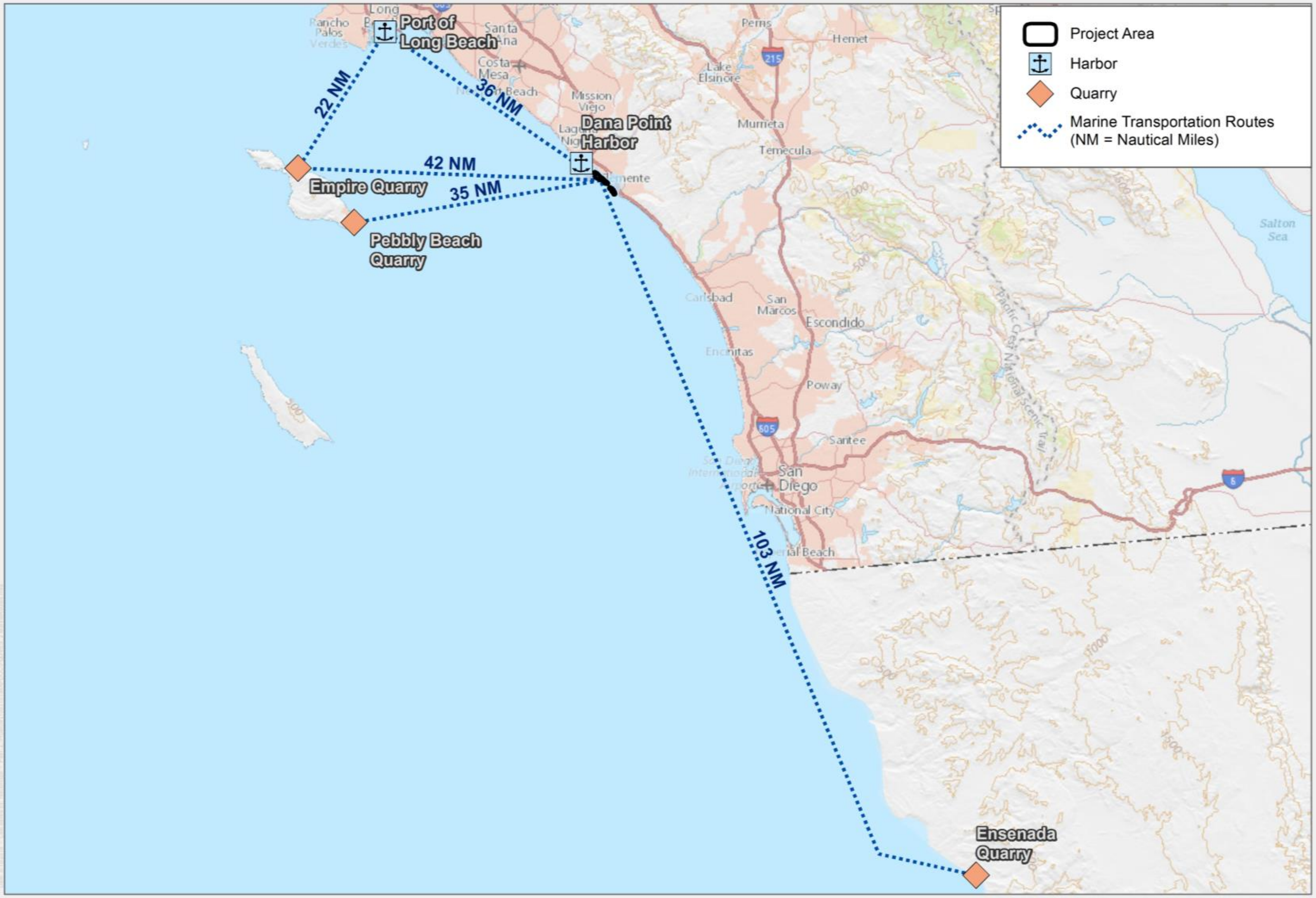
The proposed Project would expand the existing 174.4-acre Wheeler North Reef and create up to 210.6 additional acres of kelp reef by placing up to 175,000 tons of quarried rock in a low-relief fashion in 23 new subsea polygon areas adjacent to the existing Wheeler North Reef. As proposed, reef expansion would begin in mid-May 2019 (after the lobster season) and continue through to September 30, 2019. Rock would be obtained from existing quarries on Santa Catalina Island and, if needed, in Ensenada, Mexico (Figure ES-2). These quarries would also serve as the rock stockpile location prior to and during construction.

The Project includes the transport from the quarries to the Project site of approximately 4,000 tons of quarry rock per trip using one or two barges towed by a tugboat, and the transport of empty supply barges back to the quarries for additional rock. A temporary construction footprint would surround the 210-acre reef expansion area to allow for anchoring of the barges. Rock would be placed on the seafloor in the Project area using a front-end ~~track~~ loader on the supply barge (Figure ES-3).

SOURCE: Bing Maps 2018

DUDEK 0 2,500 5,000 Feet

FIGURE ES-1
Project Location
Wheeler North Reef SEIR



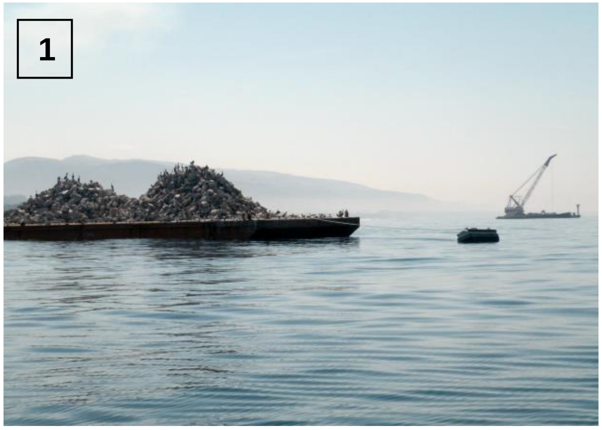
SOURCE: USGS National Map 2017

DUDEK 0 10 20 Miles

FIGURE ES-2
Marine Transportation Routes
Wheeler North Reef SEIR

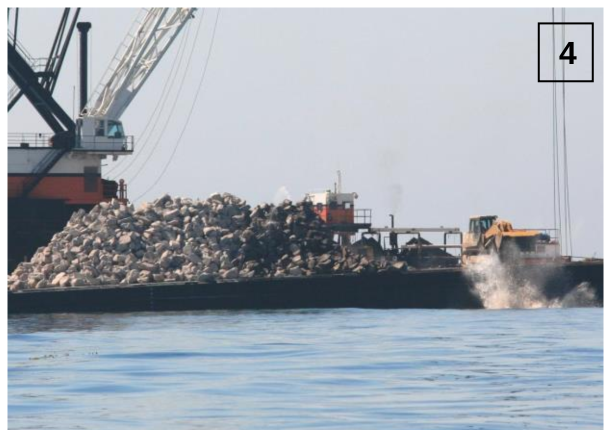
Figure ES-3. Proposed Reef Construction Summary

Quarry rock would be transported by supply barge to the Project site. An extra supply barge would be anchored nearby to be swapped over when the first supply barge is emptied.



A Global Positioning System (GPS)-positioned derrick barge secured at a six-point anchorage would remain at the Project site throughout the construction season. It would be periodically re-anchored using differential GPS.*

Supply barges would be tied to the derrick barge when rock is being placed. The derrick crane located on the derrick barge would lift the front-end loader onto the supply barge.



The front-end loader would push quarry rock off the supply barge to achieve the desired kelp reef coverage adjacent to the existing Wheeler North Reef.

* The Positional accuracy of the differential GPS system is estimated at 1 to 2 feet with the barge operator able to hold position to within a tolerance of 6 feet.

SUMMARY OF PROJECT OBJECTIVES, PURPOSE, AND NEED

Under CCC CDP No. 6-81-370-A, SCE would receive mitigation credit if it met several performance standards established to measure the success of the Wheeler North Reef for a period equal to the operating life of SONGS. The performance standards required in the CCC CDP No. 6-81-370-A are:

1. The mitigation reef shall be constructed of rock, concrete, or a combination of these materials.
2. The total area of the mitigation reef (including the experimental reef modules) shall be no less than 150 acres.

3. At least 42 percent, but no more than 86 percent, of the mitigation reef area shall be covered by exposed hard substrate.
4. At least 90 percent of the exposed hard substrate must remain available for attachment by reef biota.
5. The artificial reef(s) shall sustain 150 acres of medium- to high-density giant kelp.
6. The standing stock of fish at the mitigation reef shall be at least 28 tons.
7. The resident fish assemblage shall have a total density and number of species similar to natural reefs within the region.
8. Fish reproductive rates shall be similar to natural reefs within the region.
9. The total density and number of species of young-of-year fish shall be similar to natural reefs within the region.
10. Fish production shall be similar to natural reefs within the region.
11. The benthic community (both algae and macroinvertebrates) shall have coverage or density and number of species similar to natural reefs within the region.
12. The benthic community shall provide food-chain support for fish similar to natural reefs within the region.
13. The important functions of the reef shall not be impaired by undesirable or invasive benthic species (e.g., sea urchins or *Cryptoarachnidium*).

To assess Wheeler North Reef's performance, a team of independent scientists conducted annual monitoring of the physical and biological attributes of the reef (and, for reference, the nearby San Mateo Kelp Bed and Barn Kelp Bed) since the Phase 2 build-out of the reef in 2008. The performance standards listed above were divided into absolute standards, or standards that are measured against a fixed value at Wheeler North Reef only (i.e., 150 acres of giant kelp, 28 tons of fish biomass) and relative standards, or standards that must be similar to the reference reefs (i.e., fish reproductive rates shall be similar to natural reefs in the region). Although ~~T~~the Wheeler North Reef meets multiple performance standards, the reef has not met both the absolute and the relative performance standard~~s~~ that requires a standing fish stock of 28 tons in any of the years it has been monitored (2009 to present) ~~in any year~~; therefore, SCE has not yet received any mitigation credit for the reef (Table ES-1). Analyses of monitoring data collected from the Wheeler North Reef show that additional reef acreage is needed for the Wheeler North Reef to meet all of the performance standards.

SCE proposes to supplement the existing reef to meet the following Project objectives:

- Consistently support a fish standing stock of 28 tons to comply with the absolute standard
- Ensure that the mitigation reef can continue to meet all other absolute and relative CDP conditions even during years of unfavorable oceanic conditions

Table ES-1. Summary of Wheeler North Reef Mitigation Compliance

	2009	2010	2011	2012	2013	2014	2015	2016
Mitigation Credit?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
All Relative Standards	✓	✓	✓	✓	✓	✓	✓	✓
Hard Substrate	✓	✓	✓	✓	✓	✓	✓	✓
Giant Kelp Area	○	✓	✓	✓	✓	✓	✓	○
Fish Standing Stock	○	○	○	○	○	○	○	○
Invasive and Undesirable Species	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Permit standard met; ○ = Permit Standard not met

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This Subsequent EIR identifies potential significant impacts of the Project on the following environmental issue areas:

- Biological Resources (Marine)
- Aesthetics
- Air Quality
- Cultural and Paleontological Resources
- Cultural Resources – Tribal
- Geology and Coastal Processes
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Mineral Resources
- Noise
- Ocean Water Quality
- Public Services
- Recreation
- Transportation (Marine)

Impacts within each affected environmental issue area are analyzed in relation to pertinent significance criteria. Impacts are classified as one of five categories.

Significant and Unavoidable	A substantial or potentially substantial adverse change from the environmental baseline that meets or exceeds significance criteria, where either no feasible mitigation can be implemented or the impact remains significant after implementation of mitigation measures.
Less than Significant with Mitigation	A substantial or potentially substantial adverse change from the environmental baseline that can be avoided or reduced to below applicable significance thresholds.
Less than Significant	An adverse impact that does not meet or exceed the significance criteria of a particular resource area and, therefore, does not require mitigation.
Beneficial	An impact that would result an improvement to the physical environment relative to baseline conditions.
No Impact	A change associated with the Project that would not result in an impact to the physical environment relative to baseline conditions.

Potential significant environmental impacts anticipated during Project implementation are discussed in Section 4.0, *Environmental Impact Analysis*. With the implementation of Applicant-Proposed Measures (APMs) and mitigation measures (MMs) identified in this Subsequent EIR (see Tables ES-3 and ES-4 at the end of this Executive Summary and

Section 7.0, *Mitigation Monitoring Program*), the Project would have no significant impacts that cannot be avoided. The CSLC staff or CSLC-contracted monitors will monitor all MMs and APMs during implementation of the Mitigation Monitoring Program.

SUMMARY OF ALTERNATIVES TO THE PROPOSED PROJECT

CEQA requires identification and evaluation in an EIR of a reasonable range of alternatives to a proposed project plus a "no project" alternative to allow decision makers to compare the impacts of approving the project with the impacts of not approving the project. Pursuant to State CEQA Guidelines section 15126.6, subdivision (a), an EIR need only consider a range of feasible alternatives that will foster informed decision making and public participation; therefore, while an EIR need not consider every conceivable alternative, an EIR must include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. The range of potential alternatives that must be and are considered in this Subsequent EIR is limited to those that would feasibly attain most of the Project objectives while avoiding or substantially reducing any of the significant effects of the Project. Alternatives that were considered but rejected are identified and accompanied by brief, fact-based explanations of the reasons for rejection. Among the factors that may have been used to eliminate alternatives from detailed consideration, as permitted by CEQA, are: (1) a failure to meet most of the proposed Project objectives; (2) infeasibility; or (3) inability to avoid significant impacts (State CEQA Guidelines § 15126.6, subd. (c)). Alternatives carried forward for analysis in this Subsequent EIR are summarized below and in Tables ES-2 and ES-4.

- **No Project Alternative.** The Applicant's request for an amendment of the CSLC lease would not be approved, and the reef would not be expanded.
- **Low-Relief, Low-Coverage, Less Northward Expansion Reef.** This alternative places approximately 150,000 tons of quarry rock in nine subsea polygon areas over 200 acres. Compared to the proposed Project, the expansion would extend only 1.9 miles northwest of the existing reef, thus reducing the amount of reef face exposed to the ocean. Decreasing the perimeter-to-area ratio could decrease the fish biomass per unit of placed rock compared to the proposed Project (Wilson et al. 1990).
- **Low-Relief, Medium-Coverage Reef.** This alternative places approximately 225,000 tons of quarry rock within 15 subsea polygon areas over 125 acres. Compared to the proposed Project, a greater density of substrate would be covered by rock and approximately 12 additional barge trips would be required to complete the reef expansion.
- **Low-Relief, High-Coverage Reef.** This alternative places approximately 288,750 tons of quarry rock within 37 subsea polygon areas over 105 acres. Compared to the proposed Project, this design would require almost 93 percent more rock, and would use smaller polygons to increase the perimeter-to-area ratio and potentially

fish biomass per unit of placed rock (Wilson et al. 1990); however, the perimeters would be less available to fish, as each perimeter area would be near another perimeter. The analysis assumes that most of the additional rock would be obtained from a quarry in Ensenada, Mexico (not enough rock would be available at Santa Catalina).

- **Two-Season Construction.** If not enough rock can be obtained in 2019, the Project would be completed in two construction periods (2019 to 2020) using the same reef design, construction methods, staffing, and construction times (mid-May [after the lobster season] through September 30) as the proposed Project. This analysis assumes that all 44 barge trips would be to and from the Santa Catalina Island quarries (i.e., no trips to or from Mexico).
- **Two-Season Construction 2019–2020 Period Alternative** - In the event that the entire reef cannot be constructed in 2019, SCE would propose to construct the Project over two construction seasons. Because more time would be available to stockpile quarry rock, it is possible that all of the quarry rock could be sourced from the Catalina quarries; however, this analysis assumes that up to 6 trips to and from the Mexican quarry would be required, and the remaining 38 trips would be to and from the Catalina quarries. Construction would be expected to begin in mid-May 2019 and continue until no later than September 30, 2019, then construction would begin again in mid-May 2020 and continue no later than September 30, 2020. The reef design, construction methods, and staffing under this alternative would be the same as described for the Project.

Table ES-2. Summary of Project and Alternatives

	Estimated Acres	Tons Rock Used	# Subsea Polygons	% Substrate Coverage	Construction Date(s)
Proposed Project	210.6	175,000	23	42	2019
No Project Alternative	0	0	0	0	N/A
Low-Relief, Low-Coverage, Less Northward Expansion	200	150,000	9	42	2019
Low-Relief, Medium-Coverage	125	225,000	15	63	2019
Low-Relief, High-Coverage	105	288,750	37	81	2019
Two-Season Construction	210.6	175,000	23	42	2019–2020

ALTERNATIVES NOT CONSIDERED FOR FULL EVALUATION

Alternatives considered in the 1999 Program EIR were reconsidered as alternatives to the proposed Project and were modified to account for the presence of the existing reef and the Project objectives. These alternatives, however, were again eliminated from consideration in this Subsequent EIR because they were outside of the scope of this

Subsequent EIR, or were determined to be infeasible, did not clearly offer the potential to reduce significant environmental impacts, or did not achieve most of the Project objectives (refer to Section 5.3, *Alternatives Eliminated from Further Consideration*, for explanation). These alternatives include:

- Combination of Reef at Multiple Locations
- Northern San Clemente Site
- Farther Offshore from Existing Wheeler North Reef
- Compound Reef at San Clemente
- Compound Reefs at Multiple Locations
- Compound Reefs at Big Sycamore Canyon or Pitas Point
- Kelp Planting

COMPARISON OF PROPOSED PROJECT AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

State CEQA Guidelines section 15126.6, subdivision (e)(2) states, in part, that an EIR shall identify an environmentally superior alternative among the other alternatives "if the environmentally superior alternative is the 'No Project' alternative." Table ES-4 compares the proposed Project impacts with those of the alternatives. Based on the analysis contained within the Subsequent EIR, the Commission has determined that the proposed Project, not the No Project Alternative, is the environmentally superior alternative, because under the No Project Alternative, the existing Wheeler North Reef would not be expanded and would likely continue to be out of compliance with the CCC's CDP requirements to mitigate for impacts associated with the operation of SONGS Units 2 and 3 (see Section 6.5, *Comparison of Proposed Action and Alternatives and Environmentally Superior Alternative*).

KNOWN AREAS OF CONTROVERSY OR UNRESOLVED ISSUES

Pursuant to State CEQA Guidelines section 15123, the EIR shall identify "areas of controversy known to the lead agency including issues raised by agencies and the public." During public scoping, concern was expressed about Project changes to waves, increase in kelp wrack on local beaches, effects of the reef on fishing opportunities on existing rocky reefs, and the effectiveness of the Project in increasing the standing fish stock. See Appendix A, *Public Scoping Documents*, for the Notice of Preparation (NOP), copies of the NOP comment letters, and transcripts from the public meeting.

ORGANIZATION OF SUBSEQUENT EIR

The Subsequent EIR is presented in nine sections:

- **Section 1.0 – Introduction** provides background on the Project, previous related environmental review, and the CEQA process.

- **Section 2.0** – **Project Description** describes the Project, its location, construction activities, monitoring, and schedule.
- **Section 3.0 – Cumulative Projects** identifies the projects that are analyzed for potential cumulative effects and the Subsequent EIR's approach to cumulative impact analysis.
- **Section 4.0 – Environmental Impact Analysis** describes existing environmental conditions, impacts of the Project, mitigation measures, and evaluates cumulative impacts.
- **Section 5.0 – Project Alternatives Analysis** describes the alternatives screening methodology, alternatives screened from full evaluation, and alternatives carried forward for analysis, and analyzes impacts of each alternative carried forward.
- **Section 6.0 – Other Required CEQA Sections and Environmentally Superior Alternative** addresses other required CEQA elements, including significant and irreversible environmental and growth-inducing impacts, comparison of the Project and alternatives, and identification of the environmentally superior alternative.
- **Section 7.0 – Mitigation Monitoring Program** describes the monitoring authority, enforcement and mitigation compliance responsibilities, and general monitoring procedures, and presents the mitigation monitoring table.
- **Section 8.0 – Other Commission Considerations** presents information relevant to the Commission's consideration of SCE's lease application that are in addition to the environmental review required pursuant to CEQA. These include: (1) climate change and sea-level rise considerations; (2) commercial fishing (socioeconomics); (3) environmental justice; and (4) state tide and submerged lands identified as possessing significant environmental values within the Commission's Significant Lands Inventory. Other considerations may also be addressed in the staff report presented at the time of the Commission's consideration of the lease application.
- **Section 9.0 – Report Preparation Sources and References** lists the persons involved in preparation of the Subsequent EIR and the reference materials used.

The Subsequent EIR also contains the following appendices:

- **Appendix A** – Public Scoping Documents (Index to Where Each NOP Comment is Addressed in the Subsequent EIR, Public Scoping Comments, Hearing Transcripts, and NOP)
- **Appendix B** – *2018 Monitoring Plan for the SONGS' Reef Mitigation Project*
- **Appendix C** – Air Quality Supplementary Information
- **Appendix D** – Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Wheeler North Reef Expansion Project

- **Appendix E** – *Final Program Environmental Impact Report for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California*
- **Appendix F** – Kelp Wrack Monitoring for Existing Wheeler North Reef
- **Appendix G** – Cultural Resources Records
- **Appendix H** – Draft Subsequent EIR Distribution List

Table ES-3. Impact and Mitigation Summary (Proposed Project)

Impact	Impact Class[1]	Applicant-Proposed Measures/Recommended MMs
BIOLOGICAL RESOURCES (MARINE)		
BIO-1: Existing Giant Kelp Habitat Quality	LTS	None recommended
BIO-2: Introduction or Enhancement of Non-Native Species	LTSM	**MM BIO-2:** Prevent Import of Non-Native Species
BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction	LTSM	**MM BIO-3:** Marine Wildlife Monitoring Plan
BIO-4: Accidental Spills or Vessel Grounding May Result in Habitat Degradation or Species Mortality	LTSM	**MM BIO-4:** Spill and Grounding Contingency Plan
BIO-5: Monitoring Activities	NI	None recommended
BIO-6: Adverse Effects to Soft Sediment Habitat and Managed Fish Species	LTS	**APM-1:** Anchoring Plan
AESTHETICS		
AES-1: Affect a Scenic Vista	LTS	None recommended
AES-2: Damage Scenic Resources	NI	
AES-3: Degrade Visual Character or Quality of Site and its Surroundings	LTS	
AES-4: Create Light or Glare	LTS	
AIR QUALITY		
AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan	LTSM	**MM AQ-1a:** Nitrogen Oxides (NO_X) Emission Reduction **MM AQ-1b:** Nitrogen Oxides (NO_X) Emission Offset Credits
AQ-2: Violation of Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation	LTSM	
AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for Which the Project Region is Nonattainment	LTSM	
AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentrations	LTS	None recommended
AQ-5: Create Objectionable Odors Affecting a Substantial Number of People	LTS	None recommended

Table ES-3. Impact and Mitigation Summary (Proposed Project)

Impact	Impact Class[1]	Applicant-Proposed Measures/Recommended MMs
CULTURAL AND PALEONTOLOGICAL RESOURCES		
CUL-1: Cause a Substantial Adverse Change in the Significance of an Archaeological or Historical Resource	LTSM	**MM CR-1a:** Archaeological and Tribal Monitoring **MM CR-1b:** Unanticipated Cultural/Tribal Resources
CUL-2: Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature	LTSM	**MM CR-2:** Unanticipated Paleontological Resources
CUL-3: Disturb any Human Remains, Including those Interred Outside of Dedicated Cemeteries	LTSM	**MM CR-3:** Appropriate Treatment of Human Remains
CULTURAL RESOURCES—TRIBAL		
TCR-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource	LTSM	**MM CR-1a:** Archaeological and Tribal Monitoring **MM CR-1b:** Unanticipated Cultural/Tribal Resources **MM CR-3:** Appropriate Treatment of Human Remains
GEOLOGY AND COASTAL PROCESSES		
GEO-1: Substantial Increase or Decrease in Rates of Beach Erosion	LTS	None recommended
GEO-2: Substantial Change in Surf Characteristics	LTS	
GEO-3: Substantially Inhibit Natural Coastal Processes	LTS	
GREENHOUSE GAS EMISSIONS		
GHG-1: Generate GHG Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment	LTS	None recommended
GHG-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing GHG Emissions	LTS	
HAZARDS AND HAZARDOUS MATERIALS		
HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials	LTSM	**MM HAZ-1a:** Spill Prevention and Response Plan

Table ES-3. Impact and Mitigation Summary (Proposed Project)

Impact	Impact Class[1]	Applicant-Proposed Measures/Recommended MMs
HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment	LTSM	**MM HAZ-1b:** Prepare for Inclement Weather Condition
MINERAL RESOURCES		
MIN-1: Availability of Oil, Gas, or Geothermal Resources	NI	None recommended
MIN-2: Availability of a Local Sand, Gravel, or Concrete Aggregate Mineral Resource Recovery Site	NI	
MIN-3: Availability of Local and Regional Construction Rock Resources	LTS	
NOISE		
NOI-1: Expose Persons to or Generation of Noise Levels in Excess of Standards	LTS	None recommended
NOI-2: Expose Persons to or Generation of Excessive Groundborne Vibration or Noise Levels	LTS	
NOI-3: Substantial Permanent, Temporary, or Periodic Increase in Ambient Noise Levels	LTS	
OCEAN WATER QUALITY		
OWQ-1: Impair Marine Water Quality	LTSM	**MM OWQ-1:** Compliance with Vessel General Permit **MM HAZ-1a:** Spill Prevention and Response Plan
OWQ-2: Discharge of Pollutants into an “Impaired” Waterbody under Clean Water Act Section 303(d)	NI	None recommended
PUBLIC SERVICES		
PUB-1: Need for Emergency Response Services During Construction of the Artificial Reef	LTSM	**MM PUB-1:** Notification of Harbor Patrol
PUB-2: Increase in the Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from to the Artificial Reef	LTS	None recommended

Table ES-3. Impact and Mitigation Summary (Proposed Project)

Impact	Impact Class[1]	Applicant-Proposed Measures/Recommended MMs
RECREATION		
REC-1: Prevent Access to Recreational Sites or Disturb Users of Recreational Facilities during Times of Peak Use	LTS	**APM-3:** Local Notice to Mariners
REC-2: Degradation of a Significant Recreational Resource	LTS	None recommended
REC-3: Substantial Reduction in the Type, Quality or Quantity of Recreational Fishing Activity or Recreational Fishery Yield	B	None recommended
TRANSPORTATION (MARINE)		
MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents	LTS	**APM-2:** Forecast Notification **APM-3:** Local Notice to Mariners

Note: [1] Impact Class: B = Beneficial (Green); LTS = Less than Significant; LTSM = Less than Significant with Mitigation; NI = No Impact.

Table ES-4. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
SECTION 4.1, BIOLOGICAL RESOURCES (MARINE)						
BIO-1: Existing Giant Kelp Habitat Quality	LTS	NI	LTS	LTS	LTS	LTS
BIO-2: Introduction or Enhancement of Non-Native Species	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-4: Accidental Spills or Vessel Grounding may result in Habitat Degradation or Species Mortality	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-5: Monitoring Activities	NI	NI	NI	NI	NI	NI
BIO-6: Adverse Effects to Soft Sediment Habitat and Managed Fish Species	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.2, AESTHETICS						
AES-1: Effect on a Scenic Vista	LTS	NI	LTS	LTS	LTS	LTS
AES-2: Damage to Scenic Resources	NI	NI	NI	NI	NI	NI
AES-3: Degrading the Existing Visual Character or Quality of the Site and its Surroundings	LTS	NI	LTS	LTS	LTS	LTS
AES-4: Creating a New Source of Light or Glare Affecting Day or Nighttime Views	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.3, AIR QUALITY						
AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan	LTSM	NI	LTSM	LTSM	LTSM	LTSM

Table ES-4. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
AQ-2: Violation of Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation	LTSM	NI	LTSM	LTSM	LTSM	LTSM
AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for Which the Project Region is Nonattainment	LTSM	NI	LTSM	LTSM	LTSM	LTSM
AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentrations	LTS	NI	LTS	LTS	LTS	LTS
AQ-5: Create Objectionable Odors Affecting a Substantial Number of People	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.4, CULTURAL AND PALEONTOLOGICAL RESOURCES						
CR-1: Cause a substantial adverse change in the significance of an archaeological or historical resource	LTSM	NI	LTSM	LTSM	LTSM	LTSM
CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	LTSM	NI	LTSM	LTSM	LTSM	LTSM
CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries	LTSM	NI	LTSM	LTSM	LTSM	LTSM
SECTION 4.5, CULTURAL RESOURCES—TRIBAL						
TCR-1: Cause a substantial adverse change in the significance of a Tribal cultural resource	LTSM	NI	LTSM	LTSM	LTSM	LTSM

Table ES-4. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
SECTION 4.6, GEOLOGY AND COASTAL PROCESSES						
GEO-1: Substantial Increase or Decrease in Rates of Beach Erosion	LTS	NI	LTS	LTS	LTS	LTS
GEO-2: Substantial Change in Surf Characteristics	LTS	NI	LTS	LTS	LTS	LTS
GEO-3: Substantially Inhibit Natural Coastal Processes	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.7, GREENHOUSE GAS EMISSIONS						
GHG-1: Directly or Indirectly Generate GHG Emissions	LTS	NI	LTS	LTS	LTS	LTS
GHG-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing GHG Emissions	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.8, HAZARDS AND HAZARDOUS MATERIALS						
HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials	LTSM	NI	LTSM	LTSM	LTSM	LTSM
HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment	LTSM	NI	LTSM	LTSM	LTSM	LTSM
SECTION 4.9, MINERAL RESOURCES						
MIN-1: Availability of Oil, Gas, or Geothermal Resources	NI	NI	NI	NI	NI	NI
MIN-2: Availability of a Local Sand, Gravel, or Concrete Aggregate Mineral Resource Recovery Site	NI	NI	NI	NI	NI	NI

Table ES-4. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
MIN-3: Availability of Local and Regional Construction Rock Resources	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.10, NOISE						
NOI-1: Expose Persons to or Generation of Noise Levels in Excess of Standards	LTS	NI	LTS	LTS	LTS	LTS
NOI-2: Expose Persons to or Generation of Excessive Groundborne Vibration or Noise Levels	LTS	NI	LTS	LTS	LTS	LTS
NOI-3: Substantial Permanent, Temporary, or Periodic Increase in Ambient Noise Levels	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.11, OCEAN WATER QUALITY						
OWQ-1: Impairment of Marine Water Quality	LTSM	NI	LTSM	LTSM	LTSM	LTSM
OWQ-2: Discharge of Pollutants into an “Impaired” Waterbody under Clean Water Act Section 303(d)	NI	NI	NI	NI	NI	NI
SECTION 4.12, PUBLIC SERVICES						
PUB-1: Need for Emergency Response Services during Construction of the Artificial Reef	LTSM	NI	LTSM	LTSM	LTSM	LTSM
PUB-2: Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from the Artificial Reef	LTS	NI	LTS	LTS	LTS	LTS

Table ES-4. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
SECTION 4.13, RECREATION						
REC-1: Prevent Access to Recreational Sites or Disturb Users of Recreational Facilities during Times of Peak Use	LTS	NI	LTS	LTS	LTS	LTS
REC-2: Degradation of a Significant Recreational Resource	LTS	NI	LTS	LTS	LTS	LTS
REC-3: Substantial Change in the Type, Quality or Quantity of Recreational Fishing Activity or Yield	B	NI	B	B	B	B
SECTION 4.14, TRANSPORTATION (MARINE)						
Impact MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents	LTS	NI	LTS	LTS	LTS	LTS

Notes:[1] B = Beneficial (Green); LTS = Less than Significant; LTSM = Less than Significant with Mitigation; NI = No Impact.

1.1 PROJECT LOCATION AND BACKGROUND

Southern California Edison (SCE or Applicant) has applied to the California State Lands Commission (Commission or CSLC) to lease State tidelands to expand the existing 174.4-acre Wheeler North Reef[1] by approximately 210 acres (hereinafter Wheeler North Reef Expansion Project [Project]). **The reef expansion is required by the California Coastal Commission (CCC) as mitigation pursuant to Coastal Development Permit (CDP) No. 6-81-370-A.**

The CSLC is lead agency for the proposed Project under the California Environmental Quality Act (CEQA) and State CEQA Guidelines;[2] CSLC staff prepared this Subsequent Environmental Impact Report (EIR) to analyze the Project's potential significant impacts. The CSLC certified a prior related Program EIR in 1999 and issued a General Lease – Non-Income Producing (Lease No. PRC 8097) to SCE for the construction and maintenance of the existing Wheeler North Reef, which the CCC required to mitigate for marine resources impacts resulting from the operation of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (Item 72 and Item 73, June 14, 1999).

Wheeler North Reef lies approximately 0.6 mile offshore in water depths of 38 to 49 feet and parallels about 2.5 miles of the city of San Clemente (City) coast in Orange County from the City Pier (north end) to San Mateo Point (south end) and adjacent to several City and state beaches (Pier, T-Street, Lasuen, Riviera, Calafia [State Park], and San Clemente [State Beach]) (see Figure 1-1). Doheny State Beach and Dana Point Harbor are north of the Project site. The submerged land leased from the state for the existing Wheeler North Reef is a four-sided parcel in the ocean near the City and San Mateo Point with the following North American Datum 1983 geographic coordinates:

- Latitude 33° 25' 01.7" North, Longitude 117° 37' 45.0" West
- Latitude 33° 23' 15.2" North, Longitude 117° 36' 20.0" West
- Latitude 33° 22' 57.6" North, Longitude 117° 36' 45.2" West
- Latitude 33° 24' 47.3" North, Longitude 117° 38' 14.9" West

Rock for the reef expansion would be obtained from existing quarries on Santa Catalina Island and, if needed, in Ensenada, Mexico (see Figure 4.14-1, in Section 4.14, *Transportation (Marine)*, for quarry sites and marine transportation routes). These quarries would also serve as the rock stockpile location prior to and during construction. The quarried rock conditions are outlined in Section 2.3.2, *Quarry Rock Requirements*.

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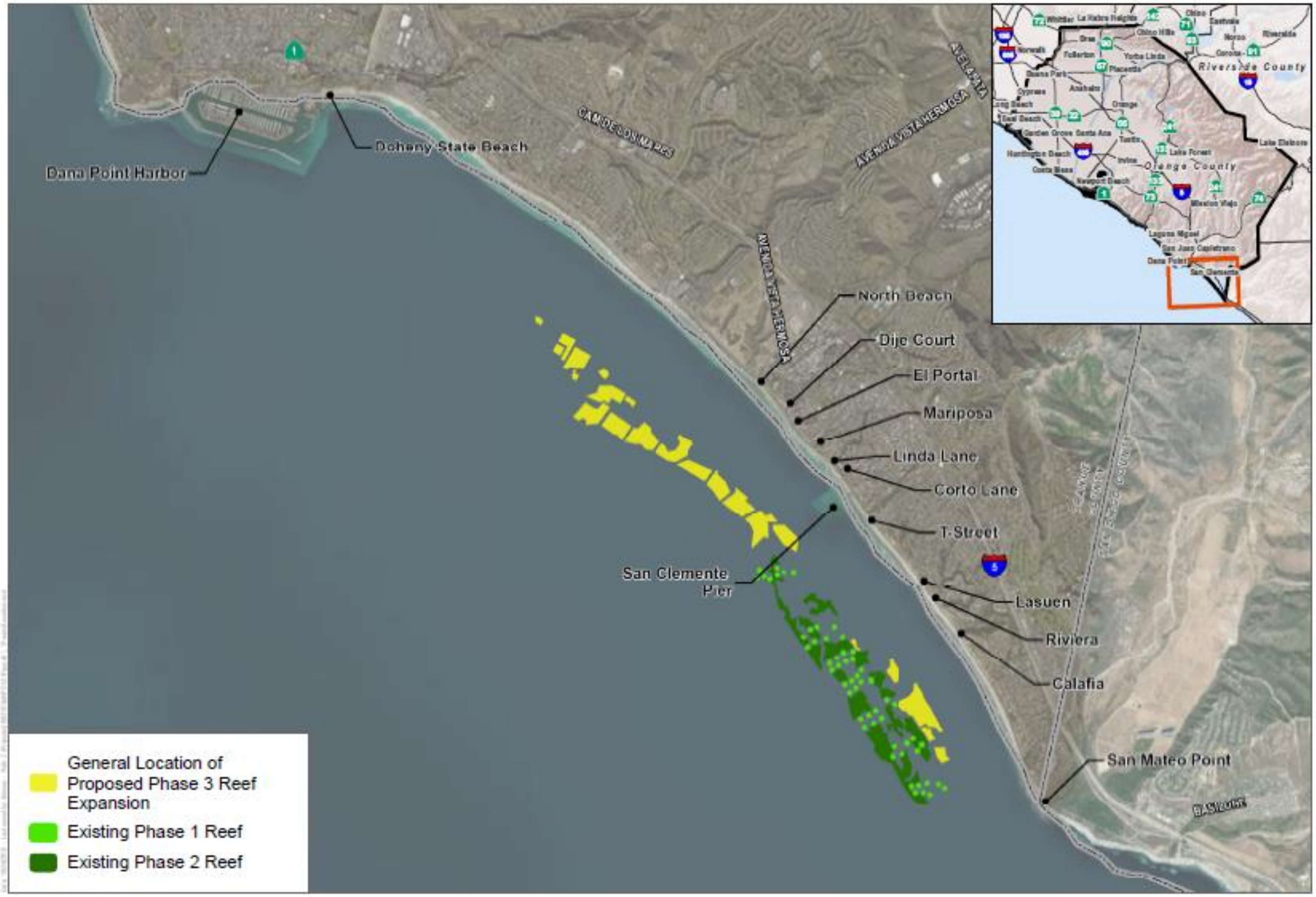
[1] The reef is named after Dr. Wheeler J. North, a pioneering marine biologist and environmental scientist at Scripps Institution of Oceanography and California Institute of Technology.

[2] CEQA and the State CEQA Guidelines are found in Public Resources Code section 21000 et seq. and California Code of Regulations, title 14, section 15000 et seq., respectively.



SOURCE: Bing Maps 2018

DUDEK 0 2,500 5,000 Feet

FIGURE 1-1
Project Location
Wheeler North Reef SEIR

The reef was originally constructed in two phases: (1) a Phase 1 experimental reef, completed in September 1999, which consisted of 56 modules totaling 22.4 acres (Coastal Environments 1999a, 1999b); and (2) Phase 2, completed in September 2008, which involved the placement of 152 acres of low-relief, low-coverage rock during a 73-day construction period.[3] (Table 1-1 provides a timeline of events associated with reef construction and monitoring.) The proposed Project would add approximately 210 additional acres of kelp reef on low-relief quarry rocks within 23 discontinuous polygonal areas (Figure 1-1). A temporary construction footprint would surround the approximate 210-acre area to allow for anchoring of barges used for reef expansion.

1.2 OVERVIEW OF ENVIRONMENTAL REVIEW PROCESS

1.2.1 Project Context with Respect to CEQA

The actions proposed by the Applicant are subject to CEQA. Pursuant to State CEQA Guidelines section 15378, the CSLC must review "the whole of [the] action that has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." With limited exceptions, CEQA requires the CSLC, before approving a project over which it has discretionary authority, to consider the environmental consequences of the project. CEQA establishes procedural and substantive requirements that agencies must satisfy to meet CEQA's objectives, which are (State CEQA Guidelines, §§ 15002 and 15083):

- Inform governmental decision makers and the public about the potential significant environmental effects of proposed activities
- Identify ways that environmental damage can be avoided or significantly reduced
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible
- Disclose to the public the reasons why the agency approved the project in the manner the agency chose if significant environmental effects are involved
- Foster multi-disciplinary interagency coordination in the review of projects
- Enhance public participation in the planning process

[3] Phase 1 served as a scientific platform for experimental study to determine the optimal materials and design specifications for subsequent reef construction (CCC 2005). The Phase 2 reef design was based on the results of the Phase 1 reef and incorporated 17 polygonal areas that varied in size from 1.35 to 38.88 acres (Coastal Environments 2008a, 2008b). The siting of each polygon relied primarily on maps of historical locations of kelp beds and multibeam and sonar surveys.

Table 1-1. Summary Timeline: Wheeler North Reef Construction/Monitoring

1974	The California Coastal Zone Conservation Commission (predecessor of the CCC) issues Permit No. 183-73 to SCE for the construction of SONGS Units 2 and 3. The permit establishes an independent Marine Review Committee to study the impacts of SONGS Units 2 and 3 operations on the marine environment and to recommend subsequent mitigation for any adverse impacts.
1983/ 1984	SONGS Units 2 and 3 begin operating using single-pass seawater for once-through cooling in 1983 and 1984, respectively.
1991	The Marine Review Committee completes a series of technical impact studies on the SONGS cooling system and concludes that adverse impacts are occurring to the San Onofre Kelp Bed (SOK) community due to turbid plumes generated during the mixing of cooling water discharged through diffusers located approximately 1.5 to 2 miles offshore, near the kelp forest. The CCC amends CDP No. 6-81-330-A (formerly 183-73) requiring SCE to construct 300 acres of compensatory kelp bed mitigation (Condition C) and to provide the funds necessary for CCC contract staff technical oversight and independent monitoring of mitigation projects (Condition D).[1]
1997	Subsequent studies determine that resource losses at SOK are less than originally estimated. The CCC amends the CDP to require construction of an artificial reef that will sustain 150 acres of medium-to-high density kelp bed and associated biota, specifically: an experimental reef project (Phase 1) with a minimum of 16.8 acres and a 5-year monitoring program to provide guidance on how to design the full reef; and a second phase (Phase 2) of construction with a minimum of 133.2 acres for the total mitigation reef, incorporating lessons learned during Phase 1.
1999	The CSLC certifies a Program Environmental Impact Report that analyzes potential significant impacts associated with construction and maintenance of the mitigation reef as required by the CCC. The CSLC subsequently issues Lease No. PRC 8097 for the Phase 1 and Phase 2 kelp reef. The approved lease covers 862 acres to allow for reef construction. (Item 72 and Item 73, June 14, 1999.)
1999 to 2004	In September 1999, construction of the 22.4-acre Phase 1 experimental artificial kelp reef is completed. The reef is monitored for 5 years to determine the optimal materials and design specifications for the Phase 2 reef.
2008	In September, construction of the 152-acre Phase 2 artificial kelp reef is completed. The artificial kelp reef is dedicated to Dr. Wheeler J. North.
2008 to present	Phases 1 and 2 are monitored annually by independent scientific staff to determine whether the reef is meeting the absolute and qualitative performance standards established in CCC permit conditions.
2011	The CSLC amends the lease to reflect the 174.4-acre size of the Wheeler North Reef within the 862-area lease parcel (Item C45, April 6, 2011).
January 2018	SCE applies to the CSLC to expand the Wheeler North Reef to meet all absolute and qualitative performance standards established in the CCC permit conditions.

Acronyms: CCC = California Coastal Commission; CDP = Coastal Development Permit; CSLC = California State Lands Commission; SCE = Southern California Edison; SONGS = San Onofre Nuclear Generating Station.

Note: [1] The Marine Review Committee also concluded that SONGS operation had and would continue to impact fish and other marine species through entrainment of larvae in the cooling intake structure. Those impacts were mitigated out-of-kind through restoration of the San Dieguito Lagoon.

Other key requirements include carrying out specific noticing and distribution actions to maximize public involvement in the environmental review process. CEQA section 21002 also states in part that it is the State's policy that public agencies:

> *… should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required by this division are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.*

The CSLC staff determined that the proposed Project could result in significant environmental impacts and that a Subsequent EIR (see Section 1.2.2) is required to analyze the Project and feasible alternatives. The purpose of an EIR is not to recommend either approval or denial of a project. The EIR is an informational document that assesses the potential environmental effects of a project and identifies mitigation measures and project alternatives that could reduce or avoid significant environmental impacts (State CEQA Guidelines, § 15121). Consistent with CEQA requirements, the CSLC has engaged in a good faith, reasonable effort towards full public disclosure of the potential effects of the Project.

1.2.2 Rationale for Preparing a Subsequent EIR

As described above, the CSLC certified a Program EIR in 1999 that analyzed potential significant impacts associated with construction and maintenance of two separate phases (Phases 1 and 2) of the mitigation reef that was named Wheeler North Reef in 2008. Program EIRs (as opposed to project EIRs) are intended to provide analysis that is more general and anticipates future project refinement and review. Related future projects in the mitigation reef area can potentially "tier" their future environmental assessment using the original Program EIR.

Under the State CEQA Guidelines (§ 15162, subd. (a)(1)), when an EIR has been certified or negative declaration adopted for a project, no subsequent or supplemental EIR shall be prepared for that project unless several conditions exist on the basis of substantial evidence in the light of the whole record, including:

> *Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects….*

Preparation of a Subsequent EIR for the proposed reef expansion is appropriate for the following reasons:

- The increase in reef size, new lease area, and time since the 1999 Program EIR was completed constitute substantial changes in circumstances under which the project is undertaken. These changes require major revisions to the previous EIR due to the potential for new significant environmental effects.
- The 1999 Program EIR, which was the subject of several levels of environmental review through 1999, retains "relevance" in light of the proposed Project and continues to have "informational value" consistent with the California Supreme Court's ruling in *Friends of the College of San Mateo Gardens v. San Mateo Community College District* (2016) 1 Cal. 5th 937. This Subsequent EIR incorporates by reference information from the 1999 Program EIR where appropriate and provides new descriptions and analyses for resources where baseline conditions or Project impacts may be substantially different than what the CSLC analyzed in the 1999 Program EIR.

The CSLC staff, therefore, prepared this Subsequent EIR to evaluate the potential significant impacts associated with the Project. For key resource area sections, such as Biological Resources (Marine), this Subsequent EIR incorporates previously published information by referencing relevant portions of the 1999 Program EIR and building upon that document. This approach is intended to facilitate understanding of the Project and its impacts, and to eliminate the need for frequent reader referral to the prior CEQA document that evaluated the Phase 1 and Phase 2 reef construction. For resource areas that would experience roughly the same impacts as described in the 1999 Program EIR and substantial new analysis is not warranted, the reader is directed to the relevant sections of the 1999 Program EIR.

Prior to any decision on whether to approve the lease, the CSLC must certify that (State CEQA Guidelines, § 15090):

- The Subsequent EIR has been completed in compliance with CEQA
- The Subsequent EIR was presented to the CSLC in a public hearing and the CSLC reviewed and considered the information contained in the Final Subsequent EIR prior to taking action on the Project
- The Subsequent EIR reflects the CSLC's independent judgment and analysis

The CSLC must also adopt a plan to implement and monitor any identified mitigation measures (see Section 7.0, *Mitigation Monitoring Program*). State CEQA Guidelines section 15121, subdivision (b) further requires public agencies, before Project approval, to prepare written findings of fact for each significant environmental impact identified in an EIR. Possible findings are (State CEQA Guidelines, § 15091):

- The project has been changed (including adoption of mitigation measures) to avoid or substantially reduce the magnitude of the impact
- Changes to the project are within another agency's jurisdiction and have been or should be required by that agency
- Specific economic, legal, social, technological, or other considerations make the mitigation measures or alternatives identified in the EIR infeasible

Under CEQA, if the CSLC finds that the above considerations make identified mitigation measures or alternatives infeasible and that implementation of the proposed Project would cause one or more significant effects to occur, the CSLC can only approve the requested lease if it prepares a written statement that the lease and Project benefits (including economic, legal, social, technological, or other region- or statewide benefits) outweigh the unavoidable adverse environmental effects. This statement of "overriding considerations" must be supported by the specific reasons and evidence in the record for making such a determination.

1.2.3 Public Scoping (2018)

A Subsequent EIR is given the same notice and public review required under State CEQA Guidelines sections 15072 or 15087. Through the Project's Notice of Preparation (NOP), the CSLC solicited comments on the Subsequent EIR's scope during a 30-day comment period beginning on January 19, 2018, and at a scoping meeting held in Dana Point on February 6, 2018. Table 1-2 lists commenters on the NOP (see Appendix A, *Public Scoping Documents*, for meeting transcripts and an index to where scoping comments are addressed in this Subsequent EIR).

Table 1-2. NOP Commenters

Classification	Name	Public Comment	
		Written	Oral (at scoping meeting)
Agency	• Native American Heritage Commission	●	
Non-Governmental Organization	• Surfrider Foundation	●	●
Individual	• Jeff Crumley	●	
	• Jim Dahl		●
	• Ken Knielsen	●	
	• Merit McCrea		●
	• J.A. Ross	●	
	• Craig Rothenburger	●	
	• Captain Brian Woolley	●	

1.2.4 Availability of Subsequent EIR

Placing CEQA documents at readily accessible sites such as local libraries can be an effective way to provide information about a project. This Subsequent EIR is available for reviewing at two sites in the proposed Project vicinity and at CSLC offices in Long Beach and Sacramento (Table 1-3).

Table 1-3. Locations to Review the Subsequent EIR

Libraries:	
San Clemente Library 242 Avenida del Mar San Clemente, CA 92672 (949) 492-3493	Dana Point Library 33841 Niguel Road Dana Point, CA 92629 (949) 496-5517
CSLC Offices (see also CSLC website at (http://www.slc.ca.gov/Info/CEQA.html):	
California State Lands Commission Attn: Mark LeClair 200 Oceangate, 12th Floor Long Beach, CA 90802 (562) 590-5266	California State Lands Commission Attn: Sarah Mongano 100 Howe Ave., Suite 100-South Sacramento, CA 95825 (916) 574-1889

1.3 PURPOSE AND SCOPE OF SUBSEQUENT EIR

The purpose of this Subsequent EIR is to identify the significant effects on the environment of the Project, to identify alternatives to the Project, and to indicate how those significant effects can be mitigated or avoided (Pub. Resources Code, § 21002.1, subd. (a)). This Subsequent EIR is intended to provide the CSLC with information required to exercise its jurisdictional responsibilities with respect to the Wheeler North Reef Expansion Project (to be considered at a noticed public hearing). Responsible agencies use the information in a certified EIR in exercising their respective jurisdictional or regulatory responsibilities. The scope of this Subsequent EIR is limited to evaluating proposed changes to Lease No. PRC 8097 to authorize the construction and maintenance of an expanded reef and the incremental effects of those modifications and should be read in conjunction with the 1999 Program EIR. Construction of the existing Wheeler North Reef is not analyzed in this Subsequent EIR.

A fundamental consideration in the identification of significant impacts is establishing the appropriate baseline for the Subsequent EIR analysis, since impacts are identified by comparing changes to the environment caused by a project to existing environmental conditions, which for the proposed Project includes the existing portion of Wheeler North Reef. Use of an appropriate baseline is also important for establishing alternatives to the proposed activities that can be analyzed in the Subsequent EIR. The alternatives must be capable of reducing or avoiding one or more significant impacts of the Project, but do not need to address impacts associated with baseline conditions. The CSLC must identify which components of a project are known or reasonably foreseeable; if it finds that a particular impact is too speculative for evaluation, the CSLC should note its conclusion and terminate discussion of the impact (State CEQA Guidelines, § 15145).

1.3.1 Baseline Conditions

Baseline conditions for this Subsequent EIR are defined as the existing physical setting that may be affected by a project (State CEQA Guidelines, § 15125, subd. (a)), which for this Project includes the proposed lease area, quarry locations, and barge transit routes. This setting constitutes the baseline physical conditions by which the CSLC will determine whether impacts from the Project and Project alternatives are significant. Impacts are defined as changes to the environmental setting that are attributable to Project components or operations. Potential impacts are often analyzed in the context of the local and regional physical environmental conditions existing at the time the NOP for the Subsequent EIR was released (in this case, January 19, 2018).

1.3.2 Potential Impacts and Summary of Alternatives Evaluated

This Subsequent EIR identifies potential significant impacts of the proposed Project on the environment and indicates if and how the impacts can be avoided or reduced by Applicant-Proposed Measures, mitigation measures, or alternatives. Consistent with State CEQA Guidelines section 15163, subdivision (b), "only the information necessary to make the previous EIR adequate for the project as revised" is provided. As described in Section 4, *Environmental Impact Analysis*, the following resource areas would not be impacted by the Project:

- Agricultural and Forestry Resources
- Biological Resources (Terrestrial)
- Land Use and Planning
- Onshore Hydrology, Drainage, and Stormwater Runoff
- Population and Housing
- Transportation/Traffic (onshore)
- Utilities and Service Systems
- Energy

The Project could have a significant impact on the following resource areas:

- Biological Resources (Marine)
- Aesthetics
- Air Quality
- Cultural/Paleontological Resources
- Cultural Resources – Tribal
- Geology and Coastal Processes
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Mineral Resources
- Noise
- Ocean Water Quality
- Public Services
- Recreation
- Transportation (Marine)

Pursuant to State CEQA Guidelines section 15126.6, an EIR must describe and evaluate a range of reasonable alternatives that would feasibly attain most of a project's basic objectives and would avoid or substantially lessen any of the significant impacts of a project as proposed. The State CEQA Guidelines also state that the range of alternatives required to be evaluated in an EIR is governed by the "rule of reason" (§ 15126.6, subd. (f))—that is, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasoned choice and to foster informed decision making and public participation. The State CEQA Guidelines also require that the EIR evaluate a "no project" alternative and, under specific circumstances, designate an environmentally superior alternative from among the remaining alternatives. Table 1-4 identifies the potential alternatives considered but not carried forward for detailed analysis in this Subsequent EIR and those identified alternatives to the proposed Project that are analyzed in greater detail (see Section 5, *Project Alternatives Analysis*).

Table 1-4. Potential Alternatives to the Proposed Project

Eliminated from Consideration	Evaluated in Subsequent EIR
• Combination of Reef at Multiple Locations • Northern San Clemente Site • Farther Offshore from Existing Wheeler North Reef • Compound Reef at San Clemente[1] • Compound Reefs at Multiple Locations[1] • Compound Reefs at Big Sycamore Canyon (inside and outside of the preserve) or Pitas Point[1] • Kelp Planting • Two-Season Construction 2018–2019 Period Alternative	• No Project Alternative • Low-Relief, Low-Coverage, Less Northward Expansion Reef • Low-Relief, Medium-Coverage Reef • Low-Relief, High-Coverage Reef • Two-Season Construction 2019–2020 Period Alternative

Note: [1] A compound reef would contain both high-relief and low-relief reef areas within the same lease.

1.3.3 Cumulative Impact Analysis

An EIR must discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (State CEQA Guidelines, § 15130). A cumulative impact is an impact that is created through a combination of the project analyzed in the EIR and other closely related past, present, and reasonably foreseeable probable future projects in the area causing related impacts. Section 3, *Cumulative Projects*, defines the applicable geographic scope of the cumulative analysis (Cumulative Projects Study Area) and lists projects included in the cumulative environment.

1.4 AGENCY USE OF SUBSEQUENT EIR / ANTICIPATED APPROVALS

An EIR shall identify the ways in which the lead and responsible agencies would use the document in their approval or permitting processes (State CEQA Guidelines, § 15124, subd. (d)). The CSLC, as CEQA lead agency for this Subsequent EIR, is responsible for considering the effects, both individual and collective, of all activities involved in the proposed Project, to the extent ascertainable; each responsible agency is responsible for considering the effects of those activities that it is required by law to carry out or approve (Pub. Resources Code, § 21002.1, subd. (d)). The information provided in this

Subsequent EIR, if certified, will assist the CSLC in any decision to approve or deny the Project. Section 3.6 of the 1999 Program EIR presented a list of agency approvals, including those to be issued by agencies acting as responsible agencies under CEQA. Most of those agency actions are related to Project construction. Table 1-5 lists other agency approvals that may be required for the Project.

Table 1-5. Additional Agreements, Permits, and Approvals

Agency	Permit, Approval, or Consultation	Covered Activity
Local/Regional		
South Coast Air Quality Management District	Permit to construct	Offshore emissions
State		
California Coastal Commission	Coastal development permit or permit amendment	Construction in coastal zone Monitoring
San Diego Regional Water Quality Control Board	Clean Water Act (CWA) Section 401 Water Quality Certification	Discharge into ocean during construction or operations
Federal		
U.S. Army Corps of Engineers	Rivers and Harbors Act Section 10 permit; CWA Section 404 permit; 33 Code of Federal Regulations Section 2104 permit for artificial reef construction	Construction of artificial reef
U.S. Coast Guard	Local Notice to Mariners	Construction, monitoring, and rock transport using marine vessels
U.S. Fish and Wildlife Service and National Marine Fisheries Service	Protection of federally listed marine resources, implementation of Migratory Bird Treaty Act, Marine Mammal Protection Act, and Magnuson-Stevens Fishery Conservation and Management Act	

1.5 ORGANIZATION OF SUBSEQUENT EIR

The Subsequent EIR is presented in nine sections:

- **Section 1.0 – Introduction** provides background on the Project, previous related environmental review, and the CEQA process.
- **Section 2.0 – Project Description** describes the Project components and activities, monitoring, and schedule.
- **Section 3.0 – Cumulative Projects** identifies the projects that are analyzed for potential cumulative effects and the Subsequent EIR's approach to cumulative impact analysis.

- **Section 4.0 – Environmental Impact Analysis** describes existing environmental conditions, Project-specific impacts, mitigation measures, and evaluates cumulative impacts.
- **Section 5.0 – Project Alternatives Analysis** describes the alternatives screening methodology, alternatives rejected from full consideration, and alternatives carried forward for analysis, and analyzes impacts of each alternative carried forward.
- **Section 6.0 – Other Required CEQA Sections and Environmentally Superior Alternative** addresses other required CEQA elements, including significant and irreversible environmental and growth-inducing impacts, comparison of the Project and alternatives, and identification of the environmentally superior alternative.
- **Section 7.0 – Mitigation Monitoring Program** describes the monitoring authority, enforcement and mitigation compliance responsibilities, and general monitoring procedures, and presents the mitigation monitoring table.
- **Section 8.0 – Other Commission Considerations** presents information relevant to the Commission's consideration of SCE's lease application that are in addition to the environmental review required pursuant to CEQA. These include: (1) climate change and sea-level rise considerations; (2) commercial fishing (socioeconomics); (3) environmental justice; and (4) state tide and submerged lands identified as possessing significant environmental values within the Commission's Significant Lands Inventory. Other considerations may also be addressed in the staff report presented at the time of the Commission's consideration of the lease application.
- **Section 9.0 – Report Preparation Sources and References** lists the persons involved in preparation of the Subsequent EIR and the reference materials used.

The Subsequent EIR also contains the following appendices:

- **Appendix A** – Public Scoping Documents (Index to Where Each NOP Comment is Addressed in the Subsequent EIR, Public Scoping Comments, Hearing Transcripts, and NOP)
- **Appendix B** – *2018 Monitoring Plan for the SONGS' Reef Mitigation Project*
- **Appendix C** – Air Quality Supplementary Information
- **Appendix D** – Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Wheeler North Reef Expansion Project
- **Appendix E** – *Final Program Environmental Impact Report for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California*
- **Appendix F** – Kelp Wrack Monitoring for Existing Wheeler North Reef
- **Appendix G** – Cultural Resources Records
- **Appendix H** – Draft Subsequent EIR Distribution List

2.0 PROJECT DESCRIPTION

2.1 PROJECT SUMMARY

As discussed in Section 1, *Introduction*, the California Coastal Commission (CCC) has directed Southern California Edison (SCE) to expand the Wheeler North Reef, located offshore the city of San Clemente (City), Orange County (Figure 2-1), which was first established in 1999 (Phase 1) and built out in 2008 (Phase 2). Although this artificial reef meets multiple performance standards established in coastal development permit (CDP) No. 6-81-370-A as amended in 1997 (see Section 2.2), the reef does not satisfy a condition that requires a standing fish stock of 28 tons in any of the years it has been monitored (2009 to present). In some years (2009 and 2016) it has also not met the kelp standard of sustaining 150 acres of medium- to high-density giant kelp. The proposed Wheeler North Reef Expansion Project (Project) would create approximately 210 acres of additional kelp reef on low-relief quarry rocks. The quarried rock would be placed on top of a thin layer of sand adjacent to the existing reef on submerged lands under the jurisdiction of the California State Lands Commission (Commission or CSLC).

2.2 PROJECT OBJECTIVES

State California Environmental Quality Act (CEQA) Guidelines section 15124, subdivision (b), requires a Subsequent Environmental Impact Report (EIR) to include a statement of objectives for the proposed Project. Wheeler North Reef was constructed to mitigate for the loss of kelp forest resources resulting from once-through cooling (OTC) required to operate San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. Under CCC CDP No. 6-81-370-A, SCE would receive mitigation credit if it met the following performance standards established to measure the success of the Wheeler North Reef and to determine whether additional remediation is necessary.

1. The mitigation reef shall be constructed of rock, concrete, or a combination of these materials.
2. The total area of the mitigation reef (including the experimental reef modules) shall be no less than 150 acres.
3. At least 42 percent, but no more than 86 percent, of the mitigation reef area shall be covered by exposed hard substrate.
4. At least 90 percent of the exposed hard substrate must remain available for attachment by reef biota.
5. The artificial reef(s) shall sustain 150 acres of medium- to high-density giant kelp.
6. The standing stock of fish at the mitigation reef shall be at least 28 tons.
7. The resident fish assemblage shall have a total density and number of species similar to natural reefs within the region.

8. Fish reproductive rates shall be similar to natural reefs within the region.
9. The total density and number of species of young-of-year fish shall be similar to natural reefs within the region.
10. Fish production shall be similar to natural reefs within the region.
11. The benthic community (both algae and macroinvertebrates) shall have coverage or density and number of species similar to natural reefs within the region.
12. The benthic community shall provide food-chain support for fish similar to natural reefs within the region.
13. The important functions of the reef shall not be impaired by undesirable or invasive benthic species (e.g., sea urchins or *Cryptoarachnidium*).

Fulfillment of the CDP reef mitigation requirement occurs when the number of years of mitigation credit accrued by the Wheeler North Reef (1 year of mitigation is credited each year the reef meets the CCC's performance standards) equals the total number of years of OTC discharge during SONGS Units 2 and 3 operation and decommissioning. To assess reef performance, CCC staff has overseen annual monitoring of the physical and biological attributes of the reef and two reference reefs—the nearby San Mateo Kelp Bed (SMK) and Barn Kelp Bed (BK)—since 2008. As shown in Table 2-1, the Wheeler North Reef has not yet met all performance standards in any year; therefore, SCE has not yet received any mitigation credit for the reef.

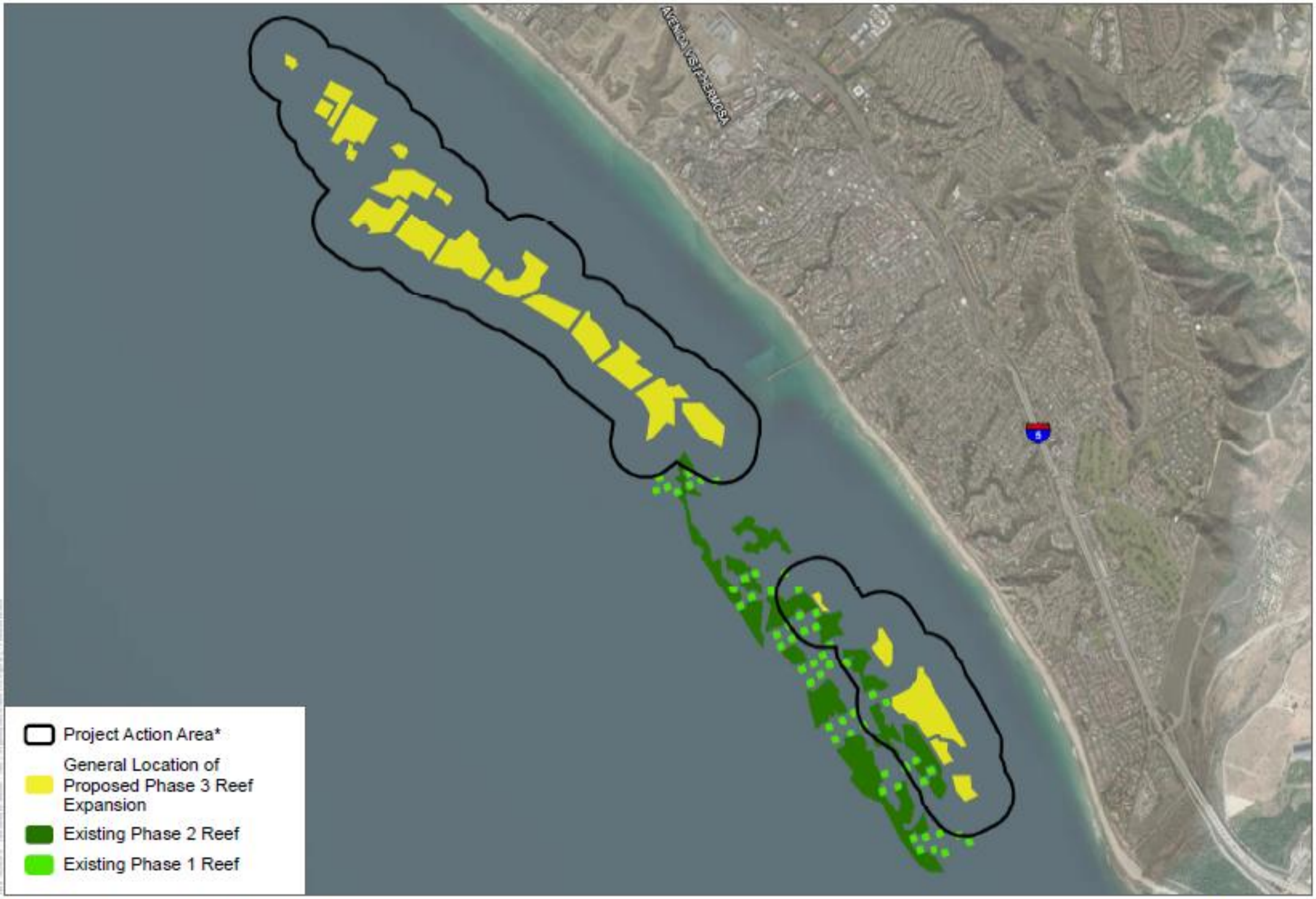
Table 2-1. Summary of Wheeler North Reef Mitigation Compliance

	2009	2010	2011	2012	2013	2014	2015	2016
Mitigation Credit?	NO	NO	NO	NO	NO	NO	NO	NO
All Relative Standards	✓	✓	✓	✓	✓	✓	✓	✓
Hard Substrate	✓	✓	✓	✓	✓	✓	✓	✓
Giant Kelp Area	O	✓	✓	✓	✓	✓	✓	O
Fish Standing Stock	O	O	O	O	O	O	O	O
Invasive and Undesirable Species	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Permit standard met; O = Permit Standard not met

The CCC has determined that additional reef acreage is needed for the Wheeler North Reef to meet the performance standards. To fulfill this purpose, SCE proposes to supplement the existing reef to meet the following Project objectives:

- Increase standing fish stock to 28 tons to comply with the absolute standard
- Ensure that the mitigation reef can continue to meet all other absolute and relative CDP conditions even during years of unfavorable oceanic conditions



SOURCE: Bing Maps 2018

*Action area derived from 250 meter buffer from proposed reef areas

DUDEK

0 1,500 3,000 Feet

FIGURE 2-1

Proposed Phase 3 Wheeler North Reef Expansion

Wheeler North Reef SEIR

2.3 PROPOSED PROJECT

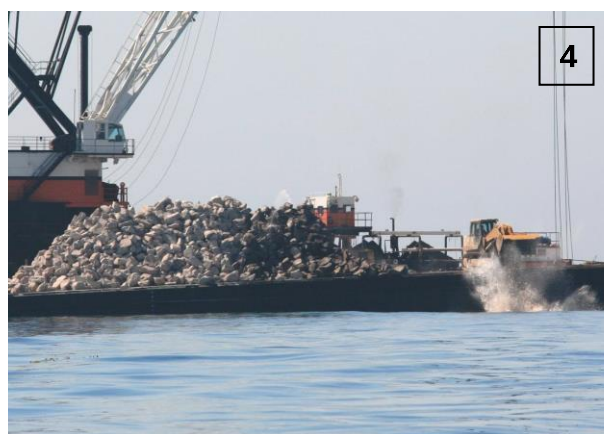
The proposed Project would expand the 174-acre Wheeler North Reef by creating up to 210.6 additional acres of low-relief kelp reef using up to 175,000 tons of quarried rock in 23 new polygons. Due to possible fluctuations in supply, the quarry rock would be purchased from a combination of Pebbly Beach and Empire Landing quarries on Santa Catalina Island, California, and La Piedra Quarry in Ensenada, Mexico. Mining at these permitted and operational quarries are considered existing conditions and are not part of the proposed Project. The rock would be transported to the reef site and placed on the seafloor as summarized in Figure 2-2 and detailed below.

Figure 2-2. Proposed Reef Construction Summary

Quarry rock would be transported by supply barge to the Project site. An extra supply barge would be anchored nearby to be swapped over when the first supply barge is emptied.

A Global Positioning System (GPS)-positioned derrick barge secured at a six-point anchorage would remain at the Project site throughout the construction season. It would be periodically re-anchored using differential GPS.*

Supply barges would be tied to the derrick barge when rock is being placed. The derrick crane located on the derrick barge would lift the front-end loader onto the supply barge.



The front-end loader would push quarry rock off the supply barge to achieve the desired kelp reef coverage adjacent to the existing Wheeler North Reef.

* The Positional accuracy of the differential GPS system is estimated at 1 to 2 feet with the barge operator able to hold position to within a tolerance of 6 feet.

2.3.1 Proposed Reef Design

The reef would be constructed using quarry boulders. The quarry rock would be placed within pre-established polygons that meet the following criteria:

- Sited within the CSLC lease area
- Near an existing kelp bed to facilitate recruitment of kelp and other species
- Water depth between 38 and 49 feet, suitable for kelp recruitment and growth
- Sand thickness of less than 2.3 feet, ± 20 percent to minimize rock burial of quarry rock
- Less than 30 percent exposed hard substrate so that a minimum of existing hard substrate is covered
- No kelp present for more than 1 year in the California Department of Fish and Game (renamed California Department of Fish and Wildlife [CDFW]) historical database from 1967 to 2012, to ensure that the kelp reef is truly new
- At least 164 feet from areas of special interest, such as fishing sites
- At least 23 feet from existing reef areas
- Provide adequate navigation channels so that vessels do not become entangled in the kelp canopy

For the proposed Project, 23 polygonal areas of the seafloor were identified totaling approximately 230.3 acres that comply with the listed criteria. The quarry rock would be placed in these polygons to ensure a low profile (approximately 3 feet in height above the seafloor), also termed low relief, and distributed at a low-coverage density (42 percent, 790 tons per acre). As discussed in Section 5, *Project Alternatives Analysis*, a "compound" reef alternative—a reef comprised of both "high-relief' (with heights between 7 to 10 feet) and low-relief reef areas within the same lease was evaluated but eliminated from further consideration. The 230.3 acres of polygons include approximately 20 acres of additional area beyond that expected to be needed to complete the reef expansion. The contingency polygons would serve as an alternate reef-construction location if site-specific issues dictate termination of construction at any of the primary locations. Those 20 acres could also be used for potential future remediation areas in the event a portion of the reef is unsuccessful or damaged.

Based on the Phase 1 and 2 reefs, approximately 790 tons (± 10 percent) of quarry rock distributed over 1 acre would achieve the desired 42 percent density of artificial hard substrate (as estimated by CCC [2005]). Consequently, reef expansion would require that approximately 150,000 tons (± 10 percent) of quarry rock be deposited over 200 acres, with a potential for 25,000 additional tons to be used if necessary to achieve the CCC condition for low, hard substrate coverage of the polygons (41 percent).

2.3.2 Quarry Rock Requirements

Quarried rock used for the reef expansion would be tested prior to installation to assure that it meets CDFW Material Specification Guidelines (Bedford 1997), listed below, for the augmentation of artificial reefs. CDFW coordinates the state program for research and construction of artificial reefs off the California coast. Department biologists have been involved in the planning and construction of more than 35 artificial reefs off the coast. Per the CDFW Guidelines, “acceptable” materials (i.e., materials suitable for construction of artificial reefs) must meet the following criteria:

- The material must be persistent. It must be hard but may not be so brittle that collisions with other similar materials or boat anchors would tend to shatter it.
- The material must have a specific gravity at least twice that of sea water (greater than 2.3 tons/cubic meter). The material must be dense enough to remain in position during strong winter storms, even in water depths as shallow as 30 feet.
- The material must not contain potentially toxic substances or foreign materials. Petroleum products, including tires, are not acceptable reef material.
- Acceptable materials include quarry rock and high-density concrete. Other materials may be considered on a case-by-case basis.
- Rocks used must remain unchanged after 30 years of submersion in seawater.

At least 85 percent of the quarry rock used for the Project would be 2 feet long, 1.5 feet wide, and 1 to 2 feet high. No more than 5 percent of the rock would exceed 3 feet in length.

2.3.3 Detailed Construction Methods

The proposed Project would use construction methods similar to those used for the Phase 2 construction of the existing Wheeler North Reef. The construction methods described below (see also Figure 2-2) are adapted from those described in the *Final Construction Report for Wheeler North Reef at San Clemente, California* (Coastal Environments 2008a, 2008b).

2.3.3.1 Project Requirements

Table 2-2 summarizes proposed Project requirements (schedule, equipment, staffing, etc.). It is anticipated that the quarry rock needed for the Project would be obtained from two quarries on Santa Catalina Island; however, a portion of the quarried rock (up to ~~14~~ approximately 18 percent of the total needed) may need to be obtained from a quarry in Ensenada, Mexico. Approximately 4,000 tons of rock would be transported via barge per trip.

Table 2-2. Anticipated Project Requirements

Reef Area	Up to approximately 210 additional acres of kelp reef (174.4 acres existing) on low-relief quarry rocks within 23 discontinuous polygonal areas
Rock Volume	Up to approximately 175,000 tons of new quarry rock
Schedule	May 1 – October 1, 2019 (~130 days) (see Section 2.3.6)
Equipment	• Two tugboat tenders, each 60 feet by 25 feet • Approximately seven flat-deck supply barges, each 200 feet by 50 feet • One derrick barge, with an attached derrick crane and differential Global Positioning System (GPS) system, 255 feet by 78 feet • Six anchorages for the derrick barge with separate winches for each • Two front-end loaders (one in use, one for backup), each 15 feet by 9 feet
Number of Barge Trips	• ~~38~~ 36 trips from Santa Catalina Island quarries • ~~6~~ 8 trips from Ensenada quarry
Staffing	An estimated 15 crew members would be needed to transport rock and build the reef. Crew at the Project site would be transported approximately 8 nautical miles from Dana Point Harbor to the Project site daily.

Barges could potentially travel directly from each quarry to the Project site. To evaluate a worst-case scenario, the Subsequent EIR assumes that barges would stop at the Port of Long Beach (POLB) then continue to the Project site. Empty barges would be transported back to the quarries directly from the Project site. Empty barges would likely make trips without stopovers as they can be transported quickly (4 to 5 nautical miles [nm]/hour for loaded barges, 7 to 8 nm/hour for empty barges); however, to make conservative estimates, the Subsequent EIR assumes stopovers for each trip to or from Santa Catalina Island. Table 2-3 presents the assumptions for each barge trip.

Table 2-3. Quarry Rock Trips

Source	Trip	Description	Distance (nm)	Duration (hours)
Quarry Rock from Santa Catalina Island	1	POLB to Santa Catalina Island (unloaded	22	4
	2	Santa Catalina Island to POLB (loaded)	22	6
	3	POLB to the Project site (loaded)	36	10
	4	Project site to POLB (unloaded)	36	6
Quarry Rock from Mexico	1	POLB to Ensenada (unloaded)	139 [1]	20
	2	Ensenada to Project site (loaded)	103 [2]	26
	3	From Project site to POLB (unloaded)	36	6

Acronyms: nm = nautical miles; POLB = Port of Long Beach.
Notes: [1] 94 nm to U.S./Mexico border; [2] 58 nm to U.S./Mexico border.

2.3.3.2 Reef Construction

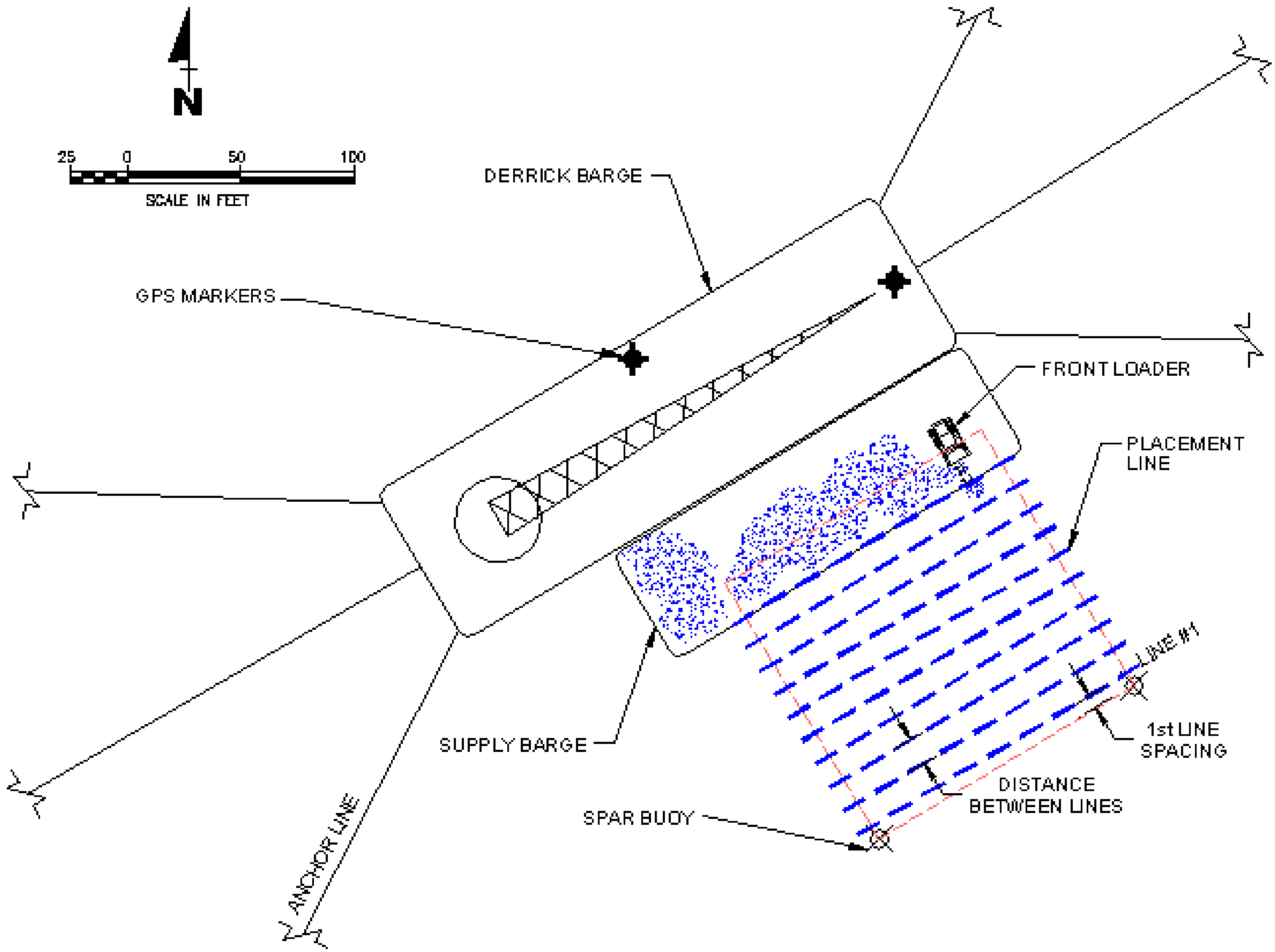
Initially, a tugboat would position the derrick barge on-site above a designated reef polygon. The derrick barge would be moored using six motorized winch anchor cables connected to their respective anchors within the boundary of the polygon. The anchors would be placed away from sensitive areas (e.g., the hard substrate at the north edge of SMK) and designed to minimize possible drag on the ocean floor. One such design would include connecting each anchor by braided steel cable to a 15-ton concrete anchor block, which would be connected to a surge-can (foam-filled) and then cabled to the derrick barge. The locations of the anchors would be routinely monitored by an attending tugboat and by the derrick barge winch operator.

Each loaded supply barge would be tethered to the derrick barge (see Figure 2-3), which would lower a front-end ~~track~~ loader via crane to the supply barge. The derrick barge winch operator would maneuver the tethered barges by winching “in” or “out” on the six anchor cables until the edge of the flat-deck barge is at the required position for placing the quarry rock (e.g., at the first line within a polygon). Positioning would be accomplished with the aid of proprietary software that uses coordinate data (horizontal coordinates, northings and eastings) from two differential Global Positioning System (GPS) systems and a differential correction signal broadcast by the U.S. Coast Guard from Point Loma, California. The software would triangulate the data to show the edge of the supply barge in relation to the polygon boundary. The derrick barge winch operator would refer to a computer monitor displaying the triangulated data to locate the edge of the supply barge at the exact line of deployment. Positional accuracy of the differential GPS system is estimated at 1 to 2 feet, and the software acceptance limits would be set at 6 feet, meaning that the winch operator would hold position to within a tolerance of 6 feet. In addition to the winch operator, the deck engineer and potentially others would observe the computer monitor displays verifying correct positioning of the supply barge and ensure that rocks are deposited in the correct location. The calibration of the system would be confirmed at the beginning of construction with a standard land survey system, and daily calibration would maintain consistent performance.

With the supply barge confirmed in the correct location, the ~~track~~ front-end loader would move boulders from the stockpile to the edge of the flat-deck barge and push them off the edge to the seafloor. The track-front-end loader would swing in a semicircle to spread any given boulder load evenly on the sea floor in a single layer. Numerous ~~track~~front-end loader bucket loads would be required to complete a line. The front-end~~track~~ loader would place rocks along a 25- to 100-foot line (depending on the amount of space available on the supply barge deck). After completing the line, the entire rig (derrick barge plus supply barge) would be moved to the next line by manipulating the anchor winches, and the process continued until reaching the edge of the polygon. After reaching the edge of the polygon, the entire rig would be moved laterally and the process would be repeated in the opposite direction (either northwest or southeast) until the polygon is complete.

Upon completion of a polygon, the derrick barge and attached supply barge would be positioned at the southern edge of the next module using the anchor/winch control system and differential GPS. The design of the anchoring locations would minimize the number of anchor relocations required during the construction process.

Figure 2-3. Proposed Construction Equipment and Configuration



2.3.4 Monitoring

2.3.4.1 Monitoring Methods for Existing Wheeler North Reef (Phases 1 and 2)

The CCC CDP requires monitoring by independent scientists to: (1) determine whether the performance standards established for the mitigation reef are met; (2) determine, if necessary, the reasons why any performance standard is not met; and (3) recommend appropriate remedial measures. The CCC CDP also requires the scientists to develop a monitoring plan for the mitigation reef that describes the sampling methodology, analytical techniques, and methods for measuring the performance of the mitigation reef relative to the performance standards identified in the CCC CDP.

University of California Santa Barbara scientists produced a monitoring plan for Wheeler North Reef (Appendix B) that contains: (1) the 13 performance standards by which the mitigation reef will be evaluated for condition compliance and the general approach to determine the overall success of the Project (see Section 2.2, *Project Objectives*); (2) descriptions of the specific sampling methods and analyses to evaluate each of the 13 performance standards; (3) an explanation of how Project data will be managed and archived; and (4) a description of how the results from the monitoring program will be disseminated to the CCC, SCE, and all other interested parties. A summary of the existing monitoring methodology is provided below. For more details, please refer to Appendix B, *2018 Monitoring Plan for the SONGS' Reef Mitigation Project*, of this Subsequent EIR or the 2017 annual report (CCC 2018). Monitoring data are evaluated annually to determine if changes need to be made to the sampling program.

For comparison, SMK and BK (adjacent to the southern end of Wheeler North Reef and approximately 7 miles south of SMK, respectively) were chosen as “reference” reefs based on several criteria established by the scientists.[4] Sampling is conducted at 82 monitoring locations, each defined by a fixed 50 meter (m) by 20 m area, in the primary polygons at Wheeler North Reef, and at SMK and BK in areas known to support persistent kelp. Sampling occurs concurrently from late spring to early autumn on an annual basis, and divers access the sites using small boats. An additional 10 monitoring locations are sampled in two contingency polygons at Wheeler North Reef. Data collected from these additional 10 transects are used with data from the 82 transects when evaluating the absolute performance standards pertaining to giant kelp and fish standing stock. Transects on each reef are arranged in pairs with the two transects in each pair spaced 25 m apart. The exceptions to this are the single transects located on 12 of the Phase 1 modules of Wheeler North Reef.

[4] Reference reefs must: (1) not be influenced by SONGS operations; (2) be located at a depth similar to the Wheeler North Reef; (3) be primarily low relief, preferably consisting of cobble or boulders; and (4) have a history of sustaining giant kelp at medium to high densities (this latter criterion is important because communities on reefs without giant kelp can differ dramatically from those with kelp).

Each transect acts as a “sampling station” on which divers measure several factors using various methods. For fish, divers count, identify species, and estimate total length (to the nearest centimeter) of each fish observed in a 3 meter (m) wide x 1.5 m high x 50 m long volume centered above a measuring tape placed along the bottom of each replicate 50 m transect. For aggregating species (e.g., blacksmith [*Chromis punctipinnis*] or salema [*Xenistius californiensis*]), the number and mean length of individuals in a group are estimated. Cryptic fishes (e.g., cottids, gobies, blennies) are recorded in a 2 m wide swath centered along the transect as divers return after completing the sampling of less cryptic fish (Appendix B). For fish, the biomass of each species within a transect is calculated by multiplying the number of fish in each life-stage by the average weight of the life stage and summing over all life stages. The biomass densities of all species encountered on a transect are summed to estimate a total biomass of fish within each transect. This value is averaged across all transects, converted to U.S. tons per acre, and multiplied by the total reef area (in acres) to obtain an estimate of the standing stock of bottom-dwelling fish at the Wheeler North Reef (Appendix B).

Adult giant kelp, large understory algae, and large mobile invertebrates are counted in five 10- by 2-m rectangular quadrats positioned perpendicular to the main transect at 10-m intervals. The percent cover of invertebrates, algae, and bottom substrate are estimated by quantifying cover within five 1-m quadrats spaced evenly along each transect. Smaller mobile invertebrates are counted in similar-sized or smaller quadrats, depending on their size and abundance.

2.3.4.2 Monitoring Methods for Expanded Wheeler North Reef (Phase 3)

An approach for monitoring of the new reef area is still under development by the UCSB scientists and CCC staff. The intent of this approach is to maintain the same level of overall monitoring activity but still provide enough information to adequately assess compliance of Phases 1, 2 and 3 with the mitigation requirements. Because the proposed Project is intended to meet the CCC CDP mitigation requirements and will be incorporated into the existing UCSB mititgation monitoring program, the monitoring plan would be updated to account for the additional area and similar monitoring methodology, described above in Section 2.3.4.2, would be used.

2.3.4.3 Monitoring Duration

As required by the CCC CDP, the Wheeler North Reef must be monitored for a period equivalent to the operating life of SONGS. The CDP also stipulates that monitoring can be reduced to annual site inspections when the Wheeler North Reef has complied with all permit standards for at least 3 consecutive years and evaluated for at least 10 years post-construction; CCC staff scientists in coordination with the UCSB monitoring team and the Science Advisory Panel would design and implement the reduced monitoring program. During reduced monitoring, if the Wheeler North Reef falls out of compliance for 2 consecutive years, then the CCC Executive Director may reinstitute full monitoring for those standards that are out of compliance for the Project duration or until compliance is reestablished. If resumption of full monitoring leads to the conclusion that noncompliance is due to poor performance of the Wheeler North Reef, SCE would be responsible for implementing any other remedial measures deemed necessary by the CCC Executive Director.

2.3.5 Applicant-Proposed Measures

The Project includes the following Applicant-Proposed Measures (APMs) to address Project construction activities. The APMs would be monitored by CSLC staff or CSLC contracted monitors along with the Project's overall Mitigation Monitoring Program (see Section 7, *Mitigation Monitoring Program*).

- APM-1. Anchoring Plan
- APM-2. Forecast Notification
- APM-3. Local Notice to Mariners

2.3.6 Proposed Project Schedule

Based on the current schedule, reef construction is expected to occur over approximately 130 days between May 1 and October 1, 2019. This construction timing would allow the Project Applicant to avoid the lobster-fishing season[5] and to benefit from the calm weather conditions that are typical of that time of year in Southern California.

The construction period is controlled by weather conditions, the time required to move from one site to another, and the tonnage of rock placement per day (estimated at 1,750 tons of rock per day). The anchoring plan (APM-1) has been designed so that minimal time would be spent moving the barge from one location to another. Based on reputable weather forecasts, 24 hours before forecasts indicate conditions that would generate ground swells (waves) greater than 5 feet, all construction vessels would be withdrawn to a safe location (APM-2). A safe location could include a nearby area where vessels can be anchored safely, deeper waters, or Long Beach Harbor.

Construction would be carried out during daylight hours 6 days a week (Monday through Saturday), except on holidays and during inclement weather (no construction would be performed if wave heights are larger than 4 feet). On-site work would begin no earlier than 7:00 a.m. and would be halted no later than 7:00 p.m. The average workday placing quarry rock at the Project site is expected to be about 10 hours. Transport of quarry rock would occur for approximately 88 days during the 130-day construction schedule. Prior

[5] As of 2018, lobster traps can be deployed up to 9 days before the beginning of lobster season on the first Wednesday of October. Assuming the rules remain the same, lobster fishermen may begin placing traps September 23, 2019. Therefore, there is a potential for some overlap of final project activities with commercial lobster activities.

to and during construction, information on the offshore Project would be provided through a Local Notice to Mariners issued by the U.S. Coast Guard, 11th District (APM-3).

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3.0 CUMULATIVE PROJECTS

State California Environmental Quality Act (CEQA) Guidelines section 15130 requires that an Environmental Impact Report (EIR) discuss cumulative impacts of a project when the project's incremental effect may be cumulatively considerable.[6] As defined in State CEQA Guidelines section 15355:

> *Cumulative impacts refer to two or more individual effects, which, when considered together, are considerable or which compound or increase other environmental impacts. (a) The individual effects may be changes resulting from a single project or a number of separate projects. (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

State CEQA Guidelines section 15130 includes the following additional guidance.

- Subdivision (a)(1) – An EIR should not discuss cumulative impacts which do not result in part from the project evaluated in the EIR.
- Subdivision (a)(2) – When the combined cumulative impact associated with the project's incremental effect and the effects of other projects:
  - Is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR
  - Is less than significant, the Lead Agency shall identify facts and analysis supporting this conclusion
- Subdivision (b) – The discussion of cumulative impacts:
  - Shall reflect the severity of the impacts and their likelihood of occurrence
  - Need not provide as great detail as is provided for the effects attributable to the project alone
  - Should be guided by the standards of practicality and reasonableness
  - Should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact

Key elements to consider when assessing cumulative impacts include:

[6] "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (State CEQA Guidelines, § 15065, subd. (a)(3)).

- The type and characteristics of the resource (e.g., aesthetics, air quality, biological resources, cultural resources)
- The geographic (spatial) limits of a cumulative effect; for example, noise impacts are typically localized, while air quality impacts tend to disperse over a large area
- The timing and duration of the proposed Project relative to the past, present, and reasonably foreseeable cumulative projects identified (such as the construction season for temporary construction projects or long-term operation if applicable)

3.1 METHODOLOGY

For the Wheeler North Reef Expansion Project (Project), closely related development projects that are in the planning stages, adopted, under construction, or completed are listed in Table 3-3 at the end of this section (see also Figure 3-1). Information on each cumulative project was provided by the city of San Clemente or obtained from publicly available sources and was current as of January 19, 2018 (the issue date of the Notice of Preparation for this Subsequent EIR). Projects that were not foreseeable at the time the CEQA analysis was initiated would likely generate impacts similar to those of the projects listed in Table 3-3. Cumulative impacts evaluated in this Subsequent EIR would likely represent a “worst-case” scenario since not all the cumulative projects will be approved, constructed, or coincide with Project activities. Other projects would likely be, or have been, subject to unspecified mitigation measures that would reduce their impacts and thereby reduce the potential for contributing to cumulative impacts.

To assess if impacts of the proposed Project and closely related projects are cumulatively considerable, this Subsequent EIR considers the following circumstances: the type of resource affected; the proximity of the projects; where an impact might occur (e.g., offshore, onshore, both); when projects may occur; and the short-term, temporary nature of the proposed Project’s construction impacts. The geographic scope of cumulative effects may extend beyond the scope of the direct, but not indirect, Project effects. The geographic scope of cumulative effects may be broader than that illustrated in Figure 3-1 for certain environmental disciplines where impacts could combine in broad areas (e.g., air quality and marine biological resources; this is described in each section’s analysis). In addition, each project has its own implementation schedule, which may or may not overlap with the proposed Project schedule.

3.1.1 Geographic Scope of Proposed Project

The cumulative projects study area (as defined in Section 1.3.3, *Cumulative Impact Analysis*) covers the two Project stages: transport and construction (Table 3-1).

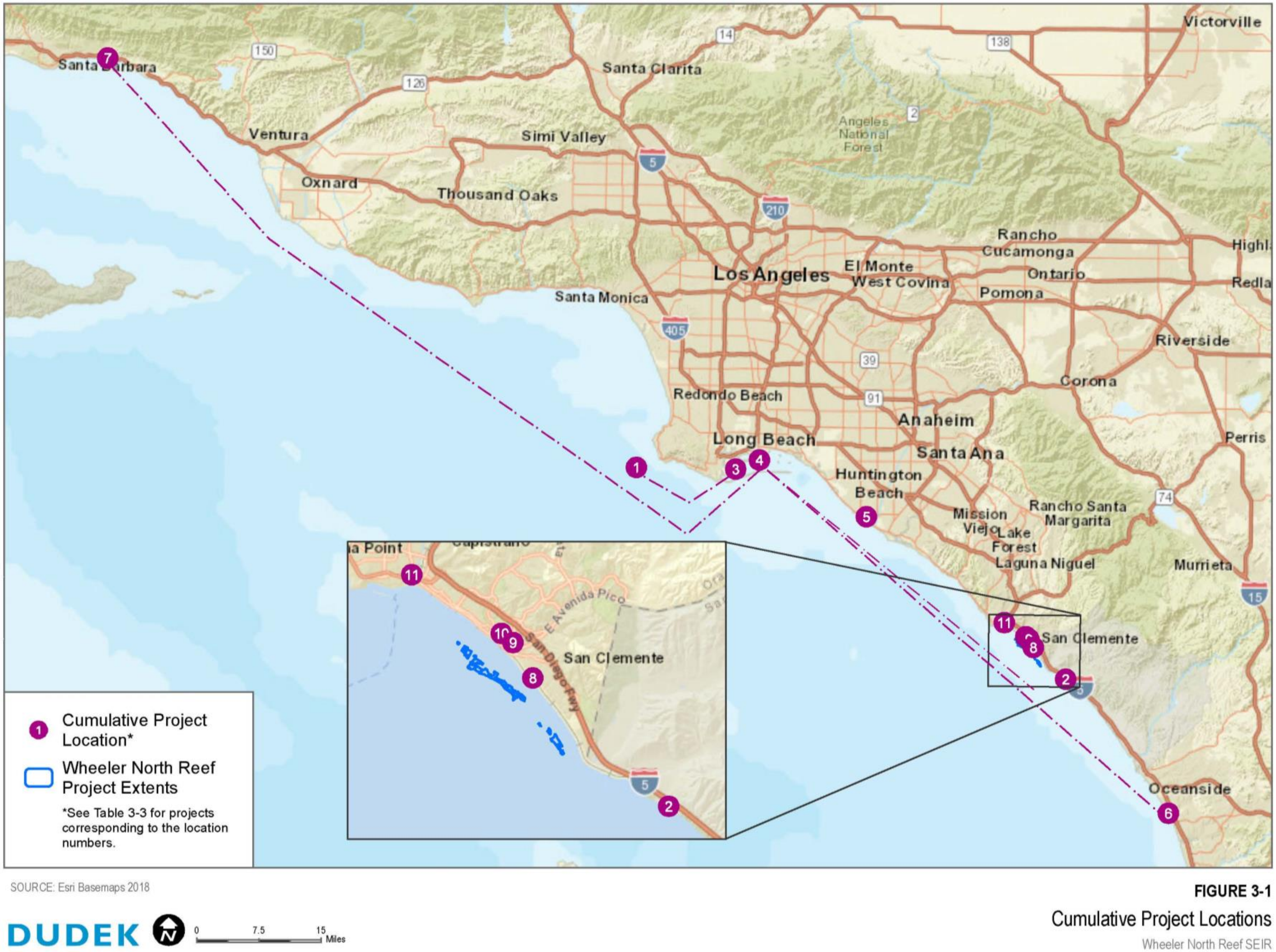

FIGURE 3-1

Cumulative Project Locations

Wheeler North Reef SEIR

Table 3-1. Project Activities and Location

Stage	Project Component	Location
Transport of Quarry Rock Along Vessel Routes	Transport between the Project site and Santa Catalina Island quarries (≥ 86 percent of rock)	~42 nm
	Transport between the Project site and a quarry in Ensenada, Mexico (≤ 14 percent of rock)	~103 nm
Reef Construction	Anchoring the barges	Project site
	Constructing the reef using a front-end ~~track~~ loader on the supply barge to place the quarry rock on the seafloor	Project site

Where applicable, the scope of each resource evaluated (aesthetics, biological resources, etc.) includes the natural boundaries of the resource affected (e.g., topography), rather than jurisdictional boundaries. Since the Project's construction activities would occur over a stretch of coastline, the localized geographic scope for multiple resource areas, identified as "San Clemente area" in Table 3-2, is ocean waters less than 0.5 mile from shore from south of Dana Point to San Mateo Point.

Table 3-2. Generalized Scope of Cumulative Analysis by Resource/Issue Area

Resource/Issue Area	Geographic Scope of Cumulative Analysis	
	Localized	Regional
Biological Resources (Marine) (BIO)	San Clemente area	Coastal Orange/LA/SD Counties
Aesthetics (AES)	San Clemente area	
Air Quality (AQ)		South Coast/SD AQMDs
Cultural Resources (CR)	San Clemente area	Orange County
Cultural Resources – Tribal (TCR)	San Clemente area	Orange County
Geology and Coastal Processes (GEO)	San Clemente area	Southern California
Greenhouse Gas Emissions (GHG)		South Coast/SD AQMDs
Hazards and Hazardous Materials (HAZ)	San Clemente area	Orange County
Land Use and Planning (LU)	San Clemente area	Orange County
Mineral Resources (MIN)		Orange County
Noise (NOI)	San Clemente area	
Ocean Water Quality (OWQ)	San Clemente area	Coastal Orange/LA/SD Counties
Public Services (PUB)	San Clemente area	Orange County
Recreation (REC)	San Clemente area	Coastal Orange/LA/SD Counties
Transportation (Marine) (TR)	San Clemente area	Coastal Orange/LA/SD Counties

Acronyms: AQMD = Air Quality Management District; LA = Los Angeles; SD = San Diego.

3.1.2 Project Timing

As stated in Section 2.3.6, *Proposed Project Schedule*, Project construction is proposed to occur from May 1 to October 1, 2019. This construction timing would allow the Project Applicant to avoid the lobster-fishing season and to benefit from the calm weather conditions that are typical of that time of year in Southern California.

3.2 CUMULATIVE PROJECTS RELATED TO REEF EXPANSION AREA

For the proposed offshore reef expansion project, local and regional offshore and onshore coastal projects may contribute to cumulative impacts depending on the resource affected. Several closely related projects (i.e., projects that could affect the same resources, in the same localized or regional area, or at the same time as the proposed Project) are summarized below (see the full list in Table 3-3 at the end of this section). Figure 3-1 is numbered in accordance with Table 3-3. Cumulative impacts are evaluated in Sections 4.1 through 4.14.

3.2.1 Offshore Regional Projects or Projects Related to Barge Shipping Routes

3.2.1.1 Palos Verdes Reef Restoration Project

The Palos Verdes Reef Restoration Project is the project most closely related to the proposed Project as it would also require quarry rock to supplement a reef and vessel trips through the region to transport the rock. Specifically, the project would place about 70,300 tons of quarried rock on 40 acres of sandy ocean bottom within a 69-acre site offshore the city of Rancho Palos Verdes, approximately 50 miles northwest of the proposed Project area. Quarry rock would be transported to the site via tugboat and barge from existing quarries on Santa Catalina Island, and construction would occur between May 1 and September 30, 2018, with an estimated range of 40 to 60 total days of construction (National Oceanic and Atmospheric Administration [NOAA] 2017). In comparison, the proposed Project would use up to 175,000 tons of quarry rock from Santa Catalina Island and Ensenada, Mexico quarries, placed on approximately 210 acres of submerged lands to expand an existing artificial reef [see Table 2-2]). As federal and lead agencies, NOAA and the CSLC prepared an Environmental Assessment (EA) and a Negative Declaration for the project, respectively. The CSLC approved this project in February 2018 (Item 89, February 27, 2018).

3.2.1.2 San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 Decommissioning

The decommissioning of SONGS Units 2 and 3 would occur both onshore at Marine Corps Base Camp Pendleton, south of the San Clemente area in northern San Diego County, and in nearshore waters adjacent to SONGS. As CEQA lead agency, the CSLC is preparing an EIR for this project. Nearshore work includes the final disposition of the seawater intake and discharge conduits; this would involve mobilizing offshore construction barges and equipment, which would be transported between the project site and the POLB. According to the Applicant, proposed offshore work is anticipated to take place in 2023 (Southern California Edison 2018).

3.2.1.3 Port of Los Angeles (POLA)/Port of Long Beach (POLB) Projects

Other projects planned for area ports (Long Beach and Los Angeles) or involving offshore construction/deconstruction could cause an increase in marine traffic throughout the region. These projects may involve increases in shipping and subsequently increased capacity of the ports.

- POLA Berth Improvement Projects. Multiple berths at the POLA are undergoing planned improvement projects, including optimization of operations and regulatory compliance, some of which could produce increases in shipping.
- POLB Middle Harbor Redevelopment Project and Pier G modernization. The Middle Harbor Redevelopment Project would combine two shipping terminals into one state-of-the-art container terminal. The program is adding on-dock rail capacity, shore power hookups, and a new longer wharf to move twice the cargo with half the air pollution. The first phase of the $1.3 billion project was started in March 2016. This project is scheduled for completion in 2019. Pier G modernization is a multi-year renovation of the International Transportation Service container terminal. The port has added a new terminal Administration and Operations Complex, new Maintenance and Repair Facility, and a new West Arrival Building. A new on-dock rail yard has also been completed, nearly doubling the terminal's capacity for on-dock rail.

3.2.2 Local Onshore Cumulative Projects in San Clemente Area

Several onshore residential, institutional, recreational, and commercial projects in the San Clemente and Dana Point areas are near the proposed Project site. These projects could directly contribute to cumulative impacts in nearshore waters.

3.2.2.1 San Clemente Beach Replenishment Project

This proposed sand replenishment project is intended to mitigate beach erosion by widening the beach by 50 feet along an approximately 0.65-mile stretch of the central portion of San Clemente’s shoreline from Linda Lane to South T-Street beaches. This section of beach would be periodically replenished with sand about every 6 years over the course of a 50-year project life. The construction phase of the project is anticipated to begin in 2018. The project would place approximately 200,000 cubic yards per year of sand on or in the near-shore environment at two designated beach sites, North Beach (up to 10.3 acres) and Linda Lane (up to 7.6 acres). Beach nourishment materials would be transported to the beach site via truck or train, then placed using conventional earth moving equipment.

3.2.2.2 Marblehead Coastal Development Project

The Marblehead Coastal Development Project has been in planning and development for the last 10 years and recently received a coastal development permit (CDP) from the California Coastal Commission. The original project was evaluated in a 2003 EIR that allowed development of a regional commercial center, and visitor-serving commercial, and residential uses. Several subsequent addenda have refined and reduced the scope of uses from the original EIR to development of 248 acres of land. Phase 1 construction of the 641,000-square-foot outlet shopping center was completed with several buildings that are currently in operation with outlet stores and restaurants. Phase 2 of the outlet project is approved but unbuilt and includes the development of additional specialty retail stores, restaurants, and a movie theater. There is also an approved but unbuilt hotel site located on a parcel across a small canyon from the outlet center and a planned community (Sea Summit residential community) to the north and west of the existing outlet center. At this time, the Sea Summit residential community is still under development and at full buildout will have 313 residential properties in four neighborhoods and a middle school. The topography of the site consists of bluffs above the Pacific Ocean and more hilly terrain inland. Elevations at the site range from approximately 38 feet to 142 feet above mean sea level where the outlet center and parking lot are located. Due to the uncertainty of the additional Marblehead Coastal projects moving forward in the foreseeable future, they are not likely to occur at the same time as the proposed Project.

3.2.2.3 Doheny Ocean Desalination Plant

Doheny Ocean Desalination Plant is an ocean water desalination facility proposed in Dana Point. This project would install a subsurface water intake system consisting of subsurface slant wells that would draw in offshore subsurface alluvial material, a water conveyance pipeline, an approximately 10.4 acre 5 to 15 MGD desalination facility, a concentrate (brine) disposal system, and associated storage and appurtenant facilities. The Draft EIR for this project, which was published on May 18, 2018, anticipates that Phase 1 would start construction in October 2019, and would be complete by December 2021.

Table 3-3. Relevant Cumulative Projects in General Project Area

Project No./Name and Location		Description	Status	Resource(s) Affected														
				BIO	AES	AQ	CUL	TCR	GEO	GHG	HAZ	LU	MIN	NOI	OWQ	PUB	REC	TR
Offshore Cumulative Regional and Marine Transit Projects																		
1	**Palos Verdes Reef Restoration Project.** Offshore city of Rancho Palos Verdes, Orange County, ~50 miles northwest of Wheeler North Reef, and vessel routes between site and Santa Catalina quarries	Natural Resources Damage Assessment (NRDA) project to supplement an existing natural reef by placing about 70,300 tons of quarried rock on 40 acres of sandy ocean bottom	CSLC adopted Negative Declaration and approved project on 2/27/18. If approved, work could occur after 5/1/18 and end 9/30/18 (40 to 60 days)	●	●	●				●	●		●	●	●		●	●
2	**San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 Decommissioning.** Marine Corp Base Camp Pendleton and offshore San Diego County	Decommission SONGS Units 2 and 3 both onshore and offshore, with the offshore portion involving mobilizing and using offshore construction barges and equipment and transportation	Final EIR in progress. If approved, offshore work is anticipated to occur in 2023	●	●	●	●	●		●	●			●	●	●	●	●
3	**Port of Los Angeles Berth Improvement Projects.** Construction in the Port of Los Angeles	Various berth improvement projects	Varies			●				●	●				●	●		●

Table 3-3. Relevant Cumulative Projects in General Project Area

Project No./Name and Location		Description	Status	Resource(s) Affected														
				BIO	AES	AQ	CUL	TCR	GEO	GHG	HAZ	LU	MIN	NOI	OWQ	PUB	REC	TR
4	**Port of Long Beach (POLB) Middle Harbor Redevelopment Project and Pier G Modernization.** Construction in POLB	Current phase is renovating Pier F container terminal, filling an additional 40 acres of harbor, and expanding the on-dock rail yard from 10,000 to 75,000 linear feet	First phase completed in 2016, remainder by 2020			●				●	●				●	●		●
5	**Poseidon Seawater Desalination at Huntington Beach Project.** Offshore lease conduit modifications and offshore waters between POLB and Huntington Beach (northward)	Offshore pipeline modification and marine transport of construction equipment round trips	CSLC certified Supple-mental EIR in October 2017	●	●	●				●	●				●	●	●	●
6	**Cabrillo Power I LLC Encina Marine Oil Terminal Decommissioning Project.** Encina Power Station, Carlsbad	Marine transport of construction equipment round trips between POLB and southward	In progress	●	●	●				●	●				●	●	●	●
7	**Becker and Legacy Wells Abandonment and Remediation Project.** Summerland Beach, Santa Barbara County	Marine transport of construction equipment round trips between POLB and northward	Completed 3/1/18			●				●								

Table 3-3. Relevant Cumulative Projects in General Project Area

Project No./Name and Location		Description	Status	Resource(s) Affected														
				BIO	AES	AQ	CUL	TCR	GEO	GHG	HAZ	LU	MIN	NOI	OWQ	PUB	REC	TR
Local Onshore Cumulative Projects in San Clemente Area																		
8	**San Clemente Beach Replenishment Project.** Linda Lane to South T St. beaches (~0.65 mile), San Clemente	Section of beach would be periodically replenished with sand about every 6 years over 50-year project life	Periodic projects	●	●	●	●				●	●	●	●	●	●	●	●
9	**Marblehead Coastal Development including the Sea Summit Residential Community** 248 acres of coastal property in San Clemente	Oceanfront mixed-use development that includes hotel, movie theater, restaurants, and specialty retail (named Plaza San Clemente) and a 248-acre residential community that will have 313 residential homes at full buildout	Phase 1 outlet center is built; Phase 2 approved but unbuilt; Sea Summit Residential Community is under construction		●	●				●	●	●		●		●		
10	**Shorecliffs via Ballena Storm Drain Project.** Cascadita Canyon adjacent to 12 single-family residences that front Via Ballena, San Clemente	Via Ballena and all utilities in that area (water supply lines, storm drain lines, sewer lines) are owned/ maintained by city of San Clemente	Under construc-tion		●	●				●	●	●		●	●	●		

Table 3-3. Relevant Cumulative Projects in General Project Area

Project No./Name and Location		Description	Status	Resource(s) Affected														
				BIO	AES	AQ	CUL	TCR	GEO	GHG	HAZ	LU	MIN	NOI	OWQ	PUB	REC	TR
11	**Doheny Ocean Desalination Project**	Desalination plant built just north of Doheny Park, brine discharge to sea via existing San Juan Creek Ocean Outfall	Public review of the Draft EIR ended August 2018	●	●	●	●			●	●			●	●		●	●

Acronyms: AES = Aesthetics; AQ = Air Quality; BIO = Biological Resources (Marine); CUL = Cultural Resources; EIR = Environmental Impact Report; GEO = Geology and Coastal Processes; GHG = Greenhouse Gas Emissions; HAZ = Hazards and Hazardous Materials; LU = Land Use and Planning; MIN = Mineral Resources; NOI = Noise; OWQ = Ocean Water Quality; PUB = Public Services; REC = Recreation; TCR = Cultural Resources–Tribal; TR = Transportation (Marine).

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4.0 ENVIRONMENTAL IMPACT ANALYSIS

INTRODUCTION

As noted in Section 1.0, *Introduction*, the California Coastal Commission (CCC) Coastal Development Permit (CDP) No. 6-81-370-A requires Southern California Edison (SCE), to expand the Wheeler North Reef offshore the city of San Clemente (City), Orange County. In Section 4.0 of this Subsequent Environmental Impact Report (EIR), the California State Lands Commission (Commission or CSLC), as lead agency under the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.), discloses and analyses the potential significant environmental impacts of the Wheeler North Reef Expansion Project (Project). Table 4-1 lists the environmental issues evaluated in this Subsequent EIR and the 1999 Program EIR that the Commission certified for Wheeler North Reef Phases 1 and 2 (Item 72 and Item 73, June 14, 1999), which is incorporated by reference (see Section 1.2.2, *Rationale for Preparing a Subsequent EIR*, and Appendix B).

Table 4-1. Environmental Issues

Issue	Section Where Issue Analyzed	
	Subsequent EIR	**1999 PEIR**
Biological Resources (Marine)	4.1	4.6
Aesthetics	4.2	4.11
Air Quality	4.3	4.4
Cultural Resources	4.4	4.12
Cultural Resources – Tribal	4.5	
Geology and Coastal Processes	4.6	4.3
Greenhouse Gas Emissions	4.7	Not analyzed
Hazards and Hazardous Materials	4.8	4.8
Mineral Resources	4.9	4.7
Noise	4.10	4.9
Ocean Water Quality	4.11	4.14
Public Services	4.12	4.10
Recreation	4.13	4.13
Transportation (Marine)	4.14	4.5
Agriculture and Forestry Resources	Not analyzed (see discussion below)	Not analyzed
Biological Resources (Terrestrial)		
Hydrology and Water Quality (Onshore)		
Land Use and Planning		4.1
Population and Housing		4.2
Transportation/Traffic (Onshore)		4.5
Utilities and Service Systems		4.10
Energy		4.7
Socioeconomics (commercial and recreational fishing, population, housing)	8.3 (Commercial Fishing) and 4.13 (Recreation)	4.2

Acronyms: EIR = Environmental Impact Report; PEIR = Program EIR.

Each environmental issue analyzed in Section 4.0 of this Subsequent EIR describes the existing environmental setting (i.e., baseline conditions prior to Project implementation), and defines the relationship between baseline conditions and potential Project impacts. Information sources include geographic information system (GIS) data, peer-reviewed articles, and environmental reports, studies, or planning documents prepared by or for other agencies (e.g., CCC, CSLC, California Department of Fish and Wildlife, City). Each section also describes the approach used to analyze impacts, determines whether each identified impact is significant or not, and recommends mitigation measures (MMs) if applicable to reduce or avoid the Project's significant impacts. Throughout Section 4.0, numbered statements are used to identify impacts, and MMs are numbered to correspond to the impacts they address (e.g., Impact AQ-1, MM AQ-1a).

TIMING OF PROJECT ELEMENTS

Based on the current schedule, reef construction is expected to occur over approximately 130 days in May through and September 2019. Information is disclosed in this Subsequent EIR where possible based on the best available information to date or using reasonable assumptions as to the activities required. This is consistent with the State CEQA Guidelines, which states:[7]

- Drafting an EIR … necessarily involves some degree of forecasting. While foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can (§ 15144).
- If, after thorough investigation, a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (§ 15145).

NO IMPACTS / NO SIGNIFICANT IMPACTS

Based on an initial review and analysis, the Project would have no impact or a less-than-significant impact on a few environmental issues listed in Table 4-1. Therefore, these issues are not reviewed in this Subsequent EIR. Consistent with the State CEQA Guidelines, the statements below indicate "the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR" (§ 15128).

[7] In *Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal. 3d 376, the California Supreme Court commented that an agency is required to forecast only to the extent that an activity could be reasonably expected under the circumstances. An agency cannot be expected to predict the future course of governmental regulation or exactly what information scientific advances may ultimately reveal. The court also noted that where future development is unspecified and uncertain, no purpose can be served by requiring an EIR to engage in sheer speculation as to future environmental consequences.

Agriculture and Forestry Resources

The Project would have no impact on agriculture or forestry resources because Project construction activities, which are temporary in nature, would occur offshore (aside from mining and staging of quarry rock from permitted quarries in areas with no agricultural or forest land) and because the Project would not:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (to non-agricultural use)
- Conflict with existing zoning for agricultural use, or a Williamson Act contract
- Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production
- Result in the loss of forest land or conversion of forest land to non-forest use
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use

Biological Resources (Terrestrial)

The Project would have no impact on terrestrial biological resources because Project construction activities would occur offshore (aside from mining and staging of quarry rock from permitted quarries) and because the Project would not:

- Have a substantial adverse effect, either directly or through habitat modifications, on any terrestrial species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service
- Have a substantial adverse effect on federally protected onshore wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory inland fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting terrestrial biological resources, such as a tree preservation policy or ordinance

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan related to terrestrial biological resources

Section 4.1, *Biological Resources (Marine)*, discusses potential significant impacts to marine biological resources.

Hydrology and Water Quality (Onshore)

The Project would have no impact on onshore hydrology or water quality because Project construction activities, which are temporary in nature, would occur offshore (aside from mining and staging of quarry rock from permitted quarries) and because the Project would not:

- Violate any water quality standards or waste discharge requirements for onshore discharges
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off site
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
- Otherwise substantially degrade onshore water quality
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows
- Expose people or structures to a significant risk of loss, injury, or death involving:
    - Flooding, including flooding as a result of the failure of a levee or dam
    - Inundation by seiche, tsunami, or mudflow

Section 4.11, *Ocean Water Quality*, discusses related impacts to ocean waters.

Land Use and Planning

The Project would have no impact on land use and planning because Project construction activities, which are temporary in nature, would occur offshore (aside from mining and staging of quarry rock from permitted quarries) and because the Project would not:

- Physically divide an established community
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect
- Conflict with any applicable habitat conservation plan or natural community conservation plan

As noted above, the reef expansion is required by the CCC pursuant to CDP No. 6-81-370-A.

Population and Housing

The Project would have no impact on population and housing because Project construction activities, which are temporary in nature, would occur offshore (aside from mining and staging of quarry rock from permitted quarries) and because the Project would not:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere

Transportation/Traffic (Onshore)

Because the proposed quarries have direct marine access for the loading of reef-building materials, truck hauling over public highways will be unnecessary. The only ground transportation associated with the Project would be the personal vehicles used by the 15 crew members needed for the proposed Project. According to the County of Orange's Growth Management Plan Transportation Implementation Manual, a traffic analysis is not warranted if the land use generates less than 200 trips (County of Orange 2012). Roads associated with the harbor are public roads with acceptable volumes of local traffic. Project construction activities, which would occur offshore (aside from mining and staging of quarry rock from permitted quarries), would not cause significant onshore transportation or traffic impacts because it would not:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and nonmotorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit
- Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities

Section 4.14, *Transportation (Marine)*, discusses potential significant impacts associated with marine vessel traffic.

Utilities and Service Systems

The Project would have no impact to utilities and public service systems because Project construction activities, which are temporary in nature, would occur offshore (aside from mining and staging of quarry rock from permitted quarries) and because the Project would not change the demand for utilities (e.g., potable water or wastewater), generate significant volumes of solid waste (all solid waste generated on board the derrick barge and other vessels would be recycled or sent to an approved disposal site) or generate new requirements for infrastructure, electricity, or wastewater in the Project area during or after expansion of the Wheeler North Reef. Specifically, the Project:

- Would not exceed wastewater treatment requirements of the San Diego Regional Water Quality Control Board
- Would not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects

- Would not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Would have sufficient water supplies available to serve the Project from existing entitlements and resources (no new or expanded water supplies or entitlements are needed)
- Would not require additional capacity to serve the Project's projected wastewater demand in addition to the provider's existing commitments
- Would be served by a landfill or recycling facility with sufficient permitted capacity to accommodate the Project's solid waste disposal needs
- Would comply with federal, state, and local statutes and regulations related to solid waste

Energy

Appendix F of the State CEQA Guidelines requires EIRs to discuss potential energy impacts of proposed projects to ensure that energy implications are considered in project-related decision-making processes. The State CEQA Guidelines do not provide thresholds for impacts associated with energy consumption; however, based on Appendix F guidance for evaluating if a project may have significant impacts regarding energy conservation, a project could have a significant impact if the Project would "Use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner."

As shown in Table 4-2, Project-related construction activities would consume an estimated 80,140 gallons of petroleum (diesel or gasoline); any natural gas or electricity that may be consumed as a result of Project implementation would be temporary and negligible. Post-construction monitoring would not increase following Project completion as existing monitoring efforts would shift to the expansion reef with fewer areas of the existing Phase 1 and Phase 2 reef monitored (see Section 2.0, *Project Description*). Diesel fuel consumed by marine vessels transporting quarry rock would be the primary energy resource expended; construction equipment and worker commutes would also use petroleum. There is no alternative way to obtain quarry rock for the Project or construct the Project that would consume less energy. The proposed petroleum use would equate to 0.00001 percent of the approximately 6.3 billion gallons of petroleum that would be consumed statewide during the construction period (based on California Energy Commission [2016] data that show California's petroleum consumption is approximately 52.9 million gallons per day). Given these considerations, the petroleum consumption associated with the Project would not be considered inefficient or wasteful.

Table 4-2. Project Petroleum Demand

Equipment Type	Vessel CO_2 (MT)	kg/CO_2/ gallon	Gallons	Rounded Total
Marine Vessel Diesel Demand[1]				
Tugboat (1,520 engine hours)	340.44	10.21	33,344.23	
Attending Tugboat (3,240 engine hours)	254.74	10.21	24,950.22	**59,704**
Crew Boat (240 engine hours)	14.39	10.21	1,409.08	
Construction Equipment Diesel Demand[1]				
~~Track~~ Front-End Loader (1)	29.72	10.21	2,911.06	
Crane (1)	12.69	10.21	1,243.01	**18,897**
Generator (1)	150.53	10.21	14,743.09	
Construction Worker Gasoline Demand[1,2]				
Commute Trips	13.52	8.78	1,539.33	**1,539**
			Total	**80,140**

Source: Appendix C; kg/CO_2/gallon (The Climate Registry 2016).
Acronyms: CO_2 = carbon dioxide; MT = metric ton; kg = kilogram.
Notes:
1 Fuel consumption is estimated by converting the total CO_2 emissions from each construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. The conversion factor for gasoline is 8.73 kilograms per metric ton CO_2 per gallon (kg/MT CO_2/gallon), and the conversion factor for diesel is 10.21 kg/MT CO_2/gallon (The Climate Registry 2017).
2 This analysis assumes that workers would travel to and from the port in passenger vehicles using gasoline; the workers would then board a crew boat to travel to the derrick crane or tugboat.

ASSESSMENT METHODOLOGY

Environmental Baseline and Setting

Baseline conditions are defined as the existing physical environmental setting that may be affected by a project (State CEQA Guidelines, § 15125, subd. (a)) (see Section 1.3.1, *Baseline Conditions*). The baseline physical conditions by which impacts from the Project (defined as changes to the environmental setting attributable to Project components or activities) and alternatives are determined to be significant is as follows.

- The existing Wheeler North Reef Phases 1 and 2 are part of the environmental baseline for analysis in this Subsequent EIR.
- Construction activities would be performed offshore. Construction vessels would travel to these work areas from ports. Onshore conditions are therefore not described for many resources.

Regulatory Setting

Each of the environmental issues is considered in terms of the federal, state, regional, and local laws, regulations, and policies applicable to the issue. Appendix D summarizes applicable federal and state laws, regulations, and policies; applicable regional and local laws, regulations, and policies are identified in each environmental issue section of Section 4.0 or referenced from the 1999 Program EIR.

Significance Criteria

Significance criteria are identified for each environmental issue; these criteria serve as benchmarks for determining if the Project would result in significant environmental impacts when evaluated against the baseline. A significant effect on the environment means "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project…" (State CEQA Guidelines, § 15382). Significance criteria relevant to each section are drawn from a variety of sources, including the 1999 Program EIR significance criteria, Appendix G of the State CEQA Guidelines, and other applicable local regulatory agency policies and standards indicated within each section. Some impact categories in this Subsequent EIR lend themselves to scientific or mathematical analysis and quantification, while others are more qualitative. Some issues, such as air quality, have significance thresholds established by agencies with regulatory authority for that resource. Significance criteria selection and the determination of impact significance are based on the independent judgment of the CSLC as CEQA lead agency.

Impact Analysis

The terms "effect" and "impact" used in this document are synonymous and can refer to effects that are either adverse or beneficial.

Direct effects	Effects caused by the Project that occur at the same time and place as the Project
Indirect effects	Effects caused by the Project that occur later in time, or further in distance, but are still reasonably foreseeable
Residual impacts	Impacts that still meet or exceed significance criteria after application of mitigation and, therefore, remain significant
Cumulative impacts	Impacts resulting from the Project when combined with similar effects of other past, present, and reasonably foreseeable future projects, regardless of which agency or person undertakes such projects (cumulative impacts could result from individually insignificant but collectively significant actions taking place over time)
Short-term impacts	Impacts expected to occur during the Project that do not have lingering effects for an extended period once the Project is complete
Long-term impacts	Impacts that persist for an extended period, including after Project completion

The significance of the impact is determined based on an analysis of the impact, compliance with any recommended mitigation, and the level of impact remaining compared to the applicable significance criteria. Impacts are classified as one of the five categories listed below.

Significant and Unavoidable	A substantial or potentially substantial adverse change from the environmental baseline that meets or exceeds significance criteria, where either no feasible mitigation can be implemented or the impact remains significant after implementation of mitigation measures.
Less than Significant with Mitigation	A substantial or potentially substantial adverse change from the environmental baseline that can be avoided or reduced to below applicable significance thresholds.
Less than Significant	An adverse impact that does not meet or exceed the significance criteria of a particular environmental issue area and, therefore, does not require mitigation.
Beneficial	An impact that would result an improvement to the physical environment relative to baseline conditions.
No Impact	A change associated with the Project that would not result in an impact to the physical environment relative to baseline conditions.

The analysis in this Subsequent EIR is prepared with the understanding that the Applicant would obtain all required permits and approvals from other agencies and comply with all legally applicable terms and conditions associated with those permits and approvals. Implementation of the Project, which is described in Section 2.0, *Project Description*, including implementation of mitigation measures (MMs) identified to reduce or avoid significant adverse impacts, would be monitored in accordance with a Mitigation Monitoring Program (MMP) (summarized below).

Mitigation, Applicant-Proposed Measures, and Mitigation Monitoring Program

An EIR is required to indicate the manner in which any significant effects on the environment of a project can be mitigated or avoided; a governmental agency must prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives (discussed below) or MMs when the agency finds the changes to be feasible (Pub. Resources Code, § 21002.1, subd. (a)&(b); State CEQA Guidelines, § 15002, subd. (a)). Implementation of multiple MMs may be needed to reduce an impact to a less-than-significant level. Impacts that still meet or exceed significance criteria after application of MMs are considered residual impacts that remain significant. An applicant may also propose measures that when implemented would reduce potential impacts; this Subsequent EIR refers to such measures as “Applicant-Proposed Measures” (APMs), which for this Project are identified in Section 2.3.5 and in Table 4-3. Any measures to reduce potential impacts proposed by the applicant as part of the project are not MMs under CEQA.

Table 4-3. Applicant-Proposed Measures

Applicant-Proposed Measure	Potential Impact Area
APM-1. Anchoring Plan	Biological Resources (Marine); Transportation (Marine)
APM-2. Forecast Notification	Transportation (Marine)
APM-3. Local Notice to Mariners	Recreation; Transportation (Marine)

Under CEQA, the lead agency must adopt a reporting or monitoring program for any changes made to the project or conditions of project approval adopted to mitigate or avoid significant effects on the environment (Pub. Resources Code, § 21081.6, subd. (a)(1)). The MMs and any APMs to reduce significant impacts are identified in the impact sections throughout Section 4.0, and are also presented in Section 7.0, *Mitigation Monitoring Program*. If adopted by the CSLC, the MMs and APMs indicated in the Mitigation Monitoring Program would become lease conditions. The CSLC or its designee would ensure implementation of all MMs and APMs.

Cumulative Impacts Analysis

An EIR must discuss the cumulative impacts of a project when that project's incremental effect is "cumulatively considerable" (State CEQA Guidelines, § 15130). A cumulative impact is an impact created through a combination of the project and other projects that cause similar impacts. Section 3.0, *Cumulative Projects*, defines the applicable geographic scope of the cumulative analysis, and lists closely related projects to be included in the cumulative environment. The impact analysis for cumulative impacts is presented at the end of each environmental issue section within Section 4.0.

Impacts of Alternatives

Pursuant to State CEQA Guidelines, section 15126.6, an EIR must describe and evaluate a range of reasonable alternatives that would feasibly attain most of a project's basic objectives and would avoid or substantially lessen any of the significant impacts of a project as proposed. The range of alternatives is governed by the "rule of reason" (State CEQA Guidelines, § 15126.6, subd. (f)); that is, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasoned choice and foster informed decision making and public participation. Section 5.0, *Project Alternatives Analysis*, describes alternatives to the Project and includes the impact analysis for each alternative scenario considered. A summary of the alternatives analysis is also included in Section 6.0, *Other Required CEQA Sections and Environmentally Superior Alternative*.

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4.1 BIOLOGICAL RESOURCES (MARINE)

This section describes the marine biological resources at Wheeler North Reef that would be affected by the implementation of the Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, assesses Project impacts to marine biological resources and their potential significance, and recommends measures to avoid or substantially lessen any effects found to be potentially significant.

4.1.1 Environmental Setting

4.1.1.1 Overview

The Project area is located in the lower third of the Southern California Bight (SCB), which extends offshore between Point Conception and the U.S.–Mexican border (Dailey et al. 1993). South of Point Conception, the narrow continental shelf expands to a broad continental borderland consisting of a series of islands, shallow banks, basins, canyons, and troughs. This dramatic change in bathymetry compared to the coastal environment north of Point Conception has an important regional effect on ocean currents and water circulation. The California Current is the dominant oceanographic current in the northeastern Pacific, driving cold, nutrient rich waters from the Bering Sea down the west coast of North America. As the California Current passes Point Conception, it continues its trajectory toward the equator following the shelf edge while the coastline turns eastward and sweeps in an arch to the south. The California Current eventually turns inshore (east) between San Diego and Punta Colonet. As it approaches the shore, the California Countercurrent diverges northward, creating a counter-clockwise gyre system that drives warmer, southerly waters up-coast along the coastline. The interaction between this northward moving warm water and southward moving cold water creates a biogeographical transition zone in the SCB. Horn et al. (2006) refer to the cool-temperate ecology north of Point Conception as the Oregonian Province and the warm-temperate ecology of coastal Baja Mexico as the San Diegan Province.

The coastal environment adjacent to the Project site includes a large stretch of near continuous sandy beach that stretches 50 miles from Dana Point Harbor in Orange County to La Jolla in San Diego County. This stretch of sandy beach is punctuated by natural creek drainages, some of which exist as tidal wetlands year-round, and artificial structures (e.g., breakwaters and harbor entrances). The subtidal environment immediately around the Project area is predominantly soft sediment habitat, primarily sand, but also made up of shell hash and muddy sediments.

The closest persistently occurring natural stand of giant kelp (*Macrocystis pyrifera*) to the Project area is San Mateo Kelp Bed (SMK), which lies adjacent to the southern edge of the existing Project area at a distance of approximately 0.125 mile (660 feet). Approximately 5.8 miles up-coast of the Project site is the Dana Point kelp bed. The San Onofre Kelp Bed (SOK) reef occurs approximately 2.9 miles down-coast of SMK, and

Barn Kelp Bed (BK) occurs approximately 9.3 miles down-coast of the Project site. The Marine Review Committee (MRC) surveyed SMK, BK, and SOK as part of an assessment of the impacts of the operation of San Onofre Nuclear Generating Station (SONGS) (MRC 1989). After construction of the mitigation reef, a team of scientists from the University of California, Santa Barbara (UCSB), under direction of the CCC, also surveyed the Project's Phase 1 Experimental Reef and Phase 2 Mitigation Reef (Reed et al. 2011 through 2016). As such, the biological communities of kelp reefs in the area are well documented. Because of its proximity to the Project site and the extensive data available through the UCSB mitigation monitoring program, the following section focuses on SMK as a primary example of natural reefs in the area. SMK is also close enough to the anticipated Project activities to be considered susceptible to impacts from the Project. For these reasons, data from the UCSB mitigation monitoring program (UCSB 2017) are summarized for both the SMK and Project area kelp forests to characterize the biota indicative of kelp reefs in the area.

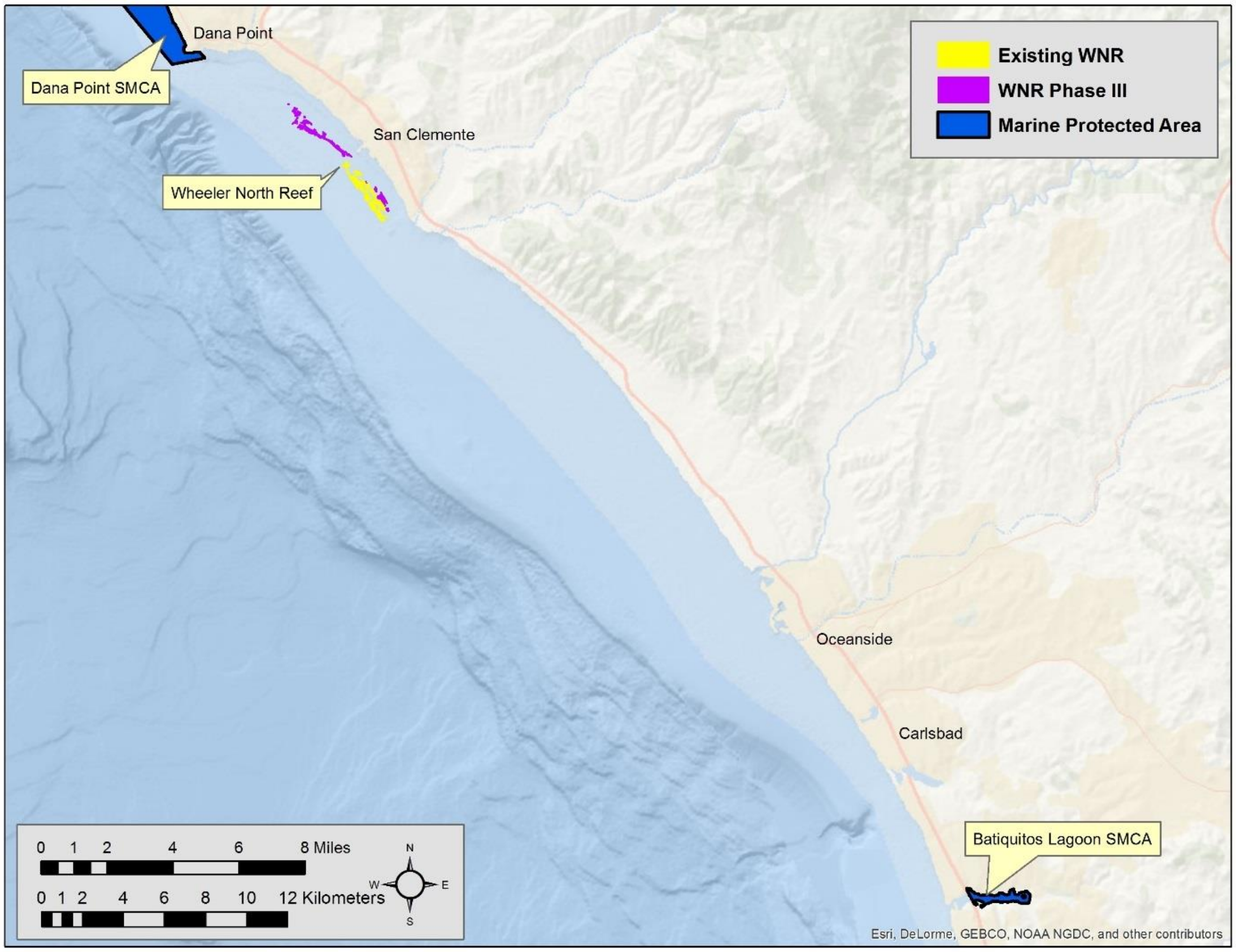
The nearest Marine Protected Area (MPA) to the Project site is the Dana Point State Marine Conservation Area located 2.9 miles up-coast; the Batiquitos Lagoon SMCA is located approximately 28 miles down-coast (Figure 4.1-1).

4.1.1.2 Natural (SMK) and Artificial (Wheeler North Reef) Kelp Forests

Kelp forests are one of the most highly productive and diverse habitats in temperate coastal waters. Giant kelp is the dominant kelp habitat-provider in Southern California. The species attaches to hard substrate and grows as a bundle of fronds up to 148 feet in length. Giant kelp plants provide seafloor, mid-water, and floating canopy habitat for many fish and invertebrate species, and acts as shelter and a food resource for the community of species that live in and around giant kelp forests. Warm water, low in nitrate, and severe storms associated with El Niño Southern Oscillation (ENSO) events can have a major effect on the abundance of kelp, sometimes removing entire forests. While giant kelp forests are characterized by the presence of giant kelp plants, they vary considerably in type depending on a suite of conditions.

For example, the understory canopy assemblage at is dominated by encrusting coralline algae, while SOK (approximately 3.4 miles down-coast of the Project area) has a very different understory kelp assemblage. Kelp beds that surround the offshore islands of the SCB benefit from a greater amount of high relief rock and clearer water. Subsequently, these kelp forests can grow in much deeper water than along the mainland (Foster and Schiel 2015).

Figure 4.1-1. Nearest Marine Protected Areas



1 ***Plants and Algae***

2 Table 4.1-1 lists the most abundant algal understory species at SMK and Wheeler
3 North Reef.

Table 4.1-1. Percentage of the Bottom Covered by Different Algal Taxa (2009–2017)

Taxa/Description	Common Name/Description	% Composition SMK	% Composition WNR
Various crustose coralline algae	Prostrate growing calcareous algae	39.2	0
Macrocystis pyrifera	Giant kelp holdfast	7.1	44.1
Desmarestia herbacea	Acid kelp	6.7	3.6
Acrosorium ciliolatum	Red algae	6.0	8.1
Unknown fleshy red alga (#5)	Red algae	5.2	0
Rhodymenia spp.	Foliose red algae	5.1	12.0
Unknown red alga (#10)	Red algae	4.8	3.5
Unknown fleshy red alga (#13)	Red algae	4.6	3.0
Polysiphonia spp.	Filamentous red algae	4.0	4.5
Nienburgia andersoniana	Foliose red algae	2.0	2.0
Unknown brown alga (#8)	Brown algae	0	4.7
Botryocladia pseudodichotoma	Sea grape red algae	0	2.2
	Cumulative %	**84.7**	**87.7**

Source: UCSB 2017.
Acronyms: SMK = San Mateo Kelp Bed; WNR = Wheeler North Reef.

Crustose coralline algae, a group of calcareous algae that grows prostrate over rocks, was the most abundant taxa at SMK. This was followed by giant kelp holdfasts. The relative abundances of the other taxa are based on thallus cover of blades, branches, and filaments that are erect in the water column. Foster and Schiel (2015) describe a similar giant kelp forest at Del Mar, about 35 miles down-coast of the Project area). The kelp forest occurs on low-relief rock at depths of 46 to 52 feet. The understory algae at the Del Mar reef was also dominated by crustose coralline algae.

One year after construction of Phase 2 of Wheeler North Reef, very high densities of giant kelp recruits were observed on the reef structures in the summer of 2009 (Reed et al. 2017). These plants established successfully, exhibited prominent growth, and by 2010 reached frond densities that exceeded those at the reference reefs (i.e., SMK and BK). From 2010 through 2015, the mean density of giant kelp at the Project site was higher than at SMK and BK, indicating a healthy giant kelp population had developed on Wheeler North Reef (Reed et al. 2017). The species of understory algae that rank highly at Wheeler North Reef are very similar to SMK (Table 4.1-1). Eight of the 10 highest ranked algal taxa at the Project site ranked among the 10 most abundant taxa at SMK. The greatest exception to this was the dominance of crustose coralline algae at SMK relative to Wheeler North Reef. Giant kelp holdfasts had the highest bottom cover of any species of algae at the Project site. Reed et al. (2017) report that giant kelp densities are high at Wheeler North Reef relative to reference reefs and the coverage of the understory algae are generally inversely related to kelp canopy due largely to shading effects (Reed and Foster 1984, Kimura and Foster 1984). The high densities of giant kelp explains the dominance of holdfasts at the Project site.

Invertebrates (Mobile)

Table 4.1-2 lists the most abundant mobile invertebrate species recorded at SMK between 2009 and 2017. Nine of these species are also present at Wheeler North Reef, although their rank abundance positions vary slightly. Mobile invertebrates included one species of brittle star, several marine snails, two marine urchins, hermit crab (*Pagurus spp.*), and a species of dwarf cucumber. The brittle star (*Ophiothrix spiculata*) was the most abundant mobile invertebrate at both reefs; Reed et al. (2017) suggest that elevated abundance levels in brittle star in the Project area compared with SMK result from higher densities levels of kelp holdfasts at the Wheeler North Reef.

The California cone shell (*Californiconus* [formerly *Conus*] *californicus*) is a shallow water species within the cone shell snail group. Its range is limited to California and Baja California. Unlike many other cone shell snails, California cone shell is a generalist feeder and preys on polychaete worms, other molluscs, fish, and crustaceans (Olivera et al. 2014).

Table 4.1-2. Mobile Invertebrate Taxa Abundance (2009–2017)

Taxa/Description	Common Name/Description	% Abundance	
		SMK	WNR
Ophiothrix spiculata	Brittle star species	46.6	79.2
Californiconus (formerly Conus) *californicus*	California cone shell	14.9	4.4
Lissothuria nutriens	Dwarf sea cucumber	13.4	2.5
Pagurus spp.	Hermit crab	6.2	7.2
Pteropurpura festiva	Festive murex snail	3.1	1.2
Strongylocentrotus purpuratus	Purple sea urchin	3.1	0.8
Alia (formerly Mitrella) *carinata*	Dove snail	1.6	0.3
Kelletia kelleti	Kellet's whelk	1.5	0.9
Strongylocentrotus franciscanus	Red sea urchin	1.4	--
Dendrodoris spp.	Group of nudibranchs	0.8	0.3
Polycera tricolor	Nudibranch species	--	0.3
	Cumulative %	**92.6**	**97.1**

Source: UCSB 2017.
Notes: Abundance defined as mean annual percent of the total number of organisms counted
Acronyms: SMK = San Mateo Kelp Bed; WNR = Wheeler North Reef.

Other marine snails were also observed in high abundance. The large, subtidal snail Kellet's whelk *(Kelletia kelletii*) has a depth range from 0 to 230 feet and is common to kelp forests and rocky reefs south of Point Conception, but is also found buried in subtidal sandy habitat but rarely in the intertidal zone. This species is taken by commercial and recreational fishermen, sometimes as bycatch in lobster and crab traps (California Department of Fish and Wildlife [CDFW] 2008a). The festive murex snail (*Pteropurpura festiva*) is a predatory drilling snail known to predate bivalves, including the non-native Asian date mussel (*Arcuatula senhousia*), which is a problem in eelgrass habitats in estuaries and bays (Castorani and Hovel 2015). The mitrellid snail (*Alia carinata*) is a relatively small marine snail that ranges from the Gulf of Alaska to Baja

California (Merilees 2017). Although not abundant, the moon snail (*Neverita lewisii*) is also known from the project vicinity and is notable as a large predatory species, primarily on bivalve molluscs.

Sea urchins, including the purple sea urchin (*Strongylocentrotus purpuratus*) and red sea urchin (*Strongylocentrotus franciscanus*), are important components of the ecology of kelp forests. They are major grazers of algae, including giant kelp that form the structure of giant kelp ecosystems. Sea urchin grazing can result in areas described as "urchin barrens" which exist as an alternate state to kelp forest ecosystems. These barrens are very low in species diversity compared to giant kelp forests. Urchins typically feed on drift algae in established kelp forests, however when large areas of giant kelp are lost, urchins will feed on new recruits, preventing the reestablishment of the kelp forest ecosystem, hence the alternative state of urchin barrens. Predation, disease, and availability of food influence the abundance of urchins, as do rates of recruitment that are usually determined by oceanographic factors (both biological and physical) affecting the pelagic larval phase of an urchin's life history. Urchins also compete for food with other grazers, including abalone (Pearse 2006).

Hermit crabs are small crustacea with soft abdomens that occupy vacant shells, typically snail shells. Hermit crabs feed mostly on detritus but may scavenge on dead animals and plant material (Kozloff 2000, as cited in CSLC 1999). Another abundant species included the dwarf sea cucumber (*Lissothuria nutriens*), which Pawson (1967) lists as ranging from Pacific Grove to the Gulf of Santa Catalina in depths of 0 to 65 feet.

Invertebrates (Sessile)

Six species of sessile invertebrates accounted for more than half the sessile invertebrate coverage at SMK (Table 4.1-3).

Table 4.1-3. Sessile Invertebrate Taxa Abundance (2009–2017)

Taxa/Description	Common Name/Description	% Composition	
		SMK	WNR
Foraminifera	Encrusting foraminifera	12.2	10.7
Encrusting bryozoan	Encrusting bryozoan	11.0	8.4
Chelyosoma productum	Horseshoe ascidian	9.9	16.0
Encrusting sponge	Encrusting sponge	8.8	13.1
Astrangia lajollaensis	Temperate coral	6.8	--
Filicrisia	Group of encrusting bryozoans	5.2	--
Plumularia plumularia	Hydroid	5.0	3.4
Leucilla nuttingi	Urn sponge	4.5	5.9
Erect sponge	Sponge	4.4	3.0
Balanophyllia elegans	Orange cup coral	2.7	--
Muricea californica	California golden gorgonian	--	4.9
Pycnoclavella stanleyi	Colonial tunicate	--	4.5

Table 4.1-3. Sessile Invertebrate Taxa Abundance (2009–2017)

Taxa/Description	Common Name/Description	% Composition	
		SMK	WNR
Salmacina tribranchiata	Polychaete worm	--	3.4
	Cumulative %	**70.5**	**73.3**

Source: UCSB 2017.
Acronyms: SMK = San Mateo Kelp Bed; WNR = Wheeler North Reef.

Sessile invertebrate abundance appears to vary inversely in percent cover with understory algae: when understory algae increases, sessile invertebrates decrease (Reed et al. 2017). No one species dominated the assemblage; however, encrusting forms were common at SMK, including foraminifera, bryozoan, and sponge. Of the abundant sessile invertebrate species at SMK, seven of 10 were also abundant at Wheeler North Reef. Of the other three top species at SMK, a group of encrusting bryozoans (*Filicrisia* spp.) ranked 15th and two species of temperate coral (*Astrangia lajollaensis* and *Balanophyllia elegans*) ranked 21st and 40th, respectively, at Wheeler North Reef. The colonial tunicate (*Pycnoclavella stanleyi*) and calcareous polychaete tube worm (*Salmacina tribranchiata*) were abundant at Wheeler North Reef, but ranked 14th, 26th, and 19th, respectively, at SMK. The California golden gorgonian (*Muricea californicus*), which ranked 6th in abundance on Wheeler North Reef, is described as a nuisance species by Reed et al. (2017) because it competes with giant kelp for space and can become invasive (see Section 4.1.1.8, *Invasive and Non-Native Marine Species*).

Fish

Table 4.1-4 lists the most abundant reef fish species, by number and weight, observed at SMK and Wheeler North Reef.

Table 4.1-4. Fish Taxa by Abundance and Estimated Biomass (2009–2017)

Taxa/Description	Common Name/Description	SMK				WNR			
		Abundance		Biomass		Abundance		Biomass	
		% (Rank)		% (Rank)		% (Rank)		% (Rank)	
Rhinogobiops nicholsii	Blackeye goby	55.4	1	5.0	5	49.7	1	3.5	5
Oxyjulis californica	Señorita	9.9	2	3.9	6	5.0	5	--	--
Chromis punctipinnis	Blacksmith	5.1	3	--	--	8.4	2	2.6	7
Paralabrax nebulifer	Barred sand bass	4.3	4	35.6	1	6.4	4	27.6	1
Rathbunella hypoplecta	Stripefin ronquil	3.1	5	2.7	8	1.8	8	--	--
Paralabrax clathratus	Kelp bass	2.5	6	6.4	4	3.7	6	6.4	3

Table 4.1-4. Fish Taxa by Abundance and Estimated Biomass (2009–2017)

Taxa/Description	Common Name/Description	SMK				WNR			
		Abundance		Biomass		Abundance		Biomass	
		% (Rank)		% (Rank)		% (Rank)		% (Rank)	
Semicossyphus pulcher	California sheephead	1.7	7	11.9	2	6.8	3	27.1	2
Gibbonsia spp.	Kelpfish	1.5	8	--	--	--	--	--	--
Lythrypnus zebra	Zebra goby	1.3	9	--	--	--	--	--	--
Heterostichus rostratus	Giant kelpfish	1.2	10	--	--	--	--	--	--
Stereolepis gigas	Giant seabass	--	--	8.3	3	--	--	4.9	4
Embiotoca jacksoni	Black surfperch	--	--	2.5	9	2.1	7	3.1	6
Cheilotrema saturnum	Black croaker	--	--	2.4	10	--	--	--	--
Oxylebius pictus	Painted greenling	--	--	--	--	1.4	9	--	--
Rhacochilus vacca	Pile perch	--	--	--	--	1.2	10	--	--
Sebastes auriculatus	Brown rockfish	--	--	--	--	--	--	2.2	8
Medialuna californiensis	Halfmoon	--	--	--	--	--	--	1.9	9
Girella nigricans	Opaleye	--	--	--	--	--	--	1.8	10
	Cumulative %	**86.0**		**78.7**		**86.5**		**81.1**	

Source: UCSB 2017.
Acronyms: SMK = San Mateo Kelp Bed; WNR = Wheeler North Reef.

While abundance provides an indication of the species most commonly observed on the reef, biomass (weight) is a valuable ecological measure of dominance (the proportion of biomass attributed to a given species indicates the amount of productivity that species has captured from an ecosystem). Fish rapidly populated the Phase 2 Mitigation Reef after its construction in 2008. Fish densities were at their highest in 2009, the first year following construction. Fish densities across the Project site have fluctuated significantly over the subsequent 7 years (Reed et al. 2017). Since 2012, the 4-year running mean of resident fish density at Wheeler North Reef has been consistently higher than SMK. Estimated fish production per area of reef was also consistently higher at the Project area compared to SMK based on a 4-year rolling average (Reed et al. 2017).

At SMK, the fish assemblage is dominated by highly abundant blackeye goby (*Rhinogobiops nicholsii*), although because of their small size they rank much lower by biomass. The highest ranked species by biomass is the barred sand bass (*Paralabrax nebulifer*). A notable inclusion in the biomass rankings is the giant seabass (*Stereolepis gigas*). This is a very large species of fish and has been quite rare in California since overfishing reduced the population to very low numbers. Fishery restrictions on the population appear to have led to a resurgence in this species in recent years. All the top ranked species, by either abundance or biomass, observed at SMK are indicative of

Southern California giant kelp forests according to Foster and Schiel (2015). Kelp bass (*Paralabrax clathratus*), blackeye goby, señorita (*Oxyjulis californica*), and stripefin ronquil (*Rathbunella hypoplecta*) ranked among the top 10 fish for both biomass and abundance at SMK. Blacksmith (*Chromis punctipinnis*), kelpfish (*Gibbonsia* spp.), and zebra goby (*Lythrypnus zebra*) ranked among the top 10 fish for abundance, but these smaller fish species ranked lower (11th, 31st, and 48th, respectively) for biomass.

Seven of the 10 top ranked fish species by average annual abundance from 2009 through 2017 were shared between SMK and Wheeler North Reef. Blackeye goby was the most frequently observed fish species at the Project site and SMK (see Table 4.1-4). At Wheeler North Reef, blackeye goby constituted nearly 50 percent of all the fish observed on average. Blacksmith, California sheephead (*Semicossyphus pulcher*), barred sand bass, señorita, kelp bass, and striped ronquil all occurred in the top 10 fish species ranked by abundance at both locations. The five most highly ranked fish species for biomass are the same for Wheeler North Reef and SMK. These are barred sand bass, California sheephead, kelp bass, giant sea bass, and blackeye goby. Their rank order is almost identical except that kelp bass ranks ahead of giant sea bass at the Project site (4th and 5th, respectively) and the order is reversed at SMK. Black surfperch (*Embiotoca jacksoni*) also ranked in the top 10 fish by biomass at both Wheeler North Reef and SMK. Four fish species—blacksmith, brown rockfish (*Sebastes auriculatus*), halfmoon (*Medialuna californiensis*), and opaleye (*Girella nigricans*)—occurred in the top 10 ranked fish in the Project area, but at SMK ranked 11th, 27th, 24th, and 15th, respectively. For the more abundant species, the fish assemblages at both Wheeler North Reef and SMK are very similar.

4.1.1.3 Soft Subtidal

As described in the 1999 Program EIR (California State Lands Commission [CSLC] 1999), soft subtidal sand-bottom community is the predominant community type at the Project site. Within the 3,120-acre area of seabed surveyed by Coastal Environments 2017b), 2,504 acres were estimated to be soft subtidal sand-bottom habitat. This is equivalent to approximately 80 percent of the area within which the proposed Project would be constructed. Soft sediment habitat is the predominant seabed habitat throughout the SCB and the continental shelf.

Infaunal sampling data on sediment grain size and infaunal community composition adjacent to the SONGS identified 133 taxonomic groups (Coastal Environments 2016). An analysis of the data (Tenera *in press*) indicated that the infaunal community at this location was largely associated with sediment grain size. Two distinct groups of infaunal organisms were identified in the multivariate analysis. The groups were associating with a median sediment grain size greater than 0.017 inch or less than 0.011 inch, respectively. The group of sites associated with larger grain size showed a gradient of change in assemblage that correlated with depth.

Fish associated with soft sediment habitats include many flatfish species, such as speckled sanddab (*Citharichthys stigmaeus*), diamond turbot (*Pleuronichthys guttulatus*), and California halibut (*Paralichthys californicus*). Fish associated with sandy habitat surrounding the Wheeler North Reef are not collected as part of the mitigation monitoring for the Project. However, data on juvenile and adult fish drawn into the SONGS intake conduits and impinged by the system have been collected at Unit 2 since 1982 and at Unit 3 since 1983 as required by the SONGS National Pollutant Discharge Elimination System permit. The SONGS intakes are located away from kelp habitat over sandy substrate approximately 2.8 miles south of the proposed Project area. The proximity to this area of sandy habitat means it likely has a similar assemblage of fish to the sandy habitat of the Project area. Since 2005, these surveys were conducted for one 24-hour period per quarter each year. Impingement data were collected bi-weekly from 2006 through 2007 (Southern California Edison [SCE] 2008). Furthermore, data on fish larvae in the proposed Project area were collected from 1976 through 1981, from 1983 through 1986 (MEC 1987), and from 2006 through 2007 (SCE 2008). The following section summarizes fish species observed in these surveys, which represent typical species associated with sandy seabed habitat in the area.

Fish observed in the most recent impingement data at SONGS included queenfish (*Seriphus politus*), northern anchovy (*Engraulis mordax*) and Pacific sardine (*Sardinops sagax*),[8] deep-body anchovy (*Anchoa compressa*), white seaperch (*Phanerodon furcatus*), topsmelt (*Atherinops affinis*), white croaker (*Genyonemus lineatus*), and yellowfin croaker (*Umbrina roncador*). Salema (*Xenistius californiensis*) were also collected in high numbers in the Fish Return Device (SCE 2008). A summary provided in the SONGS Units 2 and 3 Environmental Impact Evaluation (ENERCON 2014) of trawl data collected from the area dating as far back as 1979 indicates a similar fish assemblage to this assemblage. Summary data in MBC (2012) list walleye surfperch (*Hyperprosopon argenteum*) alongside the species listed above as frequently occurring in the trawl samples collected from 2000 through 2010.

Divers observed 45 individual fish when surveying a total of 0.9 acre spread evenly over the two conduit corridors in May and June 2016 (MBC 2016). The majority of the fish (69 percent and 31 taxa) were observed at just two of the 18 sampling locations. These two sites were not close to one another relative to the other sites surveyed. One of these sites was approximately 0.3 mile from the end of the Unit 2 conduit and the other was approximately 0.25 mile from shore. Kelp bass was the most commonly observed fish during these transect surveys. Barred sand bass was the second most frequently observed fish on these survey dives.

[8] Northern anchovy and Pacific sardine, which are pelagic (open sea) schooling fish, are not particularly associated with soft sediment areas, although they are found ranging above this habitat.

Queenfish is a common member of the croaker family and is usually found over soft-bottom habitat. They typically feed in the midwater on zooplankton. Love (2011) reports that they range from Vancouver Island to the southern Gulf of California, with highest abundance within the range from Santa Barbara Channel to Bahia Tortugas (central Baja California). Queenfish are numerically one of the most abundant species along sandy or muddy bottom habitats in Southern California. They dominate much of the surf zone along with other species, such as silversides (topsmelt and jacksmelt [*Atherinopsis californiensis*]) and northern anchovy (Allen and Pondella 2006). Long-term trends from coastal generating power plants indicate that queenfish was the most abundant species impinged at five Southern California generating stations from 1977 to 1998, and that they accounted for over 60 percent of the total fish impinged (Herbinson et al. 2001). Their abundance was stable during this period, with notable declines occurring during strong El Niño events. Abundance remained relatively high throughout the 20-year study period. There is a minor commercial fishery for queenfish, and they are used as live bait. They are a very important part of the sport catch in California and are frequently caught from piers (Jarvis et al. 2004).

Topsmelt is a common nearshore pelagic schooling fish also found commonly in bays and estuaries. They achieve this wide habitat range by being generalist feeders, capitalizing on both zooplankton in the water column (typical to many pelagic schooling species), as well as benthic prey in kelp beds and macroalgae and detritus in estuaries and bays (Horn and Ferry-Graham 2006). They range from Vancouver Island to the Gulf of California. There is a small-scale commercial fishery for this species that is primarily incidental to other fisheries. Topsmelt are commonly caught by recreational anglers, mostly from piers (Love 2011, CDFW 2013).

White seaperch, a common surfperch that sometimes forms large schools, live in most coastal habitats, including near piers, in bays, in sandy areas, and offshore near rocks and kelp. They range from Vancouver Island to northern Baja California (Love 2011).

White croaker is a common nearshore benthic fish, typically associated with soft-bottom habitat. It ranges from British Columbia to Bahia Magdelena (Love 2011), but is rare north of California. The reported depth range of white croaker is from near the surface to depths of 781 feet (Love 2011); in Southern California, Allen (1982) found white croaker over soft-bottom habitat between 33 and 427 feet, and it was collected most frequently at 33 feet. Adults feed on polychaetes (marine worms) and crustaceans, while juveniles feed during the day in midwater on zooplankton (Allen 1982). There is some commercial harvest, and the average revenue for the period from 2011 through 2015 was $6,100 (PacFIN 2016). It is more important as a sportfish, and many are harvested from piers and boats. Annual relative abundance of white croaker in impingement samples at Southern California power plants showed decreases during the strong El Niño events of 1982/83, 1986/87, and 1997/98 as compared with non-El Niño years (Herbinson et al. 2001). Additionally, the relative abundance of local populations has been influenced by contamination from polychlorinated biphenyls (PCBs) and other chlorinated hydrocarbons within bays (Cross and Hose 1988).

Yellowfin croaker is the most common species in the shallow area beyond the surf zone (16 to 46 feet deep) along the Southern California mainland coast (Pondella et al. 2008). It ranges from Point Conception to the Bahia Magdelena (Love 2011), mostly in nearshore areas such as the surf, bays, and tidal sloughs where it feeds on small fish and invertebrates. This species has been protected from commercial fishing in California since 1909, although it remains a popular target of recreational fishing (Pondella et al. 2008).

Spotted and barred sand basses are common coastal fish. Barred sand bass is usually found over and near structures and was abundant at both kelp reefs (i.e., SMK and Wheeler North Reef), but it is also often found over soft bottom. It ranges from Santa Cruz, California to Todos Santos, Baja California, but is only common south of Point Conception. Spotted sand bass is found in back bays and lagoons where there is extensive vegetation cover. They have been taken in water as deep as 200 feet; however, they are usually found shallower than 20 feet (Love 2011). Barred sand bass is found at the sand-rock interface and is commonly observed at artificial reefs. Off the coast of SONGS, important prey items of barred sand bass include brachyuran crabs, mysids, pelecypods (e.g., oysters, clams, mussels, scallops), and epibenthic fish (Roberts et al. 1984). Barred sand bass are prey for larger fish and marine mammals. In 1953, California regulations made it illegal to sell this species, so there is no commercial harvest today; however, it remains a large component of the sport catch.

4.1.1.4 Sea Turtles

Sea turtles are reptiles that belong to the superfamily Chelonioidea. All turtles are protected under the federal Endangered Species Act (FESA) and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I, which regulates international trade of endangered species. The five species that occur within the greater region are green (*Chelonia mydas*), loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricate bissa*), and olive ridley (*Lepidochelys olivacea*) sea turtles (Table 4.1-5).

Table 4.1-5. Sea Turtles in the Regional Vicinity of Project Area

Scientific Name	Common Name	Status Federal/ State	Habitat	Potential to Occur in the Project Area
Chelonia mydas	Green sea turtle	FE/SSC	Globally distributed and generally found in tropical and subtropical waters along continental coasts and islands. In eastern north Pacific, sighted from Baja California to Alaska, most commonly from San Diego south.	**Low**
Caretta caretta	Loggerhead sea turtle	FE/—	Most abundant species of sea turtle found in U.S. coastal waters. Most records along the U.S. west coast are of juveniles off the California coast.	**Low** No known nesting areas on Southern California beaches. Generally low population densities.
Lepidochelys olivacea	Olive ridley sea turtle	FT/—	Globally distributed in tropical waters. Infrequent occurrences documented off California.	
Eretmochelys imbricata bissa	Hawksbill sea turtle	FE/—	Globally distributed in tropical waters. Infrequently documented off Southern/Central/Northern California. Observed in Southern California as far north as Point Conception.	**Not Likely to Occur** No known nesting areas on Southern California beaches. Generally low population densities.
Dermochelys coriacea	Leatherback sea turtle	FE/—	Sighted with some regularity in coastal waters off the U.S. west coast. Sighting frequency is greatest off Central California. Nearly all sightings in Southern California occur in deeper waters seaward off the Channel Islands.	

Sources: National Marine Fisheries Service (NMFS) 2017a, CalHerps 2017.
Acronyms: FE = Federally listed Endangered; FT =Federally listed Threatened; SSC = California species of special concern; — = no listing status.
Potential Occurrence:

- **Low –** Marginal habitat is present on or adjacent to site; no recent records within 5 miles of the site.
- **Not Likely to Occur –** No recent records within 5 miles, no suitable habitat occurs on or near site.

Four of the five species—green sea turtle, loggerhead sea turtle, olive ridley sea turtle, and leatherback sea turtle—have the potential to occur within the Project area based on their natural distribution. While hawksbill sea turtles are not likely to occur in the Project area, they are found south of San Diego and there is a very minor chance of interaction with barges that are accessing the Mexican quarry.

Although their known occurrence is rare at the Project location compared with most of the other species discussed in this report, individuals of three of the four species—nine green sea turtles, one loggerhead sea turtle, and one olive ridley sea turtle—were entrapped in the SONGS Units 2 and 3 cooling water system from 2006 through 2011 (MBC 2012); hawksbill sea turtles have also been observed moving into temperate waters, particularly during the summer months. Green sea turtles are the most likely to arrive on California shores. A population of green sea turtles has been observed occupying the warm water discharge of the San Diego Bay power plant and feeding within the eelgrass beds (Dutton and McDonald 1991, Benson and Dutton 2012), as well as occupying the San Gabriel River in Long Beach (Aquarium of the Pacific 2018).

4.1.1.5 Seabirds and Shorebirds

Almost 200 species of marine birds are associated with coastal or offshore aquatic habitats in the SCB (Baird 1993). Baird (1993) classifies the species by habitat into four groups: marshbirds (e.g., herons, rails, and egrets), waterbirds (e.g., ducks, geese, coots, and grebes), shorebirds (e.g., plovers and sandpipers), and seabirds (e.g., gulls, cormorants, and terns). The focus of the information provided in this section is on shorebirds and seabirds, which have the most potential for being impacted during the proposed Project. The closest wetland habitat to the Project area that would support marshbirds and waterbirds is the outlet of San Mateo Creek, located at the southern end of Wheeler North Reef. The shorebirds and seabirds listed in the California Natural Diversity Database (CNDDB) Special Animals list that are likely to occur in the proposed Project area are shown in Table 4.1-6.

Shorebirds

As noted in Table 4.1-6, the federally and state listed western snowy plover (*Charadrius alexandrinus nivosus*) occurs regionally in the proposed Project area, and three individuals were observed in 2012 on San Clemente State Beach adjacent to the Project area (U.S. Fish and Wildlife Service [USFWS] 2016). However, their preferred habitat is wide sandy beaches (Baird 1993), whereas construction of the expanded reef would occur offshore in water depths of 38 to 49 feet. Two other shorebirds that could occur in the proposed Project area included on the Special Animals list are black oystercatcher (*Haematopus bachmani*) and the long-billed curlew (*Numenius americanus*). Both are listed by the USFWS as a Bird of Conservation Concern, and the long-billed curlew is also included on the CDFW watch list. The shoreline habitat in the direct vicinity of the Wheeler North Reef is not the primary habitat for either of these species, and the abundance of black oystercatcher in Southern California is low compared to Central and Northern California, where larger amounts of rock habitat are associated with this species.

Table 4.1-6. Special-Status Marine Birds in the Regional Vicinity

Scientific Name	Common Name	Federal and State Status
Shorebirds		
Charadrius alexandrinus nivosus	Western snowy plover (coastal)	FT/BCC/SSC (Nesting)
Haematopus bachmani	Black oystercatcher	BCC (Nesting)
Numenius americanus	Long-billed curlew	BCC (Nesting)
Seabirds		
Cerorhinca monocerata	Rhinoceros auklet	Nesting colony
Gavia immer	Common loon	SSC (Nesting)
Gelochelidon nilotica	Gull-billed tern	BCC/SSC (Nesting colony)
Hydroprogne caspia	Caspian tern	BCC/– (Nesting colony)
Larus californicus	California gull	SSC (Nesting colony)
Oceanodroma homochroa	Ashy storm-petrel	BCC/SSC (Nesting colony)
Oceanodroma melania	Black storm-petrel	SSC (Nesting colony)
Pelecanus occidentalis	California brown pelican	–/FP (Nesting colony/communal roosts)
Ptychoramphus aleuticus	Cassin's auklet	BCC/SSC (Nesting colony)
Sternula antillarum browni	California least tern	FE/CE/FP (Nesting colony)
Thalasseus elegans	Elegant tern	SSC (Nesting colony)
Synthliboramphus scrippsi	Scripps's murrelet	CT/BCC
Phalacrocorax auritus	Double-crested cormorant	–/SSC (Nesting colony)
Rynchops niger	Black skimmer	BCC/SSC (Nesting colony)

Sources: CDFW 2017a, Shuford and Gardali 2008, Baird 1993.
Acronyms: BCC = USFWS Birds of Conservation Concern; CE = State-listed Endangered; CT = State-listed Threatened; FE = Federally listed Endangered; FP = CDFW Fully Protected; FT = Federally listed Threatened; SSC = California Species of Special Concern; – = no listing.

While western snowy plover and black oystercatcher can occur year-round, and most shorebirds in the SCB occur in highest abundances during the winter months and may also occur in other habitats, such as the long-billed curlew that frequents agricultural fields (Baird 1993). The low abundance of western snowy plover and black oystercatcher along Southern California beaches is supported by data in Dugan et al. (2015), which showed those two species to be in relatively low abundance compared to other species. The most abundant shorebirds observed in the extensive baseline surveys in Dugan et al. (2015) were sanderling (*Calidris alba*), black-bellied plover (*Pluvialis squatarola*), whimbrel (*Numenius phaeopus*), western sandpiper (*Calidris mauri*), and marbled godwit (*Limosa fedoa*). Most of these and the other species identified in the report feed along the shore and in shallow water on insects and crustaceans, especially the Pacific sand crab (*Emerita analoga*).

Seabirds

As noted in Table 4.1-6, the California least tern (*Sternula antillarum browni*) is also a federally and state-listed species that may occur in the Project area. The California least tern uses sandy beach habitat for breeding from April through September. The most recent 5-year review of California least terns showed that the largest concentration of nesting pairs among the survey sites occurred in Southern California, near the Santa Margarita River on Camp Pendleton (USFWS 2006). Data collected during the 2015 breeding season survey also showed that Camp Pendleton had the largest numbers of breeding pairs in the state (Frost 2016). The species has increased in abundance over the past several years to the level where the USFWS believes it could be down-listed from “endangered” to “threatened.” The absence of wide sandy beach areas in the direct vicinity of the proposed Project should limit any impacts on this species.

Other seabirds identified on the CNDDB list of Special Animals that may occur in the SCB may be affected by proposed Project activities. The list includes species that may forage on the shoreline (e.g., California gull) and species that generally occur further offshore (e.g., ashy and black storm-petrels). For example, shoreline surveys by Dugan et al. (2015) found that six species of gulls were almost as abundant as the 24 species of shoreline species observed during the surveys. The most abundant species of gulls observed during the surveys were western gull (*Larus occidentalis*; 27 percent), Heermann’s gull (*Larus heermanni*; 8.3 percent), California gull (5.7 percent), and herring gull (*Larus argentatus*; 4.5 percent). These and other seabirds observed during the surveys are typically associated with foraging relatively close to shore. Based on average abundance observed over the study, the most abundant seabirds were western grebe (*Aechmophorus occidentalis*; 41 percent), double-crested cormorants (*Phalacrocorax auritus*; 23.1 percent), royal terns (*Thalasseus maximus*; 12.7 percent), and brown pelicans (*Pelecanus occidentalis*; 11.6 percent).

4.1.1.6 Marine Mammals

Historical data on marine mammal abundance near the Project area were summarized for surveys from 2007 through 2011 by MBC (2012). Over 78 percent of marine mammal observations occurred during winter and spring months; few animals were observed in summer. Commonly observed species were short-beaked common dolphin (*Delphinus delphus*), followed by California sea lion (*Zalophus californianus californianus*), bottlenose dolphin (*Tursiops truncates*) and Risso’s dolphin (*Grampus griseus*). Other observed species with a moderate likelihood of occurrence in the proposed Project area are gray whale (*Eschrichtius robustus*), which may occur in nearshore coastal waters during migratory periods, long-beaked (*Delphinus capensis*), and harbor seal (*Phoca vitulina*) (MBC 2012). Some of the identified species could also be encountered during vessel transits between the Project area and quarries.

None of the species likely to occur within the marine study area is listed as threatened or endangered. The expected presence of the following special-status marine mammals is either low, given their respective population densities and habitat preferences, or unlikely, given their known inhabited ranges or because suitable habitat is absent in the proposed Project area (CDFW 2017a, Tinker and Hatfield 2016, National Marine Fisheries Service [NMFS] 2018a–l).

- **Low** – blue whale (*Balaenoptera musculus*; FE); fin whale (*Balaenoptera physalus*; FE); sei whale (*Balaenoptera borealis*; FE); humpback whale (*Megaptera novaeangliae*; FE); and sperm whale (*Physeter macrocephalus*; FE)
- **Unlikely** – southern sea otter (*Enhydra lutris nereis*; FT, FP) and Guadalupe fur seal (*Arctocephalus townsendii*; FT, CT, FP)

Common Dolphin

Two species of common dolphin, short-beaked (*Delphinus delphis*) and long-beaked (*Delphinus capensis*), occur in the Project area, with short-beaked common dolphins, which account for more than 50 percent of sightings by researchers throughout California, common out to 300 nautical miles (nm). The life history of short-beaked common dolphins is described in Allen et al. (2011) and NMFS (2011a). Births peak in June through September, although there is evidence of calving peaks from March through May and August through October as well. Calves nurse for 6 months with their mothers and are capable of eating other food at 2 to 3 months of age. Feeding typically occurs at night, and the large groups that congregate during the daytime tend to be for socializing and rest. Like many delphinids, common dolphins communicate with an extensive repertoire of sounds. Normal travel speeds for short-beaked common dolphin are 6 miles per hour (mph), although they can reach speeds of 17 to 22 mph.

Long-beaked common dolphins (*Delphinus capensis*) are similar in appearance and distribution in the Project area and were identified as a separate species in the 1990s. Their distribution overlaps those of the short-beaked common dolphin in the Project area and their ecology is very similar to this species. Regionally, long-beaked common dolphins have a smaller range than short-beaked common dolphins. They are typically restricted to within about 50 nm of the coast from Baja California northward to about Central California. Less than 15 percent of sightings of long-beaked common dolphins occur in waters deeper than 1,640 feet (NMFS 2017b).

Bottlenose Dolphin

Bottlenose dolphin populations in California are genetically differentiated as a nearshore and an offshore population. Nearshore bottlenose dolphins occur within 0.6 mile of shore. In Southern California, this population occurs within 0.3 mile of shore 99 percent of the time and within 820 feet of shore 90 percent of the time. Population stock estimates for the nearshore stock indicate a population of around 450 to 500 individuals, and the population appears to have remained stable over the last 20 years. Results of studies indicate that individuals are highly mobile. Over 80 percent of the tagged individuals identified in Santa Barbara, Monterey, and Ensenada, Mexico have also been observed near San Diego (NMFS 2008). The offshore population in the eastern Pacific is not well described according to Allen et al. (2011), because they are rarely observed. Therefore, the offshore extent of the population is unknown.

Risso's Dolphin

Risso's dolphins are commonly seen throughout the U.S. Pacific Coast in California, Washington, and Oregon. Typically, populations shift north after the colder winter months as water temperatures increase in the late spring and summer. The most recent stock assessment of the California, Washington, and Oregon population estimated the population at around 6,300 individuals. However, interannual variability is likely to be quite high and surveys have provided estimates between 4,000 and 11,000 individuals annually from 1991 through 2008 (NMFS 2011b).

California Sea Lion

California sea lions range from Alaska to Mexico; however, the core breeding range centers on the Channel Islands in Southern California, particularly San Miguel and San Nicholas Islands (NMFS 2015a). Smaller breeding areas occur in western Baja California. Population estimates from NMFS stock assessment (NMFS 2015a) based on pup surveys in 2008 place the population size at around 300,000 individuals. They are coastal animals that typically range no further than 20 nm from shore. After breeding, males typically migrate north while females and young range much closer to breeding grounds (Allen et al. 2011). Five genetically distinct populations of California sea lion have been identified (Schramm et al. 2009) of which one, the Pacific temperate group, is most likely to constitute the majority of the individuals observed in the Project area.

Harbor Seal

The subspecies of harbor seal *Phoca vitulina richardii* inhabits the eastern north Pacific from Mexico to Alaska. Of the four genetically differentiated stocks; the California population is estimated at 31,000 individuals (NMFS 2015b). During breeding and molting seasons (around March in Southern California) harbor seals spend a considerable amount of time on the shore at haul-out locations. Lowry et al. (2008) recorded no seals at haul-out sites along the coast between Encinitas and Dana Point, which includes the proposed Project area. Harbor seals mostly forage at night and rest during the day. They are typically curious in nature and will come close to boats and divers. Surface observations of harbor seals are often of the animals resting in a vertical position with their head above the water, often within kelp canopy areas. Harbor seals typically forage close to shore and dives are frequently shallow (less than 16 feet).

Gray Whale

Within the north Pacific Ocean, a small western Pacific population of gray whales exist, with occasional individuals observed intermixing with the distribution of the eastern north Pacific (ENP) group. However, the ENP group represents the largest remaining genetically distinct population of gray whales and were removed from the endangered species list in June 1994. The ENP population is estimated to be 20,990 individuals based on 2010/2011 southbound survey data. Most ENP gray whales migrate from feeding grounds between Alaska and Russia (Chukchi, Beaufort, and northwestern Bering Seas), with a small number feeding in waters between Alaska and Northern California. There is ongoing debate as to whether these individuals constitute a genetically distinct population and should be federally managed as a distinct stock. These whales migrate to wintering lagoons in Baja California where pregnant females calve, typically in distinct lagoons within the region (NMFS 2015c). During migrations, gray whales stay within 6 nm of shore unless navigating around islands. Cow-calf pairs are most often observed heading north in May, although they can be observed as early as March and as late as June.

4.1.1.7 Protected Marine Species

Table 4.1-7 lists four marine species that are afforded protection under state or federal legislation and may occur in the Project area. These four species include two species of abalone and two species of fish. Both fish species are associated with freshwater river and creek habitats, such as near San Mateo and San Onofre Creeks.

Steelhead (*Oncorhynchus mykiss*) is a federally endangered species. The listings differentiate between several Distinct Population Segments (DPS), which is a population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The southern DPS steelhead population accesses freshwater streams for spawning throughout Southern California from Santa Maria to San Diego. San Mateo and San Onofre Creeks are included as habitat within the High Priority Core Recovery Populations listed in the recovery plan (NMFS 2012). Steelhead, like all salmonids, spawn in freshwater creeks. Steelhead are an anadromous species and therefore migrate from streams to the ocean to feed and mature before returning to streams to spawn. Steelhead typically travel offshore to feed when in the marine environment and are not commonly found nearshore unless entering or leaving freshwater streams and creeks. In Southern California, this typically occurs in the winter and early spring (NMFS 2012, Love 2011).

The tidewater goby (*Eucyclogobius newberryi*) is a small, elongate, gray-brown fish that is endemic to California. Tidewater goby inhabit brackish water habitats within shallow coastal streams, lagoons, and marshes. The species occurs from the mouth of the Smith

River in Del Norte County south to Agua Hedionda Lagoon in San Diego County (Moyle 2002). Very few tidewater gobies have ever been captured in the marine environment (Swift et al. 1989), which suggests that this species rarely occurs in the open ocean. Critical habitat for tidewater goby was first designated in November 2000 and included 10 coastal stream segments in Orange and San Diego Counties (65 FR 69693). In February 2013, the USFWS published a final revised critical habitat designation that included 65 units covering 12,156 acres in California (78 FR 8746). This includes San Mateo Creek; however, tidewater goby are unlikely to be found in the Project area owing to their restriction to the brackish zone of the creek itself.

Table 4.1-7. Regionally Occurring Marine Species with Protected Status

Scientific Name	Common Name	Status Federal/ State	Habitat	Potential to Occur in the Proposed Project Area
Haliotis sorenseni	White abalone	—/CE	Historically present from Point Conception to Baja California, Mexico. Present known occurrence ~~limited to~~ along the mainland coast of Los Angeles County and San Diego County, at deep-water reefs off Santa Barbara, and at some offshore islands and banks; however, information is not available to adequately assess the species distribution throughout their historical range.	**Not Likely to Occur** Wheeler North Reef is ~~too shallow~~at the shallower end of their depth range, and the ~~mainland population limited to Santa Barbara County~~species has not been observed on Wheeler North Reef during several years of intensive monitoring.
Haliotis cracherodii	Black abalone	—/CE	Intertidal to low subtidal rocky habitat throughout California and as far south as Baja California, Mexico.	**Not Likely to Occur** Suitable habitat absent in Project area.
Oncorhynchus mykiss	Steelhead (Southern California DPS)	—/CE	Juveniles from this DPS are born and reared in freshwater streams and creeks from Santa Maria to San Diego. Adults mature in the marine environment and return to rivers to spawn. Ocean species migrate offshore and do not stay in the nearshore environment in Southern California.	**Low** Rarely seen nearshore unless migrating to and from freshwater habitat in winter–spring. San Mateo Creek is closest adjacent freshwater habitat to Project.

Scientific Name	Common Name	Status Federal/ State	Habitat	Potential to Occur in the Proposed Project Area
Eucyclogobius newberryi	Tidewater goby	—/CE	Tidewater goby are a brackish and freshwater goby species. Individuals from the South Coast Recovery Unit Sub-unit SC 1 occur in both San Mateo and San Onofre Creeks.	**Not Likely to Occur** This species is a brackish water species that remains within creek habitats.

Sources**:** CDFW 2017a; NMFS 2009, 2012, 2016; USFWS 2006.
Acronyms: CE = State-listed Endangered; DPS = distinct population segment; — = no listing status.
Potential Occurrence:

- **Low** – Marginal habitat is present on or adjacent to site; no recent records within 5 miles of the site.
- **Not Likely to Occur** – No recent records within 5 miles; no suitable habitat occurs on or near site.

Although the Project area is in the geographic range of black abalone (*Haliotis cracherodii*), they are usually found in high relief rocky intertidal habitat that is not similar to habitat around the proposed Project area. The Project area is not included in the critical habitat listing for black abalone (Notice 76 FR No. 66806, 27 October 2011). White abalone (*Haliotis sorenseni*) are ~~usually~~ currently found at highest densities on reefs in water depths of 100 to 200 feet, beyond the depth of the Project area (NMFS 2008), but have historically occured between 17 feet and 200 feet depth (Cox 1960). No critical habitat has been designated for white abalone because of concerns regarding the identification of the locations of the remaining populations (NMFS 2008). Both of these species are highly unlikely to occur in the Project area owing to a lack of suitable habitat.

Several other fish species that could occur in the area have other special protections. The California state marine fish, the garibaldi (*Hypsypops rubicundus*), is a bright orange and pugnacious temperate water damselfish. California State Legislature designated the garibaldi as protected in California coastal waters. The giant sea bass is prohibited from recreational fishery take, and commercial fisherman are only allowed one incidentally harvested fish to be taken per boat. Both species are likely to occur within the kelp forests of Wheeler North Reef and SMK. The harvest of the great white shark (*Carcharodon carcharias*) is prohibited, with a few exceptions for incidental and accidental take in commercial fisheries and juveniles are occasionally observed in areas close to shore in Southern California.

4.1.1.8 Invasive and Non-Native Marine Species

Non-native species are organisms that have been moved from their native region to a new geographic location; to be considered invasive the organism must also become established and usually out-compete native species. Non-native species are often known as introduced, exotic, alien, or nonindigenous (CDFW 2018a, Kolar and Lodge 2001). Nuisance species are organisms that disrupt the ecological stability of infested areas.

Even if they are native to the region, these organisms can cause ecological damage and can impact the recreational, commercial, and agricultural uses of the area.

Due to concerns regarding damaging effects of non-native invasive species into the marine environment, California established the Marine Invasive Species Program (MISP) in CDFW's Office of Spill Prevention and Response (OSPR). The MISP coordinates with other state agencies, including the CSLC, to control introductions of non-native species from the ballast of ocean-going recreational and commercial vessels. Other pathways for the introduction of NIS into marine waters are from fouling organisms attached to vessels, and the introduction of fishes, invertebrates, and seaweeds intentionally brought to California waters to establish new populations for fisheries or aquaculture. A statewide monitoring program detects the potential introduction of non-native species into marine waters. Although MISP is primarily focused on bays and harbors, a statewide coastal survey was completed in 2007 (CDFW 2008b) to document the presence of non-native species in coastal habitats. Only six non-native species were detected from the open coast during a baseline survey conducted in 2004. The survey sampled areas spanning California's outer coast, and targeted prominent headlands near to shipping lanes and potential entrainment areas that may have increased larval settlement.

Some non-native marine species found in this region, including those found through the 2007 survey, are discussed below.

- *Sargassum horneri* is a large, brown alga native to marine waters of eastern Asia that can reach 10 to 16 feet tall. In 2003, *S. horneri* was discovered in Long Beach Harbor and has spread as far north as Santa Barbara in Southern California and south into Baja California. *S. horneri* can easily colonize distant areas by dispersal of floating thallii that are capable of self-fertilization. Since *S. horneri* is fast growing and highly fecund, it can spread quickly on both natural and human-made structures once established in an area. It is also avoided by most herbivores as a food source. For those reasons this alga is likely to have a competitive advantage over other macrophytes.

- *Sargassum muticum* is a large, brown alga reaching about 6.5 feet tall that was introduced to the west coast of North America in about 1945, most likely during the importation of oysters, and has spread widely in tropical and temperate waters. It grows attached to hard structures and is found in a variety of habitats including tide pools, subtidal reefs, rocky benches, pebbles, stones, shells, ropes, docks, and vessel hulls. In introduced locations, it has had varied ecological effects on native communities, including decreasing native algal diversity and abundance, and increasing invertebrate and fish abundance (Cal NEMO 2018b, Abbott and Hollenberg 1976).

- *Caulacanthus ustulatus* is a densely tufted, dark purple to brown colored turf-form red alga that is attached to substrate by way of creeping stolons. *C. ustulatus* is found in the upper to mid intertidal zone, often growing in and amongst barnacles, mussels, and fucoids. Native to coastal Asia, this species is found in several areas along the California coast and is especially common in the intertidal zone of Southern California (UCSC 2018). Where present, it can displace invertebrates, such as barnacles, limpets, and periwinkles; however, it also supports many other species of invertebrates and algae by supplying turfy habitat where turfs are uncommon (Smith et al. 2014).

- *Lomentaria hakodatensis* is a subtidal red alga that is considered non-native, although early records of this alga from the Southern California coast suggest that it might be naturalized. This species has been reported on the Atlantic shores of France and Spain and in the Mediterranean Sea, Russia, the Hawaiian Islands, and Australia (Curiel et al. 2006).
- *Caulerpa taxifolia* is a green alga with feathery, fern-like fronds that extend from a main stem. *C. taxifolia* is native to tropical waters, including the Caribbean, Indo-Pacific, and Red Sea. Infiltrations have been found in California. It can form a dense carpet on many surfaces including rock, sand, and mud, and it is capable of rapid growth. *C. taxifolia* contains toxins that are distasteful to herbivores, virtually eliminating any control effects from grazing organisms (National Oceanic and Atmospheric Administration [NOAA] 2018).
- *Botryllus schlosseri*, or gold star tunicate, is a colonial tunicate native to Europe that has been introduced to both coasts of North America. *B. schlosseri* tends to settle in protected marine waters where it lives on a variety of solid surfaces including ship hulls, docks, piers, gravel, seabed, metal, tires, plastic, styrofoam, rope, fiberglass, wood, and shellfish (WDFW 2018).
- *Musculista senhousia*, the Asian date or Senhouse mussel, is a native species ranging from the southern Kurile Islands in Russia to Japan and Singapore that has been introduced in the northeast Pacific (Mexico to British Columbia). This mussel can settle on soft and hard substrates. On soft substrates, it creates large mats of mussels surrounded by byssus threads that can increase the stability of the sediment and create a new habitat that can be colonized by some organisms at the expense of others. Impacts on eelgrass (*Zostera marina*) were mixed, with decreased rhizome growth but increased leaf growth from increased ammonium in the sediment (Cal NEMO 2018a).
- Native sea fans (*Muricea* spp.) can be considered a nuisance species when they achieve high densities on California reefs. High densities of sea fans can negatively affect giant kelp growth. Although sea urchins are part of the kelp forest ecosystem, high sea urchin densities can also cause reductions in the abundance of giant kelp on a rocky reef. Reed et al. (2017) cite 10 *Muricea* spp. and 35 sea urchins per square meter as threshold densities for these species on artificial reefs; after these thresholds, giant kelp is typically rare or absent from a reef.

4.1.2 Regulatory Setting

Appendix D lists federal and state regulations and policies related to marine biological resources. No local ordinances or policies specifically address biological resources within the study area. However, the San Diego Regional Water Quality Control Board (RWQCB) has established a Water Quality Control Plan for the coastal watersheds of San Diego County (RWQCB 1994, as amended 2016). The standards of the RWQCB incorporate the applicable portions of the Ocean Plan (refer to Appendix D) and are more specific to the beneficial uses of marine waters adjacent to the Project site. These water quality objectives are designed to protect the beneficial uses of ocean waters within specific drainage basins. The Water Quality Control Plan identifies the following existing beneficial uses for the coastal waters near Wheeler North Reef: agricultural supply; contact and non-contact water recreation; warm freshwater habitat; cold freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and spawning, reproduction, and early development.

4.1.3 Significance Criteria

Significance criteria used to evaluate potential impacts to marine biological resources are based on Appendix G of the California Environmental Quality Act (CEQA Guidelines), as adapted for this Project, which state that a significant impact would occur if the Project would:

- Have an impact that has a high likelihood of causing substantial decline in the local population of any other regulated, fully protected, candidate, sensitive or special-status species identified under federal, state, local, or regional plans, policies and regulations, or by CDFW and USFWS
- Result in any “take” of a federal- or state-listed endangered, threatened, or candidate species; CDFW fully protected species; or other special-status species
- Generate noise effects that might be considered a Level B Harassment, which is defined under the 1994 Amendments to the Marine Mammal Protection Act (MMPA) as any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild
- Result in a prolonged disturbance to, or destruction of, the habitat (or its functional habitat value) of a species that is recognized as biologically or economically significant in federal, state, or local policies, statutes, or regulations, including resulting in a net loss in the functional habitat value of an Environmentally Sensitive Habitat Area, including but not limited to vernal pools, beach, sea bird rookeries, or other areas of special biological significance

- Result in a permanent change in the community composition or ecosystem relationships among species that are recognized for scientific, recreational, ecological, or commercial importance
- Result in a permanent alteration or destruction of habitat that precludes reestablishment of native biological populations
- Result in an adverse effect on waters of the United States, waters of the State, or other jurisdictional waters through direct removal, filling, hydrological interruption, or other means
- Interfere with established native resident or migratory wildlife corridors or the use of native wildlife nursery sites
- Conflict with an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other adopted conservation plan protecting biological resources

Several of these impact criteria are not directly applicable to marine biological resources. No Habitat Conservation Plans, Natural Communities Conservation Plans, or other adopted conservation plans have been adopted to protect marine biological resources in the Project area (Criterion 5), nor are there Environmentally Sensitive Habitat Areas or areas of special biological significance in the Project area (Criterion 6).

4.1.4 Environmental Impact Analysis and Mitigation

4.1.4.1 1999 Program EIR

The 1999 Program EIR analyzed the effects of reef construction, the ongoing effects of reef presence, and the effects of monitoring activities on marine biological resources. The findings of the 1999 Program EIR determined that the project would have:

- A less than significant impact on the subtidal sand bottom community during construction from, anchoring of the derrick barge, increased turbidity from rock placement, and burial of the sand bottom habitat and associated community by the new reef
- A less than significant impact on the subtidal sand bottom community from the new reef causing changes in sediment movement and sediment size, increased food resources, and abundance of predators
- A less than significant impact on the subtidal sand bottom community from reef monitoring activities
- A less than significant impact on the existing kelp reef community during construction from the increased turbidity

- A less than significant impact on the existing kelp reef community from the new reef causing changes in wave surge, kelp entanglement, sedimentation, and the proximity of the new reef area
- A less than significant impact on the existing kelp reef community from reef monitoring activities
- A less than significant impact on marine mammals and marine birds from reef construction
- No adverse effect on marine mammals and marine birds from the presence of the reef
- A less than significant impact on marine mammals and marine birds from monitoring activities
- A less than significant impact on the beach community from changes in littoral zone sedimentation

4.1.4.2 2018 Subsequent EIR

The Project is evaluated to assess whether it would impact marine biological resources, including existing reef biota, marine mammals and turtles, soft bottom habitat, or increase in invasive non-native species. Table 4.1-8 at the end of this section provides a summary of the Project's potential impacts related to marine biological resources and any mitigation measures (MMs) or Applicant-Proposed Measures (APMs) recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact BIO-1: Existing Giant Kelp Habitat Quality
The proposed Project could affect the quality of existing giant kelp habitat **(Less than Significant).**

Impact Discussion

Three impact assessment criteria are considered applicable in the impact assessment of this effect:

- This effect has the potential to result in a prolonged disturbance to the SMK forest habitat and the existing Wheeler North Reef, potentially reducing their functional habitat value. Several marine species ecologically associated with these existing reefs are recognized as biologically or economically significant in federal and state policies, statutes, or regulations. These species could be affected by a decline in the giant kelp coverage. These include fish species that are managed under

Fishery Management Plans created under the Magnuson-Stevenson Act. They also include fish and invertebrate species managed under the Nearshore Fishery Management Plan created under the California Fish and Game Regulations and Marine Life Management Act.

- The effect has the potential to result in a permanent change to the composition or ecosystem relationships among species in the existing reef habitats. Kelp habitats and many of the species associated with these habitats are recognized for scientific, recreational, ecological, or commercial importance.
- The effect may also result in permanent alteration or destruction of the existing reef habitat, which could preclude the reestablishment of native biological populations.

The construction methods anticipated for the Project are identical to those anticipated in the Program EIR; therefore, the impact conclusions certified in the Program EIR are summarized here. Turbidity levels could increase during the deposition of rocks to create the reef structures. Placement could result in significant seabed disturbance because the rock material used to construct the reef would likely contain some fine materials, which would become suspended in the water column when the rocks are pushed off the barge. The increase in turbidity could affect organisms living in SMK, the closest natural kelp reef to the Project area, as well as organisms on the existing Wheeler North Reef. Most of the polygons intended to be constructed during the Project are to the north of the existing Wheeler North Reef and, therefore, further away from existing reefs downcoast, including SOK and BK, which are 2.9 miles and 9.3 miles from the Project site, respectively. The 1999 Program EIR determined that the impact of turbidity on existing kelp communities would be less than significant because the increase in turbidity would be minor and localized (Appendix E). The effects would also be temporary, as the suspended material would disperse and the effects would be negligible within a day of activities ceasing. Furthermore, the addition of new reef material would result in a larger area of contiguous giant kelp forest, which is likely to provide increased ecological stability by way of a source of recruits for replenishing the reef after natural deterioration or damage (e.g., storms).

Because Project activities would be generally further away from existing reefs than the Phase 2 activities, which were considered less than significant in the Program EIR, and no changes from the previously assessed construction methods are anticipated, the effects of turbidity generated during construction on SMK, other natural reefs, or the existing Wheeler North Reef are considered to be a less-than-significant impact.

Mitigation Measures

No MMs are recommended for Impact BIO-1.

Impact BIO-2: Introduction or Enhancement of Non-Native Species

Non-native species could be introduced or enhanced as a result of the proposed Project **(Less than Significant with Mitigation).**

Impact Discussion

Three impact assessment criteria are considered applicable in the impact assessment of this effect:

- The effect has the potential to result in a prolonged disturbance to the SMK forest habitat, potentially reducing its functional habitat value. Some introduced or nuisance species may directly compete with giant kelp and subsequently reduce the extent of giant kelp if introduced. Several marine species ecologically associated with the SMK forest are recognized as biologically or economically significant in federal and state policies, statutes or regulations. These species could be affected by a decline in the giant kelp coverage. These include fish species that are managed under Fishery Management Plans created under the Magnuson-Stevenson Act. They also include fish and invertebrate species managed under the Nearshore Fishery Management Plan created under the California Fish and Game Regulations and Marine Life Management Act.
- The effect has the potential to result in a permanent change to the composition or ecosystem relationships among species in the SMK habitat. Kelp habitats and many of the species associated with these habitats are recognized for scientific, recreational, ecological, or commercial importance.
- The effect may also result in permanent alteration or destruction of the SMK habitat, which could preclude the reestablishment of native biological populations.

Vessel activity would increase in the area during Project construction. ~~Numerous b~~Barge trips are anticipated to increase slightly between ports and harbors from Los Angeles to Mexico, and ~~many~~ non-native species may be introduced ~~either~~ as organisms attached to the submerged parts of vessels ~~or when ballast water is discharged from vessels.~~ The introduction of non-native species to the existing Wheeler North Reef or other marine environments can result in major changes to the native community or ecosystem. Organisms affected can include economically or ecologically important species and changes can be permanent.

Ports and harbors and adjacent areas are typically most vulnerable to non-native species, as the bulk of marine traffic is concentrated at these sites. This may also apply to the jetties and other structures at quarry sites. If non-native species are present at these locations, they could be transferred between other locations by vessels. However, transfer is highly unlikely if the vessels are not expected to remain within the harbor for a sufficient length of time for non-native species to become established on the vessel.

Additionally, ballast water discharge and recharge are strictly controlled within major harbors for large vessels; therefore, this vector is an unlikely source for non-native species transfer from a major harbor to the proposed Project site.

There is a risk, however, that *Muricea* spp. could increase in abundance after the reef is built, as it appears to be adapted to the artificial reef habitat. *Muricea* spp. is a native species; however, it competes with giant kelp for space. Therefore, it may limit the expansion of giant kelp and subsequently impede the Project's ability to meet the goals of the California Coastal Commission's Coastal Development Permit.

Mitigation Measures

Although the likelihood of transferring non-native species by vessel traffic is low, the following MMs are required to reduce the potential for introduction or enhancement of nonindigenous, non-native, or nuisance species during construction. MM BIO-2 would reduce the impacts associated with non-native species to a less-than-significant level.

MM BIO-2: Prevent Import of Non-Native Species. In order to control the import of non-native species to the Project location, the following ~~recommendations shall be considered~~ requirements shall be implemented as part of the detailed Project planning. All Project vessels shall:

- Originate from Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay
- Be continuously based out of Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay since last dry docking
- Have hulls with antifouling coatings
- Remain at ports no longer than 5 days
- ~~Have underwater surfaces cleaned before entering Southern California at vessel origination point and immediately prior to transiting to the Project site~~

Underwater surfaces of barge vessels shall be subject to evaluation by California State Lands Commission (CSLC) Marine Invasive Species Program (MISP) staff, through a Risk Assessment process and pre-construction inspection prior to use for the construction. Pre-construction inspections shall include use of underwater remotely operated vehicles with cameras, or similarly detailed inspection methods, including but not limited to review of the vessel's dry dock and cleaning records, most recent application of antifouling hull coatings, review of Biofouling Removal and Hull Husbandry Reporting Forms, and any other measures to prevent the spread on non-native species. Should vessels fail to pass Risk Assessment or pre-construction inspection screening as determined by CSLC MISP, cleaning of vessels prior to construction may be required.

Additionally, and regardless of vessel size, ballast water for all Project vessels must be managed consistent with ~~California State Lands Commission~~ ~~(~~CSLC~~)~~ ballast management regulations, and Biofouling Removal and Hull Husbandry

Reporting Forms shall be submitted to CSLC MISP staff. ~~Project vessels shall also be available for inspection by CSLC staff for compliance.~~ Further, as part of the Project kickoff meeting, a qualified marine biologist, approved by CSLC staff, shall provide information to all Project personnel about the spread of non-native species in California waters and the programs (i.e., CSLC Ballast Water Management Program and Biofouling Removal and Hull Husbandry Reporting) that would be implemented to minimize this hazard.

Impact BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction

Construction activities (including noise) could impact marine mammals and turtles **(Less than Significant with Mitigation).**

Impact Discussion

Two impact assessment criteria are considered applicable to the impact assessment of this effect:

- This effect has the potential to result in the “take” of a federal- or state-listed endangered, threatened, or candidate species. Specifically, the injury of a marine mammal or sea turtle.
- This effect also has the potential to generate noise that might be considered a Level B harassment to marine mammals.

All marine mammals are protected from harassment by the MMPA, and some of the species that inhabit the SCB are further protected by the California Endangered Species Act and FESA. All sea turtles are listed as endangered or threatened under the FESA. Both marine mammals and sea turtles are subject to similar effects caused by the Project construction. Those effects and the potential for significant impacts to these protected species are discussed below.

Effects that could significantly impact marine mammals and sea turtles are:

- Being struck or crushed by falling rocks during the construction of the reef
- Ship strikes during the transportation of barges and other vessels associated with the construction of the reef
- Disturbance due to noise generated during the construction of the reef

Sea turtles are at risk of being injured or killed by a rock landing on the seafloor because adult sea turtles spend most of their time foraging and resting on the bottom and surface only to breathe for a relatively short duration. However, the likelihood of a sea turtle occurring in the area is very low. Pinnipeds, particularly harbor seals and California sea lions, are considerably more common in the Project area than sea turtles. While they are considerably more mobile than sea turtles, and therefore may be better able to avoid rockfall, they are also curious in nature and are more likely to be attracted to the construction area. Larger coastal marine mammals, such as bottlenose dolphins run a much smaller risk of passing under falling rocks because their echolocation capabilities generally alert them to obstructions in the ocean, allowing them to take evasive actions. Larger whale species, such as blue whales and humpback whales, have a low probability of occurring in the Project area and would likely avoid the area due to construction activities. While gray whale cows and calves travel extremely close to shore during the northward spring migration (December through April), the stated construction periods (June through September) would not occur during their migration; therefore, there is minimal threat of injury to the calves or their mothers.

Ship strikes involving marine mammals and sea turtles are also a concern during the transportation of quarried rocks on barges. These barges and their towing vessels would travel through deeper waters of the SCB and are likely to encounter dolphins and whales during transit. Although the towing vessel would produce enough noise to be easily detected and avoided by marine mammals, the barge is much quieter by comparison and therefore represents a greater risk of ship strike than a normal noise producing vessel. Vessel speed is a factor in ship strike risk; however, these vessels would be operating at speeds up to 8 nm per hour (knots), which is less than the 10-knot recommendation that NOAA outlines for vessel speed reduction protocols to protect whales (Abramson et al. 2009). The onboard presence of a marine mammal observer (MMO) would also reduce the potential for ship strikes and significant impacts, if appropriate.

Underwater noise production during marine construction can disturb natural behavior, which can represent a threat to marine mammals. Sea turtles are less likely to be disturbed, as they are not as sensitive to noise activity and are considerably rarer in the area. While disturbance may occur, permanent damage to auditory sensory organs is highly unlikely. Permanent damage as a result of underwater noise generated by construction activities is generally associated with pile installation activities. This can result in a reduction of foraging success, social interactions, navigation capabilities, and detection of predators (Todd et al. 2015). Temporary threshold shifts, which are temporary reductions in hearing after exposure to loud noise, have been measured for several species of marine mammals (Southall 2007) and Level B harassment zones of influence have been established where received underwater sound pressure levels are higher than 160 dB (root-mean-square) re 1 μPa for impulse noise sources (e.g., impact pile driving), and 120 dB (root-mean-square) re 1 μPa for non-impulse noise sources (e.g., vibratory pile driving, mechanic dismantling). No data were collected during this assessment on potential sound levels produced by rockfall from a barge; however, this activity is unlikely to produce noise levels that would exceed these thresholds beyond 164 feet (50 meters) around the vessels. However, due to of the lack of information available for underwater noise generation for this form of activity, and the subsequent risk of Level

B harassment it may cause, MMs are recommended to reduce any impacts from rockfall noise generation to a less-than-significant impact.

Mitigation Measures

MM BIO-3 would reduce the potential impacts to marine mammals and sea turtles to a less-than-significant impact.

MM BIO-3: Marine Wildlife Monitoring Plan. A Marine Wildlife Monitoring Plan (Plan) shall be prepared by a qualified marine mammal biologist and submitted to California State Lands Commission (CSLC) staff for review and approval 60 days prior to commencement of activities. The Plan is intended to reduce the chance of a significant impact to marine mammals and sea turtles during construction activities. It may also form the basis of a permit application to the relevant agencies (National Marine Fisheries Services and U.S. Fish and Wildlife Service). The Plan should include:

- Determination of the exclusion zone for eliminating the risk of crushing as a result of rockfall.
- Procedures for monitoring marine mammals and sea turtles and specifications for Marine Wildlife Observers (MWO) within the rockfall exclusion zone.
- ~~Procedures for measuring in-water noise output from rocks being pushed into the water and landing on the seafloor during the first week of construction to determine if Level B harassment criteria are exceeded.~~
- ~~If Level B harassment thresholds are exceeded, procedures to determine an appropriate zone of influence and subsequent radius for an exclusion zone, which in turn should be monitored by an MWO for the duration of construction activities.~~
- Methods for communicating with contractors to stop work if there is a risk that any marine mammals or sea turtles active in the area may move closer to the construction site and inside a designated exclusion zone.
- Procedures for MWO monitoring of barge transport, if necessary.
- Methods for communicating with the ship's captain if there is a risk of collision with a marine mammal or sea turtle.
- Limitations that work occur only during daylight hours when visual monitoring of marine mammals and sea turtles can be conducted.

Impact BIO-4: Accidental Spills or Vessel Grounding May Result in Habitat Degradation or Species Mortality

Boat and ship activity may result in accidental spills or the grounding of vessels, which could lead to habitat degradation or species mortality **(Less than Significant with Mitigation).**

Impact Discussion

The impact assessment criteria considered in the assessment of impact from an accidental spill includes the following;

- The effect has the potential to result in a substantial decline in the population of regulated, fully protected, candidate, sensitive, or special-status species identified under federal, state, local, or regional plans, policies, and regulations, or by CDFW and USFWS. These would include several species of shorebird, seabird, and marine mammals.
- The effect may also result in the "take" of a federal- or state-listed endangered, threatened, or candidate species; CDFW fully protected species; or other special-status species.
- The effect may also result in a prolonged disturbance to, or destruction of, the habitat (or its functional habitat value) of a species that is recognized as biologically or economically significant in federal, state, or local policies, statutes, or regulations. This would include the entrance to San Mateo Creek, which is a seasonal habitat for steelhead trout. Kelp canopy habitat would also potentially be affected, as would shallow subtidal and intertidal habitat that may include seagrass. Both of these habitat types are Essential Fish Habitat protected under the Magnuson-Stevenson Act.

The increase in boat and ship activity associated with Project construction would result in an increase in the risk of oil and fuel spills. This could occur from fuel or hydraulic leaks from vessels or equipment on vessels or barges. Some refueling of the Project equipment such as the derrick barge and loader would occur on the barge while it is anchored at the Project site, which could result in a spill. As the oil would tend to stay on the surface, intertidal and shallow subtidal habitats and associated biological communities would be at greatest risk. Effects on subtidal communities would be less apparent, but kelp that forms canopies at or near the surface would be especially vulnerable as would seabirds, fish, marine mammals, and sea turtles that occur in the upper water column and surface waters. Toxic components of the spill could spread to marine habitats and resources by ocean currents or through the food web, potentially bioaccumulating and affecting higher trophic level organisms such as fish, lobster and crab, marine mammals, and seabirds. Several of these are state- or federally listed species, and their death owing to an oil spill would constitute "take" defined under the California Endangered Species Act and FESA. There is also a risk of spill from vessels transiting from the Project site to quarries, ports, and other vessel facilities.

Mitigation Measures

~~The consequence of a spill would result in the high likelihood of causing a substantial decline in the local population of listed species; therefore,~~ MM BIO-4 is recommended to reduce the potential impact of an accidental spill of pollutants or the grounding of a vessel to a less-than-significant level.

MM BIO-4: **Spill and Grounding Contingency Plan.** The Applicant shall prepare and submit for approval to California State Lands Commission staff at least 60 days prior to the commencement of construction activities a Spill and Grounding Plan that includes, at a minimum, the following features:

- A list of key contacts in the event of an accidental spill that will include senior Project management.
- Identification of potential pollutants used in the construction process. These are likely to include diesel fuel, lube oil, hydraulic oil, waste oil, and oil leaking from pipes on the vessels.
- Detailed procedures for averting and responding to a spill of these pollutants.
- Detailed procedures for addressing a vessel grounding scenario for both vessels underway and vessels that have broken free of moorings at the construction site.

Impact BIO-5: Monitoring Activities

Post-construction monitoring activities could result in disturbance or mortality of species **(No Impact).**

Impact Discussion

Post-construction monitoring has the potential to result in a prolonged disturbance to the Wheeler North Reef, SMK, and BK forest habitats, potentially reducing the functional habitat value. Several marine species ecologically associated with these kelp forests are recognized as biologically or economically significant in federal and state policies, statutes, or regulations. These species could be affected by a decline in the giant kelp coverage. These include fish species that are managed under Fishery Management Plans created under the Magnuson-Stevenson Act. They also include fish and invertebrate species managed under the Nearshore Fishery Management Plan created under the California Fish and Game Regulations and Marine Life Management Act.

The monitoring program anticipated for the period after Project construction would not result in any increase in monitoring effort. The locations of transect surveys would be spread across the existing and new portions of reef, essentially reducing the monitoring effort per unit area of reef. Monitoring would continue at the reference reefs (i.e., SMK and BK) in the same manner as during the Phase 1 and 2 monitoring periods.

In order for the monitoring program to assess the development of the artificial reef, scientific divers cannot significantly disturb the reef ecology. The monitoring program uses non-invasive techniques to collect data, such as the use of GPS coordinates to determine transect locations instead of attaching permanent hardware to the seafloor. No evidence of effects from the monitoring have been observed by scientists working at the site, and the methods used are similar to those used by research scientists that study kelp forests and other marine ecosystems throughout the scientific community. The 1999 Program EIR concluded that there would be no significant impact from the monitoring program and the basis for this conclusion has not been materially changed in this Subsequent EIR. Therefore, there would be no significant impact from the monitoring program anticipated for the period after Project construction.

Mitigation Measures

No MMs are recommended for Impact BIO-5.

Impact BIO-6: Adverse Effects to Soft Sediment Habitat and Managed Fish Species The loss of existing soft sediment habitat may indirectly affect managed fish species **(Less than Significant).**

Impact Discussion

Three impact assessment criteria are considered applicable in the impact assessment of this effect:

- This effect has the potential to result in a prolonged disturbance to soft sediment habitat, potentially reducing its functional habitat value. Several marine species ecologically associated with soft sediment habitat are recognized as biologically or economically significant in federal and state policies, statutes, or regulations. These species could be affected by a decline in soft sediment habitat. These include fish species that are managed under Fishery Management Plans created under the Magnuson-Stevenson Act. They also include fish and invertebrate species managed under the Nearshore Fishery Management Plan.
- The effect has the potential to result in a permanent change to the composition or ecosystem relationships among species in soft sediment habitat. Soft sediment habitat and many of the species associated with these habitats are recognized for scientific, recreational, ecological, or commercial importance.
- The effect may also result in permanent alteration or destruction of the soft sediment habitat, which could preclude the reestablishment of native biological populations.

The construction methods anticipated for the Project are identical to those anticipated in the 1999 Program EIR; therefore, the impact conclusions that relate to a loss of soft sediment habitat certified in that Program EIR are summarized here. Anchoring of the derrick barge would result in minor soft sediment habitat losses that are insignificant relative to the extensive soft sediment habitat available throughout the area.

SCE has committed to implementing an anchoring plan, based on the original design plan produced by Coastal Environments (2008a) for the Phase 2 construction to ensure that impacts to marine resources would be minimized.

APM-1. Anchoring Plan. The Applicant shall prepare an Anchoring Plan to reduce impacts sensitive marine areas.

- Anchors should be designed to minimize drag on the seabed. Each anchor should be ~~connected to a 10-ton concrete block~~ located on the ocean floor. The cable to the barge would travel via a foam filled can (surge-can) to lift the anchor chains off the seafloor.
- Anchors ~~and concrete blocks~~ should be placed on areas of seabed less than 30 percent hard substrate.
- All anchoring hardware moves would be conducted with ocean-capable tugboats with sufficient capacity to remove anchors from the seafloor ~~without causing~~ to minimize drag damage. Anchors should be checked periodically to ensure movement has not occurred.

Placement of rocks on the seabed would result in loss of soft sediment habitat. As this impact was discussed extensively in the 1999 certified Program EIR, the impact conclusions in the Program EIR are summarized here. The Program EIR anticipated the loss of between 85 and 186 acres of soft sediment habitat, which was described in the Program EIR as relatively unproductive habitat, of which there is extensive similar habitat throughout the SCB. There were no federally or state-listed species identified as occurring within the soft sediment habitat areas that were anticipated to be lost following construction of the Wheeler North Reef in the Program EIR; therefore, the loss of sand-bottom community biota and habitat through burial by concrete and rock was considered to be a less-than-significant impact.

Expansion of the Wheeler North Reef (the Project) would likely generate effects similar to those experienced during the construction of Phases 1 and 2. The Project objective is to replace an additional 200 acres of soft sediment seafloor habitat with giant kelp. While soft-bottom habitat supports several federally managed fish species, fishery stocks for these species are highly unlikely to be affected by the loss of a small proportion of this regionally extensive habitat. Therefore, the effect of removing this soft sediment habitat is considered a less-than-significant impact.

Mitigation Measures

No MMs are recommended for Impact BIO-6.

4.1.5 Cumulative Impacts

State CEQA Guidelines section 15130 requires that an EIR discuss cumulative impacts of a project when the project's incremental effect may be cumulatively considerable. This does not include impacts that do not result in part from the project evaluated in the EIR.

Furthermore, an incremental effect that is not considered “cumulatively considerable” is not considered a significant impact, however the basis for that consideration should be briefly described.

Future projects near the location of the proposed Project are described in Section 3.0, *Cumulative Projects*. The cumulative projects study area for this Subsequent EIR includes projects located in the immediate onshore, nearshore, and offshore areas of the San Clemente coast and projects using the quarries on Santa Catalina Island.

The Palos Verdes Reef Restoration Project would result in types of marine biological resource impacts similar to the proposed Project. It would also be constructed at the same time or similar time as the Project. However, it is approximately 46 miles northwest of the Project area, limiting the cumulative effects to noise impacts on highly mobile marine mammals such as whales and dolphins, or impacts related to transport of quarry rock.

The only other project likely to have a cumulative impact with the proposed Project is the SONGS Units 2 and 3 Decommissioning Project. Along with substantial land-based demolition activities that would not result in incremental effects with the proposed Project, the SONGS Units 2 and 3 Decommissioning Project may involve the partial or complete removal of intake and discharge conduits and associated submerged infrastructure. These activities would result in an increase in vessel activities close to the Project area, an increase in underwater and above water noise activities, and an increased risk of accidental spill or grounding leading to a pollution event. In addition, the increase in vessel activity in the area may increase the likelihood of an at-sea collision, in turn leading to an accidental spill event.

Currently, offshore aspects of the SONGS Units 2 and 3 Decommissioning Project that could likely interact with the proposed Project are anticipated to occur in 2023 and, therefore, would not result in cumulative impacts. Onshore construction is anticipated to start in 2019 and may therefore overlap with proposed Project activities. However, the Project would not contribute to onshore noise impacts and would not be cumulatively additive.

4.1.6 Summary of Proposed Mitigation Measures

Table 4.1-8 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.1-8. Biological Resources (Marine) Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Subtidal Sand Bottom Community	
<u>Experimental & Mitigation Reef Construction</u> • **Derrick Barge**: The derrick barge anchors and chains would drag along the bottom of the lease area, destroying sand bottom habitat and biota and potentially disturbing some existing hard substrate habitat and biota in the immediate construction areas. However, the sand bottom habitat at the lease site is mostly unproductive, and the area affected is very small compared to the area of similar habitat occurring elsewhere in the Southern California Bight.	None required. Recommended Mitigation: Buoys will be used to keep the amount of chain length dragging on the ocean bottom to a minimum.
• **Suspended Sediments**: Construction of both reefs would disturb bottom sediments and increase turbidity of the water near the construction site. The increased levels of suspended sediments and turbidity resulting from the construction of the experimental reef are expected to be localized and to involve relatively minor amounts of sediment.	None required.
• **Burial by Construction Materials**: The placement of concrete and quarry rock on the lease site for construction of the experimental reef modules and the mitigation reef would result in the permanent burial of the existing sand-dwelling biota and their habitat.	None required.
<u>Experimental & Mitigation Reefs</u> • **Sediment Characteristics**: The reefs would be expected to affect local currents, which could affect the sediment movement and sediment-size composition of the adjacent sand bottom habitat. Sand bottom communities are sensitive to changes in sediment characteristics, and changes related to the experimental reef and mitigation reef could lead to losses beyond those caused by direct burial by concrete or quarry rock.	None required.
• **Food Resources**: Establishment of the reefs would increase the supply of detrital food material available to the sand bottom community remaining within and in the vicinity of the installed concrete and quarry rock	None required.
• **Predation**: The abundance of predators in the proposed reefs would be expected to be much higher than that in the existing sand bottom community.	None required.
• **Monitoring**: The five-year monitoring program for the experimental reef, and the subsequent longer-term monitoring of the mitigation reef would not include excavation or other bottom-disturbing activities.	None required.

Table 4.1-8. Biological Resources (Marine) Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
Existing Kelp Forest Community	
Reef Construction • **Turbidity (Experimental Reef)**: Construction of the proposed 22.4-acre experimental reef could affect levels of suspended sediments and turbidity of the water at the lease site, but not likely to levels that would be extensive enough to affect the San Mateo or other kelp forests.	None required.
• **Turbidity (Mitigation Reef)**: Construction of the proposed 150-acre mitigation reef could affect levels of suspended sediments and turbidity of the water at the lease site. Increased turbidity could adversely affect the San Mateo kelp community and other nearby existing kelp forests by reducing light levels needed for production and recruitment of kelp and other algae. The levels of suspended sediments and turbidity resulting from the construction of the mitigation reef would be greater than those resulting from construction of the experimental reef, but they would probably remain well below levels that would substantially affect turbidity of water in the existing kelp forest communities.	None required.
Experimental and Mitigation Reefs • **Nutrients and Plankton Supply**: The kelp forests associated with the experimental reef and the mitigation reef could adversely affect the supply of nutrients and plankton to the San Mateo kelp forest community, which could result in damage to the existing kelp forest.	None required.
• **Kelp Entanglement**: Detached kelp from the experimental reef modules and the mitigation reef could entangle kelp in the San Mateo kelp reef and other kelp reefs, aggravating adverse effects of storm waves on these kelp forests. However, any loss of kelp in the San Mateo kelp community resulting from entanglement with kelp from the experimental reef would probably be far less than the increased kelp production of the reef.	None required.
• **Wave Surge (Experimental Reef only)**: Kelp growing on the experimental reef could shelter portions of the San Mateo kelp reef from the full force of storms but would be unlikely to afford significant protection from storm waves to the San Mateo or other kelp forests.	None required.
• **Sedimentation (Experimental Reef only)**: Low relief dune-like deposits of very fine-grained sands lie within and south of existing kelp beds in the project vicinity. If the experimental reef modules were to result in similar patterns of sand deposition, modules lying immediately north of the San Mateo kelp reef and other kelp reefs in the lease area could adversely affect these reefs.	None required.

Table 4.1-8. Biological Resources (Marine) Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
• **Sedimentation (Mitigation Reef only)**: If the mitigation reef were to result in sand deposition, portions of the San Mateo kelp reef and other kelp reefs lying immediately south of the mitigation reef could be adversely affected.	None required.
• **Monitoring:** The five-year monitoring program for the experimental reef and longer-term monitoring program for the mitigation reef would be expected to include the monitoring of reference sites in the existing San Mateo and San Onofre kelp forests as well as other possible kelp beds in the region. Drilling into these reefs would be required to set eyebolts for the permanent transects and quadrants, but the drilling would affect little reef area.	None required.
Marine Birds	
Experimental and Mitigation Reef Construction • **Foraging**: Reef construction activities may prevent several of the avian species from foraging in the lease area for the duration of construction.	None required.
Experimental and Mitigation Reefs • **Foraging**: The kelp forest would increase foraging and resting habitat for brown pelican, double-crested cormorant, common loon, California least tern and elegant tern. The kelp wrack that washes up on the beaches near kelp forests provides habitat for many of the prey species preferred by western snowy plover.	None required.
• **Monitoring**: Monitoring activities may disturb prey species for marine birds but that disturbance would be localized to lease site and avian species could use other areas for foraging.	None required.
Marine Mammals	
Experimental and Mitigation Reef Construction • **Potential Impacts**: The seasonal construction period, May 1 to September 30, is outside of the migratory period for gray whale. The marine mammals that would most likely occur in the area during the construction period are California sea lion, Pacific harbor seal and bottlenose dolphin. The proposed construction actions could affect marine mammals through: collision with water craft, direct injury from falling concrete or quarry rock, turbidity, and interference with foraging.	None required.

Table 4.1-8. Biological Resources (Marine) Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
Experimental and Mitigation Reefs • **Foraging/Habitat**: The kelp forest development may increase habitat for some of the prey that dolphins and sea lions would take. Furthermore, grey whales generally do not forage during their migration, but they have been observed skimming kelp beds for food and using kelp forests for escape cover.	None required.
• **Monitoring**: Monitoring activities associated with the experimental reef and mitigation reef have the potential to disturb marine mammals present in the lease area.	None required.
Proposed Project	
BIO-1: Existing Giant Kelp Habitat Quality	None recommended.
BIO-2: Introduction or Enhancement of Non-Native Species	**MM BIO-2:** Prevent Import of Non-Native Species
BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction	**MM BIO-3:** Marine Wildlife Monitoring Plan
BIO-4: Accidental Spills or Vessel Grounding may result in Habitat Degradation or Species Mortality	**MM BIO-4:** Spill and Grounding Contingency Plan
BIO-5: Monitoring Activities	None recommended.
BIO-6: Adverse Effects to Soft Sediment Habitat and Managed Fish Species	**APM-1:** Anchoring Plan

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4.2 AESTHETICS

This section describes the existing Area of Visual Effect (AVE), both onshore and offshore, for the Wheeler North Reef Expansion Project (Project), identifies applicable significance criteria, and assesses the Project's potential impacts to aesthetics and their significance.

Two components of the AVE are: (1) the sensitivity of critical public views most affected by proposed Project actions due to viewer proximity to the Project site, visibility of the affected view, and proposed Project duration; and (2) the Visual Modification Class (VMC), which is a measure of the existing visual conditions of the AVE and the extent to which alterations within the AVE would be noticeable to the public.

4.2.1 Environmental Setting

The proposed reef expansion area takes place on submerged lands offshore of the city of San Clemente (City). Approximately 8 miles of coastline have view corridors where the Project site may be observed, including views from beaches, transportation routes, and residences. Although the completed reef would be submerged with only kelp canopy visible at the water's surface, marine vessels would be present during the construction period. These vessels would not be static but would be periodically relocated along the 8-mile coastline to place quarry rock within the Project area identified in Figure 2-1.

4.2.1.1 Sensitivity of Critical Public Views

Identifying critical public views relies on the concept that sensitivity is more a function of a viewer's expectations, activities, awareness, values, and goals, which determine the viewer's favorable or unfavorable response to their environment than the view's aesthetic appeal (U.S. Department of Transportation [USDOT] 2015). Defining the visual quality for an AVE requires identifying what viewers like or dislike about the visual character of that AVE (USDOT 2015). The importance of the affected landscape is inferred from the following indicators of sensitivity:

- **High Sensitivity** suggests that some part of the public would react strongly to a threat to visual quality. Concern is expected to be great because the affected views are unique, rare, or otherwise special to the region or locale. A highly concerned public is assumed to be more aware of any level of adverse change and less tolerant than a public that has little concern. A small modification of the existing landscape may be visually distracting to a highly sensitive public and represents a substantial reduction in visual quality.
- **Moderate Sensitivity** suggests that the public would probably voice some concern over substantial visual impacts. Often the affected views are secondary in importance or are similar to others commonly available to the public. Noticeably

adverse changes would probably be tolerated if the essential character of the views remains dominant.

- **Low Sensitivity** is considered to prevail where the public is expected to have little or no concern about changes in the landscape. This may be because the affected views are not "public" (inaccessible to the public) or because there is no indication that the affected views are valued by the public. For instance, little public concern for aesthetics is assumed to pertain to views from industrial, commercial, and purely agricultural areas, with some exceptions (e.g., some agricultural areas are prized for their open space value, and views of such are highly sensitive). Visual sensitivity is considered low for views from all sites, areas, and travel routes not identified as moderate or high in sensitivity.

4.2.1.2 Visual Modification Class

The VMC is a measure of the existing quality of the affected setting, which is determined by how noticeable incongruous features may be within public views. Table 4.2-1 defines the four VMCs used to determine aesthetic impacts in the AVE.

Table 4.2-1. Visual Modification Class Definitions

VMC	Definition
1	**Not Noticeable.** Changes in the landscape are within the field of view but generally would be overlooked by all but the most concerned and interested viewers; they generally would not be noticed unless pointed out (inconspicuous because of such factors as distance, screening, low contrast with context, or other features in view, including the adverse impacts of past activities).
2	**Noticeable, Visually Subordinate.** Changes in the landscape would not be overlooked (noticeable to most without being pointed out); they may attract some attention, but do not compete for it with other features in the field of view, including the adverse impacts of past activities. Such changes often are perceived as being in the background.
3	**Distracting, Visually Co-Dominant.** Changes in the landscape compete for attention with other features in view, including the adverse impacts of past activities (attention is drawn to the change about as frequently as to other features in the landscape).
4	**Visually Dominant, Demands Attention.** Changes in the landscape are the focus of attention and tend to become the subject of the view; such changes often cause a lasting impression on the affected landscape.

Source: VMC definitions are adapted from U.S. Bureau of Land Management Manual 8431 (1986).
Acronym: VMC = Visual Modification Class.

4.2.1.3 Determining the Area of Visual Effect

To determine the visual quality of the reef expansion area, a range of critical public views has been identified that may be affected during construction. Viewpoints (areas from which construction would be visible) presented in Table 4.2-2 represent areas that are accessible to the public or are recognized for their aesthetic values.

Table 4.2-2. Critical Public Views Near the Project

VMC	Sensitivity	Definition
1-2	High	Local residents, travelers, and recreationists are all high-sensitivity groups that would be affected by any change in the visual quality of the site. The final buildout of the expansion reef would not be noticeable resulting in a VMC classification of 1 because the Project is under water and because of the distance from the shore; however, temporary construction activities would have a VMC classification of 2.

Source: VMC definitions are adapted from U.S. Bureau of Land Management Manual 8431 (1986).
Acronym: VMC = Visual Modification Class.

4.2.2 Regulatory Setting

The primary federal and state laws, regulations, and policies that pertain to the Project are summarized in Appendix D. Local regulations and policies relevant to aesthetics are in the City's General Plan and Coastal Land Use Plan.

The *City of San Clemente Centennial General Plan* Coastal Element requires protecting the visual character and aesthetic resources of the City through the protection of beaches, coastal canyons, significant ridgelines, designated significant public views, and public view corridors. A stated goal is to "continue to be a community that places high priority on the preservation and enjoyment of our scenic and cultural resources" (City of San Clemente 2016).

The Coastal Land Use Plan establishes policies designed to protect visual resources, all of which are specific to coastal development.

- Section 30251: Scenic and Visual Qualities. The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.
- *Visual Character and Aesthetic Resources Preservation.* Preserve the visual character and aesthetic resources of the city of San Clemente and, where feasible, enhance scenic and visual qualities of the coastal zone, including coastal bluffs, visually significant ridgelines, and coastal canyons, open spaces, prominent, mature trees on public lands, and designated significant public views. Where feasible, enhance and restore scenic and visual qualities of the coastal zone, including those to and along the ocean and coastal bluffs. Where protection of

visual character and aesthetic resources is not feasible, impacts should be mitigated.

On February 5, 2013, the City approved the Beach Ecology and Maintenance Policy. This policy recognizes that kelp has important role in the ecological and structural condition of the beach, provides habitat and nutrients for coastal marine animal and vegetative species, and provides direct and indirect support for sand retention. The policy directs the following actions for kelp wrack on City beaches:

- Remove excessive kelp, in the dry sand areas, during the summer season, May 15th through September 15th, to provide maximum towel spaces for public use while protecting grunion-spawning grounds in the wet sand areas
- Allow kelp to remain on the beach during the winter season, September 16 through May 14
- At any time, remove excessive kelp in cases of extreme kelp buildup, at the direction of the City Manager or his designee

4.2.3 Significance Criteria

Significance criteria used to evaluate potential aesthetic impacts of the Project are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area

4.2.4 Environmental Impact Analysis and Mitigation

4.2.4.1 1999 Program EIR

The 1999 Program EIR concluded that the changes associated with construction, development, and monitoring activities for the original 22.4-acre experimental reef and full 127.6-acre to 277.6-acre mitigation reef, including the presence of construction-related barges and tugboats 0.6 mile offshore:

- Would have a less than significant effect on scenic vistas or highways in the Project study area
- Would have a less than significant effect on the project area’s visual quality

- Would have a less than significant effect on the amount of perceptible light and glare.

4.2.4.2 2018 Subsequent Environmental Impact Report (EIR)

The Project is evaluated to assess whether it would impact aesthetics or conflict with the plans, policies, and regulations of agencies having jurisdiction over Project activities. Table 4.2-3 at the end of this section provides a summary of the Project's potential impacts related to aesthetics and any Applicant-Proposed Measures (APMs) or mitigation measures (MMs) recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact AES-1: Affect a Scenic Vista

Construction and monitoring of the expansion reef may have short-term visual impacts to ocean views **(Less than Significant).**

Impact Discussion

The completed kelp reef would be located underwater and would not have long-term adverse impacts on the visual quality of the site or views from the surrounding coastline. The Subsequent EIR assumes that the proposed Project would use construction methods similar to, if not identical to, those used for the Phase 2 construction of the existing reef. Construction-related visual impacts would be related to the presence of supply barges (present during construction and transport), a derrick crane barge, and associated tugboats. The reef construction would occur for 100 to 130 days over the 2019 construction season occurring between May 1 and October 1, 2019. The area where construction would occur for the proposed expansion reef would be approximately 0.6 mile offshore. The visual area of impact from nearby onshore views is small given the distance from shore and the backdrop of the Pacific Ocean. Monitoring of the new reef area would not involve an increase in overall monitoring activity; instead, fewer locations within the existing Phase 1 and Phase 2 reef would be monitored and that effort would be employed to monitor areas on the new reef. Impacts to scenic vistas would be temporary in nature and less than significant.

Mitigation Measures

No MMs are recommended for Impact AES-1.

Impact AES-2: Damage Scenic Resources

The proposed Project is not located within a state scenic highway and would not cause damage to scenic resources **(No Impact).**

Impact Discussion

The Project is not in or visible from a designated state scenic highway, and the Project would not affect scenic resources within a state scenic highway; therefore, no impact is anticipated. Offshore construction activities would be visible to passing motorists on the Pacific Coast Highway (PCH), an eligible (but not designated) state scenic highway that parallels the beachfront along the length of the Project. Due to the distance from shore, the temporary nature of construction activities, and because nearshore vessel traffic from training activities at Camp Pendleton and routine commerce frequently occurs in the coastal areas in the Project vicinity, travelers on the PCH would not consider the temporary presence of barges to substantially affect views or other aesthetic resources.

Mitigation Measures

No MMs are recommended for Impact AES-2.

Impact AES-3: Degrade Visual Character or Quality of Site and its Surroundings

Construction of the expansion reef could cause additional kelp wrack to wash ashore on surrounding beaches **(Less than Significant).**

Impact Discussion

The proposed kelp reef would be underwater and have no effect on the visual character of the site. Completion of the expansion reef could cause an increase in the amount of kelp wrack deposited on nearby beaches, particularly after storm events (November through February). As part of the monitoring effort for Wheeler North Reef Phases 1 and 2 required by California Coastal Commission (CCC) CDP Special Condition No. 12, Southern California Edison (SCE) conducted semi-annual Kelp Wrack and Rock Hazard Monitoring from October 2008 through March 2012 plus an additional year required by the California State Lands Commission lease. Results from SCE's monitoring suggested that the amount of kelp wrack found on the beach was within the normal range expected for this area and there was no evidence to suggest that the build-out of the Wheeler North Reef caused a significant increase in kelp wrack found on nearby beaches that were monitored (Appendix F; CCC 2015). Figure 4.2-1 shows photos of the typical and peak amounts of kelp observed during monitoring.

Based on the results of past monitoring of Wheeler North Reef Phases 1 and 2, the proposed expansion reef is unlikely to result in a significant increase in kelp wrack or rocks found on nearby beaches. Further, the City recognizes the value of kelp wrack to maintaining the beach environment and can also direct removal of kelp wrack if they determine it has accumulated to an unacceptable degree. Based on these factors, the construction of the expansion reef would have a less-than-significant impact on the existing visual character and quality of the site and the surrounding areas.

Figure 4.2-1. Kelp Wrack Observations for Wheeler North Reef (2008–2013)

Typical amount of kelp wrack observed on beach after wavestorm (San Clemente State Beach, September 10, 2013).

San Clemente State Beach north of pier, showing kelp wrack on beach during largest volume kelp wrack survey event during 2008 to 2013 period.

Mitigation Measures

No MMs are recommended for Impact AES-3.

Impact AES-4: Create Light or Glare

Nighttime lighting could temporarily affect nighttime views **(Less than Significant).**

Impact Discussion

Construction of the reef would not create any new permanent source of light or glare. Construction activities would be limited to daylight hours from 7:00 a.m. to 7:00 p.m. and any nighttime lighting would be associated with navigation and hazard lighting. The Project’s distance from shore would further ensure that any temporary impacts from light and glare would be less than significant.

Mitigation Measures

No MMs are recommended for Impact AES-4.

4.2.5 Cumulative Impacts

Cumulative projects that could exacerbate Project impacts include projects that could result in a perceptible reduction in visual quality due to an increased population density or proximity to the proposed Project. Cumulative projects listed in Table 3-3 in Section 3.0, such as Sea Summit Residential Community, could increase population density in San Clemente, increasing exposure to the Project's visual impacts. However, those Project impacts are minimal and would not constitute a substantial cumulative effect.

Other projects listed in Table 3-3 would contribute to marine traffic, which in combination would slightly increase vehicular traffic and nighttime vessel lighting. Located approximately 3 miles to the south, the offshore project in closest proximity is the decommissioning of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. This decommissioning project would also use offshore construction barges, similar to the proposed Project.

The Palos Verdes Reef Restoration Project would be very similar to the proposed Project and would include construction of an artificial reef approximately 50 miles northwest of the Project. Construction would overlap with the Project in 2019, potentially resulting in minor cumulative effects from marine vessel traffic offshore the Project area. However, because of the temporary nature of the construction activities, limited visual impact, and miles of separation between other offshore projects, cumulative impacts would be less than significant.

None of the cumulative projects described in Section 3.0 would result in additional accumulated kelp wrack, rock, or concrete washing ashore. Therefore, the impacts of these projects would not combine with proposed Project impacts to create a cumulative impact.

4.2.6 Summary of Proposed Mitigation Measures

Table 4.2-3 provides a summary of the MMs in the 1999 Program EIR and for the proposed Project.

Table 4.2-3. Aesthetics Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Affect a scenic vista or scenic highway	None Required. Mitigation recommended: The project proponent should conduct an educational outreach program to inform the public about the project and the construction activities. This would include notifying the media and residents about the type and duration of construction activities a month prior to beginning construction. Temporary notices would also be posted along the shore at the San Clemente Pier and near the mouth of San Mateo Creek.
Have a demonstrable negative aesthetic effect	None Required.
Create light or glare.	None Required.
Proposed Project	
AES-1: Affect a Scenic Vista	None recommended.
AES-2: Damage Scenic Resources	None recommended.
AES-3: Degrade Visual Character or Quality of Site and its Surroundings	None recommended.
AES-4: Create Light or Glare	None recommended.

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4.3 AIR QUALITY

This section describes the existing air quality setting within the air basins that may be affected by the proposed Wheeler North Reef Expansion Project (Project), identifies applicable air district significance thresholds, assesses the Project's potential impacts to air quality and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.3.1 Environmental Setting

The Project reef site is located within the South Coast Air Basin (SCAB) off the coast of the city of San Clemente, California. The majority of the construction and operational monitoring activities associated with the Project would occur within the SCAB. However, an estimated six to eight marine vessel trips to obtain quarry rock are anticipated to occur between the Project site and Ensenada, Mexico. As such, a portion of the emissions associated with the Project would occur within the San Diego Air Basin (SDAB). Accordingly, a description of both the SCAB and the SDAB are provided below.

The primary factors that determine impacts to air quality are the locations of air pollutant sources and the amount of pollutants emitted. Meteorological and topographical conditions, however, are also important. Factors such as wind speed and direction, air temperature gradients and sunlight, and precipitation and humidity interact with physical landscape features to determine the movement and dispersal of air pollutants. Meteorological and topographical conditions of the SCAB and SDAB are discussed below.

4.3.1.1 South Coast Air Basin

The SCAB is a 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east.

Reginal Climate and Meteorological Conditions[9]

The SCAB is characterized as having a Mediterranean climate (typified as semiarid with mild winters, warm summers, and moderate rainfall). The general region lies in the semi-permanent high-pressure zone of the eastern Pacific; as a result, the climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the SCAB is a function of the area's natural physical characteristics (e.g., weather and topography) and of manufactured influences (e.g., development patterns and lifestyle). Moderate temperatures, comfortable humidity, and limited precipitation characterize the climate in the SCAB. The average annual temperature varies little throughout the SCAB, averaging 75 degrees

[9] The discussion of meteorological and topographical conditions of the SCAB is based on information provided in the *Final 2016 Air Quality Management Plan* (SCAQMD 2017).

Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the SCAB show greater variability in annual minimum and maximum temperatures. All portions of the SCAB have recorded temperatures over 100°F in recent years. Although the SCAB has a semiarid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the SCAB by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as “high fog,” are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the SCAB. Precipitation in the SCAB is typically 9 to 14 inches annually and is rarely in the form of snow or hail because of typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the SCAB.

San Clemente’s climate is characterized by relatively low rainfall, with warm summers and mild winters. Average temperatures range from a high of 77°F in August to a low of 39°F in December (Western Regional Climate Center [WRCC] 2017).[10] Annual precipitation averages about 10 inches, falling mostly from October through April (WRCC 2017).

Sunlight

The presence and intensity of sunlight are necessary prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain “primary” pollutants (mainly reactive hydrocarbons and oxides of nitrogen [NO_X][11]) react to form “secondary” pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind of the emission sources. Southern California also has abundant sunshine, which drives the photochemical reactions that form pollutants such as ozone (O_3) and a substantial portion of fine particulate matter ($PM_{2.5}$, particles less than 2.5 microns in diameter). In the SCAB, high concentrations of O_3 are normally recorded during the late spring, summer, and early autumn months, when more intense sunlight drives enhanced photochemical reactions. Because of the prevailing daytime winds and time-delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of Southern California.

Temperature Inversions

Under ideal meteorological conditions and irrespective of topography, pollutants emitted into the air mix and disperse into the upper atmosphere. However, the Southern California region frequently experiences temperature inversions in which pollutants are trapped and

[10] Local climate data for San Clemente are based on the closest and most-representative station measured by the WRCC, which is the Oceanside Municipal Airport in Oceanside, California.

[11] NO_X is a general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2) and other oxides of nitrogen.

accumulate close to the ground. The inversion, a layer of warm, dry air overlaying cool, moist marine air, is a normal condition in coastal Southern California. The cool, damp, and hazy sea air capped by coastal clouds is heavier than the warm, clear air, which acts as a lid through which the cooler marine layer cannot rise. The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above mean sea level (amsl), the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet amsl, the terrain prevents the pollutants from entering the upper atmosphere, resulting in the pollutants settling in the foothill communities. Below 1,200 feet amsl, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the daylight hours.

Mixing heights for inversions are lower in the summer and inversions are more persistent, being partly responsible for the high levels of O_3 observed during summer months in the SCAB. Smog in Southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods, allowing them to form secondary pollutants by reacting in the presence of sunlight. The SCAB has a limited ability to disperse these pollutants due to typically low wind speeds and the surrounding mountain ranges.

As with other cities within the SCAB, San Clemente is susceptible to air inversions, which trap a layer of stagnant air near the ground where pollutants are further concentrated. These inversions produce haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources. Elevated concentrations of particles less than 10 microns in diameter (PM_{10}) and of $PM_{2.5}$ can occur in the SCAB throughout the year, but they occur most frequently in fall and winter. Although emissions change by day of the week and by season, the observed variations in pollutant concentrations are primarily the result of seasonal differences in weather conditions.

4.3.1.2 San Diego Air Basin

The SDAB lies in the southwest corner of California. It comprises the entire San Diego region and covers approximately 4,260 square miles.

Regional Climate and Meteorological Conditions[12]

The climate of the San Diego region, as in most of Southern California, is influenced by the strength and position of the semi-permanent high-pressure system over the Pacific

[12] The discussion of meteorological and topographical conditions of the SDAB is based on information provided in the SDAPCD *2016 Monitoring Plan* (SDAPCD 2017), the County of San Diego *Guidelines for Determining Significance—Air Quality* (County of San Diego 2007), the County of San Diego *General Plan Update Environmental Impact Report (EIR)* (County of San Diego 2011), and the California Air

Ocean, known as the Pacific High. This high-pressure ridge over the West Coast often creates a pattern of late-night and early-morning low clouds, hazy afternoon sunshine, daytime onshore breezes, and little temperature variation year-round. The SDAB is characterized as a Mediterranean climate with dry, warm summers and mild, occasionally wet winters. Average temperature ranges from the mid-40s to the high 90s, with an average of 201 days warmer than 70°F. The SDAB experiences 9 to 13 inches of rainfall annually, with most of the region's precipitation falling from November through March, with infrequent (approximately 10 percent) precipitation during the summer. El Niño Southern Oscillation has large effects on the annual rainfall received in San Diego, where San Diego receives less than normal rainfall during La Niña years.

The interaction of ocean, land, and the Pacific High maintains clear skies for much of the year and influences the direction of prevailing winds (westerly to northwesterly). The winds tend to blow onshore in the day and offshore at night. Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

The favorable climate of San Diego also works to create air pollution problems. Sinking, or subsiding, air from the Pacific High creates a temperature inversion known as a subsidence inversion, which acts as a "lid" to vertical dispersion of pollutants. Weak summertime pressure gradients further limit horizontal dispersion of pollutants in the mixed layer below the subsidence inversion. Poorly dispersed anthropogenic emissions combined with strong sunshine leads to photochemical reactions that result in the creation of O_3 at this surface layer. In addition, light winds during the summer further limit ventilation.

In the fall months, the SDAB is often impacted by Santa Ana winds, which are the result of a high-pressure system over the Nevada and Utah regions that overcomes the westerly wind pattern and forces hot, dry winds from the east to the Pacific Ocean. The Santa Ana winds are powerful and can blow the SDAB's pollutants out to sea. However, a weak Santa Ana can transport air pollution from the SCAB and greatly increase O_3 concentrations in the San Diego area.

Under certain conditions, atmospheric oscillation results in the offshore transport of air from the Los Angeles region to San Diego County. This often produces high O_3 concentrations, as measured at air pollutant monitoring stations within San Diego County. Transport of high levels of O_3 and other air pollutants from Los Angeles to San Diego can also occur within the stable layer of the elevated subsidence inversion.

Resources Board (CARB) *Recommended Area Designation for the 2010 Federal Sulfur Dioxide Standard* (CARB 2011).

Topographical Conditions

Topography in the San Diego region varies greatly, from beaches in the west to mountains and desert in the east; much of the topography in between consists of mesa tops intersected by canyon areas. Along with local meteorology, topography influences the dispersal and movement of pollutants in the SDAB. Mountains to the east prohibit dispersal of pollutants in that direction and help trap pollutants in inversion layers. The topography of the SDAB also drives pollutant levels, and the SDAB is classified as a “transport recipient,” whereby pollutants are transported from the SCAB to the north and, when the wind shifts direction, from Tijuana, Mexico, to the south.

4.3.1.3 Criteria Air Pollutants and Effects

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include O_3, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead. These pollutants, as well as toxic air contaminants (TACs), are discussed in the following paragraphs.[13] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone

O_3 is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun’s energy and O_3 precursors. These precursors are mainly NO_X and volatile organic compounds (VOCs). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 exists in the upper atmosphere O_3 layer (stratospheric ozone) and at Earth’s surface in the lower atmosphere (tropospheric ozone).[14] The O_3 that the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level O_3 is a harmful air pollutant that causes numerous adverse health effects and is thus considered

[13] The descriptions of each of the criteria air pollutants and associated health effects are based on the U.S. Environmental Protection Agency’s (USEPA’s) Criteria Air Pollutants (2017a) and the CARB Glossary of Air Pollutant Terms (2018).

[14] The troposphere is the layer of Earth’s atmosphere nearest to the surface of Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

"bad" O_3. Stratospheric, or "good," O_3 occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering Earth's atmosphere. Without the protection of the beneficial stratospheric O_3 layer, plant and animal life would be seriously harmed.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (USEPA 2013). These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO), which is a colorless, odorless gas. NO_X plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NO_X is formed from fuel combustion under high temperature or pressure. In addition, NO_X is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers. NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections (USEPA 2016a).

Carbon Monoxide

CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the Project location, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent. In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide

SO_2 is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. When combined with particulate matter, SO_2 can injure lung tissue and reduce visibility and the level of sunlight. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) consists of particulate matter that is 10 microns or less in diameter and is about one-seventh the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) consists of particulate matter that is 2.5 microns or less in diameter and is roughly one-twenty-eighth the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_X), NO_X, and VOCs.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also produce haze and reduce regional visibility and damage and discolor surfaces on which they settle.

People with influenza, people with chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death as a result of breathing particulate matter. People with bronchitis can expect aggravated symptoms from breathing in particulate matter. Children may experience a decline in lung function due to breathing in PM_{10} and $PM_{2.5}$ (USEPA 2009).

Lead

Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95 percent. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern. Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

Volatile Organic Compounds

Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to the formation of O_3 are referred to and regulated as VOCs (also referred to as reactive organic gases). Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons. Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint. The primary health effects of VOCs result from the formation of O_3 and its related health effects. High levels of VOCs in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered TACs. No separate health standards for VOCs exist as a group.

4.3.1.4 Non-Criteria Air Pollutants and Effects

Toxic Air Contaminants

A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute or chronic noncancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the State of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill 2588, was enacted by the Legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter

Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. More than 90 percent of DPM is less than 1 micrometer in diameter (about one-seventh the diameter of a human hair) and, thus, is a subset of $PM_{2.5}$ (CARB 2016). DPM is typically composed of carbon particles ("soot" or black carbon) and more than 40 known cancer-causing organic substances. Examples of these chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene (CARB 2016). CARB classified "particulate emissions from diesel-fueled engines" (i.e., DPM; Cal. Code Regs., tit. 17, § 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70 percent of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000). Because it is part of $PM_{2.5}$, DPM also contributes to the same noncancer health effects as $PM_{2.5}$ exposure. These effects include premature death; hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma; increased respiratory symptoms; and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies (CARB 2016). Those most vulnerable to noncancer health effects are children whose lungs are still developing and the elderly who often have chronic health problems.

Odorous Compounds

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor, and recognition may only occur with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

4.3.1.5 Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air-pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air-pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses) (CARB 2005). The SCAQMD identifies sensitive receptors as residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993).

Given the Project location and anticipated activities on and in the Pacific Ocean, the closest off-site sensitive receptors to the Project site include residences and potential other sensitive land uses along the San Clemente coastline approximately 0.6 mile from the Project site.

4.3.2 Regulatory Setting

Appendix D lists federal and state regulations and policies related to air quality. Although CARB is responsible for the regulation of mobile emissions sources within the state, local air quality management districts and air pollution control districts are responsible for enforcing standards and regulating stationary sources. The Project would include construction activities that would occur within the SCAB and the SDAB and is subject to the guidelines and regulations of the SCAQMD and San Diego Air Pollution Control District (SDAPCD), respectively.

The SCAQMD and SDAPCD regulate air quality in the first 3 nautical miles (nm) seaward of the coastline. In addition, both air districts have been designated by the USEPA as the corresponding onshore areas under 40 Code of Federal Regulations (CFR) Part 55, so they also regulate the next 25 seaward miles from the 3-nm county boundaries.

4.3.2.1 Federal Air Quality Standards

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The USEPA is responsible for implementing most aspects of the Clean Air Act, including setting National Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant (HAP) standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the USEPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan (SIP) that demonstrates how those areas will attain the standards within mandated timeframes.[15]

4.3.2.2 State Air Quality Standards

In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products. CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse

[15] Please see Appendix C for a discussion of federal regulations related to hazardous air pollutants.

conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered “in attainment” if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 4.3-1. (See Appendix C for a discussion of state regulations related to toxic air contaminants.)

4.3.2.3 South Coast Air Quality Management District

The SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SCAB, where the Project is located. The SCAQMD operates monitoring stations in the SCAB, develops rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. The SCAQMD’s air quality management plans (AQMPs) include control measures and strategies to be implemented to attain NAAQS and CAAQS in the SCAB. The SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

The most-recently adopted AQMP is the 2016 AQMP (SCAQMD 2017), which was adopted by the SCAQMD governing board on March 3, 2017. The 2016 AQMP is a regional blueprint for achieving air quality standards and healthful air. The 2016 AQMP addresses criteria air pollutant emissions from ocean-going vessels, which are considered federal sources, and includes emissions associated with marine vessels and engines in the baseline year and future forecasts. The 2016 AQMP’s overall control strategy is an integral approach relying on fair-share emission reductions from federal, state, and local levels. The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, co-benefits from climate programs, mobile source strategies, and reductions from federal sources (SCAQMD 2017). These control strategies are to be implemented in partnership with CARB and the USEPA.

Emissions that would result from emission sources during construction and operation of the Project are subject to the rules and regulations of the SCAQMD. The SCAQMD rules applicable to the Project may include the following:

Table 4.3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	Primary[3,4]	Secondary[3,5]
O_3	1 hour	0.09 ppm (180 µg/m^3)	—	Same as Primary Standard[6]
	8 hours	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)[6]	

Table 4.3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1] Concentration[3]	National Standards[2] Primary[3,4]	National Standards[2] Secondary[3,5]
NO_2[7]	1 hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[8]	1 hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3)	—
	3 hours	—	—	0.5 ppm (1,300 μg/m^3)
	24 hours	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[7]	—
	Annual	—	0.030 ppm (for certain areas)[7]	—
PM_{10}[9]	24 hours	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	
$PM_{2.5}$[9]	24 hours	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
Lead[10,11]	30-day Average	1.5 μg/m^3	—	—
	Calendar Quarter	—	1.5 μg/m^3 (for certain areas)[11]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m^3	
Hydrogen sulfide	1 hour	0.03 ppm (42 μg/m^3)	—	—
Vinyl chloride[10]	24 hours	0.01 ppm (26 μg/m^3)	—	—
Sulfates	24 hours	25 μg/m^3	—	—
Visibility reducing particles	8 hours (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70%	—	—

Source: CARB 2016.

Acronyms: CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; ppm = parts per million by volume; SO_2 = sulfur dioxide; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter.

Notes:

[1] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards California Code of Regulations, title 17, section 70200.

[2] National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[5] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[6] On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[7] To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[8] On June 2, 2010, a new 1-hour SO_2 standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[9] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m^3 to 12.0 μg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m^3, as was the annual secondary standard of 15 μg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m^3 were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

[10] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[11] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

- **Rule 401—Visible Emissions:** This rule establishes the limit for visible emissions from stationary sources.
- **Rule 402—Nuisance:** This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.
- **Rule 403—Fugitive Dust:** This rule requires fugitive dust sources to implement best available control measures for all sources and prohibits all forms of visible particulate matter from crossing any property line. SCAQMD Rule 403 is intended to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.
- **Rule 431.2—Sulfur Content of Liquid Fuels:** The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of SO_X and particulates during combustion and of enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the SCAQMD. The rule also affects diesel fuel supplied for mobile sources.
- **Rule 1110.2—Emissions from Gaseous- and Liquid-Fueled Engines:** This rule applies to stationary and portable engines rated at greater than 50 horsepower. The purpose of Rule 1110.2 is to reduce NO_X, VOCs, and CO emissions from engines. Emergency engines, including those powering standby generators, are generally exempt from the emissions and monitoring requirements of this rule because they have permit conditions that limit operation to 200 hours or less per year as determined by an elapsed operating time meter.

4.3.2.4 Southern California Association of Governments

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest metropolitan planning organization in the U.S.

On April 7, 2016, SCAG's Regional Council adopted the 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS). The 2016 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The 2016 RTP/SCS charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. The 2016 RTP/SCS was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. In June 2016, SCAG received its conformity determination from the Federal Highway Administration and the Federal Transit Administration indicating that all air quality conformity requirements for the 2016 RTP/SCS and associated 2015 Federal Transportation Improvement Program Consistency Amendment through Amendment 15-12 have been met (SCAG 2016). The SCAQMD 2016 AQMP applies the updated SCAG growth forecasts assumed in the 2016 RTP/SCS.

4.3.2.5 San Diego Air Pollution Control District

Federal Attainment Plans for the SDAPCD

In December 2016, the SDAPCD adopted an update to the Eight-Hour Ozone Attainment Plan for San Diego County (2008 O_3 NAAQS). The 2016 Eight-Hour Ozone Attainment Plan for San Diego County indicates that local controls and state programs would allow the region to reach attainment of the federal 8-hour O_3 standard (1997 O_3 NAAQS) by 2018 (SDAPCD 2016a). In this plan, SDAPCD relies on the Regional Air Quality Strategy (RAQS) to demonstrate how the region will comply with the federal O_3 standard. The RAQS details how the region will manage and reduce O_3 precursors (NO_X and VOCs) by identifying measures and regulations intended to reduce these pollutants. The control measures identified in the RAQS generally focus on stationary sources; however, the emissions inventories and projections in the RAQS address all potential sources, including those under the authority of CARB and the USEPA. Incentive programs for reduction of emissions from heavy-duty diesel vehicles, off-road equipment, and school buses are also established in the RAQS.

Currently, the SDAB is designated as moderate nonattainment for the 2008 NAAQS and maintenance for the 1997 NAAQS. As documented in the 2016 Eight-Hour Ozone Attainment Plan for San Diego County, the SDAB has a likely chance of obtaining attainment due to the transition to low-emissions cars, stricter new source review rules, and continuing the requirement of general conformity for military growth and the San Diego International Airport. The SDAPCD will also continue emissions control measures, including ongoing implementation of existing regulations in O_3 precursor reduction to stationary and area-wide sources, subsequent inspections of facilities and sources, and adoption of laws requiring Best Available Retrofit Control Technology for control of emissions (SDAPCD 2016a).

State Attainment Plans for the SDAPCD

The SDAPCD and San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The RAQS for the SDAB was initially adopted in 1991 and is updated on a triennial basis, most recently in 2016 (SDAPCD 2016b). The

RAQS outlines SDAPCD's plans and control measures designed to attain the State's air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in the county and the cities in the county, to forecast future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by the County and the cities in the county as part of development of their general plans (SANDAG 2017a, 2017b).

In December 2016, the SDAPCD adopted the revised RAQS for the county. Since 2007, the San Diego region reduced daily VOC emissions and NO_X emissions by 3.9 percent and 7.0 percent respectively; the SDAPCD expects to continue reductions through 2035 (SDAPCD 2016b). These reductions were achieved through implementation of six VOC control measures and three NO_X control measures adopted in the SDAPCD's 2009 RAQS (SDAPCD 2009a); in addition, the SDAPCD is considering additional measures, including three VOC measures and four control measures to reduce 0.3 daily ton of VOC and 1.2 daily tons of NO_X, provided the control measures are found to be feasible region wide. In addition, SDAPCD has implemented nine incentive-based programs, has worked with SANDAG to implement regional transportation control measures, and has reaffirmed the State's emissions offset repeal.

In regard to particulate matter emissions reduction efforts, in December 2005, the SDAPCD prepared a report titled "Measures to Reduce Particulate Matter in San Diego County" to address implementation of Senate Bill 656 in San Diego County (Senate Bill 656 required additional controls to reduce ambient concentrations of PM_{10} and $PM_{2.5}$) (SDAPCD 2005). In the report, SDAPCD evaluated implementation of source-control measures that would reduce particulate matter emissions associated with residential wood combustion; various construction activities including earthmoving, demolition, and grading; bulk material storage and handling; carryout and trackout removal and cleanup methods; inactive disturbed land; disturbed open areas; unpaved parking lots/staging areas; unpaved roads; and windblown dust (SDAPCD 2005).

Applicable Rules for SDAPCD

The SDAPCD plans, implements, and enforces federal and state ambient standards in the SDAB. The following rules and regulations apply to the Project:

- **SDAPCD Regulation IV: Prohibitions; Rule 50: Visible Emissions.** Prohibits discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any period of 60 consecutive minutes that is darker in shade than that designated as No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or of such opacity as to obscure an observer's view to a degree greater than does smoke of a shade designated as No. 1 on the Ringelmann Chart (SDAPCD 1997).

- **SDAPCD Regulation IV: Prohibitions; Rule 51: Nuisance.** Prohibits the discharge, from any source, of such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property (SDAPCD 1969).
- **SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust Control.** Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as trackout and carryout onto paved roads beyond a project site (SDAPCD 2009b).

4.3.2.6 Regional and Local Air Quality Conditions

Attainment Designation

Pursuant to the 1990 federal Clean Air Act amendments, the USEPA classifies air basins (or portions thereof) as “attainment” or “nonattainment” for each criteria air pollutant based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as “attainment” for that pollutant. If an area exceeds the standard, the area is classified as “nonattainment” for that pollutant. If not enough data are available to determine whether the standard is exceeded in an area, the area is designated as “unclassified” or “unclassifiable.” The designation of “unclassifiable/attainment” means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act also calls for the designation of areas as “attainment” or “nonattainment,” but based on CAAQS rather than the NAAQS. Table 4.3-2 depicts the current attainment status of the South Coast and San Diego Air Basins with respect to the NAAQS and CAAQS.

Table 4.3-2. Regional Air Basins Attainment Classification

Pollutant	Designation/Classification[1]			
	South Coast Air Basin		San Diego Air Basin	
	NAAQS	CAAQS	NAAQS	CAAQS
Ozone (O_3), 1-hour	None	**Nonattainment**	Attainment[2]	**Nonattainment**
Ozone (O_3), 8-hour	**Extreme Nonattainment**	**Nonattainment**	Attainment (Maintenance) **Nonattainment (Moderate)**	**Nonattainment**
Nitrogen Dioxide (NO_2)	Unclassifiable/ Attainment	Attainment	Unclassifiable/Attainment	Attainment
Carbon Monoxide (CO)	Attainment/ Maintenance	Attainment	Attainment (Maintenance)	Attainment
Sulfur Dioxide (SO_2)	Unclassifiable/ Attainment	Attainment	Unclassifiable/ Attainment	Attainment
Coarse Particulate Matter (PM_{10})	Attainment/ Maintenance	**Nonattainment**	Unclassifiable/ Attainment	**Nonattainment**
Fine Particulate Matter ($PM_{2.5}$)	**Serious Nonattainment**	**Nonattainment**	Unclassifiable/ Attainment	**Nonattainment**
Lead (Pb)	Nonattainment	Attainment	Unclassifiable/ Attainment	Attainment
Hydrogen Sulfide	None	Unclassified	None	Attainment
Sulfates	None	Attainment	None	Unclassified
Visibility-Reducing Particles	None	Unclassified	None	Unclassified
Vinyl Chloride	None	No designation	None	No designation

Sources: USEPA 2016a (federal); CARB 2016 (state).
Acronyms: CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards.
Notes:
1 None = no federal standard; Attainment = meets the standards; Attainment/Maintenance = achieves the standards after a nonattainment designation; Nonattainment = does not meet the standards; Unclassified or Unclassifiable = insufficient data to classify; Unclassifiable/Attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.
2 The federal 1-hour standard of 0.12 parts per million was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in SIPs.

Local Ambient Air Quality

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the State. The SCAQMD monitors local ambient air quality within the SCAB, where the Project site is located. See Appendix C for local ambient air quality data from monitoring stations within the SCAB and SDAB, and the number of days exceeding the ambient air quality standards.

4.3.3 Significance Criteria

Significance criteria used to evaluate potential impacts to air quality are based on State California Environmental Quality Act (CEQA) Guidelines Appendix G, which states that a significant impact would occur if the Project would:

- Conflict with or obstruct implementation of the applicable air quality plan
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Result in a cumulatively considerable new increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative threshold emissions which exceed quantitative thresholds for ozone precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a considerable number of people

State CEQA Guidelines (Cal. Code Regs., tit. 14, §§ 15000 et seq.) Appendix G indicates that, where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to determine whether the Project would have a significant impact on air quality.

Because the Project would generate emissions within the SCAB and the SDAB, numeric thresholds provided by the SCAQMD and SDAPCD, respectively, are both applied to evaluate the significance of Project-generated criteria air pollutant emissions during construction. The SCAQMD and SDAPCD operational thresholds are presented for disclosure; however, as explained in Section 4.3.4, *Environmental Impact Analysis and Mitigation*, the Project is not anticipated to require additional operational activity above existing and planned monitoring.

The SCAQMD has established Air Quality Significance Thresholds, as revised in March 2015, which set forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality under existing and cumulative conditions. The quantitative air quality analysis provided herein applies the SCAQMD thresholds identified in Table 4.3-3 to determine the potential for the Project to result in a significant impact under CEQA.

The SDAPCD has established thresholds in Rule 20.2 requiring the preparation of an Air Quality Impact Assessment for permitted stationary sources. The SDAPCD sets forth quantitative emissions thresholds below which a stationary source would not have a significant impact on ambient air quality.

Table 4.3-3. SCAQMD Air Quality Significance Thresholds

Criteria Pollutants Mass Daily Thresholds		
Pollutant	**Construction (pounds per day)**	**Operation (pounds per day)**
VOCs	75	55
NO_X	100	55
CO	550	550
SO_X	150	150
PM_{10}	150	150
$PM_{2.5}$	55	55
Lead[1]	3	3
TACs and Odor Thresholds		
TACs[2]	Maximum incremental cancer risk ≥ 10 in 1 million Chronic and acute hazard index ≥ 1.0 (Project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality Standards for Criteria Pollutants[3]		
NO_2 1-hour average NO_2 annual arithmetic mean	SCAQMD is in attainment; Project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.030 ppm (state) and 0.0534 ppm (federal)	
CO 1-hour average CO 8-hour average	SCAQMD is in attainment; Project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
PM_{10} 24-hour average PM_{10} annual average	10.4 $\mu g/m^3$ (construction)[4] 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$	
$PM_{2.5}$ 24-hour average	10.4 $\mu g/m^3$ (construction)[4] 2.5 $\mu g/m^3$ (operation)	

Source: SCAQMD 2015.

Acronyms: CO = carbon monoxide; NO_X = oxides of nitrogen; NO_2 = nitrogen dioxide; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SCAQMD = South Coast Air Quality Management District; SO_X = sulfur oxides; TAC = toxic air contaminant; VOC = volatile organic compounds; $\mu g/m^3$ = micrograms per cubic meter.

Notes: GHG emissions thresholds for industrial projects, as added in the March 2015 revision to the SCAQMD Air Quality Significance Thresholds, were not include included in Table 4.3-3 as they are addressed within the GHG emissions analysis and not the air quality study.

1 The phase-out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the Project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.

2 TACs include carcinogens and noncarcinogens.

3 Ambient air quality standards for criteria pollutants are based on SCAQMD Rule 1303, Table A-2, unless otherwise stated.

4 Ambient air quality thresholds are based on SCAQMD Rule 403.

Project air quality impacts would be considered significant if any of the applicable significance thresholds presented in Table 4.3-4 are exceeded. The thresholds listed in

Table 4.3-4 represent screening-level thresholds that can be used to evaluate whether Project emissions could cause a significant impact on air quality. Emissions below the screening-level thresholds would not cause a significant impact.

Table 4.3-4. SDAPCD Air Quality Significance Thresholds

Criteria Pollutants Mass Daily Thresholds				
Pollutant	Construction (pounds per day)	Operation		
		pounds per hour	pounds per day	tons per year
VOCs	75[a]	—	75[1]	13.7
NO_X	250	25	250	40
CO	550	100	550	100
SO_X	250	25	250	40
PM_{10}	100	—	100	15
$PM_{2.5}$	55	—	55	10
Lead	—	—	3.2	0.6

Sources: SDAPCD Rules 1501 (SDAPCD 1995) and 20.2(d)(2) (SDAPCD 2016c).
Acronyms: CO = carbon monoxide; NO_X = oxides of nitrogen; NO_2 = nitrogen dioxide; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SO_X = sulfur oxides; VOC = volatile organic compounds; µg/m^3 = micrograms per cubic meter.
Note: [1] VOC threshold based on the threshold of significance for VOC from the SCAQMD for the Coachella Valley as stated in the San Diego County Guidelines for Determining Significance.

Impact AQ-1 in this Subsequent EIR assesses the Project's potential to conflict with or obstruct the following air quality plans.

- The SCAQMD 2016 AQMP (based on the SCAQMD [1993] CEQA Air Quality Handbook, Chapter 12, Sections 12.2 and 12.3). The first criterion assesses if the Project would increase the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay the timely attainment of air quality standards of the interim emissions reductions specified in the AQMP, which is addressed in detail under Impact AQ-2 in Section 4.3.4. The second criterion is if the Project would exceed the assumptions in the AQMP or increments based on the year of Project buildout and phase, as discussed in Section 4.3.4, *Environmental Impact Analysis and Mitigation*.
- The SDAPCD 2016 RAQS (based on the potential for the Project to conflict with the underlying land use assumptions [i.e., general plan land use designations] in the RAQS).

To evaluate the potential for the Project to violate any air quality standard or contribute substantially to an existing or projected air quality violation (Impact AQ-2), this analysis applies the SCAQMD's and the SDAPCD's construction criteria pollutants mass daily thresholds, as shown in Table 4.3-3 and Table 4.3-4, respectively. A project would result in a substantial contribution to an existing air quality violation of the NAAQS or CAAQS for O_3, which is a nonattainment pollutant, if the Project's construction or operational emissions would exceed the SCAQMD or SDAPCD VOC or NO_X thresholds shown in Table 4.3-3 and Table 4.3-4. These emissions-based thresholds for O_3 precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse O_3 impacts to occur). This approach is used because O_3 is not emitted directly (see the discussion of O_3 and its sources in Section 4.3.1, *Environmental Setting*, and the effects of an individual project's emissions of O_3 precursors (VOC and NO_X) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods.

Regarding cumulative impacts (Impact AQ-3), for nonattainment pollutants, if emissions exceed the thresholds shown in Table 4.3-3 and Table 4.3-4, the Project could have the potential to result in a cumulatively considerable net increase in these pollutants and, thus, could have a significant impact on ambient air quality.

The assessment of the Project's potential to expose sensitive receptors to substantial pollutant concentrations (Impact AQ-4) includes a localized significance threshold (LST) analysis, as recommended by the SCAQMD, to evaluate the potential of localized air quality impacts to sensitive receptors in the immediate vicinity of the Project. For project sites of 5 acres or less, the SCAQMD LST Methodology (2009) includes lookup tables that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance criteria (i.e., the emissions would not cause an exceedance of the applicable concentration limits for NO_2, CO, PM_{10}, and $PM_{2.5}$) without performing project-specific dispersion modeling. Although the Project site is greater than 5 acres (estimated to be between 200 and 210 acres), the Project would disturb less than 5 acres in 1 day, so the use of the lookup tables for the LST evaluation is appropriate.

The LST significance thresholds for NO_2 and CO represent the allowable increase in concentrations above background levels in the vicinity of a project that would not cause or contribute to an exceedance of the relevant ambient air quality standards, while the threshold for PM_{10} represents compliance with Rule 403 (Fugitive Dust). The LST significance threshold for $PM_{2.5}$ is intended to ensure that construction emissions do not contribute substantially to existing exceedances of the $PM_{2.5}$ ambient air quality standards. The allowable emission rates depend on the following parameters:

- Source-receptor area (SRA) in which the Project is located
- Size of the Project site
- Distance between the Project site and the nearest sensitive receptor (e.g., residences, schools, hospitals)

The Project site is located in SRA 21 (Capistrano Valley). LST pollutant screening level concentration data are currently published for 1-, 2-, and 5-acre sites for varying distances. The Project would disturb less than 1 acre a day; as such, the 1-acre screening disturbance was assumed.

The LST pollutant screening level concentration data are published for distances between the nearest sensitive receptor and Project site boundary between 25 and 500 meters. The Project site is located approximately 0.6 mile or 966 meters from the San Clemente coastline. Because the nearest sensitive receptor would be farther than 500 meters, which is the farthest distance provided in the LST lookup tables, the 500-meter distance was assumed.

The LST values from the SCAQMD lookup tables for SRA 21 (Capistrano Valley) for a 1-acre project site and a receptor distance of 500 meters are shown in Table 4.3-5.

Table 4.3-5. Localized Significance Thresholds for Source Receptor Area 21 (Capistrano Valley)

Pollutant	Threshold (pounds per day)
NO_2	218
CO	7,724
PM_{10}	121
$PM_{2.5}$	68

Source: SCAQMD 2009.

Acronyms: CO = carbon monoxide; NO_2 = nitrogen dioxide; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter.

Note: Localized significance thresholds were determined based on the values for 1-acre site at a distance of 500 meters from the nearest sensitive receptor.

The potential for the Project to result in an odor impact (Impact AQ-5) is based on the Project's anticipated construction activity and land use type.

4.3.4 Environmental Impact Analysis and Mitigation

4.3.4.1 1999 Program EIR

The 1999 Program EIR concluded that the project would result in unavoidable and significant air quality impacts from reef construction for PM_{10} and NO_x emissions. However, the 1999 Program EIR identified purchase of emission offset credits as way to potentially reduce the significant emissions of NO_x and directed the preparation of a final mitigation plan after the construction contract for the project was awarded.

4.3.4.2 2018 Subsequent EIR

This analysis assesses the potential impacts to air quality due to the proposed Project's criteria pollutant and TAC emissions. Table 4.3-9 at the end of this section provides a list of the proposed Project's potential impacts related to air quality and the MMs recommended to reduce the proposed Project's significant emissions to the maximum extent feasible.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact AQ-1: Conflict with or Obstruct Implementation of Applicable Air Quality Plans.

Project construction could conflict with the SCAQMD 2016 AQMP or SDAPCD 2016 RAQS as a result of Project-generated emissions **(Less than Significant with Mitigation).**

Impact Discussion

South Coast Air Quality Management District 2016 AQMP

As previously discussed, the Project site is located within the SCAB under the jurisdiction of SCAQMD, which is the local agency responsible for the administration and enforcement of air quality regulations for the area. SCAQMD has established criteria for determining consistency with the AQMP, currently the 2016 AQMP, in Chapter 12, Sections 12.2 and 12.3, in the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993).

Consistency Criterion No. 1

Impact AQ-2 evaluates the Project's potential impacts in regard to State CEQA Guidelines Appendix G Threshold 2 (the Project's potential to violate any air quality standard or contribute substantially to an existing or projected air quality violation impact analysis). As discussed in Impact AQ-2, the Project would result in an exceedance of SCAQMD threshold for NO_X during construction. Therefore, the Project could result in an increase in the frequency or severity of existing air quality violations and could conflict with Consistency Criterion No. 1 of the SCAQMD CEQA Air Quality Handbook.

Consistency Criterion No. 2

While striving to achieve the NAAQS for O_3 and $PM_{2.5}$ and the CAAQS for O_3, PM_{10}, and $PM_{2.5}$ through a variety of air quality control measures, the 2016 AQMP also accommodates planned growth in the SCAB. Projects are considered consistent with, and would not conflict with or obstruct implementation of, the AQMP if the growth in socioeconomic factors (e.g., population and employment) is consistent with the underlying regional plans used to develop the AQMP (per Consistency Criterion No. 2 of the SCAQMD CEQA Air Quality Handbook).

Because the Project site and Project activity would occur within the Pacific Ocean, no general plan land use or zoning designations apply. Therefore, the Project would not conflict with the underlying land use assumptions for the Project site. In addition, the Project would not directly or indirectly promote population growth in the region because it would include short-term construction activities and would not develop a new land use that would generate a residential or employment population. Therefore, the Project would not exceed the assumptions of the 2016 AQMP. Accordingly, the Project would meet Consistency Criterion No. 2 of the SCAQMD CEQA Air Quality Handbook.

Summary

Regarding Consistency Criterion No. 2, implementation of the Project would not exceed the demographic growth forecasts in the SCAG 2016 RTP/SCS; therefore, the Project would also be consistent with the SCAQMD 2016 AQMP, which based future emission estimates on the SCAG 2016 RTP/SCS. Thus, the Project would not conflict with Consistency Criterion No. 2. However, regarding Consistency Criterion No. 1, the Project could result in an increase in the frequency and severity of existing air quality violations associated with NO_X emissions generated during Project construction and could, therefore, conflict with Consistency Criterion No. 1. Based on these considerations, impacts related to the Project's potential to conflict with or obstruct implementation of the SCAQMD 2016 AQMP could be potentially significant.

San Diego Air Pollution Control District 2016 RAQS

As previously discussed, the SDAPCD and SANDAG are responsible for developing and implementing the clean air plans for attainment and maintenance of the ambient air quality standards in the SDAB, specifically the SIP and RAQS.[16] The federal O_3 attainment plan, which is part of the SIP, was adopted in 2016. The SIP and RAQS rely on SANDAG growth projections based on population, vehicle trends, and land use plans developed by the cities and by San Diego County as part of development of their general plans. As such, projects that involve development that is consistent with the growth anticipated by local plans would be consistent with the SIP and RAQS. However, if a project involves development that is greater than that anticipated in the local plan or SANDAG's growth projections, that project might conflict with the SIP and RAQS and might contribute to a potentially significant cumulative impact on air quality.

The Project site is located in the Pacific Ocean within the SCAB. Activity within the SDAB includes marine vessel transport that would not occur in one specific place for an extended time. Accordingly, no local plan of SANDAG growth projections applies to marine vessel travel and, therefore, the Project does not conflict with underlying land use assumptions. In addition, the Project would not result in population or employment growth. As such, the Project would not conflict with the SDAPCD 2016 RAQS, and this impact would be less than significant.

Mitigation Measures

[16] The relevant federal air quality plan is the Ozone Attainment Plan (SDAPCD 2016a). The RAQS is the applicable plan for state air quality planning. Both plans reflect growth projections in the SDAB.

Implementation of MM AQ-1 and MM AQ-2 would reduce NO_X emissions within the SCAB so that the Project would not conflict with or obstruct implementation of the SCAQMD 2016 AQMP. Impacts would be less than significant.

MM AQ-1a: Nitrogen Oxides (NO_X) Emission Reduction. Prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that tugboats used for the Project meet or exceed the Tier 3 emission standards, if such tugboats with the capabilities to construct the project are available. If Tier 3 compliant tugboats with the capabilities to construct the project are not available, Tier 2 compliant tugboats may be used and the difference in NOx emissions shall be offset through purchase of additional NOx emission offset credits.

MM AQ-1b: Nitrogen Oxides (NO_X) Emission Offset Credits. At least 30 days prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff and the South Coast Air Quality Management District that NO_X emission offset credits have been purchased to offset the Project's NO_X emissions below the South Coast Air Quality Management District construction threshold for NO_X, in compliance with South Coast Air Quality Management District's *Revised CEQA Policy and Procedure in Allowing the Use of Emission Credits to Mitigate Significant Air Quality Impacts from Construction Phase* (as revised 2007). The Project's NOx emissions will be based on those calculated in the SEIR. At the discretion of the South Coast Air Quality Management District, at the end of each construction year Southern California Edison may reconcile the amount of credits purchased with the amount of actual Project emissions subject to review and approval by California State Lands Commission and South Coast Air Quality Management District staff, and receive NOx emission credits based on the excess credits paid. Actual emissions would be calculated at the end of a year's construction, based on documentation of hours of construction operations, number of barge trips, types of equipment used, and other factors.

Impact AQ-2: Violation of Air Quality Standards.

Project construction could exceed the SCAQMD construction emission thresholds for VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ **(Less than Significant with Mitigation).**

Impact Discussion

Project construction would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment and marine vessel maneuvering and hoteling) and off-site sources (i.e., land worker vehicle trips and marine vessel transport). See Appendix C for a description of the approach, methodology, and assumptions to estimate Project-generated criteria air pollutant emissions. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions.

Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts.

Project construction emissions were estimated using a spreadsheet-based model, as explained in Appendix C. Construction emissions were calculated for emissions that would occur within the SCAB and the SDAB, and compared to the SCAQMD and SDAPCD emission thresholds, respectively. For disclosure, emissions that would occur outside U.S. waters during the tugboat trips to and from the Ensenada quarry and the Project site are estimated; however, because emissions would not occur within California boundaries, they are not included in this CEQA air quality analysis.

Construction emissions were calculated for the estimated worst-case day over the construction period associated with each emission source activity and reported as the maximum daily emissions estimated during each year of construction (2019). It was assumed that all Project construction activities (i.e., marine vessels, off-road equipment, and worker trips) would occur on the same day. Construction scenario assumptions, including marine vessel activity, off-road equipment operation, and worker vehicle trips, were based on information provided by the Applicant.

Table 4.3-6 presents estimated Project-generated construction emissions that would occur within the SCAB in 2019. As shown in Table 4.3-6, Project-generated construction emissions in 2019 would exceed the SCAQMD NO_X threshold. Project-generated construction emissions of VOC, CO, SO_X, PM_{10}, and $PM_{2.5}$ would not exceed the SCAQMD's thresholds in 2019.

Table 4.3-6. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions – 2019 (Unmitigated)

Source	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	pounds per day					
South Coast Air Basin						
Marine Vessel	17.95	382.08	40.03	14.80	9.46	8.73
Off-road Equipment	1.46	16.16	7.12	0.03	0.50	0.49
Land Mobile Source (Worker Trips)	0.02	0.06	0.83	0.00	0.28	0.08
Maximum Daily Emissions	**19.42**	**398.30**	**47.98**	**14.84**	**10.25**	**9.30**
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	**Yes**	No	No	No	No
San Diego Air Basin						
Marine Vessel	14.09	297.49	31.17	11.40	7.37	6.80
Maximum Daily Emissions	**14.09**	**297.49**	**31.17**	**11.40**	**7.37**	**6.80**
SDAPCD Threshold	*75*	*250*	*550*	*250*	*100*	*55*

Table 4.3-6. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions – 2019 (Unmitigated)

Source	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	pounds per day					
Threshold Exceeded?	No	**Yes**	No	No	No	No
Outside of U.S. Waters						
Marine Vessel	14.12	298.03	31.22	11.43	7.38	6.81
Maximum Daily Emissions	**14.12**	**298.03**	**31.22**	**11.43**	**7.38**	**6.851**

Acronyms: VOC = volatile organic compound; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District; SDAPCD = San Diego Air Pollution Control District.
Note: See Appendix C for complete results.

As discussed previously, Project-generated construction emissions would occur within the SDAB boundaries that are associated with tugboat travel to and from the Project site and the Ensenada quarry in 2019. Tugboat emissions were estimated using a spreadsheet-based model, as explained in Section 4.3.4, *Environmental Impact Analysis and Mitigation*. Table 4.3-6 presents marine vessel emissions within the SDAB in 2019. As shown in Table 4.3-6, Project-generated construction emissions in 2019 would exceed the SDAPCD NO_X threshold. Project-generated construction emissions of VOC, CO, SO_X, PM_{10}, and $PM_{2.5}$ would not exceed the SDPACD's thresholds in 2019. For disclosure, emissions that would occur outside of California as a result of the six marine vessel (i.e., tugboat) trips that would travel to and from the Project site and Ensenada, Mexico, are estimated and presented. Table 4.3-6 presents marine vessel emissions that would occur south of the U.S. and Mexico border in 2019. The emissions outside of California presented in Table 4.3-6 are not compared to a numeric threshold or considered in the CEQA significance determination.

Because Project-generated construction emissions in 2019 would exceed the SCAQMD NO_X threshold and the SDAPCD NOx threshold, mitigation to reduce NO_X emissions is required to reduce Project construction air quality impacts. Table 4.3-9 presents estimated mitigated Project-generated construction emissions that would occur within the SCAB with incorporation of MM AQ-1a and MM AQ-1b. MM AQ-1a, which requires Project tugboats to meet or exceed Tier 3 emission standards, is incorporated into the marine vessel emission calculations. MM AQ-1b, which requires purchase of NO_X emission reduction offsets, is incorporated as a post-emission calculation reduction to reduce Project-generated NO_X emissions below the SCAQMD NO_X construction emission threshold of 100 pounds per day.

As shown in Table 4.3-9, incorporation of MM AQ-1a and MM AQ-1b would reduce Project-generated NO_X emissions below the SCAQMD NO_X construction mass daily threshold.

Table 4.3-7 presents estimated mitigated Project-generated construction emissions that would occur within the SDAB with incorporation of MM AQ-1a. MM AQ-1a, which requires Project tugboats to meet or exceed Tier 3 emission standards, is incorporated into the marine vessel emission calculations, which would reduce Project-generated NO_X emissions below the SDAPCD NO_X construction emission threshold of 250 pounds per day. MM AQ-1b is not required for emissions within the SDAB. For disclosure, mitigated marine vessel emissions that would occur south of the U.S. and Mexico border are also shown in Table 4.3-7.

Implementation of MM AQ-1a and MM AQ-1b would reduce Project-generated construction NOX emissions and associated impacts. With mitigation, Project-generated emissions would not exceed the SCAQMD's or the SDAPCD's mass daily thresholds for NOX (Table 4.3-7). Impacts would be less than significant with mitigation incorporated.

Table 4.3-7. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions – 2019 (Mitigated)

Source	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	pounds per day					
South Coast Air Basin						
Marine Vessel (with MM AQ-1a)	17.95	97.81	40.03	14.80	9.46	8.73
Off-Road Equipment	1.46	16016	7.12	0.03	0.50	0.49
Land Mobile Source (Worker Trips)	0.02	0.06	0.83	0.00	0.28	0.08
Total	*19.42*	*114.03*	*47.98*	*14.84*	*10.25*	*9.30*
MM AQ-1b	0.00	(14.13)	0.00	0.00	0.00	0.00
Maximum Daily Emissions Mitigated (After MM AQ-1a and MM AQ-1b)	*19.43*	*99.99*	*47.98*	*14.84*	*10.25*	*9.30*
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	No	No	No	No	No
San Diego Air Basin						
Marine Vessel	12.08	63.14	26.71	9.78	6.31	5.83
Maximum Daily Emissions	**12.08**	**63.14**	**26.71**	**9.78**	**6.31**	**5.83**
SDAPCD Threshold	*75*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	No	No	No	No	No	No
Outside of U.S. Waters						
Marine Vessel	12.08	63.14	26.71	9.78	6.31	5.83
Maximum Daily Emissions	**12.08**	**63.14**	**26.71**	**9.78**	**6.31**	**5.83**

Acronyms: VOC = volatile organic compound; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District; SDAPCD = San Diego Air Pollution Control District.
Note: Numbers presented within parenthesis indicate a negative number (i.e., a reduction in emissions).

The overall monitoring effort for Wheeler North Reef when Phase 3 is complete is not anticipated to increase. Instead, the monitoring team would monitor fewer transects within the Phases 1 and 2 reef areas to allow for monitoring of the new transects in Phase 3 with the same amount of effort. Accordingly, no increase in activity that would generate criteria air pollutant emissions is anticipated. Therefore, the Project is not anticipated to generate long-term, operational criteria air pollutant emissions. Operational air quality impacts would be less than significant.

Mitigation Measures

MM AQ-1a: Nitrogen Oxides (NO_X) Emission Reduction

MM AQ-1b: Nitrogen Oxides (NO_X) Emission Offset Credits

Impact AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for which the Project Region is in Nonattainment

Project construction could result in a cumulatively considerable net increase in NO_X emissions **(Less than Significant with Mitigation).**

Impact Discussion

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the SCAQMD and SDAPCD develop and implement plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are relevant in the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

In considering cumulative impacts from the Project, the analysis must evaluate a project's contribution to the cumulative increase in pollutants for which the SCAB and SDAB is designated as nonattainment for the CAAQS and NAAQS. If a project's emissions exceed the SCAQMD significance thresholds for a nonattainment pollutant, it would be considered to have a cumulatively considerable contribution to nonattainment status in the SCAB. If a project's emissions would exceed the SDAPCD significance thresholds for a nonattainment pollutant, it would be considered to have a cumulatively considerable contribution to nonattainment status in the SDAB. The basis for analyzing the Project's cumulatively considerable contribution is if the Project's contribution accounts for a significant proportion of the cumulative total emissions (as determined by the air district's mass daily thresholds) and consistency with the SCAQMD 2016 AQMP, which addresses the cumulative emissions in the SCAB, as well as consistency with the SDAPCD 2016 RAQS, which addresses cumulative emissions in the SDAB.

As discussed in Section 4.3.2, *Regulatory Setting* (South Coast Air Basin Attainment Designation), the SCAB has been designated as a federal nonattainment area for O_3 and $PM_{2.5}$ and a state nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. The nonattainment status is the result of cumulative emissions from various sources of air pollutants and their precursors within the SCAB including motor vehicles, off-road equipment, and commercial and industrial facilities. Project construction would generate VOC and NO_X emissions (which are precursors to O_3) and emissions of PM_{10} and $PM_{2.5}$ within the SCAB. As indicated in Table 4.3-6, Project-generated construction emissions would exceed the SCAQMD emission-based significance threshold for NO_X; however, Project construction would not exceed the SCAQMD emission-based significance thresholds for VOC, PM_{10}, or $PM_{2.5}$. As discussed in the analysis of the Project's potential to conflict with or obstruct implementation of the applicable air quality plan (Impact AQ-1), the Project could conflict with the SCAQMD 2016 AQMP because the Project would exceed the SCAQMD mass daily thresholds for NO_X during construction.

As presented in Section 4.3.2, *Regulatory Setting* (San Diego Air Basin Attainment Designation), the SDAB has been designated as a federal nonattainment area for O_3 and a state nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. Project construction would generate VOC and NO_X emissions (which are precursors to O_3) and emissions of PM_{10} and $PM_{2.5}$ within the SDAB. However, as indicated in Table 4.3-6, Project-generated construction emissions would not exceed the SDAPCD emission-based significance thresholds for VOC, PM_{10}, or $PM_{2.5}$; however, emissions would exceed the SDAPCD NO_X threshold. As discussed in the analysis of the Project's potential to conflict with or obstruct implementation of the applicable air quality plan, the Project would not conflict with the SDAPCD 2016 RAQS. Nonetheless, the Project could result in a cumulative impact because the Project would exceed the SDAPCD mass daily thresholds for NO_X during construction.

Cumulative localized impacts would potentially occur if a construction project were to occur concurrently with another off-site project. The largest construction project in the cumulative study area, the decommissioning of San Onofre Nuclear Generating Station Units 2 and 3, is not expected to begin until 2020. Construction schedules for most potential future projects near the Project site are currently unknown; therefore, potential construction impacts associated with two or more simultaneous projects would be considered speculative.[17] In addition, because the Project site and associated activities are located within the Pacific Ocean, the potential for nearby construction projects occurring during the same 100- to 120-day construction schedule is minimal. However, future projects would be subject to CEQA and would require an air quality analysis and, where necessary, mitigation if the Project would exceed SCAQMD or SDAPCD thresholds. Criteria air pollutant emissions associated with construction activity of future projects would be reduced through the implementation of control measures required by the SCAQMD and the SDAPCD. For example, cumulative PM_{10} and $PM_{2.5}$ emissions would be reduced because all future projects would be subject to SCAQMD Rule 403 (Fugitive Dust), which sets forth general and specific requirements for all construction sites in the SCAQMD, and SDAPCD Rule 55 (Fugitive Dust).

Based on the previous considerations, the Project could result in a cumulatively considerable increase in emissions of nonattainment pollutants as a result of exceeding the SCAQMD and SDAPCD mass daily construction threshold for NO_X. Impacts would be potentially significant.

Implementation of MM AQ-1a and MM AQ-1b would reduce Project-generated NO_X emissions below the SCAQMD and SDAPCD NO_X construction mass daily threshold.

[17] The State CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (Cal. Code Regs. tit. 14, § 15145). This discussion is nonetheless provided in an effort to show good-faith analysis and comply with CEQA's information disclosure requirements.

Therefore, with mitigation, the Project would not result in a cumulatively considerable impact. Impacts would be less than significant with mitigation incorporated.

Mitigation Measures

MM AQ-1a: Nitrogen Oxides (NO_X) Emission Reduction

MM AQ-1b: Nitrogen Oxides (NO_X) Emission Offset Credits

Impact AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentrations.

Project construction could result in exposure of sensitive receptors to substantial pollutant concentrations **(Less than Significant).**

Impact Discussion

As discussed in Section 4.3.1, *Environmental Setting* (Sensitive Receptors), sensitive receptors are those individuals more susceptible to the effects of air pollution than the population at large. According to the SCAQMD (1993), sensitive receptors include residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes. The closest off-site sensitive receptors to the Project site include residences and potential other sensitive land uses along the San Clemente coast approximately 0.6 mile from the Project site.

An LST analysis has been prepared to determine potential impacts to nearby sensitive receptors during construction of the Project. The SCAQMD recommends the evaluation of localized NO_2, CO, PM_{10}, and $PM_{2.5}$ impacts as a result of construction activities to sensitive receptors in the immediate vicinity of the Project site. The impacts were analyzed using methods consistent with those in the SCAQMD's *Final Localized Significance Threshold Methodology* (2009). According to the SCAQMD (2009), "off-site mobile emissions from the Project should not be included in the emissions compared to the LSTs." Accordingly, the emission sources considered in the LST analysis include the following: (1) attending Tugboat: all activities (maneuvering and hoteling); (2) CAT 973C ~~Track~~front-end ~~L~~loader; (3) crane; and (4) generator-derrick barge.

Construction activities associated with the Project would result in temporary sources of construction equipment emissions. Off-site emissions from worker vehicle trips or the tugboat operation (tugboat used for transporting rock) are not included in the LST analysis. The maximum allowable daily emissions that would satisfy the SCAQMD localized significance criteria for SRA 21 (Capistrano Valley) are presented in Table 4.3-8 and compared to the maximum daily on-site construction emissions generated at the Project site.

Table 4.3-8. Localized Significance Thresholds Analysis for Project Construction - 2019

On-Site Emission Source	NO_2	CO	PM_{10}	$PM_{2.5}$
	pounds per day			
Marine Vessel	74.99	7.86	1.86	1.71
Off-Road Equipment	16.16	7.12	0.50	0.49
Total	*91.15*	*14.98*	*2.36*	*2.20*
Maximum Daily On-Site Emissions	**91.15**	**14.98**	**2.36**	**2.20**
SCAQMD LST	*218*	*7,724*	*121*	*68*
LST Exceeded?	No	No	No	No

Source: SCAQMD 2009.
Acronyms: CO = carbon monoxide; LST = localized significance threshold; NO_2 = nitrogen dioxide; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.
Note: See Appendix C for detailed results. Localized significance thresholds are shown for SRA 21 (Capistrano Valley) for a 1-acre project sites corresponding to a distance to a sensitive receptor of 500 meters.

As shown in Table 4.3-8, Project construction activities would not generate emissions in excess of site-specific LSTs; therefore, site-specific impacts during construction of the Project would be less than significant.

Health Impacts of Toxic Air Contaminants

In addition to impacts from criteria pollutants, Project impacts may include emissions of pollutants identified by the state and federal government as TACs or HAPs. State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and aimed at TACs that are a problem in California. The State has formally identified more than 200 substances as TACs, including the federal HAPs, and is adopting appropriate control measures for sources of these TACs. The following measures are required by state law to reduce diesel particulate emissions:

- Fleet owners of mobile construction equipment are subject to the CARB Regulation for In-Use Off-Road Diesel Vehicles (Cal. Code Regs., tit. 13, § 2449), the purpose of which is to reduce DPM and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles.
- All commercial diesel vehicles are subject to California Code of Regulations title 13, section 2485, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to 5 minutes; electric auxiliary power units should be used whenever possible.

The greatest potential for TAC emissions during construction would be DPM emissions from marine vessels and heavy-equipment operations during construction of the Project; however, sensitive receptors would not be located nearby these activities. As shown in Table 4.3-6, maximum daily particulate matter (PM_{10} or $PM_{2.5}$) emissions generated by marine vessels and construction equipment operation within the SCAB (exhaust particulate matter, or DPM) would be well below the SCAQMD significance thresholds. In addition, as shown in Table 4.3-6, maximum daily particulate matter (PM_{10} or $PM_{2.5}$) emissions generated by marine vessels traveling within the SDAB would be well below the SDAPCD significance thresholds. Moreover, construction of the Project would last no longer than approximately 130 days, after which the construction activities would cease. The Project would also not emit any new TAC emissions during operation. Therefore, the impact would be less than significant.

Health Impacts of Carbon Monoxide

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal or state standards for CO are termed CO hotspots. CO transport is extremely limited and disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors. Typically, high CO concentrations are associated with severely congested intersections operating at an unacceptable level of service (LOS) (LOS E or worse is unacceptable). Projects contributing to adverse traffic impacts may result in the formation of a CO hotspot. Additional analysis of CO hotspot impacts would be conducted if a project would result in a significant impact or contribute to an adverse traffic impact at a signalized intersection that would potentially subject sensitive receptors to CO hotspots.

Pursuant to 40 CFR § 93.123(c)(5)), Procedures for Determining Localized CO, PM_{10}, and $PM_{2.5}$ Concentrations (hot-spot analysis), "CO, PM_{10}, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site that is affected by construction-related activities shall be considered separately, using established "Guideline" methods. Temporary increases are defined as those that occur only during the construction phase and last 5 years or less at any individual site" (40 CFR § 93.123). While Project construction would involve on-road vehicle trips from workers during construction, construction activities would last approximately 120 days and would not require a project-level construction hotspot analysis. In addition, the Project would involve minimal on-land vehicle trips associated with 15 workers per day who would travel within the SCAB. Because the Project would not result in long-term operational vehicular trips above existing conditions, an operational CO hotspot evaluation is also not required.

Accordingly, the Project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, due to continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth or congestion, the potential for CO hotspots in the SCAB is steadily decreasing.

Based on these considerations, the Project would result in a less-than-significant impact to air quality with regard to potential CO hotspots.

Health Impacts of Other Criteria Air Pollutants

Project construction would result in emissions that would not exceed the SCAQMD or SDAPCD thresholds for criteria air pollutants including VOC, CO, SO_X, PM_{10}, or $PM_{2.5}$. However, SCAQMD and SDAPCD thresholds for NO_X would be exceeded during construction. VOCs and NO_X are precursors to O_3, for which the SCAB and the SDAB is designated as nonattainment with respect to the NAAQS and CAAQS. The health effects associated with O_3 are generally associated with reduced lung function. The contribution of VOCs and NO_X to regional ambient O_3 concentrations is the result of complex photochemistry. The increases in O_3 concentrations in the SCAB due to O_3 precursor emissions tend to be found downwind from the source location to allow time for the photochemical reactions to occur. However, the potential for exacerbating excessive O_3 concentrations in the SCAB and SDAB would also depend on the time of year that the VOC emissions would occur because exceedances of the O_3 ambient air quality standards tend to occur between April and October when solar radiation is highest. The holistic effect of a single project's emissions of O_3 precursors is speculative because of the lack of quantitative methods to assess this impact. Nonetheless, because NO_X emissions associated with Project construction would exceed the SCAQMD and SDAPCD mass daily construction threshold, it could minimally contribute to regional O_3 concentrations and the associated health impacts. Accordingly, impacts would be considered potentially significant. As presented in Impact AQ-2, the incorporation of MM AQ-1a and MM AQ-1b would reduce Project-generated NO_X emissions below the SCAQMD and SDAPCD NO_X construction mass daily threshold. Therefore, with mitigation, the Project would not contribute to the adverse health effects related to the SCAB's nonattainment status of O_3. Impacts would be less than significant with mitigation incorporated.

Project construction would not exceed thresholds for PM_{10} or $PM_{2.5}$ and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter or would obstruct the SCAB or the SDAB from coming into attainment for these pollutants. The Project would also not result in substantial DPM emissions during construction and, therefore, would not result in significant health effects related to DPM exposure. Because the minimal contribution of particulate matter during construction, health impacts would be considered less than significant.

Although Project construction would generate NO_X emissions that would exceed the SCAQMD and SDAPCD mass daily thresholds, construction of the Project is not anticipated to contribute to exceedances of the NAAQS and CAAQS for NO_2 because the SCAB and SDAB are designated as in attainment of the NAAQS and CAAQS for NO_2 and the existing NO_2 concentrations in the area are well below the NAAQS and CAAQS standards. Health impacts that result from NO_2 and NO_X include respiratory irritation; however, there are no nearby receptors to be affected by off-road construction equipment. Therefore, potential health impacts associated with NO_2 and NO_X would be considered less than significant.

CO tends to be a localized impact associated with congested intersections. The associated potential for CO hotspots were discussed previously and are determined to be a less-than-significant impact. Thus, the Project's CO emissions would not contribute to significant health effects associated with this pollutant. In summary, construction of the Project would not result in exceedances of the SCAQMD significance thresholds for all criteria pollutants. Therefore, the potential health impacts associated with criteria air pollutants are considered less than significant.

Mitigation Measures

No MMs are recommended for Impact AQ-4.

Impact AQ-5: Create Objectionable Odors Affecting a Substantial Number of People.

Project construction could generate objectionable odors **(Less than Significant).**

Impact Discussion

The occurrence and severity of potential odor impacts depend on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors potentially would be generated from marine vessels, equipment, and worker vehicle exhaust emissions during construction of the Project. Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. Such odors would disperse rapidly from the Project site and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be less than significant.

Land uses and industrial operations associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The Project entails construction of a marine reef and would not result in the creation of a land use that is commonly associated with odors. Therefore, Project operations would result in an odor impact that is less than significant.

Mitigation Measures

No MMs are recommended for Impact AQ-5.

4.3.5 Cumulative Impacts

The potential for the Project to result in a cumulatively considerable impact, specifically a cumulatively considerable new increase of any criteria pollutant for which the Project region is nonattainment under an applicable NAAQS or CAAQS, is addressed in Impact AQ-3.

4.3.6 Summary of Proposed Mitigation Measures

Table 4.3-9 provides a summary of the MMs in the 1999 Program EIR and for the proposed Project.

Table 4.3-9. Air Quality Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
The combined construction activities for either of the mitigation reef build out scenarios (127.6 acres or 277.6 acres with all concrete or all rock at 67 percent) would produce daily emissions of NO_X and PM_{10} that exceed the thresholds of significance. In addition, the quarterly emissions for NO_X and PM_{10} would also exceed the thresholds of significance.	Standard Mitigation Measures: *1. Reducing PM_{10} Emissions.* *2. Reducing to NO_X Emissions.* *3. Purchase Emission Offsets* *4. Potential Changes in Construction*
Proposed Project	
AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan	**MM AQ-1a.** Nitrogen Oxides (NO_X) Emission Reduction. **MM AQ-1b.** Nitrogen Oxides (NO_X) Emission Offset Credits.
AQ-2: Violation of Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation	**MM AQ-1a.** **MM AQ-1b.**
AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for Which the Project Region is Nonattainment	**MM AQ-1a.** **MM AQ-1b.**
AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentrations	None recommended.
AQ-5: Create Objectionable Odors Affecting a Substantial Number of People	None recommended.

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4.4 CULTURAL AND PALEONTOLOGICAL RESOURCES

This section describes the existing cultural and paleontological resources that may be affected by the proposed Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, assesses the Project's potential impacts to cultural and paleontological resources and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant. Cultural resources are places or objects that are valued for scientific, historical, or religious reasons, and include prehistoric archaeological sites, architectural remains, historic remains, shipwrecks, isolated artifacts, and other material objects that provide evidence of past human activities. Paleontological resources (i.e., fossils) are the buried remains or traces of prehistoric organisms (i.e., animals, plants, and microbes). Tribal cultural resources are discussed in Section 4.5.

4.4.1 Environmental Setting

The Wheeler North Reef is located approximately 0.6 mile offshore of the city of San Clemente in Orange County, California. The Project area of potential effects (APE) is composed of a linear network of 23 polygonal sites totaling about 210 acres that extend from Capistrano Beach Park in the north to San Mateo Point in the south, entirely within the U.S. Geological Survey San Clemente and Dana Point 7.5-minute quadrangles. Water depths in the Project area vary from approximately 38 to 49 feet.

4.4.1.1 Regional Overview

Experts generally accept that prehistoric occupation of California extends to at least 10,000 years before present during the late Pleistocene epoch (Moratto 1984). Some evidence indicates that many of the early settlement locations along the Southern California coastline were in places that have subsequently become submerged beneath the ocean as a result of sea-level rise over time (Hudson 1976 as cited in California State Lands Commission [CSLC or Commission] 1999, Moriarty 1961 as cited in CSLC 1999).

Two major cultural groups are known to have occupied the mainland territory in the region of the Project. The San Dieguito were the first known inhabitants of the Southern California coastal region, occupying the south coastal region continuously from about 9,000 to 1,300 years ago (Gallegos and Strudwick 1994, as cited in CSLC 1999). Termed the La Jolla and Pauma complexes, subsistence activities were characterized by hunting, fishing, milling of plant foods, and shellfish collecting and processing. Most of the archaeological sites associated with the San Dieguito are coastal shell midden sites, inland hunting and milling campsites, and quarry sites.

Occupation of the mainland adjacent to the Project site post-1,300 years ago (Late Period) is well demonstrated by the numerous Shoshonean habitation sites, presumably ancestral to the ethnographic Juaneño/Luiseño (Bean and Shipek 1978, Gallegos and Strudwick 1994 as cited in CSLC 1999).

The Project's location off the coast of San Clemente places it within the traditional territory of the Juaneño/Luiseño people. Their ancestral territory covers over 1,500 square miles of coastal Southern California, extending from about Agua Hedionda Creek in San Diego County on the southern boundary, inland to Lake Henshaw, north into Riverside County, and along the coast to Aliso Creek (near Laguna Beach). This region encompassed numerous ecological zones, including the ocean, sandy beaches, shallow inlets, marshes, coastal chaparral, lush interior grassy valleys, extensive oak groves, and pines and cedars on top of Palomar Mountain (Bean and Shipek 1978). In coastal villages, people hunted and fished for finfish, crustaceans, mollusks (especially abalones), and sea mammals (Sparkman 1908). Offshore fishing was accomplished using lightweight tule rush boats (balsas) or dugout canoes, and fishing technology included both dip nets and seines, as well as basketry fish traps carved from yellow pine, and bone and *Haliotis* (abalone) shell hooks and harpoons (Bean and Shipek 1978, Kroeber 1925). The indigenous maritime activities of the Juaneño/Luiseño people likely ceased when they were forcibly brought into the missions in the late 18th century.

Another group with ancestral connection to the Project area is the Gabrielino, who occupied a large territory extending east to San Bernardino, north to San Fernando, and west to Malibu, as well as inhabiting the southern Channel Islands, including Santa Catalina Island, which lies approximately 40 miles west of the Project area (Bean and Smith 1978). Island dwellers depended heavily upon sea mammals, shellfish, and finfish (Meighan 1959, Meighan and Eberhart 1953). Harpoons, throwing spears, and clubs were used in hunting sea mammals, and people traveled back and forth between the mainland and the islands in planked boats fastened with lashing and asphaltum (Bean and Smith 1978). These plank-built boats greatly differed from the balsas and dugout canoes used by the Juaneño/Luiseño (Kroeber 1925). Known as tomol, these boats were large (up to 30 feet long), holding between 12 and 20 people, and both light and swift owing to their plank construction (Kroeber 1925). These vessels required an extensive woodworking technology (e.g., Cassidy et al. 2004) and allowed for contact between the Channel Islands and mainland coast (Arnold 2007, Fagan 2004). Villages at Redondo and San Pedro were intimately involved in trade with the islands (Kroeber 1925), and the Gabrielino were major suppliers of shell, dried fish, sea mammal pelts, and steatite from Santa Catalina, important materials in trade networks that extended well into Arizona (Ruby 1970, as cited in CSLC 1999).

The arrival of Spanish explorers in 1769 was followed by the establishment of Mission San Juan Capistrano in 1776. Historically, shipping in the Project area during the Spanish colonial period would have been infrequent, although ships may have anchored near Dana Point to bring passengers or supplies to the Mission. According to 19th century author Richard Henry Dana, pirate ships visited the area in the late 18th and early 19th centuries. Commercial shipping increased during the 20th century, resulting in several shipwrecks occurring in the area (see Table 4.4-1). Schaefer (1997) also reports that the north coast of San Diego County was used during Prohibition (1920 to 1933) to transfer loads of liquor from boats to caches in the Santa Margarita Mountains.

4.4.1.2 Prehistoric Offshore Setting

During the Pleistocene epoch, or Ice Age, as the ice shields in the northern hemisphere expanded, so much water was trapped in the glaciers that the sea levels dropped and continental shelves were exposed around the world (Hopkins 1979, as cited in CSLC 1999). During the late Pleistocene, approximately 10,000 years ago, the Southern California shoreline stood almost 500 feet offshore of its current location (Masters and Flemming 1983, as cited in CSLC 1999) and the sea level was about 180 feet below the present level (Emery 1969, as cited in CSLC 1999).

However, since the height of the last glaciation, about 18,000 years ago, warming climates melted much of the polar ice caps and resulted in rapidly rising sea levels. This sea-level rise has been accompanied by marine transgressions that have covered much of the continental shelf (Curray 1965 as cited in EDAW 2005, Inman 1983 as cited in EDAW 2005). It has long been recognized that because some now-inundated portions of the shelf were likely occupied by humans during the late Pleistocene and early Holocene, the terrestrial archaeological record is necessarily incomplete since many early cultural sites must now lie offshore (Erlandson 1994, Kraft et al. 1983 as cited in EDAW 2005, Moratto 1984).

4.4.1.3 Archaeological and Historic Resources

The BOEM (2013) report on submerged resources states that relatively few prehistoric sites are known to exist on the continental shelf along the Southern California coastline. Investigations have documented submerged archaeological material at Solana Beach, Cardiff, Encinitas, and Oceanside, and numerous sites have been documented in the Santa Barbara Channel (Hudson 1976 as cited in CSLC 1999, Moriarty 1961 as cited in CSLC 1999). Pierson et al. (1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013), in an archaeological study of the California coast from Morro Bay to the Mexican Border prepared for the U.S. Minerals Management Service, identified 10 additional underwater prehistoric resources, almost all off the coast of San Diego County.

The majority of the known in situ submerged prehistoric sites in California are located in relatively calm and shallow waters, such as estuarine environments or in the lee of a point of land (Hudson 1976 as cited in CSLC 1999, URS 1986 as cited in CSLC 1999). Some of the shallow water sites may be the result of cliff erosion and associated with archaeological sites located on the cliffs above, while other submerged artifacts may have been the consequence of random loss or have been purposefully discarded during ceremonial rituals or other events (Masters 1983, 1985 as cited in EDAW 2005, Masters and Schneider 2000). Virtually all underwater prehistoric artifacts found to date are made of stone, such as manos, metates, choppers, and pestles (Hudson 1976 as cited in CSLC 1999, Masters and Schneider 2000, Moriarty 1961 as cited in CSLC 1999, Pierson et al. 1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013), and any future underwater prehistoric discoveries would likely be the same, as stone is likely the only material that would be preserved underwater for any length of time.

Tomol (canoes) occasionally sank at sea, but given the materials of which they were constructed, evidence of the vehicles would not likely be preserved in the high-energy open water offshore environment (Hudson et al. 1978 as cited in CSLC 1999, Continental Shelf Associates 1994 as cited in CSLC 1999). The types of items associated with ethnographic fishing and mainland-to-island canoe voyages more likely to be found would be isolated artifacts lost overboard, such as stone fishnet sinkers (Hudson 1976 as cited in CSLC 1999, Horne and Barnette 1982, as cited in CSLC 1999); there is also a possibility that stone vessels may have been thrown into the sea for sacrificial purposes (Hudson 1976, as cited in CSLC 1999). However, even should such material exist within the Project area, the sandy bottom sediments are constantly shifting, making it extremely unlikely that prehistoric artifacts would be present in situ.

Due to its open coastal position, the Project area would have been exposed to considerable wave action during the Holocene Transgression and is unlikely to contain intact prehistoric deposits, as there is no evidence it was ever unsubmerged or connected to the mainland. As previously discussed, submerged artifact locations are also typically found at rocky headlands than in sandy bottom conditions such as the Project area (Masters 1983, 1985, as cited in EDAW 2005). Further, no prehistoric artifact locations are recorded near the Project area (Pierson et al. 1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013).

Information regarding prehistoric and historic archaeological resources, historic shipwrecks, and other submerged historic resources within the Project vicinity was sought from the South Central Coastal Information Center (SCCIC) database (at California State University, Fullerton), a submerged resources database maintained by the Commission, and other sources. Literature and records searches for the current Project area were conducted in January 2018. The SCCIC search included the California Office of Historic Properties Directory, National Register of Historic Places, California Register of Historical Resources (CRHR), historical maps, and all site records and reports on file. The SCCIC search did not reveal any prehistoric or historic resources within 0.5 mile of the Project area; however, two reports were identified that covered areas intersecting with the 0.5-mile search radius, but not with the Project area itself.

Submerged historic properties include sunken ships, boats, and other vessels such as barges, as well as cargo or fittings (e.g., anchors) lost from vessels, sunken navigational equipment such as buoys, sunken aircraft, and industrial equipment related to activities such as offshore oil development. Such resources are the most likely to potentially occur within the Project area. The Commission's shipwreck database search, as well as consultation of prior documentation, of the Project area indicate that six known historic shipwrecks may be present in the vicinity (Table 4.4-1). Of these six resources, two were documented within the 0.5-mile search buffer (italicized in Table 4.4-1).

Table 4.4-1. Historic Shipwrecks

Name, Type and Displacement	Built	Lost	Location/Loss Situation
Agram, Unknown type/displacement	—	*5/18/1940*	*Wrecked at San Clemente. Plotted location directly along the beach is assessed as probably being within 1 mile of the actual location, which could potentially place the wreck within the Project site (CSLC database). The wreck may have been salvaged (Pierson 1980 as cited in CSLC 1999, EDAW 2005).*
Stranger, Oil Screw, 90-ton displacement	*1918*	*7/17/1948*	*4 miles west of San Onofre. Pierson (1980 as cited in CSLC 1999, EDAW 2005) indicates part of the cargo was salvaged. The plotted location in the CSLC database is assessed as probably being within 1 mile of the actual location. This distance would potentially place the wreck within the Project site (CSLC database). According to Pierson (1980 as cited in CSLC 1999, EDAW 2005), however, the wreck has only been pinpointed within 12 miles.*
Kitty-A, Unknown type/ displacement	1856	1941	Sunk at San Mateo Point (Pierson et al. 1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013). No additional information available.
Western Pilot, Oil Screw type, 113-ton displacement	1933	1933	Burned and sank 8 miles south-southwest of Dana Point in 1953 (CSLC database). In some records, Western Pilot is referred to as Western Point (Pierson et al. 1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013).
Onward, Oil Screw type, 51-ton displacement	1919	1950	Latitude and longitude readings place it near the Western Pilot (CSLC database). If this is correct, the location description "5 miles southwest of Catalina Harbor" (CSLC database) is incorrect; it would be more than 20 miles east of Catalina Harbor.
Nerda, Barge type, 53-ton displacement	1918	1936	Lost 6 miles off San Clemente (Pierson et al. 1987 as cited in CSLC 1999, EDAW 2005, BOEM 2013). No additional information available.

Sources: CSLC 2018a, EDAW 2005
Note: Italicized shipwrecks potentially located within the 0.5-mile search buffer.

Prior to earlier phases of this Project, the Project site was directly examined by several teams of divers and has been subjected to two side-scan sonar testing surveys. While these surveys were not specifically conducted to examine cultural resources, no cultural resources were observed in the area during these surveys. Review of both the underwater video and the side-scan sonar data has revealed no evidence for historic cultural sites within the Project area.

As described in detail in Section 4.5, *Cultural Resources – Tribal*, dives on the Project study area were conducted over five days in August 2018 to determine the sensitivity of the study area for Tribal cultural resources. While no *specific* Tribal cultural resources in the form of identified physical articfacts were identified during these dives, the area is identified by the consulting Tribe to be a highly sensitive cultural area because of prior occupation of the land prior to it being submerged by changes in the sea levels. Details regarding the methods and findings of those dives are included in Appendix G.

4.4.1.4 Paleontological Resources

Paleontological resources for the proposed Project expansion area were assessed by PaleoServices (2018). The Project area is situated on the San Onofre Shelf, a wide continental shelf that extends from Dana Point south to the Oceanside Submarine Canyon, and from the modern shoreline to the shelf-slope break. As mapped by Kennedy and Tan (2007), the offshore bedrock underlying the Project area consists of undivided Miocene-age deposits. Based on the onshore geology adjacent to the Project area, the sediments are presumed to consist primarily of the Miocene-age to early Pliocene-age Capistrano Formation (Kennedy and Tan 2007). Seismic reflection studies of the region (Klotscko et al. 2015), as well as the Project-specific sonar surveys (Coastal Environments 2017a) indicate that the submarine Miocene strata may be covered by several feet of recent sand (average thickness of 2.5 feet).

The Capistrano Formation was named by Alfred O. Woodford (1925) for massive clayey siltstones and silty claystones exposed near the town of San Juan Capistrano and within the Saddleback Valley, and is considered to be Miocene to early Pliocene in age based on microfossils (e.g., Barron 1986, Ingle 1979). The Capistrano Formation contains a variety of rock types including coarse-grained pebbly sandstones and conglomerates, massive to well-laminated fine-grained sandstones and siltstones, and rhythmically bedded sand-to-mud turbidites (e.g., Campion et al. 2005, Kennedy and Tan 2007). The formation has been subdivided into several informal and formal units, the different units reflecting different depositional settings. Onshore of the Project area, the Capistrano Formation predominantly consists of the informal siltstone facies (Kennedy and Tan 2007), which presumably extends offshore.

Following the paleontological resource assessment criteria of the Society of Vertebrate Paleontology (2010), the Capistrano Formation is assigned a high paleontological potential within the Project area based primarily on the proven richness of fossils in the local onshore portions of the Capistrano Formation. However, the Capistrano Formation is overlain by recent marine sands that are on average 2.5 feet thick (Coastal

Environments 2017a). The overlying surficial seafloor sands are assigned a low paleontological potential based on their young, Holocene age.

4.4.2 Regulatory Setting

The primary federal and state laws, regulations, and policies that pertain to the proposed Project are summarized in Appendix D. The Project site is located offshore on submerged lands owned by the State and administrated by the Commission. Therefore, state laws, regulations, and ordinances are most applicable.

4.4.3 Significance Criteria

Significance criteria used to evaluate potential impacts to cultural and paleontological resources are based on Appendix G of the State CEQA Guidelines, which states that a significant impact would occur if the Project would:

- Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in State CEQA Guidelines section 15064.5
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature
- Disturb any human remains, including those interred outside of dedicated cemeteries

4.4.4 Environmental Impact Analysis and Mitigation

4.4.4.1 1999 Program EIR

The 1999 Program EIR determined that the placement of the reef would not damage any known or unknown paleontological or archaeological resources on the seafloor, and that burial of any unknown paleontological or archaeological resources would be a less-than-significant impact.

4.4.4.2 2018 Subsequent EIR

The potential impacts of the proposed Project were assessed through the following process: (1) defining the agents or causes of impact from the proposed Project, (2) outlining the APE of the proposed Project, (3) identifying the location of any known cultural resources in the Project vicinity, (4) identifying the sensitivity or likelihood of the occurrence of significant cultural resources within the APE, and (5) evaluating the significance of those resources and assessing the degree to which the Project would affect their significant aspects.

A records search was conducted at the SCCIC to identify recorded cultural resources in the Project area. Shipwreck data maintained by the Commission were also consulted, as well as other published sources. PaleoServices, a department in the San Diego Natural History Museum, conducted the paleontological resources assessment.

Table 4.4-2 at the end of this section provides a summary of the Project's potential impacts related to cultural and paleontological resources and any Applicant-Proposed Measures (APMs) or recommended MMs to reduce impacts to a level that is less than significant

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact CR-1: Cause a substantial adverse change in the significance of a historical or archeological resource

The Project could cause a substantial adverse change in the significance of a historical resource **(Less than Significant with Mitigation).**

Impact Discussion

No documented archaeological resources occur within the APE; however, two types of prehistoric remains may occur within the water depths associated with the Project site, including: (1) in situ prehistoric remains that predate the Holocene Transgression and that are situated on relict, submerged landforms, either mantled with unconsolidated marine sediments or exposed on bedrock outcrops; and (2) remains deposited subsequent to the Holocene Transgression and situated on the seafloor or within unconsolidated recent sediments. These remains would consist primarily of isolated prehistoric and historic artifacts. However, as previously noted, these are unlikely to occur in situ in the Project environment. The proposed Project would be constructed in areas that are underlain by bedrock and thinly covered by sand (generally less than 3 feet) in a high-energy dynamic environment in which the thin cover of sand is readily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits within the Project area is very unlikely. Additionally, should any isolated prehistoric or historic artifacts occur within the Project area, they would not be considered as in situ deposits as they would likely have been redeposited by waves and currents.

Two historic-period shipwrecks, those of the Agram and the Stranger, are more than 50 years old; however, their precise location, condition, and extent of possible salvage are unknown. Hence, potential CRHR eligibility of the wrecks has not been and cannot be determined based on available data. Underwater surveys conducted by Coastal Resources Associates, which included side-scan sonar, revealed no historic resources in the Project area. While no magnetometer survey has been conducted in the area, and there is a sandy substrate, wreck or other historic artifact remains could theoretically be obscured by sand. However, this is unlikely given the shallow sand in the Project area, and the failure of prior investigations to detect remains within the Project site. For similar reasons, the likelihood of unrecorded wrecks or other undocumented historical resources in the Project area is very low.

Construction of the proposed reefs would not involve excavation, so any isolated artifacts, fragmentary shipwreck remains, or archaeological remains that might be buried in the shallow sands are unlikely to be destroyed or removed; however, MM CR-1a and MM CR-1b would ensure the evaluation and treatment of any unanticipated discoveries, pursuant to Public Resources Code section 21084.3.

Mitigation Measures

MM CR-1a: Archaeological and Tribal Monitoring. To ensure that impacts to archaeological and tribal cultural resources remain less than significant, the following will occur:

- A tribal monitor that is culturally affiliated with the area may be present during Project activities. For safety reasons, the monitor would not be able to be in the water during rock placement. During the first week of rock placement, the Applicant will make arrangements so that the tribal monitor can, if desired, dive on the areas where rock has been placed to examine the area and the effects of rock placement.
- The Applicant will conduct a post-reef expansion dive with interested tribes to re-assess the Project area and compare with data obtained from the eighteen reconnaissance survey dives; and,
- The Applicant and CSLC will document the tribal consultation process and present it as professional paper to benefit future submerged projects.

~~A California State Lands Commission (CSLC) staff-approved archaeological monitor that meets the Secretary of the Interior's Professional Qualifications Standards (as defined in 36 Code of Federal Regulations Part 61), and a tribal monitor that is culturally affiliated with the area may also be present during Project activities. The archaeological monitor shall complete daily monitoring forms and prepare a summary monitoring report to be submitted weekly to CSLC staff. The archaeological and Tribal monitors have the authority to increase or decrease the monitoring effort should the monitoring results indicate that a change is warranted.~~

MM CR-1b: Unanticipated Cultural/Tribal Resources. The Applicant shall prepare a Cultural Resources Management Plan (CRMP), subject to review and approval by CSLC. The CRMP shall be prepared in coordination with the CSLC and a California Native American tribe that is culturally affiliated to the Project site. The CRMP will include, at a minimum:

- Specific discussion on the process for identifying unanticipated discoveries in a submerged context, including how unanticipated tribal cultural resources are identified during project activities, when the project area is not visible.

- Specific procedures for handling, recording and treating unanticipated cultural or tribal cultural resources in the event they are found.
- Specific procedures for keeping the location of any such finds confidential and what measures will be taken to ensure that the area is secured to minimize site disturbance and potential vandalism.
- Discussion of the successful tribal cultural resource consultation process for future submerged project consultation efforts

To facilitate proper identification and treatment of potential resources that may be discovered, the Applicant shall retain both an archaeologist (approved by the CSLC) and a monitor from a California Native American tribe that is culturally-affiliated to the Project site for coordination, monitoring, and notification purposes. The Applicant shall provide a minimum 5-day notice to the archaeologist and tribal monitor prior to all scheduled activities. In addition, should intact cultural or tribal cultural deposits be uncovered during Project implementation, CSLC staff, the archaeologist, and the tribal monitor shall be contacted as soon as possible, and in no event later than 24 hours, to allow them to evaluate the nature, extent, and significance of the discovery. Impacts to previously unknown significant Tribal cultural resources shall be avoided through preservation in place if feasible.~~If potentially significant archaeological or Tribal cultural resources are discovered during construction or monitoring activities, work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery. The Applicant shall notify California State Lands Commission (CSLC) staff and any local, state, or federal agency with approval or permitting authority over the Project that has requested/required notification within 48 hours of discovery, consistent with guidelines for Tribal involvement stated in the CSLC Tribal Policy (http://www.slc.ca.gov/About/Tribal.html). The Applicant shall retain a CSLC-approved archaeologist and request a culturally affiliated Tribal representative to evaluate the nature and significance of the discovery. In addition, the following shall apply:~~

- ~~Impacts to previously unknown significant archaeological or Tribal cultural resources shall be avoided through preservation in place if feasible.~~
- ~~If the lead archaeologist and culturally affiliated tribal representative believe that damaging effects to archaeological or Tribal cultural resources will be avoided or minimized, then work in the area may resume. Damaging effects shall be avoided or minimized following the measures in Public Resources Code section 21084.3, subdivision (b), unless other measures that would be as or more effective are mutually agreed to by the lead archaeologist and culturally affiliated Tribal representative.~~
- ~~If resources cannot be avoided, a Treatment Plan developed by the archaeologist and culturally affiliated Tribal representative shall be submitted to CSLC staff for review and approval prior to further disturbance of the area. The plan shall:~~
- ~~State requirements for professional qualifications of all cultural resources specialists and Tribal cultural resource workers.~~

- ~~Identify appropriate methods of resource recording, artifact cataloguing, and analyses.~~
- ~~Determine appropriate levels of recovery or stabilization of resources.~~
- ~~Provide documentation of a curatorial facility or museum that will be responsible for the permanent preservation of any unique or sensitive cultural materials resulting from site recovery or stabilization efforts.~~

Impact CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

The Project could directly or indirectly destroy a unique paleontological resource or unique geological feature **(Less than Significant with Mitigation).**

Impact Discussion

Despite the high paleontological potential of the strata underlying the Project area, paleontological resources are not anticipated to be impacted during construction of the Project. Direct impacts to paleontological resources occur when ground-disturbing earthwork activities cut into the geologic units within which fossils are buried and physically destroy the fossil remains. As such, the only earthwork activities that would disturb potentially fossil-bearing sedimentary rocks have the potential to significantly impact paleontological resources.

No excavation-based earthwork is anticipated to occur during the reef expansion work proposed for the Project area. Instead, the Project would primarily involve the placement of large boulders on the seafloor in order to create a hard substrate for kelp seeding and development. Boulder placement would not considerably disturb Capistrano Formation strata, nor would the subsequent growth of a kelp forest. In fact, placement of boulders would, in effect, cap and preserve in place any paleontological resources that may be present in the Capistrano Formation. The impact is considered less than significant with implementation of MM CR-2 to ensure proper treatment of unanticipated paleontological resources.

Mitigation Measures

MM CR-2: Unanticipated Paleontological Resources. The Applicant shall develop a Paleontological Resources Management Plan (PRMP), subject to review and approval by CSLC, which will include:

- Specific discussion procedures for on the identification of unanticipated discoveries in a submerged context, including how unanticipated paleontological resources are identified during project activities, when the Project area is not visible. The procedures must reduce the likelihood of disturbing unanticipated paleontological resources or unique geologic resources to the extent feasible, considering the difficulty of observing the submerged Project area during rock placement and that the rocks are likely to cap and preserve paleontological resources in place.

Specific procedures for handling, recording and treating unanticipated paleontological resources in the event they are found. The procedures must include retaining a qualified paleontologist to evaluate the nature and significance of any discovery.~~In the event unanticipated paleontological resources or unique geologic resources are encountered during demolition activities, work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery until the Applicant retains a qualified paleontologist, who has demonstrated experience in carrying paleontological projects to completion, to evaluate the nature and significance of the discovery. If the resource cannot be avoided, the paleontologist shall develop and implement a Paleontological Resources Management Plan for the proposed Project area that includes specimen identification to the lowest taxonomic level possible, analysis, curation, and the preparation of a final report. The plan shall be submitted to California State Lands Commission staff for review and approval prior to further disturbance of the area.~~

Impact CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries

The Project could result in disturbance of any human remains **(Less than Significant with Mitigation).**

Impact Discussion

The Project area is completely submerged but may have been exposed and occupied prior to sea level changes that have altered the coastline. However, the proposed Project would be constructed in areas that are underlain by bedrock and thinly covered by sand (generally less than 3 feet) in a high-energy dynamic environment in which the thin cover of sand is readily moved by waves and currents. While the presence of human remains within the Project area is likely to be low because of these physical conditions, the possibility of discovery exists due to its prior occupation. However, with the implementation of MM CR-3 to ensure appropriate treatment of unanticipated human remains, impacts to human remains would be less than significant.

Mitigation Measures

MM CR-3: Appropriate Treatment of Human Remains. In accordance with state law (Health & Saf. Code, § 7050.5; Pub. Resources Code, § 5097.98), if human remains are found, all ground disturbing activities shall halt within 165 feet (50 meters) of the discovery. The County Coroner will be notified within 24 hours of the discovery. No further excavation or disturbance of the discovery or any nearby area reasonably suspected to overlie potential remains shall occur until the County Coroner has determined whether the remains are subject to his or her authority. The County Coroner must make this determination within 2 working days of notification of the discovery (pursuant to Health & Saf. Code,

§ 7050.5 subd. (b)). If the County Coroner determines that the remains do not require an assessment of cause of death and that the remains are, or are believed to be Native American, the Coroner must notify the Native American Heritage Commission by telephone within 24 hours, which must in turn immediately notify those persons it believes to be the Most Likely Descendant (MLD) of the deceased Native American. The MLD shall complete its inspection and make recommendations within 48 hours of being granted access to the site. The MLD may recommend means for treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods. California State Lands Commission staff will discuss and confer with the MLD regarding their recommendations (pursuant to Pub. Resources Code, § 5097.98 subds. (b) and (c)).

4.4.5 Cumulative Impacts

No cumulative impacts to cultural and paleontological resources are known or anticipated.

4.4.6 Summary of Proposed Mitigation Measures

Table 4.4-2 provides a summary of the MMs in the 1999 Program EIR and for the proposed Project.

Table 4.4-2. Cultural/Paleontological Resources Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Paleontological resources	None required.
Archaeological, Historic, and Ethnographic resources	None required.
Proposed Project	
CR-1: Cause a substantial adverse change in the significance of a historical or archaeological resource	**MM CR-1a:** Archaeological and Tribal Monitoring **MM CR-1b:** Unanticipated Cultural/Tribal Resources
CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	**MM CR-2:** Unanticipated Paleontological Resources
CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries	**MM CR-3:** Appropriate Treatment of Human Remains

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4.5 CULTURAL RESOURCES – TRIBAL

Assembly Bill (AB) 52 (Gatto; Stats. 2014, ch. 532), which became effective July 1, 2015, sets forth both procedural and substantive requirements for analysis of Tribal cultural resources, as defined in Public Resources Code section 21074, and consultation with California Native American Tribes. This section identifies resources potentially of importance to California Native American Tribes that may be affected by the proposed Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, assesses the Project's potential impacts to Tribal cultural resources and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant. Project-related physical improvements are limited to the offshore artificial reef construction area. See Section 4.4, *Cultural and Paleontological Resources*, for a further discussion of cultural and historical resources.

The environmental setting is based on information obtained from the proposed Project description, recent technical studies, and information gathered during outreach conducted by the California State Lands Commission (CSLC or Commission) consistent with its adopted Tribal Consultation Policy (see http://www.slc.ca.gov/About/Tribal.html).

4.5.1 Environmental Setting

The ethnohistoric context of the study area is described in Section 4.4.1, *Cultural and Paleontological Resources*.

4.5.1.1 Tribal Cultural Resources

Tribal cultural resources are "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" as determined by inclusion in the California Register of Historical Resources (CRHR) or a local register of historical resources, or as determined by the lead agency to be significant (Pub. Resources Code, §21074). Tribal cultural resources are typically those that are important to a community's cultural practices or beliefs, are part of that community's history, and are important for maintaining continued cultural identity within the community. Often such resources are identified during government-to-government consultation between the lead agency and Tribal governments as the Tribes wish to keep resources confidential because of their spiritual and religious significance.

During discussions, the Acjachemen Nation of Juaneño Band of Mission Indians (Acjachemen Nation) raised concerns that Tribal cultural resources could remain within the Project area which had been occupied prior to being inundated from post-glacial rising sea levels. Although no specific Tribal cultural resources have been identified to date in the Project area, coordination between the CSLC and the designated representative from the Acjachemen Nation as well as other geographically affiliated Tribal Nations provided additional information on the potential sites, features, places, cultural landscapes, sacred places, or objects with cultural value to a Tribes in the San Clemente area.

4.5.1.2 Tribal Coordination

Following Governor Brown's issuance of Executive Order B-10-11 concerning coordination with Tribal governments in public decision making, the CSLC adopted a Tribal Consultation Policy (Policy) in August 2016 to provide guidance and consistency in its interactions with California Native American Tribes. The Policy, which was developed in collaboration with Tribes, other state agencies and departments, and the Governor's Tribal Advisor, recognizes that Tribes have a connection to areas that may be affected by CSLC actions and "that these Tribes and their members have unique and valuable knowledge and practices for conserving and using these resources sustainably" (CSLC 2016a).

The Native American Heritage Commission (NAHC) is "charged with the duty of preserving and ensuring accessibility of sacred sites and burials, the disposition of Native American human remains and burial items, maintain an inventory of Native American sacred sites located on public lands, and review current administrative and statutory protections related to these sacred sites" (NAHC 2018). The NAHC maintains two databases to assist specialists in identifying cultural resources of concern to California Native Americans (Sacred Lands File and Native American Contacts).

On January 3, 2018, the CSLC contacted the NAHC to obtain information about known cultural and Tribal cultural resources and request a list of Native American tribal representatives who may have geographic or cultural affiliation in the proposed Project area. The NAHC responded on January 12, 2018, with confidential information and a Native American contact list for the CSLC to use for outreach and coordination. The NAHC response noted that the Acjachemen Nation of Juaneño Band of Mission Indians should be contacted for more information about potential sites within the area of potential effect for the Project.

On March 23, 2018, outreach letters were sent to the 29 tribal contacts (several Tribes had multiple contacts) on the NAHC contact list to ensure those Tribes would have an opportunity to provide meaningful input on the potential for Tribal cultural resources to be found in the proposed Project area, and recommend steps to be taken to ensure adverse impacts to Tribal cultural resources are avoided. Tribes notified were:

- Agua Caliente Band of Cahuilla Indians
- Campo Band of Mission Indians
- Ewiilaapaayp Tribal Office
- Iipay Nation of Santa Ysabel
- Inaja Band of Mission Indians
- Jamul Indian Village
- Juaneño Band of Mission Indians
- Juaneño Band of Mission Indians Acjachemen Nation-Belardes
- Juaneño Band of Mission Indians Acjachemen Nation-Romero
- La Jolla Band of Luiseño Indians
- La Posta Band of Mission Indians
- Manzanita Band of Kumeyaay Nation
- Pala Band of Mission Indians
- Pauma Band of Luiseno Indians – Pauma & Yulma Reservation
- Pechanga Band of Mission Indians
- Rincon Band of Mission Indians
- San Pasqual Band of Mission Indians
- Soboba Band of Luiseño Indians
- Sycuan Band of Kumeyaay Nation
- Viejas Band of Kumeyaay Indians

In response to the NAHC Sacred Lands File search response, CSLC reached out to the Acjachemen Nation to further identify their concerns related to the site and determine their preferred approach to further investigate the site. The Acjachemen Nation raised concerns because their oral history and Tribal files contain references to village sites within the Project area, which had been inundated millennia ago through post-glacial sea-level rise. On May 9, 2018, CSLC staff spoke with Jeremy Zagarella representing the Pauma Band as their Natural Resources Manager, requesting additional information on how close the rocks would be placed to the shore, particularly near San Clemente State Beach. Additionally, the Pauma Band indicated that the San Mateo drainage, which exits above San Onofre near Trestles, is an area to be aware of for its sensitivity, including potential artifacts, and requested the CSLC take care to avoid and document that Project activities would avoid this area.

To investigate the possibility of Tribal cultural resources within the Project area, the Acjachemen Nation requested an archaeological reconnaissance survey of portions of the project area. Using side scan sonar images, Steven Villa of NDNA Monitoring and Consulting LLC (authorized by Acjachemen Nation Chairwoman Romero), and Dudek marine archaeologist William Burns, MSC, RPA, identified ten Project area polygons, which appeared to have geology of interest which could hold bedrock milling sites, rock shelters, or other possible Tribal cultural resources. The Acjachemen Nation and CSLC agreed to perform archaeological survey on portions of these ten polygons.

William Burns and Acjachemen Nation representative Gabriel Lopez investigated the ten polygons of interest by conducting eighteen dives over nine days. William Burns and

Acjachemen Nation representative Gabriel Lopez dove within these areas to visually investigate the possibility of Tribal cultural resources. Objects identified during the survey include five glass bottles which were not of historic age, one .50 caliber cartridge casing which is likely of historic age, and one California cone snail shell with a hole consistent with that created by a predatory gastropod. No physical Tribal cultural resources were identified. Refer to Appendix G for additional details on the results of the dive surveys.

4.5.2 Regulatory Setting

The primary federal and state laws, regulations, and policies that pertain to the Project are summarized in Appendix D. Those related to historic, prehistoric, archaeological, and other classes of cultural sites are discussed in Section 4.4, *Cultural and Paleontological Resources*. The Project area is located on submerged lands owned by the State of California and administrated by the Commission. Therefore, state laws, regulations, and ordinances are most applicable.

Tribal cultural resources is a newly defined class of resources under AB 52. These resources include sites, features, places, cultural landscapes, and sacred places or objects that have cultural value or significance to a tribe. A Tribal cultural resource is one that is either: (1) listed on, or eligible for listing on the CRHR or local register of historical resources (see Section 4.4, *Cultural and Paleontological Resources*, for more information about the CRHR); or (2) a resource that the lead agency, at its discretion and supported by substantial evidence, determines is significant pursuant to the criteria in Public Resources Code section 5024.1 subdivision (c) (see Pub. Resources Code, § 21074). Further, because tribes traditionally and culturally affiliated with a geographic area may have specific expertise concerning their Tribal cultural resources, AB 52 sets forth requirements for notification and invitation to government-to-government consultation between the CEQA lead agency and geographically affiliated tribes (Pub. Resources Code, § 21080.3.1 subd (a)). Under AB 52, lead agencies must avoid damaging effects to Tribal cultural resources, when feasible, regardless of whether consultation occurred or is required.

4.5.3 Significance Criteria

Significance criteria used to evaluate potential impacts to Tribal cultural resources are based on Appendix G of the State CEQA Guidelines, which states that a significant impact would occur if the Project would:

- Cause a substantial adverse change in the significance of a Tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.5.4 Environmental Impact Analysis and Mitigation

4.5.4.1 1999 Program EIR

The 1999 Program EIR did not analyzed impacts to Tribal cultural resources.

4.5.4.2 2018 Subsequent EIR

The potential impacts of the proposed Project were assessed through the following process: (1) defining the agents or causes of impact from the proposed Project, (2) outlining the APE of the proposed Project, (3) identifying the location of any known Tribal cultural resources in the Project vicinity, (4) identifying the sensitivity or likelihood of the occurrence of Tribal cultural resources within the APE, and (5) evaluating the significance of those resources and assessing the degree to which the Project would affect their significant aspects.

A records search was conducted at the South Central Coastal Information Center at California State University, Fullerton, to identify recorded cultural resources in the vicinity of the Project area. An inquiry for a search of their Sacred Lands Files was submitted to the NAHC in an effort to identify Tribal cultural resources that may be affected by the proposed Project. Correspondence related to that inquiry was submitted to the Commission's Tribal Liaison for use in government-to-government consultation with any interested tribal entities.

Table 4.5-1 at the end of this section provides a summary of the Project's potential impacts related to Tribal cultural resources and any Applicant-Proposed Measures (APMs) or recommended MMs to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact TCR-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource

The Project could cause a substantial adverse change in the significance of a Tribal cultural resource **(Less than Significant with Mitigation).**

Impact Discussion

No resources listed or eligible for listing in the CRHR or any local register were identified by the literature searches conducted for the Project in January 2018. Cultural dive surveys performed by Dudek and the Acjachemen Nation in August 2018 also did not locate any physical Tribal cultural resources, as defined by Public Resources Code section 21074, subdivisions (a)(1)-(2), within the project area. However, the Acjachemen Nation did identify an area of cultural sensitivity within a polygon that was previously part of the Project area, based on their confidential internal records. The Acjachemen Nation also requested that the applicant place rock in areas of greater sand depth, to the extent feasible, to minimize the risk of damaging buried Tribal cultural resources. Through CSLC's consultation with the Acjachemen Nation, CSLC staff determined that the culturally sensitive area should be considered a "site" or "cultural landscape" that would be a Tribal cultural resource. Additionally, CSLC staff determined that damage to undiscovered artifacts, village sites, and ancestral remains resulting from crushing during rock placement would be potentially significant. As a result, the applicant eliminated the culturally sensitive area of concern from the Project and identified additional "contingency" areas seaward of existing polygons. These "contingency" polygons would allow the applicant to expand the reef by the originally proposed approximately 210.6 acres, while avoiding areas identified by the Acjachemen Nation as being of concern for Tribal cultural resources. In addition, through this consultation all parties came to agreement that the size of rock being used, the depth of sand in the proposed reef locations, and the method of placement (as described in Section 2, *Project Description*) would sufficiently protect undiscovered resources from damage. Nonetheless, the below mitigation measures are required to ensure potentially significant impacts to unknown Tribal cultural resources would be reduced or avoided.

Mitigation Measures

MM CR-1a: Archaeological and Tribal Monitoring

MM CR-1b: Unanticipated Cultural/Tribal Resources

MM CR-3: Appropriate Treatment of Human Remains

4.5.5 Cumulative Impacts

No cumulative impacts to cultural resources or Tribal cultural resources are known or anticipated.

4.5.6 Summary of Proposed Mitigation Measures

Table 4.5-1 provides a summary of the MMs in the 1999 Program EIR and for the proposed Project.

Table 4.5-1. Cultural Resources – Tribal Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Cultural Resources – Tribal not analyzed.	None required.
Proposed Project	
TCR-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource	**MM CR-1a:** Archaeological and Tribal Monitoring **MM CR-1b:** Unanticipated Cultural/Tribal Resources. **MM CR-3:** Appropriate Treatment of Human Remains

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4.6 GEOLOGY AND COASTAL PROCESSES

This section describes the existing geological setting that may be affected by the proposed Wheeler North Reef Expansion Project (Project) as well as local and regional coastal processes, identifies applicable significance thresholds, and assesses the Project's potential impacts to geologic resources and their significance.

Geologic issue areas typically associated with development projects and outlined in the State California Environmental Quality Act (CEQA) Guidelines Appendix G checklist are not addressed in this section because the Project is located approximately 0.6 mile offshore and would not expose people to geologic hazards. The issue areas that are not analyzed include seismic shaking; exposure of people to a seiche or tsunami; subsidence of land; expansive soils; unstable soil conditions from grading, excavation, or fill; effects on groundwater; and exposure of people to floods. Instead, this section addresses issues involving waves, currents, and beach erosion.

4.6.1 Environmental Setting

4.6.1.1 Geology and Soils

The assessment of geologic setting is based on information included in the 1999 Program Environmental Impact Report.[18] The Program EIR analyzed an 862-acre initial lease area that included a portion of the Project area, and geologic characteristics of the Project area are largely unchanged. The Project is situated on the San Onofre Shelf portion of the California Continental Borderland. The San Onofre Shelf between Dana Point and Oceanside, California, is about 3 to 5 miles wide and extends seaward to a depth of about 295 feet. Most of the bedrock underlying the Project area and exposed along the seafloor in the Project vicinity is thought to be Capistrano Formation (Eco-M 1997, as cited in CSLC 1999). The Capistrano Formation is Late Miocene and Early Pliocene in age (McNey 1979, as cited in California State Lands Commission [CSLC] 1999) and consists of dark gray and light gray siltstone and clayey siltstone with scattered and interbedded layers of sandstone tuff and diatomite. Concretions can be found within the clayey siltstone. Stratigraphic deformation of the Capistrano beds varies from tightly folded and sheared in the San Onofre bluff area to gently undulating with a westerly dip near San Mateo Point (Eco-M 1997, as cited in CSLC 1999).

4.6.1.2 Coastal Processes

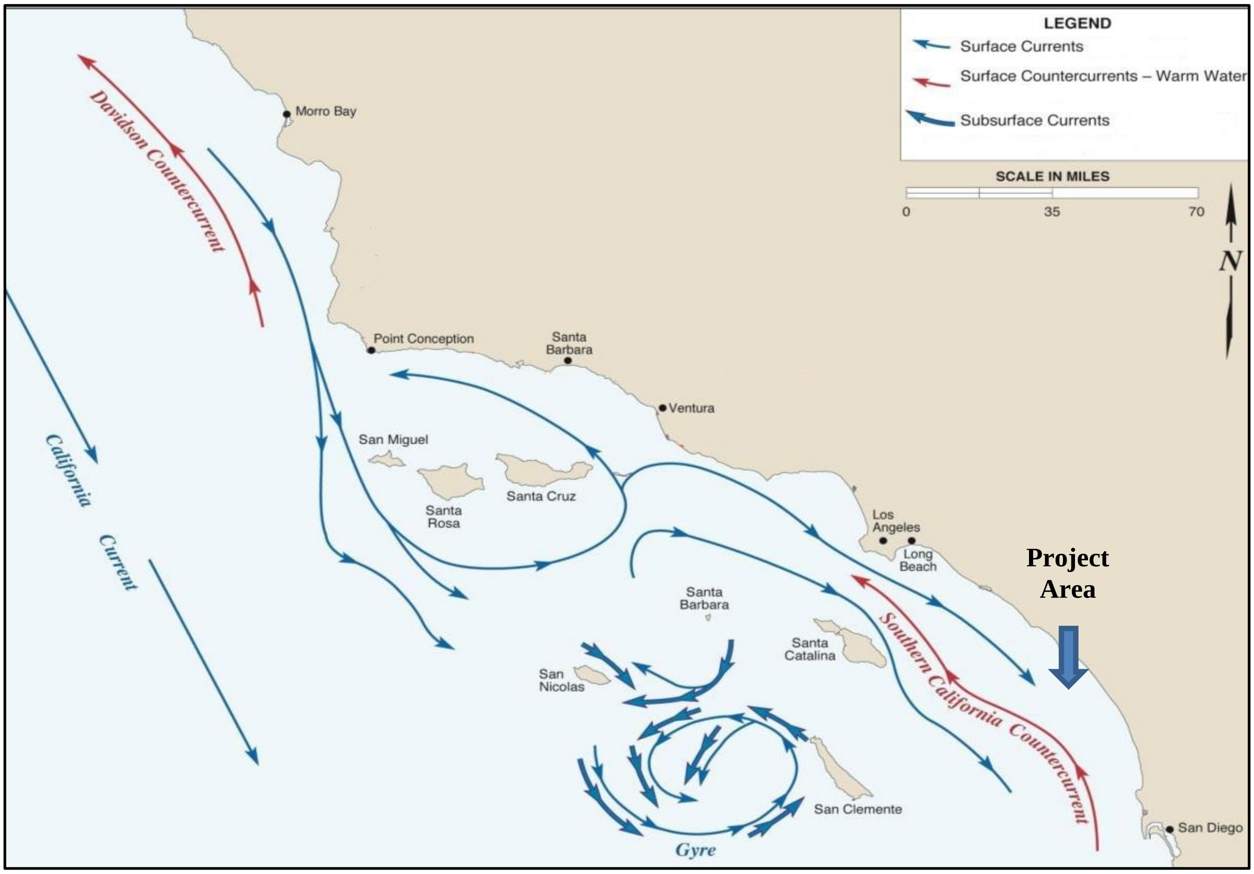
Currents and Sediment Movement

The longshore currents within the Project area tend to be consistent with the prevailing wind direction. The result is a southward-flowing cold surface current along the shoreline

[18] Although much of the analysis was conducted in 1999, the geologic nature of the lease area and its surrounding seafloor remains unchanged (Coastal Environments 2017a).

that predominates in every season, with the strongest southerly flow occurring in the summer months (Daily et al. 1994) (Figure 4.6-1). A northward-flowing surface current known as the Southern California Countercurrent brings warmer southern waters into the Project area (Figure 4.6-1). These currents, along with large storm waves, are the primary forces that suspend and transport sediments (Cacchione et al. 1987, Wiberg and Smith 1983, Cacchione and Drake 1982 as cited in CSLC 1999).

Figure 4.6-1. Ocean Currents in Proposed Project Vicinity



Source: CSLC 2016b.

The character of the ocean bottom in the Project vicinity is the result of both natural processes and human-caused changes. The major natural sources of sediment to this system include San Juan Creek, San Mateo Creek, Santa Margarita River, San Luis Rey River, and San Dieguito River, as well as material eroded from coastal bluffs. A limited amount of fine sediment in the littoral cell is transported shoreward from deep ocean sources. Historic human impacts to the littoral cell sediment in the Project vicinity include the construction of Dana Point Harbor, the placement of railroad tracks at the base of the coastal bluff in San Clemente, the addition of artificial beach fill to the beach and littoral system, and the construction of the seawalls and fortifications at the San Onofre Nuclear Generating Station (SONGS), along the railroad tracks and at the base of coastal bluffs (ACOE 1987, as cited in CSLC 1999).

Beaches

The onshore areas adjacent to the Project area stretch from San Mateo Point in the south through the city of San Clemente beaches in the north. The beach berms in this area are typically 9.5 to 13 feet above mean sea level (Moffatt and Nichol 1990, as cited in CSLC 1999). Beaches along the city of San Clemente are relatively narrow sandy beaches backed by railroad tracks and protected with riprap boulders and a seawall. Behind the railroad tracks are highly erodible coastal bluffs that average about 100 feet in height (Moffatt and Nichol 1990, as cited in CSLC 1999). Severe storms have been known to overwash the tracks. Along San Mateo Point, the beach face is steep and the beach is comparatively wide and backed by a floodplain; marsh; and low, active sand dunes (Griggs and Savoy 1985, as cited in CSLC 1999).

4.6.2 Regulatory Setting

The jurisdiction of municipal entities ends at the ordinary high-water mark; however, for disclosure and because the Project could have impacts to onshore environments, local policies from Orange County and the city of San Clemente have been included in this analysis, and the Project was assessed for consistency with the *County of Orange General Plan* (County of Orange 2012) and the *City of San Clemente Centennial General Plan* (City of San Clemente 2016).

- **County of Orange General Plan, Resources Element, Goal 3, Policy 5, Landforms:** Protect the unique variety of significant landforms in Orange County through environmental review procedures and community and corridor planning activities.
- **City of San Clemente Centennial General Plan**
  - **Policy C-2.02 – Development Proposals:** We protect the natural resources found in the Coastal Zone by evaluating development proposals, as required under the California Environmental Quality Act.
  - **Policy C-4.03 – Sand Protection, Enhancement and Restoration:** Wide beaches provide critical protection against storm surges and tsunami run-up, and we participate in state and regional initiatives that address the protection, enhancement and restoration of sand and other sedimentary deposits of our coastal beaches.
  - **Policy BPR-3.01 – Beach Conservation:** We maintain our beach resources to conserve the natural, recreational and economic resources.

4.6.3 Significance Criteria

Offshore placement and monitoring of the artificial reef would have no impact on geology and soils because such activities would not risk exacerbating the following hazards or conditions, which are the criteria suggested for geology and soils in the State CEQA Guidelines Appendix G checklist:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault; (ii) Strong seismic ground shaking; (iii) Seismic-related ground failure, including liquefaction; (iv) Landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

In accordance with the California Supreme Court's decision in December 2015 in *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal. 4th 369, 386, this analysis focuses on the Project's potential to alter geologic or coastal processes that affect others, based on site-specific information described in Section 4.6.1, *Environmental Setting*. The Court held that

> "[A]gencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment — and not the environment's impact on the project — that compels an evaluation of how future residents or users could be affected by exacerbated conditions."

Therefore, potential thresholds of significance for coastal processes consider both the potential effects of the proposed Project on coastal processes as well as the effects of coastal processes on the Project. The State CEQA Guidelines Appendix G checklist does not indicate specific thresholds of significance for impacts to coastal processes. However, based on policy guidance provided in the California Coastal Act, which balances maintenance of natural coastal processes with protection of development and coastal-dependent uses and suggested findings in State CEQA Guidelines Appendix G related to geology, hazards, and hydrology, impacts to coastal processes were determined to be significant if the proposed Project would:

- Result in substantially increased or decreased rates of beach erosion
- Substantially change surf characteristics
- Substantially inhibit natural coastal processes

4.6.4 Environmental Impact Analysis and Mitigation

4.6.4.1 1999 Program EIR

The 1999 Program EIR determined that the construction and presence of the artificial reef would result in:

- A less than significant impact on beach development and coastal landforms from attenuation of short-period waves or changes in currents
- A significant but mitigable impact related to smaller rocks or concrete pieces from the artificial reef washing up onshore after storm events.

The 1999 Program EIR proposed mitigation for the significant impact, wherein the Applicant would conduct monitoring of the reef for movement of construction material during storms.

4.6.4.2 2018 Subsequent EIR

The following discussion is largely based on studies conducted for the 1999 Program EIR. As the proposed expansion reef is within the lease area examined in the 1999 Program EIR and the recent seafloor study conducted by Coastal Engineering showed no change to the bathymetry of the lease area, the studies used in the 1999 Program EIR are still viable sources of information to inform the impact analysis of the expansion reef (Coastal Environments 2017b). Table 4.6-1 at the end of this section provides a summary of the Project's potential impacts related to geology and coastal processes and any Applicant-Proposed Measures (APMs) or recommended mitigation measures (MMs) to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact GEO-1: Substantial Increase or Decrease in Rates of Beach Erosion

The density and overall size of offshore kelp beds and boulders could impact the width of beaches directly onshore or otherwise impact beach erosion rates **(Less than Significant).**

Impact Discussion

The 1999 Program EIR analysis incorporated the results of a scientific study conducted by Elwany et al. (1998a), which found there was no consistent pattern or significant correlation between the width of a given beach and the size of an offshore kelp bed. Because the proposed Project would be located within the same general area as the existing Wheeler North Reef and within the area studied by Elwany et al. (1998a), the study is also applicable to the Project. The study examined beaches in the San Diego region between Dana Point and Mexico and performed a correlation analysis between the beach width and the width of the kelp beds (Elwany et al. 1998a). The study determined that observed variance in beach width within the study area could not be explained by width or presence of offshore kelp beds. Because the offshore kelp beds were established on rocky reef, this study also suggests that the variance is not explained by the width or presence of rocky reef.

Another study by Elwany et al. (1998b) was conducted to examine the effects of kelp beds on wave characteristics and the resulting changes to beach erosion rates. In short, the study found that the presence of kelp beds dampen short-period, high-frequency waves or “wind waves,” but do not have an impact on long-period, low-frequency “swell waves.” Short-period waves contain minimal energy in comparison to swell waves and are a negligible component of the beach sedimentation process. Similar to the study on beach width, the offshore kelp beds were established on rocky reef, so this study also suggests that beach sedimentation would not be substantially affected by the presence of rocky reef.

Therefore, the Project would have a less-than-significant impact on beach erosion rates.

Mitigation Measures

No MMs are recommended for Impact GEO-1.

Impact GEO-2: Substantial Change in Surf Characteristics

The expansion of the reef could substantially change the surf characteristics in the Project area or conflict with the local policies **(Less than Significant).**

Impact Discussion

As noted above, a study prepared for the 1999 Program EIR (Elwany et al. 1999b) examined the effect of kelp beds on wave energy and direction. The study area was the North Carlsbad Kelp Forest, which had similar bathymetry to the Project area (Elwany et al. 1998b). As stated in the 1999 Program EIR, the study concluded that the presence of kelp forests would likely result in the attenuation of short-period, local, wind-driven waves, such as surface chop, but would not have a substantial affect upon the large-period, low-frequency swell waves. The attenuation of the short-period waves would result in a smoother water surface as compared to the site without the kelp beds.

The Project would expand the size of Wheeler North Reef, thus increasing the area where this minor dampening of short-period waves would occur. However, these short-period waves are not a significant contributor to either the beach sedimentation process, nor for recreational activities near the lease area, such as surfing, fishing, or diving. Therefore, impacts to surf characteristics would be less than significant.

Mitigation Measures

No MMs are recommended for Impact GEO-2.

Impact GEO-3: Substantially Inhibit Natural Coastal Processes

The expansion of the Wheeler North Reef could result in localized minimal impacts to currents around the proposed Project area, or inhibit natural coastal processes, such as large-scale current patterns **(Less than Significant).**

Impact Discussion

The 1999 Program EIR analysis incorporated the results of a study (Elwany et al. 1998b), finding that current speed is affected as it passes through a kelp bed. Kelp beds exert considerable drag on currents, reducing the speed of currents within the kelp beds more than 50 percent. However, along the edges of the kelp bed, the current speed increases as it passes around the kelp bed. The reduction of speed within the kelp beds could result in at least temporary accumulations of fine sediments within and around the area of the expansion reef. Deposits of fine-grained sand are commonly found in most natural established kelp beds within the Project vicinity. The sand material originates from the littoral zone and is transported short distances through wave action. Storm events will periodically suspend and transport the accumulated sediment more widely within the littoral cell (Elwany et al. 1998b).

The Project has the potential to affect coastal currents within the immediate vicinity of the Project once the kelp reefs are established on the quarry rock. However, the effect would be local and would not affect the overall shape and direction of currents passing through the Project area. Furthermore, the impacts to currents would not result in significant changes to beach erosion rates as wave action is the primary contributor to the suspension and deposition of sand within the littoral and subtidal zones (Elwany et al. 1998b). Additionally, as discussed under Impacts GEO-1 and GEO-2, the expansion reef would not have a significant impact on the swell waves, which is the primary wave action that affects erosion rates along beaches. Therefore, impacts related to natural coastal processes would be less than significant.

Mitigation Measures

No MMs are recommended for Impact GEO-3.

4.6.5 Cumulative Impacts

Outside of the existing Wheeler North Reef, there are no cumulative projects that would compound or otherwise add to the impacts of the Project. The expansion of the Wheeler North Reef would further reduce the energy of sea and wind waves once the kelp bed is established. However, as discussed in Section 4.6.4 for Impacts GEO-1 and GEO-2, wind and sea waves are a negligible component of both surf characteristics and beach erosion. Therefore, the cumulative impact of the existing Wheeler North Reef and the proposed expansion would be less than significant.

4.6.6 Summary of Proposed Mitigation Measures

Table 4.6-1 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.6-1. Geology and Coastal Processes Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Movement of reef building materials onto beaches.	Beach monitoring.
Proposed Project	
GEO-1: Substantial Increase or Decrease in Rates of Beach Erosion	None recommended.
GEO-2: Substantial Change in Surf Characteristics	None recommended.
GEO-3: Substantially Inhibit Natural Coastal Processes	None recommended.

4.7 GREENHOUSE GAS EMISSIONS

This section describes the greenhouse gas (GHG) emissions that would be generated by the proposed Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, assesses the potential impacts of Project GHG emissions on climate change and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.7.1 Environmental Setting

4.7.1.1 Introduction

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system. Many factors, both natural and human, can cause changes in Earth's energy balance, including variations in the sun's energy reaching Earth, changes in the reflectivity of Earth's atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth's atmosphere (U.S. Environmental Protection Agency [USEPA] 2017a).

The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature and creates a pleasant, livable environment on the Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise.

The scientific record of the Earth's climate shows that the climate system varies naturally over a wide range of time scales and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. Recent climate changes, in particular the warming observed over the past century, however, cannot be explained by natural causes alone, and evidence suggests that human activities are the dominant cause of that warming since the mid-20th century and the most significant driver of observed climate change (Intergovernmental Panel on Climate Change [IPCC] 2014, USEPA 2017a). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2014). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2014). Continued emissions of GHGs will cause further warming and changes in all components of the climate system, which is discussed further in the Appendix C, under "Potential Effects of Climate Change." Appendix C also presents a summary GHG emissions inventories at the national, state, and local level.

4.7.1.2 Greenhouse Gases

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code section 38505(g), for purposes of administering many of the State's primary GHG emissions reduction programs, GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) (see also State of California Environmental Quality Act [CEQA] Guidelines, § 15364.5).[19] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. The following paragraphs summarize the most common GHGs and their sources.[20]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic (human-caused) GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of fuels such as coal, oil, natural gas, and wood, and changes in land use.

Methane. CH_4 is produced through both natural and human activities. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide. N_2O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other

[19] Climate-forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the seven GHGs identified in California Health and Safety Code section 38505 as impacts associated with other climate-forcing substances are not evaluated herein.

[20] The descriptions of GHGs are summarized from the IPCC Second Assessment Report (IPCC 1995), IPCC Fourth Assessment Report (IPCC 2007), CARB's "Glossary of Terms Used in GHG Inventories" (California Air Resources Board [CARB] 2017b), and the USEPA (2016b) Glossary of Climate Change Terms.

processes also create N_2O. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using N_2O as a propellant (such as in rockets, racecars, and aerosol sprays).

4.7.1.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (USEPA 2017b). The IPCC developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2e).

The current version of CalEEMod (version 2016.3.2) assumes that the GWP for CH_4 is 25 (so emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). While this GHG analysis uses a spreadsheet model because CalEEMod is the industry standard emission estimator model, the GWP values identified in CalEEMod were applied to the Project.

4.7.2 Regulatory Setting

See Appendix D for a discussion of federal and state executive orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions or address climate change issues.

4.7.2.1 Key State Regulations

Relevant state regulations are summarized below.

Executive Order (EO) S-3-05. EO S-3-05 (June 2005) established the following statewide goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

Assembly Bill (AB) 32 and CARB's Climate Change Scoping Plan. In furtherance of the EO S-3-05 goals, the Legislature enacted AB 32, the California Global Warming

Solutions Act of 2006, which requires California to reduce its GHG emissions to 1990 levels by 2020. Under AB 32, CARB is responsible for and is recognized as having the expertise to carry out and develop the programs and requirements necessary to achieve the GHG emissions reduction mandate of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions from specified sources. This program is used to monitor and enforce compliance with established standards. CARB also is required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 relatedly authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

In 2007, CARB approved a limit on the statewide GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2e). CARB's adoption of this limit is in accordance with Health and Safety Code section 38550. In 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan) in accordance with Health and Safety Code section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, and identifies additional measures to be pursued. The key elements of the Scoping Plan include the following (CARB 2008):

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewable energy mix of 33 percent
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions
- Establishing, and pursuing policies and incentives to achieve, targets for transportation-related GHG emissions for regions throughout California
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
- Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level (i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations [referred to as "business-as-usual"]). For purposes of calculating this percent reduction, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

In the 2011 *Final Supplement to the Scoping Plan's Functional Equivalent Document*, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 percent (down from 28.5 percent) from the business-as-usual conditions. When the 2020 emissions level projection was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009 to 2016) and the Renewables Portfolio Standard (RPS; 12 to 20 percent), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16 percent (down from 28.5 percent) from the business-as-usual conditions.

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (First Update). The stated purpose of the First Update was to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050" (CARB 2014). The First Update found that California is on track to meet the 2020 emissions-reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB identified "six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050" (CARB 2014). Those six areas are energy, transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), agriculture, water, waste management, and natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of Executive Order (EO) S-3-05's 2050 reduction goal.

Based on CARB's (2014) research efforts presented in the First Update, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy-demand reduction through efficiency and activity changes;

large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the State's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2e) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15 percent (instead of 28.5 or 16 percent) from the business-as-usual conditions.

On January 20, 2017, CARB released the *2017 Climate Change Scoping Plan Update* (Second Update) for public review and comment (CARB 2017a). This update proposes CARB's strategy for achieving the State's 2030 GHG target as established in Senate Bill (SB) 32, including continuing the Cap-and-Trade Program through 2030, and includes a new approach to reduce GHGs from refineries by 20 percent. The Second Update incorporates approaches to cutting short-lived climate pollutants under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017), acknowledges the need for reducing emissions in agriculture, and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the Natural and Working Lands, Agriculture, Energy, and Transportation sectors to inform development of the Climate Change Scoping Plan Update (CARB 2017a). The Second Update was approved by CARB's Governing Board on December 14, 2017.

***SB 32 and AB 197*.** SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction target, make changes to CARB's membership, increase legislative oversight of CARB's climate change-based activities, and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. More specifically, SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the State's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting facilities; and requires CARB to identify specific information for GHG emissions-reduction measures when updating the Scoping Plan.

4.7.2.2 Local Regulations

The Project reef site is located within the South Coast Air Basin (SCAB) off the coast of the city of San Clemente (City), California. The majority of the construction and operational activities associated with the Project would occur within the SCAB. However, an estimated 6 to 8 marine vessel trips to support construction activities are anticipated to occur between the Project site and Ensenada, Mexico. As such, a portion of the emissions associated with the Project would occur within the San Diego Air Basin (SDAB). Accordingly, a description of the South Coast Air Quality Management District (SCAQMD), which has jurisdiction over the SCAB, and the San Diego Air Pollution Control District (SDAPCD), which has jurisdiction over the SDAB, are provided herein.

South Coast Air Quality Management District

Air districts typically act in an advisory capacity to local governments in establishing the framework for environmental review of air pollution impacts under CEQA. This may include recommendations regarding significance thresholds, analytical tools to estimate emissions and assess impacts, and mitigation for potentially significant impacts. Although air districts will also address some of these issues on a Project-specific basis as responsible agencies, they may provide general guidance to local governments on these issues (SCAQMD 2008). As discussed in Section 4.7.3, *Significance Criteria*, the SCAQMD has recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects; however, these thresholds were not adopted.

Southern California Association of Governments (SCAG)

SB 375 requires metropolitan planning organizations to prepare a Sustainable Communities Strategy (SCS) in their Regional Transportation Plan (RTP). The SCAG Regional Council adopted the 2016 to 2040 RTP/SCS (2016 RTP/SCS) in April 2016. The 2016 RTP/SCS establishes a development pattern for the region that, when integrated with the transportation network and other policies and measures, would reduce GHG emissions from transportation (excluding goods movement). Specifically, the RTP/SCS links the goals of sustaining mobility with the goals of fostering economic development; enhancing the environment; reducing energy consumption; promoting transportation-friendly development patterns; and encouraging all residents affected by socioeconomic, geographic, and commercial limitations to be provided with fair access.

City of San Clemente

The City adopted a Climate Action Plan (CAP) in January 2014. The CAP is the City's first step in the development of a long-range, comprehensive plan to move from business-as-usual growth practices to an environmentally and economically sustainable growth model (City of San Clemente 2014).

The CAP included 2020 and 2030 GHG inventory forecasts under a business-as-usual scenario to identify their 2020 and 2030 GHG reduction targets. For 2020, the City identified a 15 percent below 2009 levels as the target, and for 2030, a target of 38 percent below 2009 levels was identified.

The CAP is linked to the City's Centennial General Plan and 2010 Sustainability Action Plan. The Centennial General Plan remarks on the critical role the natural environment plays in sustaining community lifestyle and the local economy. As such, the CAP builds upon the environmental values set forth in the General Plan. In addition, the Sustainability Action Plan serves as an overall roadmap for the City to increase sustainability of its operational practices. Both the CAP and the Sustainability Action Plan focus on water, energy, and waste consumption as areas targeted for action. All plans identify community engagement and ownership of San Clemente's environment as a key to success.

While the City's CAP meets many of the plan elements required under State CEQA Guidelines section 15183.5 for tiering and streamlining GHG emissions analyses, the CAP process did not include a formal environmental review or specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level. Accordingly, the City's CAP is not a qualified GHG emission reduction plan under CEQA that the Project could tier from. In addition, the Project includes construction of a reef off the coast of the City and the City's CAP did not address activities that would occur within the Pacific Ocean. Nonetheless, the Project's consistency with the City's CAP is qualitatively evaluated for disclosure.

San Diego Air Pollution Control District

The SDAPCD does not have established GHG rules, regulations, or policies.

4.7.3 Significance Criteria

Significance criteria used to evaluate potential impacts related to Project GHG emissions are based on Appendix G of the State CEQA Guidelines, which states that a significant impact would occur if the Project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project, such as the proposed Project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change. In addition, while GHG impacts are recognized exclusively as cumulative impacts (California Air Pollution Control Officers Association [CAPCOA] 2008), GHG emissions impacts must also be evaluated on a project-level under CEQA.

The CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific MMs. Rather, the State CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (California Natural Resources Agency [CNRA] 2009). The State of California has not adopted emission-based thresholds for GHG emissions under CEQA. The Governor's Office of Planning and Research's (OPR) Technical Advisory titled "CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review" states that

> "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008).

Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice." Section 15064.7(c) of the State CEQA Guidelines specifies that "when adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

To address Impact GHG-1, this analysis applies two numeric thresholds: one threshold to address Project-generated GHG emissions that would occur within the SCAB and one threshold to address GHG emissions that would occur within the SDAB.

For the Project-generated emissions that would occur within the SCAB, this analysis uses the SCAQMD recommended (not adopted) numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects. The SDAPCD has not adopted or recommended GHG emissions thresholds to evaluate the significance of GHG emissions impacts in CEQA evaluations. Accordingly, this analysis applies a numeric threshold evaluated by CAPCOA and applied by various lead agencies across the State for Project-generated

GHG emissions that would occur within the SDAB. The substantial evidence to apply these two thresholds is presented below.

4.7.3.1 SCAQMD

In October 2008, the SCAQMD proposed recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects as presented in its *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* (SCAQMD 2008). This guidance document, which builds on the previous guidance prepared by the CAPCOA, explored various approaches for establishing a significance threshold for GHG emissions. The draft interim CEQA thresholds guidance document was not adopted or approved by the Governing Board. However, in December 2008, the SCAQMD adopted an interim 10,000 MT CO_2e per-year screening level threshold for stationary source/industrial projects for which the SCAQMD is the lead agency (see SCAQMD Resolution No. 08-35, December 5, 2008).

The SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. From December 2008 to September 2010, the SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The SCAQMD has continued to consider adoption of significance thresholds for residential and general land use development projects. The most recent proposal, issued in September 2010, uses the following tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010):

- **Tier 1.** Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.
- **Tier 2.** Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan that has gone through public hearing and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.
- **Tier 3.** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 MT CO_2e per year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 MT CO_2e per year), commercial projects (1,400 MT CO_2e per year), and mixed-use projects (3,000 MT CO_2e per year). Under option 2, a single numerical screening threshold of 3,000 MT CO_2e per year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

- **Tier 4.** Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The efficiency targets were established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2020 efficiency targets are 4.8 MT CO_2e per service population for project level analyses and 6.6 MT CO_2e per service population for plan level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.
- **Tier 5.** Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

Because the Project most closely fits under the general non-industrial project category, this analysis applies the recommended SCAQMD threshold of 3,000 MT CO_2e per year.

The SCAQMD (2008) *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* recommends that "construction emissions be amortized over a 30-year Project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies." Thus, the total construction GHG emissions are calculated, amortized over 30 years, and compared to the GHG significance threshold of 3,000 MT CO_2e per year because the Project would not generate an increase in operational GHG emissions.

4.7.3.2 SDAPCD

The SDAPCD has not adopted GHG emissions thresholds to evaluate the significance of GHG emissions impacts in CEQA evaluations. Accordingly, this analysis applies the numeric threshold of 900 MT CO_2e per year recommended by CAPCOA (2008) as a theoretical approach to identify projects that require further analysis and potential mitigation. The 900 MT CO_2e per year screening threshold was developed by CAPCOA based on data collection on various development applications submitted among four diverse cities, including the cities of Los Angeles, Pleasanton, Dublin, and Livermore. Following the review of numerous pending applications within these four cities, an analysis was conducted to determine the threshold that would capture 90 percent or more of applications that would be required to conduct a full GHG analysis and implement GHG emission reduction measures as part of final Project design. Following CAPCOA's analysis of development applications in various cities, it was determined that the threshold of 900 MT CO_2e per year would achieve the objective of 90 percent capture and ensure that new development projects would keep the State on track to meet the AB 32 goals. This 900 MT CO_2e screening level threshold is considered appropriate for small maritime projects such as the Project.

Lead agencies can set thresholds on a project-by-project basis, or they can informally or formally adopt thresholds to be consistently applied to all projects. CEQA does not require that a lead agency use the same significance threshold for different CEQA documents

(Association of Environmental Professionals [AEP] 2016). Lead agencies are encouraged in the State CEQA Guidelines (Cal. Code Regs., tit. 14, § 15064.7, subd. (a)) to develop and formally adopt thresholds of significance, though most do not do so (AEP 2016). Thresholds established for general use by a lead agency must be: adopted by ordinance, resolution, rule, or regulation; be subjected to public review; and be supported by substantial evidence (State CEQA Guidelines, § 15064.7, subd. (b)). Thresholds used only for a specific project are not required to be adopted by ordinance or other formal means (AEP 2016).

Thresholds of significance must be backed by substantial evidence, which is defined in the CEQA statute to mean "facts, reasonable assumptions predicated on facts, and expert opinion supported by facts" (Cal. Code Regs., tit. 14, § 15384, subd. (b)).[21] Substantial evidence can be in the form of technical studies, agency staff reports or opinions, expert opinions supported by facts, and prior CEQA assessments and planning documents. The 900 MT CO_2e per year threshold is supported by expert opinion (i.e., CAPCOA 2008), agency guidance (e.g., County of San Diego's [2015] Recommended Approach for Addressing Climate Change), and prior environmental impact reports (e.g., *National City Marine Terminal Tank Farm Paving and Street Closures Project & Port Master Plan Amendment Draft Environmental Impact Report* [San Diego Unified Port District 2016]), at a minimum.

In summary, for Project-generated emissions that would occur within the SDAB, the 900 MT CO_2e threshold is applied to evaluate whether the Project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

4.7.4 Environmental Impact Analysis and Mitigation

4.7.4.1 1999 Program EIR

The 1999 Program EIR did not analyze impacts related to GHG emissions.

4.7.4.2 2018 Subsequent EIR

This Subsequent EIR analyzes the GHG emissions associated with construction of the artificial reef and transport of the reef materials. GHG emissions associated with quarry operations were not analyzed as they are part of an ongoing permitted activity. Table 4.7-

[21] Pursuant to California Code of Regulations, title 14, section 15384: "Substantial evidence" as used in the Guidelines is the same as the standard of review used by courts in reviewing agency decisions. Some cases suggest that a higher standard, the so called "fair argument standard" applies when a court is reviewing an agency's decision whether or not to prepare an Environmental Impact Report. Public Resources Code section 21082.2 was amended in 1993 (Chapter 1131) to provide that substantial evidence shall include "facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts." The statute further provides that "argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly inaccurate or erroneous, or evidence of social or economic impacts which do not contribute to, or are not caused by, physical impacts on the environment, is not substantial evidence."

2 at the end of this section provides a summary of the Project's potential impacts related to GHGs and any Applicant-Proposed Measures (APMs) or recommended MMs to reduce impacts to a level that is less than significant

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact GHG-1: Directly or Indirectly Generate GHG Emissions

Construction and operation of the Project could generate GHG emissions that would exceed the GHG emissions thresholds **(Less than Significant).**

Impact Discussion

Construction Emissions

Project construction would result in GHG emissions, which are associated with use of marine vessels, off-road construction equipment, and worker vehicles. Emissions from the construction phase of the Project were estimated using a spreadsheet model. See Appendix C for a description of the approach, methodology, and assumptions to estimate Project-generated GHG emissions. Construction emissions were calculated for emissions that would occur within the SCAB and the SDAB, and compared to the SCAQMD and SDAPCD emission thresholds, respectively. For disclosure, emissions that would occur outside U.S. waters during the tugboat trips to and from the Ensenada, Mexico quarry and the Project site are estimated; however, because emissions would not occur within California boundaries, they are not included in this CEQA air quality analysis.

Construction emissions were calculated for the estimated annual activity associated with each emission source activity and reported as total annual GHG emissions estimated during the year of construction (2019). Construction scenario assumptions, including marine vessel activity, off-road equipment operation, and worker vehicle trips, were based on information provided by the Applicant.

As explained in Section 4.7.3, per the SCAQMD guidance, construction emissions should be amortized over the operational life of the Project, which is assumed to be 30 years (SCAQMD 2008). This impact analysis, therefore, amortizes construction emissions, and then compares emissions to the proposed SCAQMD threshold of 3,000 MT CO_2e per year.

Table 4.7-1 presents estimated Project-generated construction GHG emissions that would occur within the SCAB in 2019 and SDAB in 2018. For disclosure, Table 4.7-1 also presents estimated Project-generated construction GHG emissions south of the U.S./Mexico border. The GHG emissions presented in Table 4.7-1 are not compared to a numeric threshold or considered in the CEQA significance determination.

- **SCAB**. As shown in Table 4.7-1, the Project would generate approximately 1,491 MT CO_2e within the SCAB over 1 construction year. Project-generated construction emissions in the SCAB amortized over 30 years would be approximately 50 MT CO_2e per year, which does not exceed the SCAQMD GHG threshold of 3,000 MT CO_2e per year. As discussed subsequently, the Project would not generate operational GHG emissions above existing conditions; therefore, there are no operational emissions to include prior to comparing amortized construction emissions to the GHG threshold.
- **SDAB**. As shown in Table 4.7-1, the Project would generate approximately 101 MT CO_2e within the SDAB over 1 construction year. Project-generated construction emissions in the SDAB amortized over 30 years would be approximately 3 MT CO_2e per year, which does not exceed the GHG threshold of 900 MT CO_2e per year applied to Project emissions that would occur within the SDAB.

Table 4.7-1. Estimated Annual Construction GHG Emissions (2019)

Source	CO_2	CH_4	N_2O	CO_2e
	metric tons per year			
South Coast Air Basin				
Marine Vessel	1,257.00	0.06	0.02	1,264.07
Off-road Equipment	209.03	0.02	0.01	212.16
Land Mobile Source (Worker Trips)	14.34	0.00	0.00	14.47
Total	**1,480.37**	**0.08**	**0.03**	**1,490.70**
30-Year Amortization of Construction Emissions				***49.69***
San Diego Air Basin				
Marine Vessel	100.23	0.00	0.00	100.80
Total	**100.23**	**0.00**	**0.00**	**100.80**
30-Year Amortization of Construction Emissions				***3.36***
Outside of U.S. Waters				
Marine Vessel	100.42	0.00	0.00	100.99
Total	**100.42**	**0.00**	**0.00**	**100.99**

Note: See Appendix C for complete data.
Acronyms: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.

Project-generated construction GHG emissions within the SCAB would not exceed the SCAQMD GHG emissions threshold of 3,000 MT CO_2e per year (Table 4.7-1). Project-generated construction GHG emissions within the SDAB would also not exceed the GHG emissions threshold of 900 MT CO_2e per year applied to Project emissions that would occur within the SDAB (Table 4.7-1). Accordingly, Project-generated GHG emissions would be less than significant.

Operational Monitoring

The overall monitoring effort for Wheeler North Reef when Phase 3 is complete is not anticipated to increase. Instead, the monitoring team would monitor fewer transects within the Phases 1 and 2 reef areas to allow for monitoring of the new transects in Phase 3 with the same amount of effort. Accordingly, no increase in activity that would generate criteria air pollutant emissions is anticipated. Therefore, the Project is not anticipated to generate long-term, operational GHG emissions. Operational GHG emissions impacts would be less than significant.

Mitigation Measures

No MMs are recommended for Impact GHG-1.

Impact GHG-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing GHG Emissions

The Project could conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions **(Less than Significant).**

Impact Discussion

Potential to Conflict with the City of San Clemente Climate Action Plan

The City's CAP does not address the primary GHG emission source associated with the Project, which is the marine vessels, or the secondary GHG emissions source, which is the off-road equipment. The CAP does address vehicle-related GHG emissions; however, the Project's 15 workers traveling to and from Dana Point Harbor for a maximum of 120 days is not a substantial source of GHG emissions. Therefore, the Project-generated motor vehicle (mobile source) GHG emissions would not conflict with the CAP. While the CAP's GHG reduction measures do not specifically apply to the Project, the Project would not interfere or impede implementation of the CAP measures to reach the City's GHG emissions reduction targets. Accordingly, the Project would not conflict with the City's CAP.

Potential to Conflict with the CARB Scoping Plan

As discussed in Section 4.7.2, the Scoping Plan (approved by CARB in 2008 and updated in 2014 and 2017) provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The Scoping Plan is not directly applicable to specific projects, nor is it intended to be used for Project-level evaluations.[22] Under the Scoping Plan, however, several state regulatory measures are aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., Low-Carbon Fuel Standard), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. To the extent that these regulations are applicable to the Project, its inhabitants, or uses, the Project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

Therefore, the Project would be consistent with the applicable strategies and measures in the Scoping Plan.

Potential to Conflict with EO S-3-05 and SB 32

The Project would not impede the attainment of the GHG reduction goals for 2030 or 2050 identified in EO S-3-05 and SB 32. EO S-3-05 establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. SB 32 establishes a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40 percent below 1990 levels by December 31, 2030. While no established protocols or thresholds of significance have been established for that future-year analysis, CARB forecasts that compliance with the current Scoping Plan puts the State on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014).

To begin, CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that "California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). With regard to the 2050 target for reducing GHG emissions to 80 percent below 1990 levels, the First Update to the Climate Change Scoping Plan states the following (CARB 2014):

> *This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of*

[22] The Final Statement of Reasons for the amendments to the State CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that "[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009).

> *renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.*

In other words, CARB believes that the State is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05. This is confirmed in the *2017 Climate Change Scoping Plan Update*, which states (CARB 2017a):

> *The Proposed Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while also identifying new, technologically feasibility and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities. The Proposed Plan is developed to be consistent with requirements set forth in AB 32, SB 32, and AB 197.*

The Project would not interfere with implementation of any of the previously described GHG reduction goals for 2030 or 2050 because the Project would not exceed the SCAQMD's recommended threshold of 3,000 CO_2e per year (SCAQMD 2008). As discussed in Section 4.7.3, this threshold was established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. Because the Project would not exceed the threshold, this analysis provides support for the conclusion that the Project would not impede the State's trajectory toward the statewide GHG reduction goals for 2030 or 2050.

In addition, as discussed previously, the Project is consistent with the GHG emission reduction measures in the Scoping Plan and would not conflict with the State's trajectory toward future GHG reductions. In addition, since the specific path to compliance for the State in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional MMs for the Project would be speculative and cannot be identified at this time. With respect to future GHG targets under SB 32 and EO S-3-05, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet SB 32's 40 percent reduction target by 2030 and EO S-3-05's 80 percent reduction target by 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the State on its trajectory toward meeting these future GHG targets.

Based on the above considerations, the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

Mitigation Measures

No MMs are recommended for Impact GHG-2.

4.7.5 Cumulative Impacts

As described in Section 4.7.3, global climate change is a cumulative impact; however, no thresholds have currently been established to assess whether a project's GHG emissions would be considered a cumulatively considerable contribution to global climate change.

GHG impacts are recognized exclusively as cumulative impacts and there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). The supporting documentation for the 2010 CEQA amendments indicates that the impact of GHG emissions should be considered in the context of a cumulative impact, rather than a Project-level impact (CNRA 2009), and an environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable (CNRA 2009). To reduce cumulative GHG emissions, various statewide regulatory measures focusing on different GHG emission sources have been implemented that will ultimately reduce GHG emissions associated with the Project and other future new development projects. Examples include the Low Carbon Fuel Standard, which set GHG standards for passenger vehicles, and the Cap-and-Trade Program. Regional measures have been adopted by various agencies (e.g., cities, counties, metropolitan planning organizations) throughout the State to support and enhance the effectiveness of the statewide efforts. Although many of the statewide and regional plans, policies, and regulations would not be specifically applicable to reductions in GHG emissions from the Project and would vary in applicability to off-site (non-Project-related) cumulative projects, to the extent required by law, the Project and other cumulative projects would be required to comply with applicable existing regulations and future regulations adopted in furtherance of statewide or regional goals.

To evaluate whether the Project would generate GHG emissions that are cumulatively considerable, total Project-generated construction GHG emissions were estimated and then amortized (i.e., annualized over 30 years) to determine the average annual GHG emissions level, which was then compared to annual significance thresholds for the SCAB and SDAB. As discussed in Section 4.7.3, *Significance Criteria*, the threshold applied in the GHG emissions analysis was the recommended SCAQMD threshold of 3,000 MT CO_2e per year for non-industrial projects (SCAQMD 2010) for the emissions generated in the SCAB, and a threshold of 900 MT CO_2e per year for the emissions generated in the SDAB. As presented in Section 4.7.4, Project-generated emissions would not exceed the applied thresholds to determine the potential significance of program-generated GHG emissions under CEQA. Therefore, the Project would not result in cumulatively considerable emissions.

4.7.6 Summary of Proposed Mitigation Measures

Table 4.7-2 provides a summary of the MMs proposed for potential Project impacts in the 1999 Project and for the proposed Project. Because the Project would not result in impacts related to GHG emissions, no mitigation is required or recommended.

Table 4.7-2. Greenhouse Gas Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
GHG emissions not analyzed.	None required.
Proposed Project	
GHG-1: Generate GHG Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment	None recommended.
GHG-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing GHG Emissions	None recommended.

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4.8 HAZARDS AND HAZARDOUS MATERIALS

This section describes the hazards and hazardous materials associated with the implementation of the Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, assesses the Project's potential impacts related to hazards and hazardous materials and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.8.1 Environmental Setting

Project construction requires the use of marine vessels and construction equipment (e.g., a crane and front-end ~~track~~ loader) powered by diesel fuel and lubricated by oil and other mechanical fluids, which are considered hazardous materials. There is also a hazard potential if the reef building materials are moved ashore during extreme storm events, particularly if attached kelp creates a degree of buoyancy. "Hazardous materials" include both hazardous substances and hazardous waste. Any substance, including waste, may be considered hazardous if it is listed by statute as such, toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). Hazardous material is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment (Health & Saf. Code, § 25501, subd. (n)(1)). Hazardous wastes are hazardous substances that no longer have a practical use, such as material that has been abandoned, discarded, spilled, or contaminated, or is being stored prior to proper disposal.

In some cases, past industrial or commercial activities on a site may have resulted in spills or leaks of hazardous materials to the ground, resulting in soil or groundwater contamination. If improperly handled, hazardous materials can cause public health hazards when released to the soil, groundwater, or air. The four basic exposure pathways through which an individual can be exposed to a chemical agent include inhalation, ingestion, bodily contact, and injection. Exposure can result from an accidental release during transportation, storage, or handling of hazardous materials. Disturbance of subsurface soil during construction can also lead to exposure of workers or the public from stockpiling, handling, or transportation of soils contaminated by hazardous materials from previous spills or leaks.

4.8.2 Regulatory Setting

Federal and state laws and regulations pertaining to and relevant to hazards and hazardous materials and the Project are identified in Appendix D. At the local level, the city of San Clemente (City) Safety Element seeks to minimize potential property damage and human injury by reducing the exposure of people and property from hazards related to various sources, including hazardous materials. This element is intended to enhance safety onshore through advance preparation for catastrophic events and through prevention or mitigation of hazards and avoidance of conditions that could adversely affect residents', businesses', and visitors' safety (City of San Clemente 2016). The Orange County Environmental Health Division (OC Environmental Health) is the designated Certified Unified Program Agency (CUPA) for the City.[23] As CUPA, the OC Environmental Health coordinates the regulation of hazardous materials and hazardous wastes in the county for six programs: Hazardous Waste, USTs, Aboveground Petroleum Storage Tank, Hazardous Materials Disclosure, Business Emergency Plan, and California Accidental Release Prevention Program.

4.8.3 Significance Criteria

Significance criteria used to evaluate potential impacts associated with hazards and hazardous materials are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment

The offshore Project area is not located: (1) within 0.25 mile of an existing or proposed school; (2) on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 (Cortese List); (3) within an airport land use plan or 2 miles of a public airport, public use airport, or private airstrip; or (4) in an area that would be exposed to wildland fires. Offshore reef construction and monitoring would also not impair implementation of or physically interfere with an adopted emergency response or evacuation plan.

4.8.4 Environmental Impact Analysis and Mitigation

4.8.4.1 1999 Program EIR

The 1999 Program EIR included the following conclusions related to hazards and hazardous materials.

- The experimental reef and mitigation reef may have an impact on hazards by the presence of artificial reef materials offshore of San Clemente. The experimental reef has the potential to introduce quarry rock and concrete onto the beaches or into the surf zone nearest to the lease site. Kelp plants attached to rock or concrete

[23] A CUPA is a local agency (county, city, or joint powers authority) that has been certified by the California Environmental Protection Agency (CalEPA) to implement the local Unified Program.

would increase the buoyancy of the reef material and possible movement during large storm events.

The same impact was also identified in the geology section of the 1999 Program EIR.

The Commission adopted the following Finding associated with hazards and hazardous materials (Item 72 and Item 73, June 14, 1999).

- The experimental reef will be monitored for the movement of construction material during storm events. The monitoring will be on a biweekly basis from the months of November through March and monthly during the rest of the year. The monitoring visits will be coordinated to occur immediately after any large storm events (by the next day). Any recycled concrete or quarry rock from the experimental or mitigation reefs, which is found on the beaches or shallow surf, would be removed by the project proponent. This would reduce impacts to a less-than-significant level.

4.8.4.2 2018 Subsequent EIR

The Project has been evaluated to assess whether it would create hazards to people or the environment, or conflict with regulations of agencies having jurisdiction over Project activities. Table 4.8-1 at the end of this section provides a summary of the Project's potential impacts related to hazards and hazardous materials and any Applicant-Proposed Measures (APMs) or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials

Construction of the expansion reef could create a hazard to the public or environment through the routine transport, use, or disposal of hazardous materials **(Less than Significant with Mitigation).**

Impact Discussion

Reef Construction

As noted above, marine vessels and equipment powered by diesel fuel and lubricated by oil and other mechanical fluids would be used to expand the Wheeler North Reef, which is 0.6 mile from the shoreline. Construction-related activities would be limited to 130 days in 2019.

Safe operation of vessels and equipment would limit the potential for an accident that could adversely affect the environment if these hazardous substances were released. This requires licensed, trained personnel and the adoption of a regular, comprehensive maintenance program. In addition, all construction watercraft and equipment would carry supplies of fuel and other mechanical fluids only in the quantities needed for their operation.

Impacts could also occur if quarry rocks contain hazardous materials. However, as described in Section 2.3.2 of the Project Description, all quarry rocks used for this Project would be required to conform to the California Department of Fish and Wildlife (CDFW) material specification guidelines for augmentation of artificial reefs with surplus materials (Bedford 1997). In addition, the U.S. Coast Guard and local emergency agencies have response plans and regulatory programs in place to contain and clean up potential fuel spills. Therefore, all materials would be required to be clean and free of any contaminants, especially those that could dissolve in seawater (e.g., asphalt, paint, oil, or oil stains) and foreign materials.

Reef Monitoring

Monitoring of the expansion reef would involve the use of small motor boats to travel to and from the Project site. Licensed operators would operate these vessels and all equipment would comply with regulatory requirements. Further, overall monitoring effort for the proposed Project reef and the existing Wheeler North Reef would remain the same as the current monitoring effort for the existing Wheeler North Reef. Therefore, impacts to hazardous materials spills relating to extended monitoring activities would be less than significant.

Mitigation Measures

To ensure that impacts to the environment associated with the release of hazardous materials are minimized, MMs HAZ-1a and HAZ-1b are proposed.

MM HAZ-1a: Spill Prevention and Response Plan. At least 60 days prior to commencement of construction, a Spill Prevention and Response Plan for all Project vessels shall be prepared by Southern California Edison or its contractor and submitted to California State Lands Commission (CSLC) staff for review and approval. The plan shall include at a minimum the following elements:

- A list of all fuels and hazardous materials that will be used or might be used during construction, along with material safety data sheets for each material
- Specific protocols for monitoring and minimizing the use of fuel and hazardous materials during offshore construction Project operations, including best management practices that will be implemented to ensure minimal impacts to the environment

- An estimate of a reasonable worst-case release of fuel or other hazardous materials at the offshore construction Project site or into coastal waters resulting from the construction activities
- A list of all spill prevention and response equipment that will be maintained on the vessels performing the construction activities
- The designation of the on-site person with responsibility for implementing the plan
- A detailed response and clean-up plan in the event of a spill or accidental discharge or release of fuel or hazardous materials
- A telephone contact list of all regulatory and trustee agencies, including CSLC and California Coastal Commission staffs, having authority over the development or Project site and its resources to be notified in the event of a spill or material release.

MM HAZ-1b: Prepare for Inclement Weather Condition. Southern California Edison (SCE) or its contractor shall tie down or provide secondary containment for any deck equipment that may discharge contaminants to minimize the potential for unanticipated release of pollutants due to inclement weather or rough sea conditions. In addition, SCE or its contractor shall monitor weather conditions and tsunami warnings and cease work if it they determine that existing or forecast sea states or weather conditions would create unsafe working conditions for personnel or equipment.

Upon implementation of MMs HAZ-1a and HAZ-1b, impacts would be less than significant.

Impact HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment

Construction of the expansion reef could create a hazard to the public or environment through the release of hazardous material into the environment during accidents or adverse weather conditions **(Less than Significant with Mitigation).**

Impact Discussion

Reef Construction

The tugboats and barges could accidentally discharge oils, fuel, lubricants, or other contaminants into the ocean. Other potential sources of marine spillage would include equipment such as the front-end loaders. Southern California Edison would be required to transport, handle, and dispose of hazardous materials or chemicals in accordance with all federal, state, and local laws regulating the management and use of hazardous materials. However, accidental spillage can still happen, and accidents can pose a risk to the public and the environment. A spill from a construction vessel could occur during refueling, if the hull of a vessel is breached in the area of the tank, or if a vessel sinks.

However, the collision of a Project-related vessel with other vessels in the area is unlikely since all work would be done during daylight hours.

Reef Monitoring

The monitoring of the expansion reef would involve the use of small motor boats to travel to and from the Project site. Licensed operators would operate these vessels and all equipment would comply with regulatory requirements. Further, the overall monitoring effort for the proposed Project reef and the existing Wheeler North Reef would remain the same as the current monitoring effort for the existing Wheeler North Reef. Therefore, impacts from release of hazardous materials relating to monitoring activities would be less than significant.

Mitigation Measures

To ensure that impacts to the environment associated with the release of hazardous materials are minimized, MMs HAZ-1a and HAZ-1b are proposed. Upon implementation of MMs HAZ-1a and HAZ-1b, impacts would be less than significant.

MM HAZ-1a: Spill Prevention and Response Plan.

MM HAZ-1b: Prepare for Inclement Weather Condition.

4.8.5 Cumulative Impacts

Cumulative projects that could exacerbate Project impacts include any projects that could result in a perceptible increase in hazards or hazardous wastes due to an increased population density or proximity to the proposed Project. Relevant projects within the cumulative study area are provided in Table 3-3.

Construction-related activities would be limited to 130 days over the summer months in 2019. All construction watercraft, vehicles, and equipment would carry fuel and other mechanical fluids only in the volumes needed for their operation. None of the craft, vehicles, or equipment would transport such substances in quantities in excess of its operating requirements. Additionally, implementation of MMs HAZ-1a and HAZ-1b would minimize Project impacts associated with the accidental release of hazardous materials.

While a simultaneous, accidental release of hazardous materials from the proposed Project and cumulative projects may pose a cumulatively significant impact to the environment, the Project’s contribution would not be cumulatively considerable given the small scale of hazardous materials used and the precautions in place. The largest cumulative project in the vicinity, the decommissioning of SONGS Units 2 and 3, would not overlap with the construction of the proposed Project. This lack of overlap would reduce the cumulative effect of any accidental release of hazardous materials. Further, the likelihood of such an event is low, and each project would have a hazardous spill response plan in place to limit potential combination with adjacent projects. Therefore, construction and operation of the proposed modifications, in combination with the other cumulative projects, would not result in a cumulatively considerable impact from hazards and hazardous materials.

4.8.6 Summary of Proposed Mitigation Measures

Table 4.8-1 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.8-1. Hazards and Hazardous Materials Impact/Mitigation Summary

Impact	Mitigation Measures or Applicant-Proposed Measures
1999 Project (Phases 1 and 2 Reef)	
Creation of potential health hazards due to movement of construction material onto the beach during inclement weather	Monitoring of reef for movement of construction materials and removal of any material from the beach
Proposed Project	
HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials	**MM HAZ-1a:** Spill Prevention and Response Plan **MM HAZ-1b:** Prepare for Inclement Weather Condition
HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment	**MM HAZ-1a:** Spill Prevention and Response Plan **MM HAZ-1b:** Prepare for Inclement Weather Condition

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4.9 MINERAL RESOURCES

This section describes the existing setting for mineral resources for the Wheeler North Reef Expansion Project (Project), identifies applicable significance thresholds, and assesses the Project's potential impacts to mineral resources and their significance. The analysis addresses mineral resources at and beneath the seafloor in the construction area, as well as the effect of additional mining at the source areas for the rock used to construct the proposed reef additions. The proposed rock sources include the Pebbly Beach/East End and Empire Landing quarries at Santa Catalina Island and the La Piedra Quarry near Ensenada, Mexico.

4.9.1 Environmental Setting

The Project is situated on the San Onofre Shelf portion of the California Continental Borderland. The San Onofre Shelf between Dana Point and Oceanside is about 3 to 5 miles wide and extends seaward to a depth of about 295 feet. Most of the bedrock underlying the Project area and exposed along the seafloor in the Project vicinity is thought to be Capistrano Formation (Eco-M 1997, as cited in CSLC 1999). The Capistrano Formation is Late Miocene and Early Pliocene in age (McNey 1979, as cited in CSLC 1999) and consists of dark-gray and light-gray siltstone and clayey siltstone with scattered and interbedded layers of sandstone tuff, and diatomite. Concretions can be found within the clayey siltstone. Stratigraphic deformation of the Capistrano beds varies from tightly folded and sheared in the San Onofre bluff area to gently undulating with a westerly dip near San Mateo Point (Eco-M 1997, as cited in CSLC 1999).

4.9.1.1 Seafloor Mineral Resources, Reef Construction Area

The Project site encompasses approximately 200 acres of sand substrate near the southern end of San Clemente, between San Mateo Point and extending north of the San Clemente Pier. Two mineral commodities could occur on the ocean floor within the Project site: phosphorite and sand and gravel. Each of these resources is briefly discussed below.

Phosphorite. Phosphorite occurs on bank tops, shelves, and other high areas of the continental borderland. Although not proven, phosphorite is thought to form as colloids from the direct precipitation from sea water in areas of strong upwelling (Emery 1960 as cited in CSLC 1999). About 600 square miles of the seafloor offshore of Southern California is believed to be covered by phosphorite. If the average thickness of phosphorite is 1 inch, the region contains approximately 1 billion tons of rock, about one-tenth of the phosphate rock reserves of the U.S. (Emery 1960 as cited in CSLC 1999). If present, any phosphorite within the Project boundary would not likely be mined given the availability of onshore sources.

Sand and Gravel. The Project area consists of a thin layer of sand overlying Capistrano Formation siltstone, sandstone, clayey siltstone, diatomite, and clayey siltstone. Sand and gravel occur on the ocean floor in enormous quantities. As land-based sand and gravel deposits are depleted or lost to competing land uses, offshore sources of sand and gravel are becoming more important. A 1983 report[24] on sand and gravel resources on the continental shelf from Dana Point to San Mateo Point (which includes the Project area) by the Sedimentary Petrology Laboratory at the University of Southern California, along with the Department of Boating and Waterways (currently Department of Parks and Recreation, Division of Boating and Waterways [DBW], as cited in CSLC 1999), CSLC, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, and California State University, Northridge reached the following conclusions (DBW 1983, as cited in CSLC 1999).

- The shelf segment between Dana Point and San Mateo Point does not contain sediment deposits suitable for beach restoration and nourishment.
- Neither the Holocene sediments nor the underlying Pleistocene formation are suitable for gravel extraction: the Pleistocene material is absent of coarser-grained sand and gravel, and the Holocene sediments are micaceous, silty, very-fine- to fine-grained sand.

Consequently, mining of sand or gravel from the artificial reef Project area is not likely to occur.

In summary, none of these seafloor materials is an economically mineable deposit due to environmental conditions, physical properties, or each material's limited quantity. In addition, their potential values are associated with limited commodity prices dictated by the more-favorable location and size of competing onshore sand and gravel deposits.

4.9.1.2 Oil, Gas, and Geothermal Resources

Individual well permits and production records for oil, gas, and geothermal resources underlying State lands are administered and maintained by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR). The location of operating and abandoned wells and exploratory coreholes and the boundaries of major oil, gas, and geothermal fields underlying and surrounding the Project area are depicted on DOGGR Reference Maps J and K and on Regional Wildcat Maps W1-4 and W1-7

[24] The study inventoried the sand and gravel deposits along the inner continental shelf from Point Dume at the northwestern extreme of Santa Monica Bay to the international border with Mexico. The study team divided their study area into eight major study segments. The Dana Point Segment includes the portion of the continental shelf from Dana Point to San Mateo Point. The purpose of the study was to identify, locate, and characterize site-specific borrow areas for sand and gravel on the inner continental shelf of Southern California using the following criteria: (1) the deposit must occur in water depths not exceeding approximately 30 meters, the current practical limit for commercial extraction; (2) the deposit must not be covered by more than 1 meter of fine-grained sediment, which would generate considerable turbidity during extraction; (3) the deposit must represent sedimentary environments capable of yielding considerable sand- or gravel-size material with little fine-grained admixture; and (4) the deposit must not be too indurated for dredging operations.

(DOGGR 2007a, 2007b). Neither the reference maps nor the regional wildcat maps shows any oil, gas, or geothermal wells, exploratory coreholes, or fields underlying the Project area or in the immediate vicinity, either onshore or offshore.

According to Wildcat Map W1-4, the nearest oil and gas activity in the area occurred on shore, about 2 miles east and 4 miles northeast of the city of San Clemente, within and surrounding two small fields referred to as "Cristianitos Creek" and "San Clemente." The Cristianitos Creek Oil Field was abandoned in 1960 after producing a cumulative total of 3,000 barrels (bbl) of oil and 11,000 thousand cubic feet (Mcf) of gas. The San Clemente Oil field was abandoned in 1955 after producing 1,452 bbl of oil and 446 Mcf of gas. The nearest offshore activity occurred about 5 miles off of the coast, just south of the Orange/San Diego county border, where Mobil drilled and abandoned a dryhole in 1965.

According to Commission records, there has been no historic oil, gas, or geothermal activity in the immediate vicinity of the Project area, and none is expected in the near future (CSLC 2018b). Furthermore, there are no known oil, gas, or geothermal reservoirs underlying the proposed Project site, and there are no active or pending leases. This information is consistent with the data contained on the maps and in the records maintained by DOGGR.

4.9.1.3 Non-Fuel Minerals Used for Reef Construction

Quarries in the region that have been identified as sources for the Project, as described in Section 2.0, *Project Description*, of this Subsequent EIR include Pebbly Beach/East End and the Empire Landing quarries located on Santa Catalina Island, and La Piedra Quarry near Ensenada, Mexico. Other quarries are also present in Southern California. The availability and demand for quarry rock at these various quarries are discussed in the following subsections.

The quarries considered below are rock quarries whose primary purpose is supplying stone of various sizes that meet specific engineering requirements for size, density, shape, and durability. Material mined from hard rock quarries can be used as riprap to armor embankments, construct breakwaters or jetties, construct harbor structures, or use as dimension stone. Alternatively, it can be sorted or crushed and sorted for use in a variety of construction purposes such as "quarry run" material used for the interior core portion of breakwater cross sections. The coarse crushed material can be sold as "ballast," which is used for applications such as railroad grades and aggregate, which is used for road base, trench fill, asphalt, and concrete.

Vulcan Otay Mesa Quarry, San Diego County. Vulcan Otay Mesa Quarry is within 20 miles of the Port of San Diego and approximately 72 miles south-southeast of the Project area. The quarry is located in an area identified by the California Geological Survey as the Western San Diego County Production-Consumption Region, and generally is an aggregate quarry. The majority of the materials generated at the Otay

Mesa quarry consists of sand, gravel, and aggregate products; however, a limited amount of construction stone that consists of dense Santiago Peak Volcanic rock is mined. Rock produced at the Otay Mesa quarry has been used for coastal protection (Paredes, pers. comm. 2018).

The reserve quantity of stone available at the Vulcan Otay Mesa Quarry is unknown at this time, but may be sufficient for all or part of the Project requirements. However, because this site is inland, rock used in reef construction must be trucked to ports such as the Port of San Diego approximately 20 miles to the west, or the Port of Long Beach located 120 miles to the north.

Vulcan Corona Quarry, Riverside County. Several quarries that supplied granite stone for portions of the Long Beach/Los Angeles Harbor breakwater and harbor structures are no longer operating. Vulcan Materials operates a quarry in Corona, between Temescal Wash and Lake Mathews. The rock mined is volcanic, mapped as Estelle Mountain Volcanics, consisting of rhyolite and andesite (Morton 2004). The principal commodity delivered from the Corona pit is sand, gravel, and aggregate. Lesser amounts of quarried construction stone are produced. The reserve quantity of construction rock available at the Vulcan Corona Quarry is unknown at this time, but may be sufficient for all or a part of Project requirements. However, because this site is inland, rock used in reef construction must be trucked to ports such as the Port of Long Beach located 50 miles to the west.

Vulcan Fish Canyon Quarry, Los Angeles County. Vulcan Materials operates the Fish Canyon Quarry, upstream on the San Gabriel River from the cities of Duarte and Azusa. The principal commodity generated at the quarry is sand, gravel, and aggregate. Historically quarried riprap stone was produced at the Fish Canyon Quarry, but production of stone has been discontinued.

Santa Catalina Island Quarries. The Pebbly Beach Quarry is located on the southeast end of Santa Catalina Island, at Jewfish Point, south of the city of Avalon. The quarry encompasses about 208 acres of seacliff between Pebbly Beach and Seal Rocks (Connolly-Pacific Co. 1994, as cited in CSLC 1999) and resides on land leased from Santa Catalina Island Company and the Commission. The rock is produced by drilling and blasting, followed by sizing and sorting with hydraulic rock breakers and large front-end loaders. Following sorting for size, the rock is stockpiled at the quarry floor shoreline for loading and barge transport. These operations are shown in Figure 4.9-1.

Figure 4.9-1. Rock Quarry Production

Pebbly Beach Quarry rock face, Catalina Island

Rock production at Pebbly Beach Quarry. Large rocks were broken into smaller rocks by the Breaker (right) and small rocks were separated out by the Grizzly (left).

According to Connolly-Pacific's Reclamation Plan, the Pebbly Beach Quarry produces between 250,000 to 1,000,000 tons of rock per year, with total anticipated production expected to be about 70 million tons. Materials from this quarry consist of volcanic breccias and sandstone conglomerates (Connolly-Pacific Co. 1994, as cited in CSLC 1999). More recent production since 2000 has been on the order of 5 to 10 million tons from the Pebbly Beach Quarry (Schryver, pers. comm. 2018).

The Empire Landing Quarry is located on the northeast end of Santa Catalina Island, near Blue Cavern Point, east of Isthmus Harbor. The quarry encompasses about 218 acres of chaparral-covered seacliff and quarried shoreline and resides on land leased from Santa Catalina Island Company and the Commission. The rock at Empire Landing is produced by drilling and blasting, followed by sizing, sorting, and stockpiling with large front-end loaders. The rock is loaded on rock transport barges at Empire Landing with a large barge-mounted crane.

According to Connolly-Pacific's Reclamation Plan, the Empire Landing Quarry produces between 250,000 to 1,000,000 tons of rock per year, with total anticipated production expected to be about 110 million tons. The material from this quarry consists of volcanic breccias. Production since 2000 has been less than 1 million tons (Schryver, pers. comm. 2018).

Mexican Quarries. The rock at the La Piedra Quarry is produced by blasting from a south-facing ridge composed of hard granitic rock. Total acreage and reserves for this quarry are unknown. This quarry is located approximately 9.5 miles by road southeast of the port of Ensenada, Mexico, and approximately 128 miles south-southeast by water from the Project area to the port of Ensenada.

Project conditions for quarried rock are outlined on Section 2.3.2, *Quarry Rock Requirements*. Previous testing results (Coastal Environments 2008a, 2008b) indicate that rock available from the Connolly Pebbly Beach and Empire Landing quarries, as well as rock from the La Piedra Quarry near Ensenada, Mexico, meets or exceeds California Department of Fish and Wildlife (CDFW) specifications and requirements. Quarried rock available from the Vulcan Corona and Vulcan Otay Mesa quarries also meets or exceeds CDFW specifications. However, the Project proposes use of quarries that could load rock directly onto barges from the quarry location, avoiding the need for onshore trucking with the attendant traffic impacts, air quality impacts, and other impacts associated with that activity.

4.9.2 Regulatory Setting

Mineral resources within the Project area are governed by a variety of federal and state laws and regulations. Federal and state laws that may be relevant to the Project are identified in Appendix D.

4.9.3 Significance Criteria

Significance criteria used to evaluate potential mineral resource impacts are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan

4.9.4 Environmental Impact Analysis and Mitigation

The mineral resources assessment focused on identifying potentially significant impacts, with the analysis directed toward (1) offshore oil, gas, and geothermal resources; (2) offshore sand, gravel, and concrete aggregate resources; and (3) depletion of regional rock resources for breakwater, channel riprap, slope protection, harbor structure, and jetty construction. Table 4.9-2 at the end of this section provides a summary of the Project's potential impacts related to mineral resources and any Applicant-Proposed Measures (APMs) or mitigation measures (MMs) recommended to reduce impacts to a level that is less than significant.

4.9.4.1 1999 Program EIR

The 1999 Program EIR concluded that availability of mineral resources in the San Diego and Los Angeles County regions would not be impacted by the Project.

4.9.4.2 2018 Subsequent EIR

This Subsequent EIR analysis examines the potential for impacts to mineral resources related to the placement of the rock on the seafloor, as well as the potential for depletion of construction rock taken from area quarries. Table 4.9-2 at the end of this section provides a summary of the Project's potential impacts related to mineral resources and any APMs or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact MIN-1: Availability of Oil, Gas, or Geothermal Resources

The Project would not prevent access to known reserves of oil, gas, or geothermal heat **(No Impact).**

Impact Discussion

The construction of an artificial reef offshore could render oil, gas, and geothermal resources underlying the Project site inaccessible to exploration and development. However, there are no active or abandoned oil, gas, or geothermal wells or fields underlying the Project area or vicinity. Furthermore, there are no active or pending State leases for exploration and development of these resources in the Project area or vicinity. Upon issuing a permit to construct the reef, the Commission would retain its rights to all oil, gas, and geothermal resources beneath the site. In the event that oil, gas, or geothermal resources are discovered beneath the site in the future, the site is small enough that any potential reserves underlying the site could be accessed by nearby wells or using directional drilling techniques. Therefore, the Project would have no impact on access to oil, gas, and geothermal resources.

Mitigation Measures

No MMs are recommended for Impact MIN-1.

Impact MIN-2: Availability of a Local Sand, Gravel, or Concrete Aggregate Mineral Resource Recovery Site

The Project would not reduce availability of sand, gravel, or concrete aggregate mineral resource recovery sites through use of materials or blocking access **(No Impact).**

The Project would not use sand, gravel, or concrete aggregate to construct the reef modules. As a result, the Project would not deplete these local or regional resources. In addition, there are no significant economically recoverable sand, gravel, or concrete aggregate resources on the seafloor beneath the Project area. Additionally, the Project would not prevent access to sand, gravel, or concrete aggregate mineral resource recovery sites. Therefore, no impact would occur.

Mitigation Measures

No MMs are recommended for Impact MIN-2.

Impact MIN-3: Availability of Local and Regional Construction Rock Resources

The Project could require quarry rock in quantities that could create shortfalls of availability for other local and regional construction projects **(Less than Significant).**

Impact Discussion

The Project would use approximately 175,000 tons of high-quality quarried rock. Proposed quarry rock sources are the Pebbly Beach and Empire Landing quarries located on Santa Catalina Island. The third proposed quarry source is the La Piedra Quarry near Ensenada, Mexico. Each of the three quarries could provide the required tonnage of nominal 1,000-pound stones specified for the work and can meet or generally exceed the CDFW specifications for artificial reef material. However, due to possible fluctuations in supply, the quarry rock would be purchased from a combination of all three quarries. Time constraints related to mining, stockpiling, and transportation would dictate the mix of rock obtained from the three quarry sources to fit the limited allowable construction season for the Project. The most-recent assessment of mineable quarry rock reserves available to Connolly-Pacific Co. on Santa Catalina Island was undertaken in 1994 (Schryver, pers. comm. 2018). Table 4.9-1 lists 1994 reserve estimates and estimated tons of rock mined to the present. By subtracting the estimated amount sold since 1994, an estimated amount remaining as of 2018 was calculated.

Table 4.9-1. Estimated Santa Catalina Island Quarry Rock Reserves

Quarry	Estimated Mineable Reserves (1994)	Amount Mined Since Reserves Estimated	Estimated Remaining Rock (2018)
Pebbly Beach	70 million tons	5–10 million tons	60 million tons
Empire Landing	110 million tons	<1 million tons	109 million tons

Source: Schryver, pers. comm. 2018

If all the rock for the Project were taken from the Pebbly Beach Quarry, the Project would use 0.3 percent of the estimated mineable rock remaining at Pebbly Beach. If all the rock for the proposed action were taken from the Empire Landing Quarry, the reef would use 0.16 percent of the estimated mineable rock at Empire Landing. Therefore, mining of the Project rock quantities does not represent significant depletion of the regionally available quarried construction rock reserves. Further, the Pebbly Beach Quarry and Empire Landing Quarry operate under existing permits and cannot expand without separate authorization that would be subject to discretionary authority and CEQA analysis. Estimated mineable rock reserve quantities for the La Piedra Quarry near Ensenada, Mexico, were not available for preparation of this analysis; however, based on the size of the quarry, the reserves are likely to be extensive. However, availability of quarry rock reserves in Mexico are not analyzed under CEQA. Therefore, the Project would have a less than significant impact on availability of local and regional rock resources.

Mitigation Measures

No MMs are recommended for Impact MIN-3.

4.9.5 Cumulative Impacts

The Project would have no impact or less-than-significant impacts to mineral resources. The Palos Verdes Reef Restoration Project would include placement of 70,300 tons of quarried rock, with the rock obtained from similar quarries to those proposed for the Project. However, as discussed in Section 4.9.1, the quarries have substantial reserves that would not be depleted by the combination of these two projects. The impact of the two projects on mineral resources would not be cumulatively considerable. The other projects identified in Table 3-3 would not consume quarry rock and, thus, would not contribute to cumulative impacts on the availability of local or regional mineral resources.

4.9.6 Summary of Proposed Mitigation Measures

Table 4.9-2 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.9-2. Mineral Resources Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
No significant impacts associated with mineral resources were identified. No mitigation measures were required.	
Proposed Project	
MIN-1: Availability Oil, Gas, or Geothermal Resources	None recommended.
MIN-2: Availability of a Local Sand, Gravel, or Concrete Aggregate Mineral Resource Recovery Site	None recommended.
MIN-3: Availability of Local and Regional Construction Rock Resources	None recommended

4.10 NOISE

This section describes the noise that would be generated during Wheeler North Reef Expansion Project (Project) implementation, identifies applicable significance thresholds, and assesses the Project's potential noise impacts and their significance. The nature of the Project eliminates some typical noise issues from further consideration, such as noise from traffic. Accordingly, the focus of the noise analysis is based upon the offshore construction-related effects of the reef's proposed expansion. Because this is a Subsequent Environmental Impact Report (EIR), the focus of this section is on the Project's noise impacts that may be greater than what was previously assessed in the Final Program EIR for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California (California State Lands Commission [CSLC] 1999). Because the quarry in Ensenada[25] is located outside California, potential noise impacts from this portion of the Project are not addressed in this analysis.

4.10.1 Environmental Setting

4.10.1.1 Introduction

The proposed Project would expand the existing 174-acre Wheeler North Reef by creating approximately 200 additional acres of kelp reef through the placement of quarried rock on top of sandy bottom habitat. The quarry rock would be transported to the Project site via tugboat and barge, with most of the rock obtained from existing quarries at Santa Catalina Island. The tugboats and barges would originate from the Port of Long Beach.

4.10.1.2 Project Location

The reef construction portion of the Project is restricted to an offshore site west of the city of San Clemente (City), in the Pacific Ocean. As shown in Section 2.0, *Project Description*, Figure 2-1, the proposed Project site would range from within 100 feet or less, to approximately 2.5 miles northwest of existing Wheeler North Reef Phases 1 and 2. The nearest distance from shoreline to the Project site is approximately 0.4 mile, and the maximum distance is approximately 1.1 miles. Directly onshore of the Project area are San Clemente City Beach, San Clemente State Beach, and Calafia Beach Park. Doheny State Beach and Dana Point Harbor are approximately 2 miles north of the Project.

[25] As proposed, in the Year 2019 construction season, approximately ~~six~~ eight barge trips would take place from the quarry in Ensenada, while approximately ~~38~~ 36 trips would take place from the Santa Catalina Island quarries.

4.10.1.3 Existing Ambient Noise Levels

The assessment of existing ambient noise levels is based upon that used for the Wheeler North Reef Phases 1 and 2 Project.[26] Onshore noise sources are similar to that described in the prior noise analysis. Assuming an attenuation rate of 4.5 decibels (dB) per doubling of distance,[27] the average daily ambient noise levels in the proposed Project lease area are estimated at Community Noise Equivalent Level (CNEL) values of between 59 and 65 A-weighted decibels (adjusted for human frequencies) (dBA), based on the distance of the area from the existing onshore sources of noise.

Rock quarries and docks at Santa Catalina Island are developed industrial facilities operated under the oversight of the County of Los Angeles, including the County's noise control ordinances. In general, the median noise level in the vicinity of the quarries is expected to be about 45 dBA when equipment is not being operated. When equipment is being operated, the median noise levels would be expected to increase to levels of approximately 50 to 60 dBA. The nearest noise-sensitive (residential) uses are located approximately 5,600 feet or more from the quarries and are separated by mountainous terrain.

The industrial land uses in the Port of Long Beach are generally characterized by CNEL values between 60 and 70 dBA. The median nighttime noise levels in these areas are generally approximately 50 to 60 dBA.

4.10.2 Regulatory Setting

Noise levels in California are regulated through state, county, and municipal standards and regulations. Federal and state regulations related to noise are presented in Appendix D. California has required each local government to perform noise studies and implement a noise element as part of their general plan. California Administrative Code, title 4, has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. In addition, the Occupational Safety and Health Administration regulations protect the hearing of workers from excessive noise levels.

The City has a noise ordinance (City of San Clemente 2007) to implement requirements in the General Plan Noise Element. The Community Development Director has responsibility for enforcing the ordinance. Specific activities have been identified as capable of producing loud noise and are prohibited. In addition, criteria are given for determining when exterior or interior noise increments from these or any other activities will result in prohibited noise levels. The tolerances are defined in terms of noise increments over a specified duration.

[26] Although the noise analysis was conducted in 1999, the coastal area had already been substantially built-out, and average daily traffic volumes on the Interstate (I-) 5 freeway are nearly unchanged based upon California Department of Transportation (Caltrans) traffic census reports. The annual average daily traffic on I-5 at Avenida Pico was 200,000 in Year 1999; in Year 2016 it was 200,100 (Caltrans 2000, 2017).

[27] As appropriate for a "pseudo-line" source such as a highway or train line.

The most restrictive land use in the City is residential. Noise levels in exterior spaces are not to exceed 55 dBA between 7:00 a.m. and 10:00 p.m. and 50 dBA during nighttime hours. Higher average noise levels are allowed in commercial areas; however, there are no commercial areas along the shore opposite the Project site. The residential areas between the surf line and Interstate (I-) 5 currently exceed the residential noise criteria because of significant noise from the I-5. Construction is limited to the daytime hours between 7:00 a.m. and 6:00 p.m., Monday through Friday. Noise levels during construction may not exceed 70 dBA at the property line.

Orange County also has an ordinance that establishes legal limits for noise within the county boundaries. The noise control ordinance (County of Orange 1973) includes community noise criteria and places specific limits on construction noise. According to the ordinance, the exterior noise standard for residential areas is 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.), the same as in the City noise ordinance.

Los Angeles County has adopted ordinances to control noise and vibration. They are administered by the County's Hazardous Materials group in the Department of Health Services. The County Municipal Code noise control ordinance (County of Los Angeles 1978) includes community noise criteria and places specific limits on construction noise. According to the ordinance, the exterior noise standard for residential areas is 50 dBA during daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA during nighttime (10:00 p.m. to 7:00 a.m.) hours. Intrusive noises are prohibited from causing the exterior noise levels measured at the affected property to exceed the noise level standards or the median noise level, whichever is highest, for a cumulative period of more than 30 minutes in any hour. For shorter time durations, higher noise level increments are allowed.

Construction activities are prohibited by Los Angeles County ordinance from creating a noise disturbance across any residential or commercial property line during the weekday hours of 7:00 p.m. to 7:00 a.m., or at any time on Sunday. The ordinance also specifies the maximum noise levels that may not be exceeded at affected buildings. For mobile equipment operating intermittently and for less than 10 days, the maximum noise level at single-family residential structures is 75 dBA during weekdays (excluding legal holidays) from 7:00 a.m. to 8:00 p.m. and 60 dBA daily, including Sundays and holidays from 8:00 p.m. to 7:00 a.m. At multifamily residences, the 7:00 a.m. to 8:00 p.m. and 8:00 p.m. to 7:00 a.m. maximum noise levels are 80 and 64 dBA, respectively. For stationary equipment operating repetitively and for 10 days or more, the maximum noise levels at single-family residences may not exceed 60 dBA daily (except Sundays and legal holidays) from 7:00 a.m. to 8:00 p.m. and 50 dBA daily from 8:00 p.m. to 7:00 a.m. At multifamily residences, the maximum noise levels for the 7:00 a.m. to 8:00 p.m. and 8:00 p.m. to 7:00 a.m. periods are 65 and 55 dBA, respectively.

4.10.3 Significance Criteria

Significance criteria used to evaluate potential noise impacts are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Result in the exposure of persons to or generation of noise levels, timing of noise, or duration of noise that exceed standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels
- Result in a substantial permanent, temporary, or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. A substantial increase for this criterion is defined as follows:
- existing ambient noise levels at noise-sensitive receptors would increase by 3 dBA while exceeding a day-night average sound level (24-hour average noise level with measured values between 10:00 p.m. and 7:00 a.m. increased by 10 dB) of 60 dBA
- there would occur a substantial increase on the order of 15 dB in noise levels at a sensitive receptor at any ambient noise level even if the increase would occur for as short a period as one-half day (increases of 10 dB that would be permanent would also be significant)
- long-term noise would conflict with state or local guidelines, specified interior noise levels or 24-hour averages, and specifically, noise levels exceeding a day-night average sound level of 60 dBA at the nearest noise sensitive receptor (California Office of Noise Control)
- noise increments to the ambient noise level that are as low as 5 dB would be significant if they occur during quieter hours at night (between 10:00 p.m. and 7:00 a.m.) in the presence of sensitive receptors

The Project is not located within an airport land use plan or within 2 miles of a public use airport and is not located in the vicinity of a private airstrip. Therefore, impacts related to exposing people to these noise sources are not analyzed.

4.10.4 Environmental Impact Analysis and Mitigation

4.10.4.1 1999 Program EIR

The 1999 Program EIR found that Project noise at the construction site produced during daytime hours (the planned construction period) would be masked by ambient noise onshore and was a less-than-significant impact. Project noise at the rock quarries and Port facilities was also considered ambient noise and was also a less-than-significant impact.

4.10.4.2 2018 Subsequent EIR

Noise impacts methodology and the definition and use of significance criteria were the same as used in the 1999 Program EIR. Accordingly, the prediction of noise levels and the subsequent estimation of impacts at receptor points in the vicinity of the Project involved consideration of the following factors: (1) identification and location of construction equipment or operations that are significant noise sources, (2) distances between the Project noise sources and noise-sensitive receptors, and (3) intervening obstacles or barriers to sound propagation. Data on noise levels from construction equipment were used in a noise propagation model to estimate the noise levels at sensitive receptor points. The model takes into account the physical aspects of the intervening distance and barriers. Table 4.10-1 at the end of this section provides a summary of the Project's potential impacts related to noise and any Applicant-Proposed Measures (APMs) or mitigation measures (MMs) recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact NOI-1: Expose Persons to or Generation of Noise Levels in Excess of Standards

Noise generated by construction activities could have a short-term noise impact by exceeding local noise standards **(Less than Significant).**

Impact Discussion

This evaluation of potential noise impacts considers the Project activities within the reef construction area and the port. Noise from quarrying, rock loading, and shipping at the quarries on Santa Catalina Island are not analyzed here as these are existing, permitted industrial facilities, and the noise is part of the existing environment and is controlled by County of Los Angeles noise control ordinances.

Reef Construction Area

The concern for noise generated in the reef construction area is the effect on City residents and sensitive land uses within 0.4 to 1.1 miles from proposed construction activities. Ambient noise levels within the Project lease area are estimated at CNEL values between 59 and 65 dBA. Simultaneous operation of a tugboat and either a crane or a ~~tracked~~ front-end loader would produce 85 dBA or less of noise at a reference distance of 50 feet. This noise would propagate toward shore with continuously decreasing energy. After traveling 0.4 mile, this construction noise would decrease at the shoreline to approximately 52 dBA. At the shoreline, ambient noise varies between approximately 70 dBA during midday to about 60 dBA in the early morning hours. The combined noise level (ambient plus Project construction) would be approximately 60.6 dBA during the early morning hours, which represents an increase in overall noise levels of less than 1 dB. Generally, a change in noise levels of 1 dB or less for noises that are similar in character to one another is not an audible change in the context of community noise. Because construction noise is different in character than the dominant ambient noise source (i.e., traffic noise), the noise from offshore construction may be barely audible during the early morning hours, when the levels would be very low. During the remainder of the workday, Project construction is anticipated to be masked by ambient noise onshore. This would be a less-than-significant impact.

Port Facilities

The transport tug and derrick barge are anticipated to use the Port of Long Beach as the homeport, arriving and departing once every other day. The Port of Long Beach is an existing, permitted facility that must comply with local noise ordinances. Furthermore, the arrival and departure of the transport tug and derrick barge every other day at the Port of Long Beach would amount to a very small contribution in overall operations; the Port of Long Beach is the second-largest container terminal in the world. Therefore, any potential increase in noise from Project-related operations at the Port of Long Beach would be considered a less-than-significant impact.

Mitigation Measures

No MMs are recommended for Impact NOI-1.

Impact NOI-2: Expose Persons to or Generation of Excessive Groundborne Vibration or Noise Levels

Vibration generated by construction activities could result in a short-term impact by exposing persons to excessive groundborne vibration or noise **(Less than Significant).**

Impact Discussion

Groundborne vibration is typically attenuated over short distances. The heavier pieces of construction equipment used for this Project would include a ~~track~~ front-end loader and a derrick (i.e., a crane). Groundborne vibration information related to construction activities has been collected by the California Department of Transportation (Caltrans) (Caltrans 2013). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inch per second begin to annoy people.

Because the proposed Project is located offshore, groundborne vibration would be negligible. Construction activities on the supply derrick would create vibration, but the vibration would not be effectively transmitted through the water. The rock would create some levels of groundborne vibration upon landing on the seafloor; however, the large distances between the construction areas and the shore (approximately 2,300 to 5,800 feet) would result in groundborne vibration levels that would be very low. For example, assuming that the vibration level from the dropping of the rock is relatively high (i.e., comparable to that of an impact-type pile driver), the activity would generate a peak particle velocity of approximately 0.644 inch per second at a distance of 25 feet (USDOT 2006). At a distance of 2,300 feet, the peak particle velocity would be approximately 0.001 inch per second. Therefore, construction activities are anticipated to result in vibration well below levels that typically annoy people, and well below damage criteria (approximately 0.5 inch per second or greater for buildings of reinforced-concrete, steel, or timber construction). Construction vibration impacts would be less than significant, and no MMs are required.

Mitigation Measures

No MMs are recommended for Impact NOI-2.

Impact NOI-3: Substantial Permanent, Temporary, or Periodic Increase in Ambient Noise Levels

The proposed Project could result in substantial increases above ambient noise levels during construction, operation, or maintenance activities **(Less than Significant).**

Impact Discussion

Permanent

Upon completion of Project construction, the proposed reef would be in place, and no operational noise would occur. There would be no permanent noise increase as a result of the Project. Therefore, no noise impact would occur.

Temporary or Periodic

As discussed in the first noise significance threshold topic, the combined noise level (ambient plus Project construction) would be approximately 60.6 dBA during the early morning hours, which represents an increase in overall noise levels of less than 1 dB above the estimated ambient noise level. The temporary noise increase during construction would be well below the stated threshold of significance of 15 dB, and for the most part would be inaudible or barely audible. Thus, temporary noise impacts would be less than significant.

Although periodic operational noise would occur during monitoring of the Project reef area, the monitoring effort for Wheeler North Reef would not increase upon completion of Project construction. Fewer transects within the existing Phase 1 and 2 reef areas would be monitored to allow the monitoring of new transects in the Project reef with the same amount of effort. As a result, periodic operational noise would not increase due to the proposed Project. Periodic noise impacts would be less than significant.

Mitigation Measures

No MMs are recommended for Impact NOI-3.

4.10.5 Cumulative Impacts

Section 3.0, *Cumulative Projects*, lists cumulative projects in the Project area. The San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 Decommissioning Project, approximately 3 miles to the southwest, is the nearest offshore project to the Project site. Offshore work at SONGS is not projected to occur until 2023, approximately 4 years after completion of the proposed Project. Because of this timing and the large distance between the SONGS Units 2 and 3 Decommissioning Project and the proposed Project, noise from these projects would not combine. The nearest onshore project is the Marblehead Coastal Development, located approximately 0.8 mile to the east of the Project site. Thus, onshore construction noise impacts would also not readily combine. Although cumulative development within the vicinity of the Project site would result in increased noise levels, the Project would not result in long-term operational noise levels, and periodic noise levels (during monitoring activities) would not increase above existing levels for monitoring of Wheeler North Reef Phases 1 and 2. Therefore, the Project contribution to a potentially significant, cumulative long-term noise impact would not be cumulatively considerable and would, therefore, be less than significant.

4.10.6 Summary of Proposed Mitigation Measures

Table 4.10-1 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.10-1. Noise Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
No significant impacts associated with noise were identified. No mitigation measures were required.	
Proposed Project	
NOI-1: Expose Persons to or Generation of Noise Levels in Excess of Standards	None recommended.
NOI-2: Expose Persons to or Generation of Excessive Groundborne Vibration or Noise Levels	None recommended.
NOI-3: Substantial Permanent, Temporary, or Periodic Increase in Ambient Noise Levels	None recommended.

4.11 OCEAN WATER QUALITY

This section describes the water quality at the Wheeler North Reef Expansion Project (Project) site, identifies applicable significance thresholds, assesses the Project's potential impacts to water quality and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.11.1 Environmental Setting

The proposed Project study area includes 210.6 acres of submerged State lands located offshore of the city of San Clemente adjacent to the existing Wheeler North Reef (Figure 1-1). For the purpose of this analysis, the study area also includes the vessel routes (supply barge[s] with tugboat) for transport of quarry rocks between Santa Catalina Island (Pebbly Beach and Empire Landing quarries) or La Piedra Quarry in Mexico, and the Project site. Basic ocean water quality parameters such as salinity, temperature, and pH vary appreciably with location, season, and year to year based on natural oceanographic processes (Southern California Coastal Water Research Project [SCCWRP] 2010). In addition, there is significant variation in the composition of minor constituents of seawater such as nutrients, oxygen, and trace metals with depth as well as with distance from the shore (SCCWRP 2010).

The main driver of biological activity in the coastal ocean is upwelling, which occurs because of the prevailing wind direction and orientation of the coastline. Upwelling brings cold, nutrient-rich waters to the surface, which encourage seaweed growth and support blooms of phytoplankton. Upwelling in the Project area is most common during the spring and early summer as a result of stronger and more consistent northwest winds (Hickey 1979, as cited in California State Lands Commission [Commission or CSLC] 1999).

Ocean water quality in any one place is influenced by both local factors and large-scale oceanographic patterns and climate. Natural factors that locally influence ocean water quality include differences in solar radiation, precipitation, and wind; the geologic and biogeographic characteristics of watersheds draining into the ocean; and the presence of naturally occurring hydrocarbon seeps and groundwater seepage. Large-scale ocean cycles and related climatic patterns also have significant effects on temperature; nutrients; and other physical, chemical, and biological components that support marine life. For example, El Niño and La Niña oceanographic events can have large effects on the range and abundance of coldwater versus warmwater species by altering or ceasing typical upwelling patterns; and severe flood and coastal storm events can produce visible turbidity plumes visible from space, resulting in near-shore decreases in salinity, temperature, and water clarity (SCCWRP 2012).

Few places in the world have truly "natural" ocean water quality, as human influences would continue even if all point source discharges ceased (SCCWRP 2010). One such example is the persistence of plastics, particulates, and organic pollutants in the ocean owing to aerial deposition, transport from distant sources by ocean currents and continuing vessel discharges. However, selected reference areas can be used to define water quality conditions that should be mimicked to the extent possible. Such reference areas are those that maintain support for marine life, allow natural ecological responses to oceanographic and climatic cycles, and exhibit the natural variability in water quality that would be expected in non-impacted waters (SCCWRP 2010). These reference sites are used in setting ocean water quality standards.

4.11.1.1 Ocean Water Quality Standards

The primary standards for maintaining acceptable ocean water quality are contained in the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan), as well the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan) (State Water Resources Control Board [SWRCB] 2015, 1975). These standards are established based upon the beneficial uses of the ocean waters[28] of the State, which include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture;[29] preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting (SWRCB 2015).

For the study area specifically, the main beneficial uses are related to ecology (i.e., rare and endangered species; marine habitat; fish migration; and fish spawning) and commercial and sport fishing. Areas required for vessel navigation were excluded from the study area, and waters used for industrial water supply, water contact and non-contact recreation, and shellfish harvesting are located in near-shore areas outside the study area. The beneficial use related to ASBS does not apply to the Project because there are no ASBS designated by the SWRCB or marine protected areas (MPAs) designated by the California Department of Fish and Wildlife (CDFW) in the vicinity of the Project. The closest ASBS to the Project site is the Heisler Park ASBS, which is located approximately 10 miles north-northwest of the Project in Laguna Beach (SWRCB 2018). The MPA closest to the Project site is the Dana Point State Marine Conservation Area, located approximately 2 miles to the northwest (CDFW 2014). Furthermore, the study area is not designated as an impaired waterbody under Clean Water Act (CWA) section 303(d) (SWRCB 2012).

[28] Ocean waters are the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons.
[29] The cultivation of algae, plants, and animals in marine waters independent of any pollution source.

For the study area specifically, the main beneficial uses are related to ecology (i.e., rare and endangered species; marine habitat; fish migration; and fish spawning) and commercial and sport fishing. Areas required for vessel navigation were excluded from the study area, and waters used for industrial water supply, water contact and non-contact recreation, and shellfish harvesting are located in near-shore areas outside the study area. Under the Ocean Plan, the SWRCB maintains and prohibits discharges in, and monitors, 34 ASBSs for water quality; however, the beneficial use related to ASBS does not apply to the Project because there are no ASBS designated by the SWRCB inside or connecting to the Project site. In addition, there are no marine protected areas (MPAs) designated by the California Department of Fish and Wildlife (CDFW) in the vicinity of the Project. The closest ASBS to the Project site is the Heisler Park ASBS, which is located approximately 10 miles north-northwest of the Project in Laguna Beach (SWRCB 2018). The MPA closest to the Project site is the Dana Point State Marine Conservation Area, located approximately 2 miles to the northwest (CDFW 2014).

Furthermore, the Project area is not designated as an impaired waterbody under Clean Water Act (CWA) section 303(d) (SWRCB 2017). CWA section 303(d) requires states to list waters that do not meet water quality standards and to develop a Total Maximum Daily Loads (TMDL) when a waterbody is identified as impaired (the listing of all impaired waterbodies is called the 303(d) List). The nearest 303(d) listed waterbodies in the study area are San Mateo Creek and the Pacific Coast shoreline near the mouth of San Mateo Creek (see Table 4.11-1). These waterbodies are listed under the 2014 and 2016 California Integrated Report: CWA Sections 303(d) and 305(b) as having impaired water quality as shown in Table 4.11-1; however, no TMDLs have been prepared for these 303(d) listings, and the sources of the pollutants are unknown (SWRCB 2017).

Table 4.11-1. 303(d) Listings Near the Project Area

Location	303(d) Constituent
Pacific Ocean Shoreline (Multiple Locations)	Indicator Bacteria (Total Coliform, Fecal Coliform, Enterococcus)
San Juan Creek	Benthic Community Effect, Dichlorodiphenyldichloroethylene (DDE), Indicator Bacteria (Enterococcus, Fecal Coliform), Nitrogen, Dissolved Oxygen, Phosphorus, Selenium, Toxicity
San Mateo Creek	Indicator Bacteria (E. coli, Enterococcus, Total Coliform), Invasive Species
Prima Deschecha Creek	Cadmium, Indicator Bacteria, Malathion, Nitrogen, Phosphorus, Selenium, Turbidity
Segunda Deschecha Creek	Benthic Community Effect, Indicator Bacteria (Enterococcus, Fecal Coliform), Malathion, Nitrogen, Phosphorus, Selenium, Toxicity, Turbidity

Source: SWRCB 2017.

Both the Ocean Plan and the Thermal Plan contain narrative and numeric objectives intended to preserve and maintain the beneficial uses of ocean waters, which include rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting. Examples of specific objectives are provided in Appendix D. These water quality criteria and objectives are used in the development and issuance of National Pollutant Discharge Elimination System (NPDES) Permits under the CWA, as well as Waste Discharge Requirements (WDRs) under the Porter-Cologne Water Quality Control Act, both also summarized in Section 4.11.2.

4.11.1.2 Study Area Ocean Water Quality

Ocean water quality is continually monitored by state and federal agencies within the larger Southern California offshore coastal area, which is also referred to as the Southern California Bight (SCB). The SSCWRP has been monitoring conditions in the SCB since the early 1970s, with its last integrated assessment occurring in 2008 (SCCWRP 2012). One of the main water quality problems within the SCB is the occurrence of harmful algal blooms, and the water quality monitoring report focuses on evaluating whether the occurrence of such blooms have been increasing and whether anthropogenic inputs of nutrients, primarily from onshore ocean discharges (e.g., stormwater and treated wastewater discharges), are significantly affecting the occurrence, frequency, or distribution of harmful algal blooms (SCCWRP 2012).

Little information exists on water quality specific to the proposed study area, since coastal monitoring stations within the study area do not overlap. Variations in water quality among regions within the SCB are generally small in comparison to local variations related to factors such as depth, river, and stream discharge, or sources of pollution (SCCWRP 2012). When available, local and recent water quality data has been included in this document. Local effects of stream discharge and pollution are small in the study area because the Project site was selected to avoid stream outflows or point sources of pollution.

Temperature

As previously noted, ocean water temperatures are determined by solar radiation, surface currents, atmospheric circulation, and the mixing and stratification of water masses such as upwelling. Based on measurements conducted in the 1970s near the study area, mean water temperature ranged from about 15 degrees Celsius (°C) at the surface and 14°C at a depth of 60 meters during winter to about 22°C at the surface and 12°C at 60 meters during summer (SCCWRP 1973). During May through December 1993, water temperatures were measured at the site of the existing Wheeler North Reef approximately 2 meters from the bottom, at a depth of about 14 meters. The temperatures ranged from about 12°C to 22°C (SCE 1994, as cited in CSLC 1999). Newer measurements are not available for the study area, but based on recent measurements elsewhere in the SCB, average water temperatures remain approximately the same (SCCWRP 2012).

Salinity

Seawater contains a mixture of dissolved salts and other material. The most abundant salt in seawater is sodium chloride. Common elements in seawater include magnesium, sulfur, calcium, potassium, and carbon. Except in nearshore areas adjacent to river mouths or treatment plants, salinity is fairly constant in the SCB (CSLC 1999). Salinity increases slightly during the summer months in nearshore waters as a result of greater evaporation of surface waters, and decreases slightly during the winter with increased freshwater run-off. Variations in salinity are generally limited to surface waters above 15 meters. Below 15 meters, salinity is essentially constant until the halocline at approximately 120 meters (Schneider et al. 2005). Salinity typically ranges from 33.2 parts per thousand to 33.7 parts per thousand in the nearshore SCB and varies little with depth (EDAW 2005, as cited in CSLC 2018c).

Density

The stratification of seawater into density gradients can result from differences in temperature or salinity. Salinity levels throughout the water column typically differ by less than 1 ppt from surface to bottom waters, except during winter storms when fresh water runoff reduces surface water salinity, especially at nearshore locations (EDAW 2005, as cited in CSLC 2018c). Salinity levels in both surface and bottom waters may be slightly higher from April to August due to upwelling. Thus, density gradients within the water column generally result from temperature differences.

Within the Project area, pronounced temperature gradients (i.e., thermoclines) develop as a result of warming of the ocean surface during the late spring, summer, and early fall. The formation of thermoclines affects the distribution of water quality parameters and the dilution and dispersion of discharged materials (Continental Shelf Associates 1993, as cited in CSLC 1999).

Dissolved Oxygen

Dissolved oxygen (DO) is essential for plant and animal respiration. DO concentrations equal to or above 5 parts per million (ppm) is a general standard of acceptable water quality for aquatic life (USEPA 1986, as cited in CSLC 1999). Variability in the concentration of DO in seawater results from natural mixing (from waves, winds, tides, currents, and upwelling) and biological processes (photosynthesis, respiration, and biochemical oxidation of organic matter). Contaminants such as dredge or drilling spoils, sanitary sewage, or oil can locally decrease DO levels.

Atmospheric exchange and photosynthetic production of oxygen by phytoplankton and benthic algae maintain DO concentrations near saturation in the upper 10 meters of the water column with peak concentrations in late spring/early summer (SCCWRP 2012). In the Project vicinity, the mean surface DO concentration ranged from about 8 to 9 milligrams per liter (EDAW 2005 as cited in CSLC 2018c, SCE 2017 as cited in CSLC 2018c).

Acidity

Hydrogen Ion Concentration (pH) is the logarithmic measurement of the hydrogen (acidic) and hydroxyl (alkaline) ion activity in a solution and is measured on a scale of 0 to 14. One-unit change in pH corresponds to a ten-fold change in relative ion concentrations. A neutral solution has a pH of 7.0. Seawater is well buffered; consequently, oceanic pH levels are relatively uniform and normally alkaline. Higher pH levels occur near the surface owing to photosynthetic reduction of carbon dioxide. Historically, pH in the SCB have ranged from 7.6 to 8.2 (SCCWRP 2007). Nearer the study area, pH in the San Onofre coastal area normally ranges from 7.5 to 8.5 (EDAW 2005, as cited in CSLC 2018c). Slightly higher pH values occur during May through September when water temperatures are warmer, and in surface waters as related to equilibrium with carbon dioxide in the atmosphere. Depth related changes in pH typically are minimal.

Water Clarity

Light penetrating the ocean is reflected, scattered, or absorbed. The depth of light penetration is a critical factor for photosynthesis and the vertical distribution of plants in the ocean. The concentration of suspended matter or particles in seawater is the most important factor in the determination of light penetration (Continental Shelf Associates 1994, as cited in CSLC 1999). The primary sources of river input and suspended particles in the Project area are San Juan Creek to the north and San Mateo Creek to the south. Anthropogenic influences that affect light transparency include erosion and sedimentation from land clearing and construction, wastewater discharges, and infrequently oil spills and vessel discharges.

Water clarity is measured using several methods, including percent light transmittance (transmissivity), total suspended solids (TSS) concentration, and the nephelometric method, which measures and compares light scattered by a water sample and light scattered by a reference solution. Seasonal variability in water clarity occurs as a result of increased concentrations of particulate matter from biological production (phytoplankton blooms), land runoff, and resuspension of bottom sediments from winds, waves, and upwelling events. Most of these agents are more prevalent in coastal or nearshore areas; consequently, particulate concentrations usually increase approaching shore. Light levels in nearshore areas strongly affect production and recruitment of kelp and other benthic algae (see Section 4.1, *Biological Resources (Marine)*).

Similar to transmissivity values, TSS or particulate concentrations are generally higher nearshore than offshore, likely due to storm runoff or algal blooms, which primarily affect the nearshore area (USACE 2015). TSS concentrations ranged from less than 1 to 47 mg/L offshore Carlsbad over a 13-year monitoring period, with the highest concentrations recorded after storm events or occasionally in the summer, probably due to phytoplankton blooms (USACE 2015). Nearshore turbidity measurements ranging from less than 1 to 11 nephelometric turbidity units represent typical background values near SONGS in the Encinitas-Solana Beach vicinity (USACE 2015). Elevated values of 50 to 187 nephelometric turbidity units have been reported at control locations during beach replenishment monitoring at Carlsbad and Oceanside (USACE 2015).

Nutrients

Marine plants, including phytoplankton and kelp, must obtain a variety of substances from their surrounding environment to survive and reproduce. The most important of these are inorganic nutrients such as nitrate, phosphate, and silicate. Sources of these nutrients to coastal waters include freshwater runoff from land, upwelling events, current transport, and sewage discharges. Nutrients are also introduced into coastal waters by diffusion and mixing of sedimentary organic material by winds and waves. The concentrations of these nutrients vary seasonally in relation to the level of primary production and the number of other sources of nutrients to coastal waters (Continental Shelf Associates 1993, as cited in CSLC 1999). Typical ranges of nutrient concentrations in surface waters (0 to 20 meters) of the SCB are 0.3 to 12 micrograms per liter for nitrate, 9.5 to 47.5 micrograms per liter for phosphate, and less than 0.5 milligram per liter for silicate (EDAW 2005, as cited by CSLC 2018c).

Petroleum Hydrocarbons

Hydrocarbon concentrations in sediments reported here are normalized to total organic carbon to compensate for the effects of varying sediment grain size (Dailey et al. 1993). Fine sediments (e.g., silts and clays) can adsorb greater concentrations of hydrocarbons than coarser sediments (e.g., gravels and sands). In 1976 to 1977, the concentration of hydrocarbon in surface sediments in the Project vicinity was 2.0 milligrams per gram organic carbon, a low value compared to most others in nearshore sediments of the SCB (Dailey et al. 1993). Natural petroleum seepage has been reported from many areas of the SCB. These natural seeps have been documented on both the mainland shelf and around the Channel Islands (Dailey et al. 1993).

Trace Metals in Seawater and Sediments

Most trace metals occur naturally in both seawater and marine sediments and are essential for biological productivity. Trace metals in the marine environment include zinc, manganese, copper, cadmium, cobalt, iron, and silver (Continental Shelf Associates

1993, as cited in CSLC 1999). These trace metals are introduced into coastal waters by rock weathering, land runoff, currents, municipal and industrial effluents, and atmospheric fallout. Elevated concentrations of trace metals are often responsible for negative impacts to marine organisms. Table 4.11-2 identifies mean background concentrations of trace metals in in seawater as reported in the Ocean Plan and at sediments at 38 sites in the SCB ranging in depth from 30 meters to 150 meters.

Table 4.11-2. SCB Seawater/Sediment Heavy Metal Background Concentrations

Seawater		Sediment	
Metal	**Concentration (ppm)**	**Metal**	**Concentration (ppm)**
Arsenic	0.003	Silver	0.03
Copper	0.002	Cadmium	0.14
Mercury	0.0000005	Chromium	25.4
Silver	0.00016	Copper	10.4
Zinc	0.008	Nickel	12.9
—		Lead	4.8
—		Zinc	48.0

Sources: SWRCB 2015 (seawater); Dailey et al. 1993 (sediment)
Acronym: ppm = parts per million

Point Source Discharges and Nearshore Water Quality

Discharges are classified as either point source or nonpoint source. Point source discharges originate from known sources and generally flow through pipes or channels. Typically, point sources are individually regulated by federal and state agencies. Nonpoint source discharges are a combination of discharges from a general geographic region rather than from a single identifiable source. One of the largest discharges of pollution in the Southern California coastal zone is runoff from the Tijuana River Watershed: in February 2017, at least 143 million gallons of untreated wastewater was discharged into the Tijuana River, resulting in multiple beach closures in the City of Imperial Beach, San Diego County (International Boundary and Water Commission 2017). The Tijuana River Watershed is an approximately 1,750-square-mile watershed on both sides of the international border between California and Mexico. Nearly three-quarters of the watershed is in Mexico, but it drains to the Pacific Ocean through the 8-square-mile Tijuana River Valley, which is north of the border (Tijuana River Valley Recovery Team 2012). Wastewater outfall monitoring is conducted in the surf zone and nearshore area to assess bacteriological (total coliform, fecal coliform, and enterococcus) conditions in waters used for body contact, as well as offshore monitoring for general physical and chemical parameters. Orange County Environmental Health collects beach bacteriological samples. If water quality bacteriological standards are exceeded, notices must be posted beaches to alert the public of the exceedances. Table 4.11-3 summarizes beach postings for 2001 through 2016 at the San Clemente City and State Beach monitoring stations nearest the project area (County of Orange 2017).

Table 4.11-3. San Clemente City and State Beach Postings

Year	# of Postings	Days	Beach Mile Days	Year	# of Postings	Days	Beach Mile Days
2001	4	13	3.8	2009	8	20	1.1
2002	6	10	0.6	2010	1	2	0.1
2003	4	7	0.6	2011	7	17	1.1
2004	2	5	0.3	2012	5	42	2.4
2005	2	4	0.2	2013	2	4	0.2
2006	4	6	0.3	2014	0	0	0.0
2007	3	6	0.3	2015	8	214	1.7
2008	6	10	1.1	2016	6	148	7.0

Source: County of Orange 2017.

4.11.2 Regulatory Setting

Ocean water quality within the Project area are governed by a variety of federal and state laws and regulations. Federal and state laws that may be relevant to the Project are identified in Appendix D.

4.11.3 Significance Criteria

Significance criteria used to evaluate potential ocean water quality impacts are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Discharge of pollutants that exceed the water quality standards set forth in the applicable NPDES Permit, the Regional Water Quality Control Board's (RWQCB) Basin Plan or otherwise impairs the beneficial uses of a receiving waterbody
- Discharge of pollutants into an "impaired" waterbody that has been designated as such by the SWRCB or the RWQCB under Clean Water Act section 303(d)
- Discharge of pollutants of concern to a receiving waterbody, as identified by the RWQCB
- Create a substantial conflict with the Ocean Plan or with the CDFW's Material Specification Guidelines and Notification Procedure for Augmentation of Artificial Reefs with Surplus Materials
- Otherwise substantially degrade the quality of marine waters and sediments, for example, if activities conducted offshore or onshore would result in increased turbidity; biological/chemical/dissolved oxygen demand; significant spills or other releases of oil, chemicals, and other toxic materials; or the deposition of reef materials

4.11.4 Environmental Impact Analysis and Mitigation

4.11.4.1 1999 Program EIR

The 1999 Program EIR examined ocean water quality impacts related to introduction of contaminants on the reef materials, and temporarily increased turbidity during placement of the reef materials. The 1999 Program EIR analysis determined that these two impacts were less than significant and no mitigation was required.

4.11.4.2 2018 Subsequent EIR

The proposed Project may affect ocean hydrology and water quality. Project activities would potentially discharge chemicals or physical materials to marine waters and sediment or re-suspend physical or chemical materials from marine sediment within the offshore area. Table 4.11-4 at the end of this section provides a summary of the Project's potential impacts related to hydrology and water quality and any Applicant-Proposed Measures (APMs) or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact OWQ-1: Impairment of Marine Water Quality

Temporary and localized impacts to ocean water quality could occur as a result of construction related discharges, mismanagement of materials, or accidental spills **(Less than Significant with Mitigation).**

Impact Discussion

The Project has the potential to negatively affect ocean water quality, which could conflict with water quality standards set forth in the applicable NPDES Permit, the RWQCB's Basin Plan, or the Ocean Plan, or with the CDFW's Material Specification Guidelines and Notification Procedure for Augmentation of Artificial Reefs with Surplus Materials. Applicable beneficial uses within the study area are related to ecology (i.e., rare and endangered species, marine habitat, fish migration, and fish spawning) as well as commercial and sport fishing. Areas required for vessel navigation were excluded from the study area, and waters used for industrial water supply, water contact and non-contact recreation, and shellfish harvesting are located in near-shore areas outside the study area. Therefore, the primary pollutants of concern would be those that adversely affect marine wildlife; these include toxic contaminants and excessive turbidity. Once constructed, the Project would not measurably change temperatures, salinity, oxygen, pH, or other basic water quality measures. However, temporary and localized impacts to ocean water quality could occur as a result of construction-related discharges or accidental spills or mismanagement of materials.

The two types of discharge with the potential to adversely affect ocean water quality would be planned discharges and accidental/unintended discharges. Planned discharges would consist primarily of rocks pushed off the deck of the supply barge by a ~~track~~ front-end loader, but could also consist of normal operational discharges of vessels (e.g., ballast water). The first is not expected to result in significant impacts on ocean water quality, and the second is covered under the VGP, which includes required best management practices (BMPs) and prohibitions designed to protect ocean water quality. Accidental/unintended discharges could include operational spills of diesel fuel, lube oil, hydraulic oil, or waste oil; these substances are not carried as cargo, but carried in small quantities on board for the fueling, maintenance, and operation of the derrick barge and its appurtenances.

Planned Discharges

All rocks used for this Project would conform to the CDFW Material Specification Guidelines for Augmentation of Artificial Reefs with Surplus Materials (see Section 2.3.2, *Quarry Rock Requirements*).

CDFW coordinates the State program for research and construction of artificial reefs off the coast of California. Department biologists have been involved in the planning and construction of over 35 artificial reefs off the State's coastline. Placement of material at any reef site requires prior written approval from the CDFW. Specific off-loading sites and actual configuration of material placement has and will continue to be coordinated with CDFW, in writing, and will be strictly adhered to. Given the application of CDFW guidelines, the potential for materials placed in the water to have long-term effects on water quality is negligible because the rocks are obtained from quarries known to not have any water-soluble contaminants or leachable toxic compounds.

The action of pushing quarry rocks into the ocean, as well as currents cause by vessel motors, could cause localized and temporary effects on turbidity. The sand-sized particles would fall out of suspension in a matter of seconds or minutes and would likely be redeposited in the immediate vicinity. Silt-sized particles could remain in suspension for a period of several hours, and clays could remain in suspension for several days before settling. Currents and waves could retain the particles in suspension for longer periods and transport material away from the Project site. The suspension of the finer particles would increase the local turbidity.

Increased turbidity is a concern since it would lead to a reduction in light transmissivity and reduced irradiance, which could adversely affect the existing biological resources. As kelp and other primary producers in the biological communities in the Project vicinity rely on sunlight for production, substantial increased turbidity could negatively affect biological productivity. Increased turbidity would also reduce the reproduction and productivity of marine organisms by smothering and reducing light and nutrients.

The potential for adverse effects relating to turbidity is low because the reef construction materials must meet the CDFW guidelines. Additionally, sands predominate within the Project area. Once disturbed, the sand-sized particles would not remain in suspension for more than several hours, as noted above. Therefore, the Project actions are expected to result in less-than-significant impacts relating to turbidity.

Finally, vessels used for the Project could discharge ballast water, bilgewater, graywater (e.g., water from sinks, showers), or deck wash down and runoff. The water quality impacts of such activities are likewise expected to be temporary and localized, quickly being diluted by ocean volume and currents. The CSLC has requirements for ballast water discharges to control the introduction of non-native species as defined in the Public Resources Code section 71200 et seq. and California Code of Regulations, title 2, Article 4.6, section 2284 et seq.

Overall, owing to their short-term nature, localized area of impact, Commission requirements for ballast water discharge, and within the oceanic context, the probability is very low that the discharges previously described would cause exceedance of ocean water quality standards, violate an applicable NPDES Permit, or impair a beneficial use. The impact of operational vessel discharges would be considered less than significant with the implementation of MM OWQ-1.

Unplanned Discharges (Accidental Spills)

As comprehensively discussed in Section 4.14, *Transportation (Marine)*, Local Notices to Mariners, compliance with U.S. Coast Guard and U.S. Army Corps of Engineers regulations, and implementation of standard safety practices would substantially reduce the potential for marine accidents. Besides being protective of crew health and safety, this would also be protective of ocean water quality by significantly reducing the potential for marine debris and spills in the process of transporting reef rocks. Owing to the short-term nature of the vessel trip increase and the limited number of trips, along with vessel safety-related programs and organizations put in place to enforce vessel transportation regulations, the impact to ocean water quality from vessel collisions would be less than significant.

The potential for spills from onboard storage and use of fuels, greases and oils also exists. This potential impact is adequately addressed in Section 4.8, *Hazards and Hazardous Materials*, which concludes that the impact is potentially significant, with mitigation required. With implementation of MM HAZ-1a, the potential impact on ocean water quality from onboard storage and use of hazardous materials would be less than significant. MM

HAZ-1a includes procedures to avert operational spills while fueling the loader or winches, and as needed, while lube oil is drawn off the tank into a pail or while hydraulic oil is drawn from the tank into a pile, or in the storage of waste oil. This includes proper crew training and the provision of on board spill kits.

Long-Term Monitoring

Water activities associated with long-term monitoring would involve the use of small vessels, scientific equipment, and divers to observe the reef conditions. These activities would have negligible and short-term effects on water quality and would not represent an increase above existing levels of monitoring effort at Wheeler North Reef. No impact would occur from long-term monitoring.

Mitigation Measures

MM HAZ-1a Spill Prevention and Response Plan (Section 4.8, *Hazards and Hazardous Materials*).

MM OWQ-1: Compliance with Vessel General Permit. Vessel discharges must comply with California State Lands Commission requirements for ballast water discharges and hull fouling to control and prevent the introduction of non-native species. Vessel discharges must not result in violations of water quality objectives in the Ocean Plan. Vessels subject to the federal National Pollutant Discharge Elimination System Vessel General Permit (VGP) must follow the best management practices for graywater as required in the VGP, including the use of only those cleaning agents (e.g., soaps and detergents) that are phosphate-free, non-toxic, and non-bioaccumulative.

Impact OWQ-2: Discharge of Pollutants into an “Impaired” Waterbody under Clean Water Act Section 303(d)

The Study area is not designated as an impaired waterbody under CWA section 303(d) (SWRCB 2012). Therefore, there would be no impact with respect to this criterion **(No Impact).**

Impact Discussion

The study area is not designated as an impaired waterbody under CWA section 303(d) (SWRCB 2012). Therefore, there would be no impact with respect to this criterion.

Mitigation Measures

No MMs are recommended for Impact OWQ-2.

4.11.5 Cumulative Impacts

Cumulative projects that could exacerbate Project impacts include any projects that could result in a perceptible reduction in ocean water quality as a result of an increased population density or proximity to the proposed Project. The cumulative scenario described in Section 3.0, *Cumulative Projects*, includes the decommissioning of several energy facilities, remediation of contaminant-impacted sites, and removal of fuel storage facilities, all of which would have beneficial impacts to ocean water quality through removal of the threat of contamination, as well as the removal of once-through cooling. Overall implementation of the State's *Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling* is progressively removing the thermal ocean water quality and entrainment/impingement impacts that have been cause by the operation of coastal power plants.

With regard to the planned residential, commercial, institutional, and recreational projects, all would be required to comply with existing laws regarding protection of urban stormwater quality. Compared to past and current conditions, whereby urban storm runoff has and continues to have detectable impacts to ocean water quality, continued implementation of Municipal Separate Storm Sewer System NPDES/WDR Permit requirements are expected to progressively decrease the severity of urban pollutants on ocean water quality.

The cumulative impacts of the Project along with cumulative projects in the study area with regard to ocean water quality would be less than significant.

4.11.6 Summary of Proposed Mitigation Measures

Table 4.11-4 provides a summary of the MMs from the 1999 Program EIR and for the proposed Project.

Table 4.11-4. Ocean Water Quality Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Exceedance of regulatory standards, conflict with the Ocean Plan, or with the CDFW's Material Specification Guidelines and Notification Procedure for Augmentation of Artificial Reefs with Surplus Materials	None required.
Proposed Project	
OWQ-1: Impair Marine Water Quality	**MM OWQ-1:** Compliance with Vessel General Permit **MM HAZ-1a:** Spill Prevention and Response Plan

Table 4.11-4. Ocean Water Quality Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
OWQ-2: Discharge of Pollutants into an "Impaired" Waterbody under Clean Water Act Section 303(d)	None recommended.

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4.12 PUBLIC SERVICES

This section describes public services that may be affected by Wheeler North Reef Expansion Project (Project) implementation, identifies applicable significance thresholds, assesses the Project's potential impacts to public services and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.12.1 Environmental Setting

Offshore Emergency Response

Offshore emergency response services are provided for events such as fires, collisions, or other accidents onboard boats or barges and for emergencies involving recreational swimmers, divers, or surfers. In southern Orange County, these services are provided by the U.S. Coast Guard (USCG), Orange County Harbor Patrol Marine Operations Bureau, city of San Clemente (City) Marine Safety Division, and California Department of Parks and Recreation (CDPR) Lifeguards. While these organizations all work together, each has a different role.

The USCG is the federal government's primary maritime law enforcement agency and is responsible for ensuring overall safety and security in the marine environment. The closest USCG stations to the Project site are located in Carlsbad and Newport Beach. The USCG would assist within State waters (3 nautical miles offshore) only if there were a major event such as a tanker sinking or a plane crash.

The Orange County Harbor Patrol Marine Operations Bureau provides around-the-clock law enforcement, marine fire-fighting, and search and rescue services along the 48 linear miles of Orange County coastline, including open water areas within 3 nautical miles of the coastline. The County's three major harbors are located at Newport Beach, Sunset-Huntington, and Dana Point. Marine Operations is overseen by the captain of the Orange County Sheriff's Department Homeland Security Division. The bureau is staffed by a lieutenant (who serves as County Harbormaster), seven sergeants, and 40 deputy sheriffs. Dispatchers and professional staff provides support along with a marine maintenance team consisting of one supervisor, four marine mechanics, two marine painters, and one marine carpenter. The Marine Operations Bureau also provides the services of the Underwater Search and Recovery Team for the varied duties of evidence and body recoveries, boating accident investigation on sunken or damaged vessels, and emergency inspections. The team consists of 11 divers who are trained in underwater search and recovery operations, hazardous device recognition, underwater post-blast investigations, vessel maintenance, and swift water rescues. The team often assists in investigations conducted by the sheriff's department and a variety of outside agencies (Orange County Sheriff's Department 2016, 2018).

Lifeguards at City and state beaches generally respond to distress calls primarily from people swimming or surfing near the shore, as well as to some boaters.

Beach Maintenance

Kelp strands and fronds often detach from living plants during storms and have the potential to be deposited on beaches nearby. This material may originate in part from the artificial reef. The dead kelp, also called kelp wrack, can be considered a nuisance because of its pungent odor and tendency to attract flies and birds. Kelp on the beach usually persists for about 2 weeks before disintegrating.

Generally, loose kelp plants wash onshore fairly close to their point of origin. The direction that kelp travels in the ocean can be affected by the prevailing surface current near the kelp forest of origin and the prevailing winds. The prevailing current along the Southern California coastline travels in a southerly direction. The prevailing winds come out of the north/northwest, which would also result in a southerly surface current. These conditions can shift with different storm events and at different times of the year.

The City removes kelp in areas with dry sand. The kelp is removed either manually or by a sand grooming machine. Kelp is left in areas where it has collected in wet sand. The removed kelp is disposed of using regular trash bins at the City Corporation Yard. Cobble is left on the beach, because it serves as a foundation between bedrock and accumulated sand (City of San Clemente 2012).

4.12.2 Regulatory Setting

Federal and state laws and regulations pertaining to and relevant to public services and the Project are identified in Appendix D. At the local level, the City of San Clemente seeks to protect the community from hazards related to geologic, seismic, and soil hazards; flooding, tsunami, and sea level change; excessive noise; hazardous materials; radiological hazards; wildfire; marine hazards; and illegal activities. The City's General Plan, Safety Element seeks to minimize potential property damage and human injury by reducing the exposure of people and property to these hazards and the risks of their occurrence. This element is intended to enhance safety through advance preparation for catastrophic events and by preventing or mitigating hazards and avoiding conditions that could adversely affect residents', businesses', and visitors' safety (City of San Clemente 2016).

4.12.3 Significance Criteria

Significance criteria used to evaluate potential public service impacts are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Need emergency response services during construction of the artificial reef beyond the level of service available. This would require calling in additional response units from outside the area to respond to an emergency

Commission staff identified an additional criterion for significance related to beach cleanup. For this criterion, a potential significant impact could result if the Project would:

- Increase the need for beach cleanup as a result of accumulated kelp wrack, rock, or concrete from the artificial reef at either the City or state beaches. This would mean: (1) creating the need to hire additional personnel for beach maintenance and cleanup, (2) requiring the purchase of special equipment for beach maintenance and cleanup, or (3) increasing the costs for land fill or other disposal by more than 10 percent.

The criteria for public services in the State CEQA Guidelines Appendix G checklist include several other public services, including schools and other public facilities. The offshore proposed Project would not affect any of these public services; therefore, they are not included in the significance criteria.

4.12.4 Environmental Impact Analysis and Mitigation

4.12.4.1 1999 Program EIR

The 1999 Program EIR considered several potential Project effects on public services, with the following findings:

- Less than significant effects of reef construction and reef monitoring on demand for offshore emergency services
- Significant but mitigable effects on beach cleanup services caused by kelp, rocks, or concrete from the reef moving onto the shore

4.12.4.2 2018 Subsequent EIR

The Project has been evaluated to assess whether it would cause disruptions to public services or otherwise conflict with the plans, policies, and regulations of agencies having jurisdiction over Project activities. Table 4.12-1 at the end of this section provides a summary of the Project's potential impacts related to public services and any Applicant-Proposed Measures (APMs) or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact PUB-1: Need for Emergency Response Services during Construction of the Artificial Reef

Construction and monitoring of the expansion reef could have a short-term impact on emergency response services **(Less than Significant with Mitigation).**

Impact Discussion

Reef Construction

The need for offshore emergency response services could occur during the construction of the expansion reef. For example, tugboats and barges could be involved in an accident or have a fire on board. The Project site would be located approximately 0.6 mile offshore the City, within the Orange County Harbor Patrol's jurisdiction. However, tugboats and barges traveling to the Project site could potentially go more than 3 nautical miles offshore while in transit requiring USCG assistance.

Construction of the expansion reef would involve seven flat deck supply barges, one derrick barge with attached derrick crane, six anchorages for the derrick barge, two front end loaders, and two tugboat tenders. The delivery of 175,000 tons of quarry rock for 23 of the new polygons would require approximately 44 barge round trips. The supply barges at the site would be exchanged every 2 to 3 days. Construction activities would be marked with buoys and other signals according to permit requirements outlined by the U.S. Army Corps of Engineers and in compliance with USCG regulations.

The construction is anticipated to occur over the 2019 construction season occurring between May 1 and October 1, 2019. This construction timing would allow the Applicant to benefit from the calm weather conditions that are typical of that time of year in Southern California, reducing the chances of emergencies related to weather.

Tugboat/barge operators are licensed and must comply with USCG regulations. Current USCG emergency services would be adequate for any problems that might occur.

However, similar to the conclusions of analysis in the Program Environmental Impact Report, MM PUB-1 would be required to ensure that the Orange County Harbor Patrol Marine Operations Bureau is notified when construction plans and schedules are finalized. The construction of the expansion reef would have a less-than-significant impact with mitigation for these services.

Reef Monitoring

The monitoring of the expansion reef would involve the use of small motor boats to travel to and from the Project site. These boats would be piloted by licensed operators, and all equipment would comply with regulatory requirements. Because the overall monitoring effort for the proposed Project would not increase from the existing conditions, the impacts relating to monitoring activities would be less than significant.

Mitigation Measures

MM PUB-1. Notification of Harbor Patrol. The Orange County Harbor Patrol Marine Operations Bureau shall be notified when construction plans/schedules for the artificial reef are finalized. The Orange County Harbor Patrol Marine Operations Bureau shall also be given notification 2 weeks prior to the start of construction activities for both the experimental and mitigation reefs.

Impact PUB-2: Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from the Artificial Reef

Construction of the expansion reef could increase the need for beach cleanup as a result of accumulated kelp wrack, rock, or concrete **(Less than Significant).**

Impact Discussion

The majority of kelp wrack occurs over a small number of days after big storms, primarily during November through February. Most kelp wrack would likely be deposited on the City beaches and San Clemente State Beach. If a significant increase in the amount of kelp wrack reaching the beaches occurs, there could be a need for additional public services to clean up the kelp.

In addition, there is a small chance some small rocks or pieces of concrete used to construct the expansion reef could wash onshore or into the surf zone because of the added buoyancy from attached kelp plants. The reef construction materials are intended to be large rocks and concrete pieces; however, some smaller fragments could result from handling. These fragments are likely to be dispersed and buried before kelp can attach and grow on them. The remaining larger rocks and concrete would be stable and would not wash onshore or into the surf zone.

As discussed in Section 4.1, monitoring of kelp wrack conducted following completion of Wheeler North Reef Phases 1 and 2 (Appendix F) determined that the Phases 1 and 2 reef had not resulted in a significant increase in kelp wrack as compared to reference beaches. Based on these monitoring results, the proposed expansion reef is unlikely to result in a significant increase in kelp wrack or rocks found on nearby beaches. Therefore, the construction of the expansion reef would have a less-than-significant impact on the need for beach cleanup as a result of accumulated kelp wrack, rock, or concrete.

Mitigation Measures

No MMs are recommended for Impact PUB-2.

4.12.5 Cumulative Impacts

Cumulative projects that could exacerbate Project impacts include any projects that could result in a perceptible reduction in public services through an increased population density or proximity to the proposed Project. Relevant cumulative projects within the general Project area are provided in Section 3.0, *Cumulative Projects*, Table 3-2.

Other projects proposed in the Project area would contribute to marine traffic, which, in combination with the proposed Project, could impact the level of safety for navigating vessels or increase the potential for marine vessel accidents, requiring assistance from the Orange County Harbor Patrol or USCG. The Project construction is anticipated to occur over the 2019 season between May 1 and October 1, 2019. This construction timing would allow the Applicant to use the calm weather conditions that are typical of that time of year in Southern California. Because the overall monitoring effort for the proposed Project would not increase from the existing conditions, the only cumulatively additive impacts to public services would be from construction of the expansion reef. Adjacent cumulative projects could conflict with construction vessels at the Project site. However, the construction activities would be contained to the area surrounding the Project site. Further, as standard practice for offshore activities, the proposed Project would issue a Local Notice to Mariners (APM-3) to provide adequate notification to affected mariners in the Project area and would prevent the vessels at the Project site from interference with existing marine transportation. The proposed Project would not result in long-term construction or operational impacts to Emergency Response Services.

Additionally, none of the relevant cumulative projects described in Table 3-3 would involve the construction of a reef or would result in the need for beach cleanup as a result of accumulated kelp wrack, rock, or concrete. Therefore, cumulative impacts would be less than significant.

4.12.6 Summary of Proposed Mitigation Measures

Table 4.12-1 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.12-1. Public Services Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
PUB-1: Need for Emergency Response Services During Construction of the Artificial Reef Beyond the Level of Service Available.	The Harbor Patrol requested that they be notified when any construction plans/schedules for the artificial reef are finalized. The Harbor Patrol will be given notification 2 weeks prior to the start of construction activities for both the experimental and mitigation reefs.
PUB-2: Increase in the Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from the Artificial Reef at Either the City of San Clemente Beaches or the State Beaches.	**Experimental Reef** A monitoring program will be initiated upon the construction of the experimental reef and continued for the following 5 years to determine the amount of kelp wrack currently washing onto the beaches. Because the City of San Clemente and CDPR do not collect data on the amount of kelp washing onto beaches currently, monitoring would establish a baseline. The monitoring of the experimental reef should also observe whether concrete or quarry rock are moved toward the beach during strong wave events. This monitoring would make it easier to compare changes as a result of the experimental reef or to the subsequent build out of the mitigation reef, as outlined as follows. The beach monitoring would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months. The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day). The beach monitoring would include: 1) observations of the amount of kelp wrack on the beach (cubic yards or percentage coverage), 2) tracking beach clean-up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses regarding kelp or rocks/concrete on the beaches. The movement of the concrete and quarry rock would be monitored as a component of the larger performance monitoring effort. **Mitigation Reef** Because of uncertainty regarding the amount, frequency, and location of increased kelp washing onshore, kelp on the beaches shall be monitored as part of the experimental reef (as

Table 4.12-1. Public Services Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
	previously discussed) and the larger mitigation reef. Although rocks and concrete used in constructing the reef are not likely to wash onshore or into the shallow surf, the monitoring program shall also observe this possibility. Monitoring shall be conducted for 5 years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches. This would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months. The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day). The monitoring would include: 1) observations of the amount of kelp wrack on the beach (cubic yards or percentage coverage) and of potential rocks/concrete, 2) tracking beach clean-up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses regarding kelp and rocks/concrete on the beaches. Based on the results during the monitoring period, it would be determined if additional clean-up services are needed as a result of the artificial reef. This cleanup would occur at any time as necessary during monitoring. Possible mitigation includes the Project proponents establishing a trust fund to pay for: 1) leasing or purchasing special equipment for cleanup or possibly to bury kelp in the sand, 2) additional personnel for beach cleanup, and 3) landfill or other disposal costs for kelp and rocks/concrete removed.
Proposed Project	
PUB-1: Need for Emergency Response Services During Construction of the Artificial Reef	**MM PUB-1:** Notification of Harbor Patrol
PUB-2: Increase in the Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from to the Artificial Reef	None recommended.

4.13 RECREATION

This section describes the recreational setting in the Wheeler North Reef Expansion Project (Project) area, identifies applicable significance thresholds, assesses the Project's potential impacts to recreation and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant.

4.13.1 Environmental Setting

The study area considered in this analysis includes the coastline from Capistrano Beach to SONGS. This length of coastline, approximately 8 miles long, includes all existing recreational areas that could potentially be affected by the construction within the Project area, as well as those recreational areas from which the Project area may be observed. Although the completed reef will be submerged and mostly not visible, aside from kelp canopy at the water surface, marine vessels will be present throughout the construction period. These marine vessels will not be static, but will be periodically relocated along the 8-mile coastline to place quarry rock within the project area identified in Figure 2-1.

Recreational Facilities

This discussion focuses on recreational facilities that could be potentially affected by Project construction and the presence of the expanded artificial reef. As such, this discussion focuses on recreational facilities that generally parallel the Project area such as beaches, and famous nearby surfing locations such as Trestles, Church's, and Cotton's Point. Locations of the facilities discussed are included on Figure 4.13-1.

City of Dana Point Recreational Facilities

The following information regarding the City of Dana Point recreational facilities comes from the Orange County Parks website (Orange County Parks 2018).

Capistrano Beach Park. Capistrano Beach Park is a public park with restrooms, outdoor showers, seven volleyball courts, and a basketball court located approximately 1.1 miles northeast of the Project area. The park includes a parking lot for 140 vehicles.

Pines Park. Pines Park is located in the city of Dana Point, approximately 1.2 miles from the northern boundary of the Project area. The park is situated behind Capistrano Beach Park, across Coast Highway. Facilities available at the park include a playground, benches, picnic tables, barbeques, a grassy area, and a paved trail.

SOURCE: Esri Basemaps 2018

DUDEK 0 0.5 1 Miles

FIGURE 4.13-1

Recreational Facilities along the 8-Mile Study Area Coastline

Wheeler North Reef SEIR

City of San Clemente Recreational Facilities

The City of San Clemente's (City's) Beaches, Parks, and Recreation Department (BPRD) manages 21 parks, 13.8 miles of hiking trails, 2 miles of public beaches, and a 133-acre golf course, which comprise 324 acres of recreational space (BPRD 2018a). There are 11 beach access points within City limits, all of which access City beaches located within 0.5 mile of the Project site. Popular recreational activities include surfing, camping, boating, kayaking, fishing, SCUBA diving, swimming, walking, and jogging.

The following information regarding the City's recreational facilities comes from the BPRD website (BPRD 2018c). Brief descriptions are provided for the more heavily used beaches with facilities such as restrooms. Other beaches in the City that are not listed include Dije Court, El Portal, Mariposa, and Riviera. Calafia Beach is within the City but is discussed under San Clemente State Beach below. In addition to these beaches, the coastline fronting the Project area has several bike and pedestrian trails such as the San Clemente Beach Trail.

North Beach. Located approximately 0.65 mile from the Project area, access to North Beach features restrooms, barbeques and fire rings, metered parking, and a train station. Access to North Beach is provided from Avenida Estacion at its intersection with North El Camino Real.

Linda Lane Beach. Linda Lane Beach is accessed from Linda Lane southwest of Linda Lane Park. The beach includes restrooms, metered parking, and is ADA accessible.

Corto Lane Beach. Corto Lane Beach access is provided from the intersection of Avenida Granada and Corto Lane. The beach includes restrooms and a volleyball court.

Pier Beach. Pier Beach is located just north and south of the San Clemente Pier, and access is provided from Avenida Victoria. The beach provides barbeques and fire rings, food concessions, and restrooms. A parking lot near the beach provides approximately 270 metered parking spaces. Pier Beach is located approximately 0.5 mile from the Project area.

T-Street Beach. T-Street Beach, which is located just south of Pier Beach, has three main surf breaks. Located near the City's downtown area, it is accessible by car with ample parking with fees (Guisado et al. 2013 as cited in CSLC 2018). The beach's best surfing seasons are summer and winter and appropriate for all surfing skill levels (Guisado et al. 2013). Its use is categorized as "Crowded" (Guisado et al. 2013).

Lasuen Beach. Lasuen Beach is a small local access beach that is accessible via dirt path within a public easement that starts from Calle de Los Alamos and continues down a ravine to the beach. Located approximately 0.6 mile from the southerly portion of the

Project area near San Mateo Rocks, the beach offers a volleyball court but no other facilities.

Department of Parks and Recreation

Doheny State Beach, San Clemente State Beach, and San Onofre State Beach are located within the study area. The three parks are managed by the California Department of Parks and Recreation (CDPR) for their ecological and recreational values. Generally speaking, the most popular uses of Doheny State Beach include sunbathing, surfing, camping, and picnicking. San Clemente State Beach supports camping and surfing, and uses at San Onofre State Beach are primarily sunbathing, swimming, and surfing.

Doheny State Beach. Doheny State Beach consists of 62 acres of coastal land approximately 2 miles to the northwest of the Project area. The beach includes a visitor/interpretive center and aquarium, which exhibit the natural and cultural history of the park. The park provides a 5-acre landscaped picnic area with picnic tables, barbeques, and parking. The park also offers 113 campsites, including 33 beachfront sites, with fire rings, picnic tables, and showers. The western portion of the beach is used by certified divers and licensed anglers. Other popular activities include volleyball, horseshoes, swimming, sunbathing, kayaking, and paddle boarding. Surfing is allowed on the day-use beach north of San Juan Creek (CDPR 2015).

San Clemente State Beach. Located within the City’s boundaries, but under the jurisdiction and management of the CDPR, San Clemente State Beach is nearly 110 acres in size, including 6,000 feet of ocean frontage (BPRD 2016b). In addition to the beach, it includes nature trails, 160 family campsites with picnic tables and fire rings, 72 RV sites with electrical hookups, two group camping areas for up to 50 people each, potable water, parking, showers, restrooms, and sanitation stations (CDPR 2015). The campground is open year-round and has a maximum capacity of 1,370 people (Tobin 2016 as cited in CSLC 2018). Its peak use is from June through September; during the off-peak season, its average use is 50 percent of its peak use, or 685 people (Tobin 2016 as cited in CSLC 2018). Although they are often referred to separately, Calafia Beach is part of San Clemente State Beach.

San Onofre State Beach. San Onofre State Beach has almost 2.5 million visitors per year and ranks as one of California’s five most-visited state parks (CDPR 2017). Overnight facilities include family/individual and group campsites, primitive (undeveloped) campsites, and recreational vehicle (RV) sites. Additional facilities include parking areas, restrooms, showers, electrical hook-ups, potable water, and fire pits (CDPR 2017b). Day-use activities include bike trails, hiking trails, picnic areas, fishing, interpretive exhibits, scuba diving/ snorkeling, swimming, surfing, kayaking, windsurfing, nature and wildlife viewing, and geocaching (CDPR 2017b). Day use hours are year-round from 6:00 a.m.

to 10:00 p.m. (CDPR 2009). Both day use and over-night camping require fees and permits.

San Onofre State Beach is made up of four subunits, three of which are within the study area: Cristianitos Creek, San Mateo Creek/Trestles, and Surfer Beach. Cristianitos Creek includes the San Mateo Campground, located at 830 Cristianitos Road and includes 157 group, individual, and RV campsites that can each accommodate up to eight people (CDPR 2009). The campground is open year-round and has a maximum capacity of 1,370 people (Tobin 2016). Its peak use is from June through September; during the off-peak season, its average use is 50 percent of its peak use, or 685 people (Tobin 2016). During the peak season, campers are restricted to 7 nights of use, and during the off-peak season, campers are restricted to 2 weeks of use. Upon leaving the campground, campers are prohibited from re-entering for 30 days (Tobin 2016).

Trestles Beach is considered a premier surfing break and is not accessible by car (CDPR 2017b). No use fee is required. Surfers distinguish between several sub-areas of the beach, including “Lower,” “Middle(s),” “Upper(s),” “Cotton,” and “Churches,” with characteristic wave types that call for varying board lengths and skills (CCC 2009 as cited in CSLC 2018, Guisado et al. 2013). Trestles is considered to produce some of the best and most consistent surf in the region all year round, and its use is categorized as being “Crowded” (Guisado et al. 2013). The location of Trestles Beach is shown in Figure 4.12-1. Annual (2017) recreation events at or near San Onofre State Beach included the: Hurley Pro Am at Trestles Beach (September 2017); Surfing America 2017 USA Surfing Championships at Lower Trestles Beach (June 2017); Iron Man Triathlon (April 1, 2017), and Bike MS: Bay to Bay Cycling Event (October 2017) (CDPR 2017a as cited in CSLC 2018).

Other Recreational Facilities in the Study Area

The Marine Corps Camp Pendleton recreational beach, which is not open to the public, is located up-coast (north) of San Onofre Surf Beach (see Figure 4.13-1). Bluffs Beach, also known as Trails Beach, can be accessed via the San Onofre Bluffs and Campground, and a CDPR day pass fee is required. The beach is open year-round, and is appropriate or all surf skill levels. Due to its day fee and the steep hike necessary to access the beach, its use is lower than the use associated with Trestles and San Onofre Surf Beaches (Wavecation.com 2018).

Harbors

Many boaters, fishermen, sailors, SCUBA divers, and other offshore recreationists who use the Project area access the area from nearby harbors. Harbors provide boat ramps and storage slips, fuel, and tourist information, which are important to the offshore recreation in the area. The most important harbor in the Project vicinity is Dana Point

Harbor. Dana Point Harbor is located approximately 2.4 miles northwest of the Project area and is the closest access point. The harbor is divided into the East and West Basins, which have a total of 2,500 vessel slips, 50 guest slips for transiting boats, a 10-lane launch ramp, a dry boat storage hoist, a fishing pier, a shipyard, a marine fuel dock, three yacht clubs, and a commercial sports fishing operation, which also offers whale watching tours throughout the year (Dana Point Harbor 2017). Harbor facilities at Oceanside Harbor, Newport Harbor, and the Port of Long Beach are also used to access the Project vicinity.

Recreational Fisheries

In addition to the recreational activities described in the 1999 Program EIR, a detailed recreational fisheries inventory was conducted for the proposed Project. In general, recreational fishing is an important social activity in Southern California. Within the recreational fishery in Southern California, several gear types are used to target a wide variety of fish and invertebrate species such as traps, spears, and rod-and-reel. Within the Project vicinity, the primary recreational fishing activity is likely comprised of rod-and-reel fishing from small boats, the San Clemente Pier, and the beach.

California Department of Fish and Wildlife (CDFW) undertakes regular surveys of recreational fishermen as part of the California Recreational Fisheries Survey (CRFS) program. These recreational fishing data are made available through the Recreational Fisheries Information Network (RecFIN) maintained by the Pacific States Marine Fisheries Commission (PSMFC). The following section describes data retrieved from the RecFIN database (RecFIN 2018) and provides a summary of recreational finfish fishing activity for the region based on these data.

The CRFS program collects information on both catch and effort for California's recreational finfish fishery. Each year, the program conducts approximately 7,000 sampling assignments and interviews around 68,000 fishing parties throughout California. CRFS data on catch are collected from four fishing modes: private and rental boats, commercial passenger fishing vessels (CPFVs, also commonly called charter or party boats), human-made structures (e.g., jetties, breakwaters, piers), and beaches and banks (CDFW 2018b).

Catch data for recreational fisheries available through RecFIN are combined for San Diego, Orange, and Los Angeles Counties. The proposed Project site sits roughly in the middle of this large and populous area. The area is highly urbanized and home to more than 16 million people (43 percent of California's population). It has over 33,000 private boat slips and moorings contained in 22 boat basins (e.g., harbors and marinas) and is also accessible via 27 public-access boat launch facilities. Recreational fishermen also use dozens of piers, other man-made structures, and easily accessible beaches and banks. These fishing modes are heavily used by shore anglers in this region relative to other regions of the coast of California (CDFW 2017b).

The most abundant fish caught on average by recreational fisherman surveyed from 2012 through 2016 was kelp bass (*Paralabrax clathratus*) followed by barred surfperch (*Amphistichus argenteus*) and Pacific mackerel (*Scomber japonicas*) (see Table 4.13-1). These three species of fish represented greater than 45 percent on average of the catch each year by recreational fishermen in the region for this period.

Table 4.13-1. Mean Annual Proportional Catch by Recreational Fishermen, Los Angeles, Orange, and San Diego County Areas (2012 to 2016)

Rank	Species	Proportion Caught (%)	Cumulative Proportion (%)
1	Kelp bass (*Paralabrax clathratus*)	22.3	22.3
2	Barred surfperch (*Amphistichus argenteus*)	14.0	36.3
3	Pacific (chub) mackerel (*Scomber japonicas*)	9.0	45.3
4	Barred sand bass (*Paralabrax nebulifer*)	4.2	49.5
5	Vermilion rockfish (*Sebastes miniatus*)	3.2	52.8
6	California scorpionfish (*Scorpaena guttata*)	3.2	56.0
7	Rockfish genus (Sebastes)	2.8	58.8
8	Pacific bonito (*Sarda lineolata*)	2.8	61.6
9	Pacific sanddab (*Citharichthys sordidus*)	2.3	63.8
10	Surfperch family (Embiotocidae)	2.1	65.9
11	Pacific barracuda (*Sphryaena argentea*)	2.0	67.9
12	Silver surfperch (*Hyperprosopon ellipticum*)	1.8	68.8
13	California sheephead (*Semicossyphus pulcher*)	1.3	71.1
14	Yellowtail (*Seriola lalandi*)	1.3	72.4
15	Bocaccio (*Sebastes paucispinis)*	1.2	73.5
16	Ocean Whitefish	1.1	74.6
17	Sanddab genus	1.0	75.6

Source: RecFIN 2018.

The methods used to catch the most frequently caught fish vary widely. More than 70 percent of the Pacific mackerel recorded as caught by recreational anglers on average each year from 2012 through 2016 were caught from man-made structures such as piers, jetties, and break walls. This contrasts with kelp bass, for which just 2.5 percent were recorded as caught from man-made structures such as jetties and break walls. Most kelp bass were recorded as caught from party/charter boats and private/rental boats (59.5 and 32.9 percent, respectively). Barred surfperch and Pacific sardine (*Sardinops sagax*) were almost exclusively recorded as being caught from a beach or bank (97.5 and 98.8 percent, respectively). (RecFIN 2018).

Recreational fishing records indicate that both beach/bank and man-made structure are dominated by catches of one species (Table 4.13-2).

Table 4.13-2. Fish Species Most Frequently Caught by Recreational Anglers in Southern California (2012 to 2016)

Species	Proportion Caught	Cumulative Proportion Caught	Species	Proportion Caught	Cumulative Proportion Caught
Beach and Bank			**Man-Made Structures**		
Barred surfperch	46.0	46.0	Pacific mackerel	48.8	48.8
Surfperch	7.2	53.3	Pacific sardine	13.0	61.8
Silver surfperch	4.8	58.1	California lizardfish	8.9	70.7
Kelp bass	3.6	61.7	Silverside	4.3	75.1
Bivalves	3.2	64.9	Northern anchovy	3.9	78.9
Yellowfin croaker	3.1	68.0	Pacific bonito	2.7	81.7
Skates and rays (Superorder Batoidea)	2.9	70.9	Jacksmelt	2.6	84.2
California corbina	2.5	73.5	Topsmelt	1.4	85.6
Walleye surfperch	2.1	75.6	Walleye surfperch	1.4	87.0
Spotfin croaker	2.0	77.6	Kelp bass	1.3	88.3
Party/Charter Boats			**Private/Rental Boats**		
Kelp bass	28.0	28.0	Kelp bass	31.8	31.8
Pacific mackerel	9.6	37.6	Pacific mackerel	17.2	49.0
California scorpionfish	6.4	44.0	Barred sandbass	7.0	56.0
Vermilion rockfish	5.6	49.6	Pacific bonito	3.8	59.8
Barred sandbass	4.9	54.6	Rockfishes	3.4	63.2
Rockfishes	4.1	58.7	Pacific barracuda	3.1	66.3
Pacific sanddab	4.1	62.8	Vermilion rockfish	2.9	69.2
Pacific bonito	3.3	66.1	California sheephead	2.6	71.8
Pacific barracuda	2.5	68.6	Yellowtail	2.3	74.1
Bocaccio	2.3	70.9	California lizardfish	2.1	76.2

See Table 4.13-1 for most scientific names. Scientific names not included in Table 4.13-1 are topsmelt (*Atherinops affinis*, bivalves (Class Bivalvia), skates and rays (Superorder Batoidea), California corbina (*Menticirrhus undulates*), and spotfin croaker (*Roncador stearnsii*)
Source: RecFIN 2018.

For beach and bank fishing, 46 percent of the fish recorded as caught by recreational fishermen were barred surfperch. The next-most-abundant species recorded as caught by fishermen fishing from beaches and banks was fishes from the surfperch family (Embiotocidae) (7.2 percent), followed by silver surfperch (*Hyperprosopon ellipticum*; 4.8 percent). Kelp bass, bivalves, yellowfin croaker (*Umbrina roncador*), and skates and rays ranked fourth through seventh, respectively, after these three surfperch groups. For man-made structures, the most frequently recorded species of fish caught by recreational fishermen was Pacific mackerel (48.7 percent). Pacific sardine ranked second (13.0 percent), followed by lizardfish (*Synodus lucioceps*), silversides, northern anchovy (*Engraulis mordax*), and Pacific bonito (*Sarda lineolata*). Recreational fishing from both beach and bank and man-made structures are most likely to occur over sandy seabeds. Beach-and-bank fisherman will exclusively fish the nearshore sandy seabed habitat, as they are typically casting bait with rod and reel from the shoreline. This accounts for the abundance of very nearshore, sandy seabed species such as surfperches, yellowfin croakers, skates and rays, California corbina (*Menticirrhus undulates*), and spotfin croaker (*Roncador stearnsii*). Kelp bass are more typically found associated with kelp habitat. However, they are also an extremely common species caught by rod-and-reel recreational fisherman throughout Southern California.

Most man-made structures from which recreational fishing occurs are likely to be jetties and piers, such as the San Clemente Pier. Jetties and piers are popular due to their ease of access and amenities such as bathrooms, parking, running water, and local shops. Also, unlike most other forms of fishing in California, there is no requirement to obtain a fishing license. Fishermen fishing from jetties are able to access deeper water further offshore than beach and bank fisherman. The assemblages of commonly caught fishes by recreational fishermen fishing from jetties and piers are reflective of these conditions. Both Pacific mackerel and Pacific sardine are pelagic schooling fishes. They are often taken by recreational fishermen using baitless “feathering” tackle on rod and reel that is appealing to recreational fishermen as a low-cost alternative to fresh bait or more expensive specialist lures.

The recreational fishing catch from boats includes a more diverse assemblage of fish species compared to the other two categories. The assemblages from party/charter boats and private/rental boats are similar, as these forms of recreational fishing use nearly identical methods and target similar types of fish habitat. Kelp bass ranks first and Pacific mackerel ranks second for both of these boat-based recreational fishing types. Other common species include barred sand bass (*Paralabrax nebulifer*), several rockfishes, and Pacific barracuda (*Sphryaena argentea*). The species that rank highest are typically reflective of reef and midwater habitats.

In addition to recreational finfish fisheries in Southern California, several invertebrate species are targeted by recreational fishermen. In particular, California spiny lobster (*Panulirus interruptus*) are pursued by recreational fishermen using hoop nets, breath hold, and SCUBA diving techniques. Lobsters are typically found by recreational fishermen on rocky reefs, where they spend much of their time during the day hiding in caves and cracks. At night, lobsters are more frequently outside of these habitats. Hoop nets are typically deployed from man-made structures or boats and are more often deployed at night. SCUBA and breath-hold divers may only take lobster by hand, the use of spears or other tools is not allowed. Some divers also pursue lobsters at night, although this is likely to be less frequent than during the day because of the increased safety risks. The recreational fishery for lobster in California is usually limited to the months of October through the middle of March. A minimum lobster size applies, and lobster fishermen require an additional recreational permit to the generic CDFW fishing permit (CDFW 2018c).

Other invertebrates that are taken by recreational fishermen include bivalves. Pismo clam (*Tivela stultorum*) is a large clam species relative to many bivalves found in subtidal soft sediment habitats and are the most popular bivalve taken by recreational fishermen in the subtidal area in Southern California. Minimum size and bag limits apply for this species, but there is no seasonal closure (CDFW 2017c). Rock scallops are also taken by divers. These cryptic bivalves attach to rocky reef and other hard substrate and are pried away by divers by hand, typically using a knife or abalone iron. Daily bag limits apply; however, there are no size limits or seasonal closures (CDFW 2017c). Crustaceans, in particular rock crabs (*Romaleon antennarium*), are also a popular target for recreational fishermen. Recreational fishermen typically target rock crabs with hoop nets that are often left in place for several hours. These devices are often deployed from boats with buoys attached, or from man-made structures such as jetties, piers, and breakwaters. Limits on the number of hoop nets per individual or boat apply, and maximum inspection times of 2 hours apply (CDFW 2017c). There is no seasonal closure for crabs, except for Dungeness crabs (*Metacarcinus magister*) (CDFW 2017c), which is a northerly species in California and does not occur within the Project area (CDFW 2011). Daily limits and minimum size restrictions apply (CDFW 2017c).

4.13.2 Regulatory Setting

Federal and state laws and regulations pertaining to and relevant to recreation and the Project are identified in Appendix D. Of relevance to State parks in the Project area is the San Clemente State Beach General Development Plan (CDPR 1970), which was adopted in 1970 to describe long-term development plans for the San Clemente State Beach while allowing for proper protection, maintenance, and management of the state park. At a local jurisdictional level, only lands in the City of San Clemente and the City of Dana Point fall within the 8-mile study area coastline. Although these cities do not have direct jurisdiction or permit authority over the Project; the cities' General Plans (City of San Clemente 2016a, City of Dana Point 1991) provide goals, policies, and implementation measures for recreational programs, facility acquisition and development, existing resources, public health and wellness, and facility financing and economics in the cities. The City of San Clemente Local Coastal Program/Land Use Plan (LCP/LUP), adopted in 2016, contains the City's goals and policies for public access and recreation, including parks, trails, and beaches (City of San Clemente 2016b).

4.13.3 Significance Criteria

Significance criteria used to evaluate potential recreational impacts are based on Appendix G of the State California Environmental Quality Act (CEQA) Guidelines, which states that a significant impact would occur if the Project would:

- Prevent access to recreational sites or disturb users of recreational facilities during times of peak use
- Cause the degradation of a significant recreational resource
- Result in an impact that has a high likelihood[30] of a substantial[31] reduction in the quality or quantity of reational fishing activity or recreational fishery yield in the local[32] area
- Result in an impact that has a high likelihood of a substantial change in the type of recreational fishing activity in the local area

The significance criteria for recreation included in State CEQA Guidelines Appendix G would not apply to the offshore proposed Project because the Project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the park would occur or be accelerated or include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

4.13.4 Environmental Impact Analysis and Mitigation

4.13.4.1 1999 Program EIR

The 1999 Program EIR considered several potential Project effects on recreation, with the following findings:

- Less than significant effects of the new reef on waves and surfing conditions
- Significant but mitigable effects on beach recreation and consistency with local recreational planning documents caused by kelp, rocks, or concrete from the reef moving onto the shore
- Less than significant effects from limiting boating activity or excluding people from accessing recreational areas during construction

[30] *High likelihood* is a professional judgement or assertion that is reasonably supported by evidence, precedent, or reasoned assessment of other established available information.
[31] *Substantial* used in this context is defined as any change that could be detected over natural variability and occurs for a period of time greater than 6 months.
[32] *Local* is used in this context to define any population or habitat occurring within 3 miles of the Project area and activities on either a permanent or intermittent basis.

- Less than significant effects from construction interfering with enjoyment of the beach

4.13.4.2 2018 Subsequent EIR

The Project has been evaluated to assess whether it would impact recreation or otherwise conflict with the plans, policies, and regulations of agencies having jurisdiction over Project activities. Table 4.13-3 at the end of this section provides a summary of the Project's potential impacts related to recreation and any Applicant-Proposed Measures (APMs) or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact REC-1: Prevent Access to Recreational Sites or Disturb Users of Recreational Facilities during Times of Peak Use

Offshore construction activities, including anchored barges and tugboats with supple barges, could prevent access to recreational areas during peak use **(Less than Significant).**

Impact Discussion

Installation of the artificial reef would be performed from a derrick barge and supply barge that would be positioned above a designated polygon by use of a tugboat and motorized winch anchor lines. Anchors would be designed to minimize possible drag on the ocean floor and could include connecting each anchor by braided steel cable to a 15-ton concrete anchor block, which would be connected to a surge-can (foam-filled) and then cabled to the derrick barge. Once in proper placement, a ~~track~~front-end loader would move boulders from the stockpile to the edge of the flat deck barge and push them off the edge to the seafloor. Project construction is proposed to take place over the 2019 construction season between May 1 and October 1, 2019. Construction would occur during daylight hours 6 days a week (Monday through Saturday), except on holidays and during inclement weather (no construction would be performed if wave heights are larger than 4 feet). On-site work would begin no earlier than 7:00 a.m. and be halted no later than 7:00 p.m.

Construction would only be performed in offshore waters, and as such, work would not impede access to recreation in City parks and recreational areas and state beaches. Therefore, construction activities would not result in permanent development onshore that would be capable of impeding access to onshore recreational facilities and areas. Beach goers, campers, walkers and runners, surfers, and other beachfront or surf zone users would not be directly affected by the construction of the artificial reef because of the distance of construction from the beach and surf zone, even during peak use periods.

Overall, the impact of construction to onshore and nearshore recreationists would be less than significant.

Construction activities could potentially conflict with recreational boating/kayaking, diving, and fishing activities in the Project area. Party/charter boats or private/rental boats used by recreational anglers likely originate from local harbors. California spiny lobster are also pursued by recreational fishermen and are typically found on rocky reefs, where they spend much of their time during the day hiding in caves and cracks. At night, lobsters are more-frequently located outside of these habitats. Other invertebrates that are taken by recreational fishermen include bivalves including Pismo clam and rock scallops, which are also taken by divers. The southern portion of the Project area is located near the existing Phase 1 and Phase 2 artificial reefs. Because of the proximity of the existing artificial reef to the Project area, reef-associated fish, lobsters, and other invertebrates are likely located near the southern portion of the Project area.

The Project area would be precluded from recreational access between May 1 and October 1, 2019. Construction activities would generally avoid the recreational spiny lobster season (September 29 to March 21; the first day of the commercial spiny lobster season is October 3). Also, because the area that is precluded from recreational access and use during construction is very small compared to the expanse of ocean in the surrounding areas that would remain accessible to recreationists during the short 5-month construction period in the summer of 2019, potential impacts to boaters, divers, and sport fishers would be less than significant.

This less-than-significant impact to recreational boating and fishing would be further reduced with the publication of a Local Notice to Mariners (LNM) to ensure that other vessels in the area, as well as the USCG and area harbor personnel, would be advised of the locations of the vessels and the approximate dates and duration of the construction (see Section 4.14, *Transportation (Marine)*). The LNM is the USCG's weekly update to local mariners regarding important information affecting navigational safety. With publication of an LNM, harbor personnel would be aware of construction activities and the preclusion of the Project area from recreational use.

Once construction activities are completed and the artificial reef is installed, barges and other vessels would be removed from the Project area. As such, the site would not visually stand out from the surrounding open ocean. Work crews or vessel would not be permanently stationed above the Project area; however, fully implemented monitoring of the new reef would last a minimum of 10 years and would occur on an annual basis. During inspections, a monitoring crew would be deployed in a service boat that would be temporarily anchored over the Wheeler North Reef area. While the duration of annual monitoring efforts has not yet been determined, the overall Wheeler North Reef (existing Phases 1 and 2, and the Project area) monitoring effort would be similar to the monitoring currently employed at the existing Phase 1 and 2 sites. In addition, monitoring locations are not anticipated to be closed to recreational activities during annual monitoring activities. Because of the annual frequency of site inspections and the distance of the Project area from the shore, and because monitoring locations would not be temporarily closed during monitoring, impacts to recreational access during operations would be temporary and less than significant.

The Applicant has committed to the submittal of a LNM to ensure that impacts to offshore recreation and safety would be reduced to a less-than-significant level.

APM-3: Local Notice to Mariners. A Local Notice to Mariners will be published with the U.S. Coast Guard (USCG) Waterways Branch prior to Project construction to ensure that other vessels in the area, as well as the USCG and area harbor personnel, would be advised of the locations of the vessels and the approximate dates and duration of the construction. A similar notice shall be posted at several locations at Dana Point Harbor, including providing copies to the Sheriff's Harbor Patrol, charter boat businesses, and dive shops. Temporary signs should also be posted at recreational sites, such as the San Clemente Pier and the mouth of San Mateo Creek, to inform recreational users about the Project.

With the implementation of APM-3, impacts to offshore recreation and safety are reduced to a less-than-significant level.

Mitigation Measures

No MMs are recommended for Impact REC-1.

Impact REC-2: Degradation of a Significant Recreational Resource

Kelp wrack and rock from the Project artificial reef could be deposited onshore and degrade the local beach landscape **(Less than Significant).**

Impact Discussion

Because the proposed Project would be located nearly 0.5 mile offshore, onshore and nearshore recreational resources including campgrounds, beaches, and parks would not be degraded. However, establishment of a 200- to 210-acre persistent, medium- to high-density kelp forest could result in an increase of kelp wrack washing onto shore. The majority of kelp wrack would occur over a small number of days after big storms, primarily during the months of November through February. There is also a small chance some quarry rocks used to construct the reef could wash onshore on account of the added buoyancy of attached kelp plants.

As discussed in Section 4.1, monitoring of kelp wrack conducted following completion of Wheeler North Reef Phases 1 and 2 (Appendix F) determined that the Phase 1 and 2 reef had not resulted in a significant increase in kelp wrack as compared to reference beaches. Based on these monitoring results, the proposed expansion reef is unlikely to result in a significant increase in kelp wrack or rocks found on nearby beaches. Therefore, the construction of the expansion reef would have a less-than-significant impact on the beach recreational environment as a result of accumulated kelp wrack, rock, or concrete.

During operations, the presence of the Project artificial reef would not significantly affect waves and surfing activities. As detailed in the 1999 Program EIR, studies carried out by Elwany et al. (1998b) concluded that the experimental and mitigation reefs, and the resulting kelp forests, would create no measurable attenuation of height or energy of long-period swell waves, and would not affect the propagation or direction of swell waves. Studies also concluded that the experimental and mitigation reefs would not substantially affect the distribution and transport of sediment in the littoral zone, nor would it substantially affect the width of the beach. Similar effects to waves are anticipated for the Project artificial reef. Potential effects are of concern with respect to maintaining the characteristics of the existing waves for surfing and other recreation. Elwany et al. (1998b) concluded that the presence of a kelp forest would have a damping effect on high-frequency sea waves. These waves are generated by local onshore winds and are characterized as surface chop or roughness. High-frequency sea waves generated by local onshore winds generally do not result in surfable waves. Waves that are surfed are typically longer-period swell waves generated by winds or storms outside of the region. Local onshore-wind-generated seas commonly degrade surfing conditions; surfing conditions are considered optimal during glassy conditions, when there is no local wind or surface roughness. Therefore, any reduction in high-frequency sea waves would likely have a beneficial effect on surfing conditions. As with the experimental and mitigation reefs evaluated in the 1999 Program EIR, the Project reef would have a less-than-significant impact on waves and wave-related recreation.

Regarding recreational fishing, construction and operation of the Project artificial reef would not degrade a substantial recreational resource. As detailed in Impact REC1 above, the Project areas would be precluded from recreational access between May 1 and October 1, 2019. Once construction activities are completed, recreational access to the Project area would be re-established. Also, after completion of the Project reef, the fish standing stock in the Project area would improve through the establishment of a persistent kelp bed. According to the Annual Report of the Status of Condition C: Kelp Reef Mitigation in 2016—SONGS Mitigation Program (Marine Science Institute 2016), the standing stock of reef-dwelling fish on the existing Wheeler North Reef was below 15 tons between 2009 and 2013, increased dramatically to 25.5 tons in 2014, and then declined to 17.5 tons in 2015. A slight increase to 19.1 tons was recorded in 2016 (Marine Science Institute 2016). Based on the monitoring results from Phases 1 and 2 of the Wheeler North Reef, the existing recreational fishery in the area would be improved and existing recreational fishing opportunities would be expanded. Furthermore, based on the results of monitoring Phases 1 and 2 of the Wheeler North Reef, the spiny lobster fishery would also improve after completion of the Project reef.

Mitigation Measures

No MMs are recommended for Impact REC-2.

Impact REC-3: Substantial Change in the Type, Quality or Quantity of Recreational Fishing Activity or Yield

Expansion of the existing Wheeler North Reef would improve the quality and quantity of recreational fishing activity and would improve the recreational fishery yield in the local area **(Beneficial).**

Impact Discussion

The Project would cover sandy ocean bottom and expand a rocky artificial reef, which would support reef-dwelling species that are more desirable to anglers and that are traditionally caught in similar reef environments in the local area including kelp bass, Pacific mackerel, sandbass, and bonito. With establishment of the Project artificial reef and a persistent, medium-to high-density kelp forest, fishing opportunities would be improved. Based on the monitoring observations of the Phases 1 and 2 Wheeler North Reef (see the Annual Report of the Status of Condition C: Kelp Reef Mitigation in 2016—SONGS Mitigation Program [Marine Science Institute 2016]), the standing stock of reef-dwelling fish in the area would increase dramatically. Because the highest-ranking species caught from boats are typically reflective of reef and midwater habitats and the Project would increase the stock of reef-dwelling fish, a substantial change in recreational fishing activities is not anticipated. Lastly, establishment of the Project reef would expand existing recreational spiny lobster fishing opportunities as the Project would expand an existing artificial reef. As stated previously, lobsters are typically found by recreational fishermen in these rocky reef environments. Therefore, establishment of the Project reef would not result in a substantial change in the type of recreational fishing activity in the local area.

The local fishery at the Project area would shift away from the existing assemblage of species and more toward species targeted by recreational fishermen. As proposed, the Project would improve the quality and quantity of recreational fishing activity and would improve the recreational fishery yield in the local area through the creation of approximately 200 acres of rocky reef habitat. Therefore, impacts would be beneficial.

Mitigation Measures

No MMs are recommended for Impact REC-3.

4.13.5 Cumulative Impacts

As stated above, the proposed Project would improve and expand existing recreational fishery opportunities in the San Clemente and south coastal Orange County area. The creation of approximately 200 acres of new rocky reef would shift the existing assemblage of fish species toward those targeted by recreational fishermen and the proposed medium- to high-density kelp forest would create a more-productive fishery than the existing sandy ocean bottom.

Because the Project would result in less-than-significant impacts or even beneficial impacts to shore- and near-shore recreational activities, the Project would not combine with cumulative projects listed in Table 3-3 to significantly impact shore and near-shore recreational areas and activities. For example, the residential and commercial projects included in Table 3-3 would potentially result in localized increases to the local community that could impact the availability of parks and other recreational facilities. The Project consists of the expansion of an existing artificial reef and would not result in increased population density. Therefore, the recreational impacts associated with the Project and identified residential and commercial projects would be dissimilar. Select industrial and marine transportation projects would, however, result in similar impacts as the Project.

Similar to the Project, decommissioning of SONGS Units 2 and 3 would include the use of offshore construction barges. While dismantling of the plant and its intake and outfall pipelines would take place nearly 3 miles to the south of the Project area, the presence of offshore construction barges would temporarily preclude offshore recreational activities in areas of active underwater dismantling activities. Proposed offshore work for SONGS Units 2 and 3 in northern San Diego County would commence after completion of the Project, so there would not be overlap of construction activities. Despite the potential for temporary cumulative impacts to offshore recreational access, temporary restrictions on use would be relatively brief, and closed areas would be very small compared to the expanse of ocean in the surrounding area. In addition, and similar to the proposed Project, the SONGS Units 2 and 3 Decommissioning Project would likely publish an LNM to ensure that other vessels in the area, as well as the USCG and area harbor personnel, would be advised of construction activities and would be likely to avoid the areas. Therefore, because of the temporary nature of construction activities, the sizes of the areas that would be temporarily closed to recreational use, and publication of LNMs, the Project would not combine with the SONGS Units 2 and 3 Decommissioning Project to create a significant cumulative impact. In addition, Project impacts would not be cumulatively considerable.

Both the Berth Improvement Projects and Middle Harbor Redevelopment Project and Pier G Modernization Project are proposed in Los Angeles County, and as such, these projects would not impact local San Clemente or regional south coastal Orange County recreational resources. Therefore, the impacts of these projects would not combine with Project impacts to create a cumulative impact to recreational activities. Marine transport trips associated with the Poseidon Seawater Desalination at Huntington Beach Project would occur in offshore waters located more than 20 miles to the north of the proposed Project. Because of the distance between the Poseidon project and the proposed Project, a cumulative impact to local San Clemente and regional south coastal Orange County recreational resources would not occur.

4.13.6 Summary of Proposed Mitigation Measures

Table 4.13-3 provides a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.13-3. Recreation Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Proximity of Reef construction to the Beaches	None required.
Effects of Reef Construction on Boaters	None required.
Effects of Excluding Other Uses during Reef Construction	None required.
Effects of Kelp and Reef Materials on the Beach (Experimental Reef)	Monitoring program for kelp and rock washing onto the beach.
Effects of Kelp and Reef Materials on the Beach (Mitigation Reef)	Monitoring program for kelp and rock washing onto the beach.
Potential Effects on Waves and Surfing	None required.
Conflicts with Plans and Policies	Monitoring program for kelp and rock washing onto the beach.
Proposed Project	
REC-1: Prevent Access to Recreational Sites or Disturb Users of Recreational Facilities during Times of Peak Use	**APM-3:** Local Notice to Mariners
REC-2: Degradation of a Significant Recreational Resource	None recommended.
REC-3: Substantial Change in the Type, Quality or Quantity of Recreational Fishing Activity or Yield	None recommended.

4.14 TRANSPORTATION (MARINE)

This section describes the existing waterborne transportation setting at the Wheeler North Reef Expansion Project (Project) site, identifies applicable significance thresholds, assesses the Project's potential impacts to marine transportation and their significance, and recommends mitigation measures (MMs) to avoid or substantially reduce any effects found to be potentially significant. The nature of the proposed Project eliminates some typical transportation issues from further consideration, including parking, public transit, and rail and air traffic. As discussed in Section 4.0, *Environmental Impact Analysis*, no impacts associated with onshore transportation/traffic would result from this offshore project.

4.14.1 Environmental Setting

Offshore traffic in the proposed Project area consists primarily of activities associated with the Project site (located 0.6 mile offshore of the city of San Clemente), Dana Point, the Port of Long Beach, and Santa Catalina Island. No harbor or launching facilities are in the immediate Project vicinity. The nearest marina is approximately 4 nautical miles (nm) away at Dana Point. Dana Point Harbor contains two marinas that are used by sailboats, small powerboats, and personal watercraft. The Port of Long Beach, that adjoins the Port of Los Angeles, is managed and operated by the Long Beach Harbor Department and is the second busiest cargo container port in the U.S. Santa Catalina Island includes two commercial quarries, the Pebbly Beach Quarry and the Empire Landing Quarry, which have loading docks with direct marine access for loading of quarried rock. Vessels, ranging in size from private and chartered yachts to large passenger vessels, travel between Santa Catalina Island and nearby harbors. Ferries travel between Dana Point Harbor and Avalon on Santa Catalina Island, with round trips two to three times per day during the summer and one to three times per day during early fall (Catalina Express 2018).

A monitoring program for the existing Wheeler North Reef is currently in place. Existing monitoring activities associated with the experimental reef include the presence of one or two small watercraft and several divers within the Project site at specific times during the year.

4.14.1.1 Vessel Transportation Safety

Commercial and recreational vessels, ranging from deep-draft cargo vessels to small sailboats and excursion charters, use the ocean waters of the proposed Project area. Navigation within the Project area is facilitated by charts, physical aids to navigation, and regulation and information published by the U.S. Coast Guard (USCG) and National Oceanic and Atmospheric Administration (NOAA).

Several measures are in place to guide the safety of vessel navigation in the Los Angeles–Long Beach harbor complex. Restricted navigation areas and routes have been designated to ensure safe vessel navigation and are regulated by agencies and organizations to ensure navigational safety.

Marine vessel traffic within and approaching the POLB is managed by two separate entities: (1) the Vessel Traffic Service, and (2) Jacobsen Pilot Service (POLB 2017). The Vessel Traffic Service is jointly operated by the U.S. Coast Guard and the Marine Exchange of Los Angeles/Long Beach. Jacobsen Pilot Service is the sole piloting company for the POLB and provides navigation services into and out of the POLB.

Regional vessel traffic is also coordinated using Traffic Separation Schemes (TSS), an internationally recognized vessel routing designation, which separates opposing flows of vessel traffic into lanes, included a zone between lanes where traffic is to be avoided. The TSS controls access to and from the ports of Long Beach and Los Angeles through two approaches, the Southern and Western approaches, and the Precautionary Area. Each approach has a 1- to 2-mile-wide traffic lane, established on each side of the TSS. The Project area is approximately 15 miles east of the nearest TSS on the Southern approach; however, the barge route to and from Santa Catalina Island would cross the TSS.

The Harbor Safety Plan for the POLB/POLA designates a Precautionary Area in congested areas near the Port of Long Beach harbor entrance to set speed limits or to establish other safety precautions for ships entering or departing the harbor. The Precautionary Area is defined by the line that extends south of Point Fermin for approximately 8 miles (7 nm), continues east for approximately 8 miles, continues northeast for approximately 3 miles (3 nm), and then heads back northwest. Ships are required to cruise at speeds of 12 knots (12 nm/hour) or less upon entering the Precautionary Area. The nearest edge of the Precautionary Area is approximately 30 miles northwest of the Project area.

The Vessel Traffic Service operated jointly by the Marine Exchange and USCG monitors the positions of all inbound/outbound vessels within the Precautionary Area and the approach corridor traffic lanes (Marine Exchange 2017). While vessels are not required to adhere to a designated TSS, failure to use one could be factor in determining liability if a collision occurs.

Commercial container vessels, as well as most of ocean-going vessels, are required to have tug assistance within the Long Beach Harbor (Marine Exchange 2017). Tug assistance refers to the position of a tug alongside a vessel and applying force to assist in making turns, reducing speeds, and dockings.

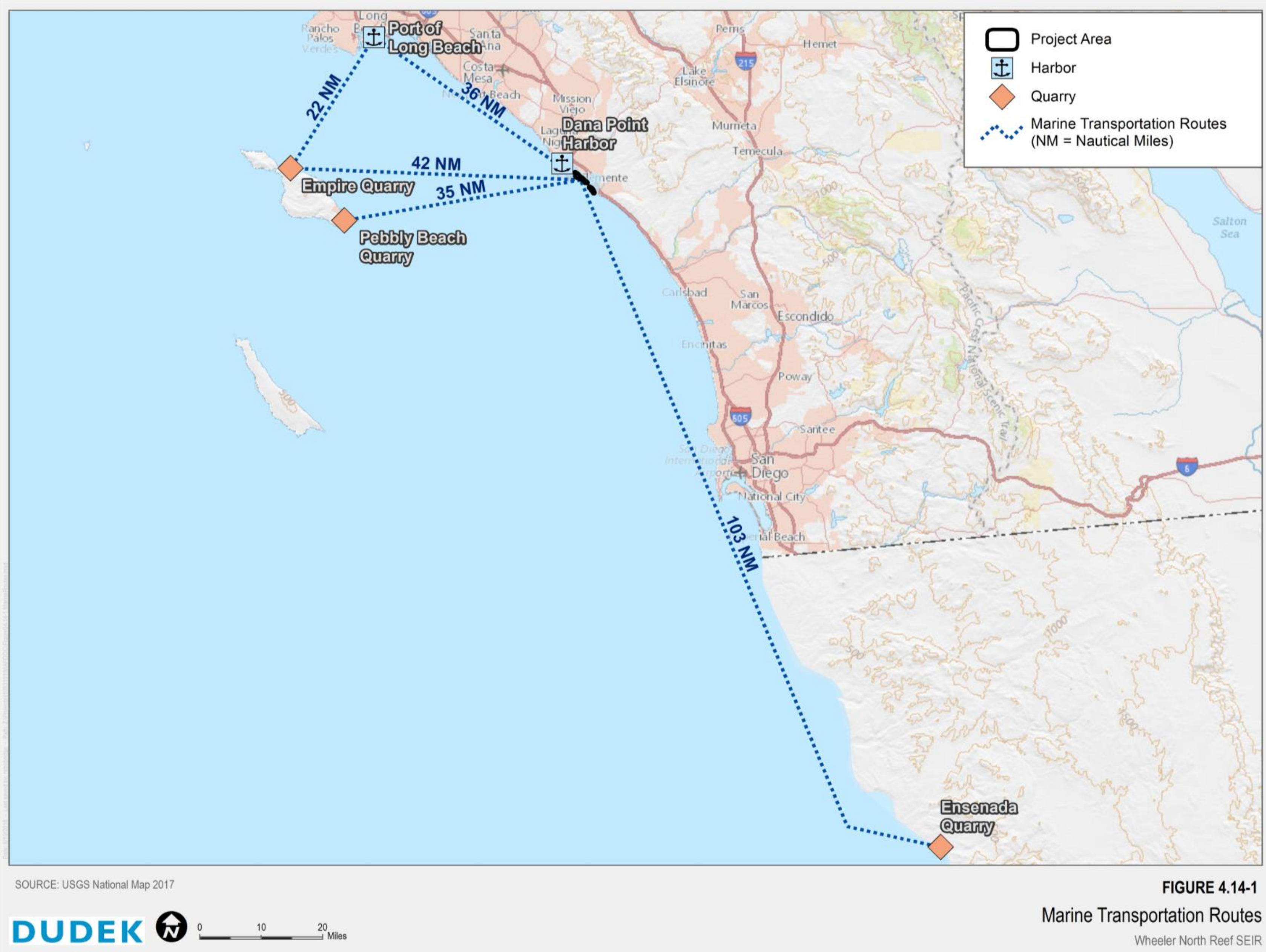

FIGURE 4.14-1

Marine Transportation Routes

Wheeler North Reef SEIR

4.14.1.2 Navigational Hazards and Other Factors Affecting Vessel Traffic Safety

Although marine safety is thoroughly regulated and managed within the Port of Long Beach, various undesirable events can occur during marine navigation. Port pilots can easily identify fixed navigational hazards in the Long Beach Harbor, such as breakwaters protecting the outer harbor anchorage from the open sea and various land masses that comprise the harbor complex. These hazards are both easily visible by radar and are currently illuminated. Four bridges cross the navigational channels of both ports. All have restricted vertical clearances, and two have restricted horizontal clearances as well (Marine Exchange 2017).

Table 4.14-1 summarizes the vessel allisions, collisions, and groundings in the port complex to give an overall estimate of the likelihood of vessel accidents. The table shows that, even in the country's busiest port complex, collisions are rare.

Table 4.14-1. Allisions, Collisions, and Groundings – Port of Los Angeles/Port of Long Beach

Year	ACG[1] Incidents			Total
	Allisions	Collisions	Groundings	
1997	2	3	1	6
1998	3	2	1	6
1999	2	4	2	8
2000	1	2	3	6
2001	1	1	4	6
2002	0	5	6	11
2003	2	2	4	8
2004	2	4	6	12
2005	0	1	3	4
2006	4	1	0	5
2007	2	0	0	2
2010	1	0	1	2
2011	7	0	1	8
2012	6	0	1	7

Sources: Harbor Safety Committee 2007, 2013.
Note: [1] Allisions = when a vessel strikes a stationary object; collision = when two vessels strike each other; groundings = when a ship strikes the seabed.

Other factors affecting vessel traffic safety include fog, winds, tides and currents, and water depth. Fog in the Long Beach Harbor area most commonly occurs during April, as well as from October through February when visibility over the bay is below 0.5 mile for 7 to 10 days per month. Fog drifts out and worsens in the late night and early morning. Smoke from nearby industrial areas often adds to its thickness and persistence. Along the shore, fog drops visibility to less than 0.5 mile on 3 to 8 days per month from August through April, with December usually being the worst (Marine Exchange 2017).

Winds vary, particularly in fall and winter. They are strongest when the Santa Ana winds blow. This offshore desert wind, though infrequent, can be violent. It occurs when a strong high-pressure system sits over the plateau region and generates a northeasterly to easterly flow over Southern California. Aside from weather forecasts, there is often little warning of a Santa Ana's onset: good visibility and unusually low humidity often prevail for some hours before it arrives. Shortly before arriving on the coast, a Santa Ana may appear as an approaching dark-brown dust cloud. This indication often gives a 10- to 30-minute warning. A Santa Ana can come at any time of day and can be reinforced by an early morning land breeze or weakened by an afternoon sea breeze (Marine Exchange 2017). The prevailing winds at Santa Catalina Island are westerly and northwesterly and blow nearly every day, especially in the afternoon. Strong southeast winds occur in the winter, and at times, the sea is too rough for several days to permit the passage of small vessels. In the summer, the winds in the channel are wholly different from those outside the islands and off the coast to the northwest (Marine Exchange 2015).

Tides in the Long Beach Inner and Outer Harbors have a mean range of 3.7 feet, a diurnal range of about 5.4 feet, and a range of 9 feet can occur at the maximum tide. Real and predicted tides along with wind speed, air pressure, and air/water temperature are available from NOAA's website (Marine Exchange 2017). Tidal currents follow the axis of the channels and rarely exceed 1 knot, or 1 nm/hour. The Long Beach Harbor is subject to seiche and surge, with the most persistent and conspicuous oscillation having about a one-hour period. In the vicinity of Reservation Point and near the east end of Terminal Island, the hourly surge is prominent, causing velocity variations that, at times, may be as great as 1 knot. These variations often overcome the lesser tidal current, so that the current ebbs and flows at half-hour intervals. Because of the more-restricted channel, the surge through the Back Channel at the east end of Terminal Island usually reaches a greater velocity than through the channel west of Reservation Point. In the Back Channel, hourly variation may be 1.5 knots or more. At times, the hourly surge, together with shorter, irregular oscillations, causes a very rapid change in water height and current direction/velocity, which may endanger vessels moored at the piers (Marine Exchange 2017).

4.14.1.3 Vessel Traffic

Baseline Vessel Traffic Levels

Based on information in the Port of Long Beach's emission inventory, in 2006, there were 2,792 arrivals, 2,626 departures, and 1,461 shifts, which equates to 6,879 vessel movements in the Port of Long Beach. By comparison, the Port's 2016 emission inventory shows 2,016 arrivals, 2,034 departures, and 1,124 shifts in 2016, which equates to 5,174 vessel movements. This general trend reflects an approximately 25 percent decrease in vessel movement over the last 10 years (Table 4.14-2).

Table 4.14-2. Vessel Calls at Port of Long Beach (2006–2016)

Year	Arrival	Departure	Shift
2006	2,792	2,626	1,461
2007	2,700	5,582	1,535
2008	2,505	2,528	1,317
2009	2,287	2,266	1,300
2010	2,212	2,189	1,111
2011	2,313	2,323	1,175
2012	2,036	2,046	1,157
2013	1,921	1,947	1,140
2014	1,965	1,974	1,263
2015	1,988	2,011	1,378
2016	2,016	2,034	1,124

Sources: Starcrest Consulting Group 2017, POLB 2017.

Future Vessel Traffic Levels

Project-related construction activities are proposed to occur between May 1 and October 1, 2019. Since the proposed Project would generate only minimal operational vessel traffic (monitoring), the bulk of the analysis focuses on the construction period (2019 conditions).

The demand for Port of Long Beach cargo capacity is expected to increase in future years as international trade volumes continue to expand. The number of vessel callings at the Port will increase accordingly, but not in direct proportion to the increased tonnage of cargo since the trend is to use large container ships, which will result in more cargo per vessel calling at the port. Therefore, accurately projecting vessel calls is infeasible. The ability of the port to handle increasing numbers of ships depends on primary and secondary limiting factors. Primary factors are those features of the Port that cannot be easily changed, such as the breakwater entrance, channel depth, channel geometry, and environmental conditions. Secondary factors are those features that can be changed or modified at modest capital or operational expenditure, including towage services.

4.14.2 Regulatory Setting

Federal and state laws and regulations pertaining to and relevant to marine transportation and the Project are identified in Appendix D.

4.14.3 Significance Criteria

Criteria set forth for transportation and traffic in the State California Environmental Quality Act (CEQA) Guidelines Appendix G checklist apply primarily to onshore transportation (e.g., effects to intersections, streets, highways and freeways, pedestrian and bicycle paths, mass transit, congestion management programs [including but not limited to level of service standards], air traffic patterns) and are, thus, not applicable to the analysis of the offshore proposed Project. Therefore, consistent with other EIRs prepared by the Commission for offshore projects in its jurisdiction, a significant impact would occur if the Project would:

- Reduce the existing level of safety for navigating vessels or increase the potential for marine vessel accidents

The analysis considers the specific type and number of vessels that would pass by the Project area and evaluates the number and characteristics of vessels that would be used in the construction and operation of the proposed Project. Any increase in vessel traffic related to the proposed Project is evaluated in the context of baseline and anticipated vessel movements within the Project area.

4.14.4 Environmental Impact Analysis and Mitigation

4.14.4.1 1999 Program EIR

The 1999 Program EIR examined the onshore transportation impacts of trucks hauling construction rock from mainland quarries, unlike the Project. The 1999 Program EIR analysis determined that these rock hauling trips would cause intersection level of service to drop to unacceptable levels, a significant impact. The 1999 Program EIR also considered the potential for marine vessels or the new reefs to create hazards to navigation; those were determined to be less than significant impacts.

4.14.4.2 2018 Subsequent EIR

The Project has been evaluated to assess whether it would cause disruptions to marine transportation or otherwise conflict with the plans, policies, and regulations of agencies having jurisdiction over Project activities. Table 4.14-5 at the end of this section provides a summary of the Project’s potential impacts related to marine transportation and any Applicant-Proposed Measures (APMs) or MMs recommended to reduce impacts to a level that is less than significant.

ENVIRONMENTAL IMPACT ANALYSIS

Impacts of the proposed Project and MMs recommended are examined in this section.

Impact MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents

Traffic generated by construction activities could have a short-term impact on the level of safety for navigating vessels or increase the potential for marine vessel accidents **(Less than Significant).**

Impact Discussion

Project construction would use marine vessels to transport quarry rock, construct the reef, and transport crew members from Dana Point Harbor to the Project site. (Figure 4.14-1) Construction vessels include a derrick barge (construction barge), two tugboats, and four supply barges. One tugboat would be used to transport quarry rock, while the other would be used to support construction operations and positioning of barges. Construction would occur during daylight hours, 6 days a week, except on holidays and during inclement weather. Work would commence at approximately 7 a.m. and end at approximately 5 p.m. for an average workday of 10 hours. Construction is scheduled over the 2019 season between May 1 and October 1, 2019. Rock transport would take place for ~~92~~ 94 days and reef construction for 130 days. Table 4.14-3 summarizes the trips, time to transit, nautical miles travelled, and days of construction.

Table 4.14-3. Quarry Rock Transport by Barge and Tugboat

Location to Destination	NM travelled[1]	Hours	Trips[4]	Construction Days[4]
2019 Construction Season				
Santa Catalina Island to POLB[2]	22	6	~~38~~36	~~38~~36
POLB to Project Site[2]	36	10		
Project Site to Santa Catalina Island[3]	42	8	~~38~~36	~~38~~36
POLB to Ensenada	139	20	~~6~~8	~~6~~8
Ensenada to Project Site	103	25	~~6~~8	~~6~~8
Project Site to Ensenada	103	15	~~6~~8	~~6~~8
Total Construction Days				**~~92~~94**

Source: Elwany 2018.
Acronyms: nm = nautical mile; POLB = Port of Long Beach.
Notes:
[1] 1 nm = 1.15 miles.
[2] Assuming 4 to 5 knots (1 knot = 1 nm/hour), loaded.
[3] Assuming 5 to 7 knots, unloaded.
[4] Number may vary depending upon rock quarry availability. The scenario for 2019 assumes a total of 44 trips, which could include ~~38~~ 36 trips to Catalina and ~~6~~ 8 trips to Ensenada.

Quarry Rock Transport

Project construction would involve the conveyance of quarry rock for the reef. As described above, quarry rock would be obtained from Santa Catalina Island and

Ensenada, then transported by tugboat and barge to the Project site. The transport tug from Santa Catalina Island would likely stop at Long Beach to change crew.

Cranes and front-end loaders would be used to load the quarry rock onto two 2,000-ton-capacity, flat-deck supply barges. Alternatively, the contractor may elect to use one flat-deck barge having a capacity of 4,000 tons. In either case, approximately 4,000 tons of rock would be transported, which equates to 44 round trips. Each trip consists of a one-day trip from Santa Catalina Island to the Project site and a day traveling back to Santa Catalina Island with the empty barges. The transport tugboat will take approximately 10 hours each way assuming an average speed of 4 to 5 knots. The tugboat would only make one trip per day; thus, the supply barges would be exchanged every 2 to 3 days.

The proposed Project would result in a slight increase in vessel traffic in the Project area and routes to and from the homeport (the Port of Long Beach). The derrick barge would be moved to the Project site once and would remain there throughout construction. The supply barge and tugboats used for the proposed Project activities would be mobilized to the Project site from the Port of Long Beach. Thus, increased use of the port during construction of the reef could result in a reduced level of safety for navigating vessels or increase the potential for vessel accidents. However, the construction would occur over one season during summer months to avoid conflicting with commercial fishing uses of the Project area. Additionally, the proposed Project would result in approximately 44 round trips (88 total trips) for the rock transport over the one construction season. Compared to the 2,016 vessel arrivals and 2,034 vessel departures from the port in 2016, the proposed Project would result in less than 3 percent of the port's arrivals and departures. Similarly, the proposed ~~six~~ eight round trips to Ensenada during the 2019 construction season would result in a nominal increase in vessel traffic.

Vessel transportation within the port, the Project area, and offshore of California is regulated by many laws and regulations to ensure vessel safety. Various entities including international, federal, and other state and local agencies are responsible for enforcing these regulations. Federal laws and USCG's title 33 and title 46 provisions, in addition to the U.S. Army Corps of Engineers procedures, would regulate the navigation system. Additional organizations and programs in place include the Marine Exchange, Harbor Safety Committee, TSS, and VTS, which would prevent safety-related conflicts. Compliance with the HSP and the various regulations enforced by the agencies listed above would prevent safety-related conflicts with vessel traffic resulting from quarry rock transport between Santa Catalina Island and Ensenada, the port, and the Project site.

Due to the limited number of trips resulting from Project-related construction activities, resulting in a short-term increase of vessel trips in the area, along with vessel safety-related programs and organizations put in place to enforce vessel transportation regulations, the vessel safety and accident impacts resulting from the proposed Project would be less than significant.

Crew Transport

Tugboat crew would originate from the Port of Long Beach. During quarry rock transport, the tugboat would tow the derrick barge through San Pedro Bay and past the breakwater, then follow the southbound coastwise traffic lane toward the Project site (approximately 36 nm). The trip from the Port of Long Beach to the Project site would be approximately 10 hours. The rest of the crew would originate from Dana Point Harbor. This crew boat would generate, on average, one round trip per day during reef construction (Table 4.14-4), which would occur for approximately 130 days over one construction season. These trips would have a minimal effect on existing boat traffic during the construction period, which would occur during summer months to avoid conflicting with commercial fishing uses of the Project area.

Based upon compliance with existing Harbor Patrol Marine Operations Bureau boating regulations, along with the proposed Project's minimal increase in crew boat transport, the proposed Project would not interfere with existing waterborne traffic in Dana Point Harbor, resulting in less-than-significant impacts to vessel safety and the potential for increased vessel accidents.

Table 4.14-4. Crew Transport by Crew Boat

Location to Destination	nm traveled[1]	Trips	Construction Days
Dana Point Harbor to Project Site	4	65	65
Project Site to Dana Point Harbor	4	65	65
		Total Construction Days	**130**

Source: Elwany 2018.
Acronym: nm = nautical mile.

Operations

The proposed Project could result in safety impacts to other vessels because Project construction would require the use of the derrick barge, tugboat, derrick barge crane, and ~~track~~front-end loader at the Project site, which could potentially impact other established marine traffic systems in the area or existing aids to navigation. To reduce potential for vessel accidents, marker buoys would be used during materials placement activities. In addition, under APM-2, Forecast Notification, all construction vessels would be withdrawn to a safe location 24 hours before reputable forecasts indicate conditions that would generate ground swells (waves) greater than 5 feet. A safe location could include a nearby area where vessels can be anchored safely, to deep water, or to Long Beach Harbor. Under APM-3, Local Notice to Mariners (see Section 4.13, *Recreation*) the Applicant would publish a Local Notice to Mariners to ensure that other vessels in the area, and USCG and area harbor personnel, would be advised of the vessels locations, likely transit routes, and dates and duration of the construction. The Local Notice to Mariners would provide adequate notification to affected mariners, and the presence of vessels at the

Project site would not interfere with existing marine transportation. Therefore, this impact is considered less than significant.

Reef Monitoring

Because the overall monitoring effort for the existing reef would not increase as a result of the proposed Project upon completion, impacts related to reef monitoring would be less than significant.

Project impacts associated with the safety of navigating vessels would be less than significant; however, the Applicant has committed to a forecast notification for Project vessels (APM-2) and submittal of a Local Notice to Mariners (APM-3) to ensure that impacts to offshore transportation would be further reduced. With the implementation of APM- 2 and APM-3, impacts to transportation would remain at a less-than-significant level.

Mitigation Measures

No MMs are recommended for Impact MT-1.

4.14.5 Cumulative Impacts

Import volumes at the Port of Long Beach are expected to increase substantially in future years as international trade volumes continue to expand. However, as discussed in Section 4.14.1.3, *Vessel Traffic*, the number of vessel calls at the port is difficult to accurately predict. The ability of the port to handle increasing numbers of ships depends on primary and secondary limiting factors. Primary factors are those features of the port that cannot be easily changed, such as the breakwater entrance, channel depth, channel geometry, and environmental conditions. Secondary factors are those features that can be changed or modified at modest capital or operational expenditure, including towage services.

Cumulative transportation impacts at the port could result from increased port calls and potential vessel accidents. The proposed Project would result in an increase in vessel transportation during the 1-year construction season. As presented in Table 4.14-3, the proposed Project would result in 44 round trips over one construction season, representing less than 3 percent of the port calls in 2016. Therefore, the proposed Project's contribution to potential cumulative impacts to vessel transportation at the port and in the region would be less than significant.

Other projects proposed in the Project area would contribute to marine traffic, which in combination with the proposed Project could impact the level of safety for navigating vessels or increase the potential for marine vessel accidents. The SONGS Units 2 and 3 Decommissioning Project would occur near the proposed Project site, but offshore decommissioning activities are not expected to overlap with the proposed Project's schedule; therefore, no cumulatively considerable impact is anticipated regarding the two projects.

The crew boat used during the reef construction phase of the proposed Project would contribute to temporary increases in marine vessel activities and may overlap with other marine projects identified in Section 3.0, *Cumulative Projects*. Crew boat transit would result in an additional 65 round trips over the construction season. However, the short-term Project impacts when combined with the relevant cumulative projects (see Table 3-3) would not result in a substantial increase in total vessel movement in future years. Additionally, while adjacent cumulative projects could conflict with construction vessels at the Project site, reef construction activities would be contained to the area around the Project site. Furthermore, while marine vessels are also needed to conduct monitoring of the existing reef and proposed Project after construction, continued monitoring would not result in more trips than baseline.

Because the proposed Project would have no long-term marine transportation impacts and would only contribute a small number of marine vessels over the short term, it would not combine with other projects' marine vessel traffic to result in a cumulative impact on marine transportation. Additionally, as standard practice for offshore activities, the proposed Project would adhere to a forecast notification process for Project vessels (APM-2), would issue a Local Notice to Mariners (APM-3) to provide adequate notification to affected mariners in the Project area and would prevent the vessels at the Project site from interference with existing marine transportation.

The proposed Project would not result in long-term construction or operational marine transportation impacts, would not reduce the existing level of safety for navigating marine vessels, and would not substantially increase the potential for marine accidents. Therefore, cumulative impacts would be less than significant.

4.14.6 Summary of Proposed Mitigation Measures

Table 4.14-5 presents a summary of the impacts and MMs in the 1999 Program EIR and for the proposed Project.

Table 4.14-5. Transportation (Marine) Impact/Mitigation Summary

Impact	Mitigation Measure or Applicant-Proposed Measure
1999 Project (Phases 1 and 2 Reef)	
Impact MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents	None required.
Proposed Project	
Impact MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents	**APM-2:** Forecast Notification **APM-3:** Local Notice to Mariners

5.0 PROJECT ALTERNATIVES ANALYSIS

5.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires the California State Lands Commission (Commission) to analyze a reasonable range of alternatives to a proposed project that could feasibly achieve the objectives of the project while substantially reducing significant environmental effects. As noted in Section 1.0, *Introduction*, in 1999, the Commission certified a Final Program Environmental Impact Report and approved the lease for Phases 1 and 2 of Wheeler North Reef. The 1999 Program EIR analyzed alternatives to that project, including alternative locations, reef materials, and reef designs. The Commission is preparing this Subsequent EIR to assess the changes in environmental impact resulting from the proposed expansion of the Wheeler North Reef by 200 additional acres of low-relief rocky reef. This section describes the Commission's alternatives screening methodology, identifies alternatives eliminated from further consideration, and provides descriptions and impact analyses of each alternative considered. Section 6.0 identifies the environmentally superior alternative.

5.2 SELECTION OF ALTERNATIVES

An important aspect of the environmental review process is the identification and assessment of reasonable alternatives that have the potential to avoid or reduce the significant impacts of a proposed project to allow for a comparative analysis for consideration by decision makers. The range of alternatives and methods for selection is governed by CEQA and applicable CEQA case law. As stated in State CEQA Guidelines section 15126.6, subdivision (a), the lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. This section includes the range of alternatives that have been selected by the lead agency (in this case, the Commission) for examination, as well as its reasoning for selecting these alternatives.

5.2.1 Guidance on Alternatives Development and Evaluation

The State CEQA Guidelines provide the following guidance for evaluating alternatives in EIRs:

- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible (State CEQA Guidelines, § 15126.6, subd. (a)).
- The discussion of alternatives shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the

attainment of the project objectives, or would be more costly (State CEQA Guidelines, § 15126.6, subd. (b)).

- The range of potential reasonable alternatives to the project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. Among the factors used to eliminate alternatives from detailed consideration are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts (State CEQA Guidelines, § 15126.6, subd. (c)).
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (State CEQA Guidelines, § 15126.6, subd. (d)).

CEQA also requires an EIR to evaluate a "no project" alternative. The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the project with the impacts of not approving the project. The analysis of the no project alternative must discuss the baseline conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved (State CEQA Guidelines, § 15126.6, subd. (e)).

5.2.2 Alternatives Screening Methodology

Alternatives to the Project were identified, screened, and either retained for further analysis or eliminated, as described herein. Alternatives were developed based on input received from comments on the Notice of Preparation (NOP), information presented by the Commission, comments received during consultation with the California Coastal Commission (CCC), and information provided by the Applicant. The alternatives screening process consisted of the following steps:

Step 1: Define the alternatives to allow comparative evaluation.

Step 2: Evaluate each alternative using the following criteria:

- The extent to which the alternative would accomplish most of the basic goals and objectives of the Project (see Section 2.2, *Project Objectives*)
- The feasibility of the alternative, taking into account site suitability, economic viability, availability of infrastructure, General/Local Coastal Plan consistency, and consistency with other applicable plans and regulatory limitations
- The extent to which the alternative would avoid or lessen one or more of the significant environmental impacts of the Project

Step 3: Determine the suitability of the proposed alternative for full analysis in the SEIR based on Steps 1 and 2, described previously. Alternatives considered unsuitable were eliminated, with appropriate justification, from further consideration.

For the screening analysis, the technical and regulatory feasibility of potential alternatives was assessed at a general level. The assessment of feasibility was conducted by using "reverse reason" to identify anything about the alternative that would be infeasible based on technical or regulatory grounds. CEQA does not require elimination of a potential alternative based on cost of construction and operation/maintenance. At the screening stage, potential impacts of the alternatives or the Project cannot be evaluated with any measure of certainty; however, elements of the Project that are likely to be sources of impacts can be identified.

In general, characteristics used to eliminate alternatives from further consideration included:

- Inconsistency with the Project's purpose and need
- Limited effectiveness in reducing environmental impacts
- Engineering feasibility and safety
- Permitting feasibility
- Potential for adverse effects on air quality or marine resources
- Potential for inconsistency with adopted agency plans and policies
- Feasibility when compared to other alternatives under consideration

An alternative with infeasible characteristics was disregarded. Feasible alternatives that did not clearly offer the potential to reduce significant environmental impacts and infeasible alternatives were also removed from further analysis. In the final screening step, environmental advantages and disadvantages of the remaining alternatives were carefully weighed with respect to their potential for overall environmental advantage, technical feasibility, and consistency with Project objectives.

The State CEQA Guidelines require the consideration of a "no project" alternative and to identify, under specific criteria, an "environmentally superior" alternative. If the environmentally superior alternative is determined to be the no project alternative, the EIR must identify an environmentally superior alternative among the other alternatives (State CEQA Guidelines, § 15126.6, subd. (e)(2)).

5.2.3 Impacts of Major Concern

As documented in Sections 4.1 through 4.16, implementation of the Project would result in minor increases to the less-than-significant impacts identified in the 1999 Program EIR, without changing any CEQA significance determinations. While implementation of the

Project would result in less-than-significant impacts in all resource areas with implementation of mitigation measures, the resource areas of particular importance in the consideration of alternatives for this Subsequent EIR include: (1) Biological Resources (Marine), (2) Air Quality, (3) Hazards and Hazardous Materials, (4) Ocean Water Quality, (5) Public Services, (7) Recreation, and (8) Transportation (Marine).

As discussed in Section 4.1, *Biological Resources (Marine)*, marine vessels used for Project construction could transfer or introduce invasive non-native or nuisance species to the Project area. Implementation of MM BIO-2 would reduce this potential impact. In addition, both marine mammals and sea turtles could be significantly impacted by either being struck or crushed by falling rocks, disturbed as a result of noise generated, or struck by a ship during the transportation of barges and other vessels associated with Project construction. Implementation of MM BIO-3 is required to reduce the potential impacts to marine mammals and sea turtles to a less-than-significant level. Furthermore, the increase in boat and ship activity associated with the construction of the proposed Project would result in an increased risk of oil and fuel spills, which could significantly impact coastal and marine wildlife, especially listed species. Implementation of MM BIO-4 is required to reduce the potential impact of an accidental spill of pollutants or the grounding of a vessel to a less-than-significant level.

As discussed in Section 4.3, *Air Quality*, Project-generated construction emissions in 2018 and 2019 would exceed the South Coast Air Quality Management District's (SCAQMD) construction mass daily threshold for emission of oxides of nitrogen (NO_X).[33] Implementation of MM AQ-1a and MM AQ-1b would reduce these emissions to a level below significance within both the ACAQMD and San Diego Air Basin (SDAB) and would avoid generating cumulatively considerable increases in emissions of nonattainment pollutants (NO_X). Implementation of MM AQ-1b would also avoid adverse health effects related to the South Coast Air Basin's (SCAB's) nonattainment status of ozone (O_3).

As discussed in Section 4.8, *Hazards and Hazardous Materials*, potential impacts from Project construction could occur if hazardous materials are released as a result of marine vessel collision or adverse weather conditions. Implementation of MM HAZ-1a and MM HAZ-1b would reduce impacts to a less-than-significant level.

As discussed in Section 4.11, *Ocean Water Quality*, temporary and localized impacts to ocean water quality could result from construction-related discharges, mismanagement of materials, or accidental spills. Although the probability is very low that such discharges would exceed ocean water quality standards, violate an applicable National Pollutant Discharge Elimination System (NPDES) permit, or impair a beneficial use, this impact would be considered potentially significant. Implementation of MM OWQ-1 and MM HAZ-1a would reduce the potential impact to a less-than-significant level.

[33] NO_X is a general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2) and other oxides of nitrogen.

Finally, as discussed in Section 4.12, *Public Services*, although the proposed Project's construction timing would allow Project construction to benefit from the calm weather conditions and decrease the likelihood of accidents due to bad weather, accidents could still occur and potentially impact an emergency plan or emergency services. Implementation of MM PUB-1 would ensure impacts to emergency services would be reduced to a less-than-significant level.

The potential impacts from the resource areas listed herein and additional considerations for further reducing potential impacts to marine transportation were considered while screening for the alternatives in this Subsequent EIR.

5.2.4 Summary of Screening Results

Alternatives found to be technically feasible and consistent with the Project's objectives were reviewed for their ability to reduce the potentially significant environmental impacts associated with the Project. Table 5-1 identifies potential alternatives to the proposed Project and indicates if they were eliminated from further consideration (see rationale in Section 5.3, *Alternatives Eliminated from Further Consideration*), or fully described and evaluated in detail (see Section 5.4, *Alternatives Evaluated in this Subsequent EIR*).

Table 5-1. Potential Alternatives to the Proposed Project

Eliminated from Further Consideration
Combination of Reef at Multiple Locations
Northern San Clemente Site
Farther Offshore from Existing Wheeler North Reef
Compound Reef at San Clemente
Compound Reefs at Multiple Locations
Compound Reefs at Big Sycamore Canyon (inside and outside of the preserve) or Pitas Point
Kelp Planting
Two-Season Construction 2018–2019 Period Alternative
Fully Evaluated in Subsequent EIR
No Project Alternative
Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative
Low-Relief, Medium-Coverage Reef Alternative
Low-Relief, High-Coverage Reef Alternative
Two-Season Construction 2019–2020 Period Alternative

The alternatives listed in Table 5-1 are not an exhaustive list of potential options for the Project. The alternatives considered but eliminated from further consideration in the 1999 Program EIR were reconsidered as alternatives to the proposed Project and were modified to account for the presence of the existing reef and the Project objectives, but were ultimately eliminated from consideration in this Subsequent EIR because they were (1) outside of the scope of this Subsequent EIR, or (2) for the same reasons as in the 1999 Program EIR. These alternatives are described and the rationale for their elimination is presented in Section 5.3 below. The alternatives listed in Table 5-1 are not an exhaustive list of potential options for the Project. The alternatives considered but eliminated from further consideration in the 1999 PEIR were reconsidered as alternatives to the proposed Project and were modified to account for the presence of the existing reef and the Project objectives, but were ultimately eliminated from consideration in this Subsequent EIR because they were (1) outside of the scope of this Subsequent EIR, or (2) for the same reasons as in the 1999 PEIR. These alternatives are described and the rationale for their elimination is presented in Section 5.3.

5.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

5.3.1 Combination of Reef at Multiple Locations

5.3.1.1 Description

The following sites were suggested during preparation of the 1999 Program EIR for locating the mitigation reef in part or in whole: North Carlsbad (30 acres), South Carlsbad (64 acres), Leucadia (25 acres), Encinitas (25 acres), and Mission Beach (85 acres). This alternative would allow for the build out of the reef on different project sites and would provide a larger reef than the proposed Project.

5.3.1.2 Rationale for Elimination

The offshore sites listed in Section 5.3.1.1 are located between San Onofre and Point Loma. Since none of the sites provide the number of acres needed for the mitigation reef build out, it would be necessary to combine several sites and possibly include part of the San Clemente site to achieve the necessary acreage. In addition, since no reef has been built at these locations in the past, it would likely be necessary to conduct experiments with different reef designs at these sites to ensure that the mitigation reef could meet the criteria included in the San Onofre Nuclear Generating Station (SONGS) Coastal Development Permit (CDP). This would substantially increase the time required to construct the additional reef area by several years. Construction at multiple locations would also require multiple mobilizations of the derrick barge and associated construction equipment, raising construction costs further. Due to likely economic infeasibility, this alternative was not considered further in the Subsequent EIR.

5.3.2 Northern San Clemente Site

5.3.2.1 Description

This alternative would involve construction of the artificial reef at the Northern San Clemente Site, which is an alternative site location suggested by local commercial fishing groups during the preparation of the 1999 Program EIR. The alternative site location is located just north of the San Clemente Pier. The fishermen suggested this site because they believed that it had more existing hard substrate and would avoid known commercial fishing grounds.

5.3.2.2 Rationale for Elimination

The northern San Clemente area was evaluated during the site selection and it was determined that kelp beds were less likely to be successful in this area because of the close proximity to San Juan Creek. Sedimentation from the San Juan Creek would reduce the success for growing sustainable kelp in this location. In addition, there would be greater navigation hazards associated with the site due to the close proximity of Dana Point Harbor and the use of the area by recreational boaters.

This site is just north of the San Clemente Pier and much of it overlaps with the Project site. Because this alternative would not be substantially different from the Project, it was eliminated from further consideration.

5.3.3 Farther Offshore from Existing Wheeler North Reef

5.3.3.1 Description

This alternative would involve construction of the artificial reef at a location farther offshore from the existing Wheeler North Reef in San Clemente. The artificial reef would be situated adjacent to the existing reef at a depth of 50 to 55 feet. This alternative site location was originally suggested by local commercial fishing groups during preparation of the 1999 Program EIR. The fishermen suggested this site because they believed that it had more existing hard substrate and would avoid known commercial fishing grounds.

5.3.3.2 Rationale for Elimination

The Farther Offshore alternative site location was eliminated for construction of the artificial reef during the site selection process in 1999 because of the depth of the water. Because of the reduced light levels at depth, there is a reduced chance that kelp would recruit and grow in this area. In addition, the greater depth of sand cover on the ocean bottom in this area would require that more reef material be placed to avoid the reef being covered over by sand. This rationale still applies; therefore, this alternative was eliminated.

5.3.4 Compound Reef at San Clemente

5.3.4.1 Description

This alternative would construct a compound reef, with both high-relief and low-relief areas, within the same lease area proposed for the Project (for information on this type of reef, see Granneman and Steele [2015]). Generally, a compound reef design harbors more invertebrates, and supports less giant kelp than a strictly low-relief reef. Fish density and biomass are also positively correlated with compound reef designs (Granneman and Steele 2015). The reef expansion area would be the same size as that proposed for the Project, at approximately 200 acres.

5.3.4.2 Rationale for Elimination

This alternative was eliminated from further consideration for several reasons:

- The Project is intended to satisfy CDP requirements to mitigate for impacts to San Onofre kelp reef, a low-relief reef. Although one of the key objectives of the Project is to increase the fish standing stock, the new reef area must meet the requirements of CDP Condition C for an "artificial reef that develops and maintains a kelp bed community, and has a physical structure as similar as practicable to San Onofre kelp bed (SOK)" (SONGS CDP, p. 77). A compound reef would include a different physical structure than the low-relief San Onofre kelp reef and would thus be inconsistent with the requirements of the CDP.
- During the permitting process that led to the CDP, the CCC worked closely with the Applicant to develop an experimental reef design. That reef design was limited to low-relief reef because that was the structure of the impacted San Onofre kelp reef. The results of the experimental reef monitoring informed the design of the Phase 2 reef. This alternative was not a design tested through the experimental Phase 1 reef and would potentially require a new experimental reef to be constructed and monitored before constructing the mitigation reef.
- CDP Condition C requires that mitigation reef include medium- to high-density kelp bed community. Areas of high-relief reef would not support this density of kelp, based on research conducted on other reefs (e.g., Patton et al. 1994, Deysher et al. 2002).
- Studies conducted on other reefs within the bight indicate that high-relief reefs are more subject to colonization by non-native invasive sea fans (*Muricea* spp.) (Deysher et al. 2002) and encrusting organisms that encourage fish to graze on kelp (Patton et al. 1994). Therefore, a reef design with high-relief could conflict with the following performance standard in the CDP: "The important functions of the reef shall not be impaired by undesirable or invasive benthic species…." Since detailed studies of high-relief reefs have not been performed, the potential impact a new high-relief reef may have on the existing reef is unknown. The existing Phase 1 and 2 reef currently meets the CDP performance standard for invasive species, so the high-relief reef could jeopardize the compliance of the existing reef by introducing or increasing invasive species.

In addition to these key rationales, a compound reef design would require much more quarry rock than the Project, which would substantially increase impacts to air quality and greenhouse gases (GHGs). For reference, approximately 7,000 tons per acre would be needed to construct a high-relief reef. This is up to 10 times the amount of rock needed for the Project (low-relief reef ranges from 760 to 2,750 tons per acre depending on coverage). For example, a 200-acre low-relief, low-coverage reef would require approximately 152,000 tons of rocks, while a 30-acre high-relief reef would require

210,000 tons. This amount of rock would also substantially increase the costs to construct the reef, and could extend the duration of construction activities into an additional year. A high-relief reef design would also have an increased potential for impacts to wave propagation toward the shoreline, and could interfere with recreational activities such as surfing.

For these reasons, this alternative was eliminated from further consideration in the Subsequent EIR.

5.3.5 Compound Reefs at Multiple Locations

5.3.5.1 Description

This alternative would involve building a compound reef, with both high-relief and low-relief areas, at the South Carlsbad and Mission Beach sites, and possibly at other sites as well. Depending on the reef design, a total of up to 300 acres of artificial reef could be constructed.

5.3.5.2 Rationale for Elimination

Refer to the rationale for eliminating the Compound Reef at San Clemente (Section 5.3.4.2).

5.3.6 Compound Reefs at Big Sycamore Canyon (Inside and Outside the Preserve) or Pitas Point

5.3.6.1 Description

This alternative would involve constructing the artificial reef at an alternative site location at Big Sycamore Canyon, which is located near Oxnard in Ventura County. This alternative site location was suggested by the United Anglers Association during the preparation of the 1999 Program EIR.

5.3.6.2 Rationale for Elimination

This site was evaluated during the site screening process during the preparation of the 1999 Program EIR, and it was determined that the Big Sycamore Canyon site is approximately 96 miles from SONGS. It was determined this site is too far removed from San Onofre to provide in-kind mitigation for the lost kelp resources. It was also determined that the site does not meet the criteria outlined in the CCC permit conditions for reef mitigation because Pitas Point is even farther north up the coast, and as a result, would also not meet the CCC permit conditions. In addition, refer to the rationale for eliminating the Compound Reef at San Clemente (Section 5.3.4.2).

5.3.7 Kelp Planting

5.3.7.1 Description

This alternative would rely on planting juvenile kelp plants on plastic floats and lines anchored to existing sand and rock substrate rather than constructing an artificial reef. Following a 20-acre experimental phase at the San Clemente site and 2 years of monitoring, an additional 180 acres of kelp would be planted at San Clemente or Mission Beach. This alternative was recommended by the Marine Forests Society during preparation of the 1999 Program EIR.

5.3.7.2 Rationale for Elimination

This alternative was evaluated during the site screening process during preparation of the 1999 Program EIR, and it was determined that while this alternative would largely mitigate the air quality impacts that resulted from Phases 1 and 2 of the Wheeler North Reef, the alternative would not adequately address the purposes of the constructed reefs as described in the permit adopted by the CCC. In particular, the alternative would not provide adequate conditions for a community of reef-associated biota similar in composition, diversity, and abundance to the San Onofre kelp bed. This would conflict with the SONGS CDP requirements, similar to the conflicts described previously for the Compound Reef at San Clemente alternative (see Section 5.3.4).

5.3.8 Two-Season Construction 2018–2019 Period Alternative

The Applicant originally intended to construct the expansion reef over 2 years, starting in August 2018 through September 2018, and then continuing construction in 2019.

5.3.8.1 Rationale for Elimination

During preparation of the Subsequent EIR CSLC staff and the Applicant determined that permitting would not be complete until 2019, which would make achieving the proposed timeline for construction infeasible. Therefore, this alternative was eliminated from further consideration in the Subsequent EIR.

5.4 ALTERNATIVES EVALUATED IN THIS SUBSEQUENT EIR

Pursuant to State CEQA Guidelines section 15126.6, this Subsequent EIR analyzes a reasonable range of alternatives to the proposed Project that would feasibly attain most of the basic objectives of the proposed Project but would avoid or substantially lessen one or more of the potentially significant effects of the proposed Project. Each selected alternative is described below. Pursuant to State CEQA Guidelines section 15126.6, subdivision (d), the descriptions include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed Project.

5.4.1 No Project Alternative

The No Project Alternative is included pursuant to the requirements of CEQA and the State CEQA Guidelines. Under the No Project Alternative, the proposed Project would not be constructed. Rather, the existing Phase 1 and Phase 2 mitigation reef would remain as is and would not be expanded beyond the 174 acres that currently exist. Most likely, the existing Phase 1 and Phase 2 mitigation reef would continue to not meet the CDP performance standard for standing fish stock, and the Applicant would not receive mitigation credit for the reef. Table 5-2 provides a summary of environmental impacts associated with the No Project Alternative.

Table 5-2. Impact Summary: No Project Alternative

BIOLOGICAL RESOURCES (MARINE)
No impacts to marine biological resources would occur. Under the No Project Alternative, no new development would occur. Thus, none of the potentially significant impacts related to invasive species, marine mammals and sea turtles, or accidental spill of pollutants or the grounding of a vessel requiring mitigation would occur in the No Project Alternative and no mitigation would be required. Furthermore, minor soft sediment habitat losses would not occur. However, with no development in the Project area, the proposed expansion of the existing 174-acre Wheeler North Reef would not occur, and the Wheeler North Reef would continue to not meet all of the absolute performance standards specified in the SONGS CDP, including the replenishment of fish stock. Construction and operation of the Phase 3 artificial reef would improve the quality and quantity of fish stock in the local area through the creation of approximately 200 acres of rocky reef habitat. Under the No Project Alternative, this beneficial impact would not occur; however, since the No Project Alternative would avoid three potentially adverse impacts, the potential impacts to marine biological resources would be less than that created by the proposed Project.
AESTHETICS
No impacts to aesthetics or light and glare would occur. The Project area would remain as is, and no new artificial reef would be introduced in the Project area beyond that which already exists. No construction-related equipment would be present in the Project area, so the area would not experience the temporary visual impacts related to the presence of such equipment. Under this alternative, no new sources of kelp wrack or rocks would be introduced to the Project site, and the visual characteristics of the Project area would remain the same as existing conditions. Aesthetics impacts would be less under the No Project Alternative as compared to the Project.
AIR QUALITY
No impacts to air quality would occur. With no reef construction under the No Project Alternative, there would be no new construction emissions or vessel emissions. No new or additional significant air quality impacts outside of those generated under existing conditions would be expected under the No Project Alternative.
CULTURAL RESOURCES
No impacts to cultural resources would occur. Under the No Project Alternative, there would be no new ground disturbance, and therefore, no potential impacts to historic, archaeological, or paleontological resources would occur. With no additional reef construction within the Wheeler North Reef area, there would be no potential to disturb any undiscovered historic resources or intact prehistoric cultural deposits that are buried in the shallow sands. Accordingly, no

Table 5-2. Impact Summary: No Project Alternative

significant adverse impacts on cultural resources would occur under this alternative, and potential impacts to cultural resources would be less than those created by the Project.
CULTURAL RESOURCES—TRIBAL
No impacts to Tribal cultural resources would occur. Under the No Project Alternative, there would be no new ground disturbance, and therefore, no potential impacts to Tribal cultural resources would occur. With no additional reef construction within the Wheeler North Reef area, there would be no potential to discover or disturb any human remains or Tribal cultural resources within the Project area. Accordingly, no significant adverse impacts on Tribal cultural resources would occur under this alternative, and potential impacts to Tribal cultural resources would be less than those created by the Project.
GREENHOUSE GAS EMISSIONS
No impacts to GHG emissions would occur. Thus, the No Project Alternative would have less GHG emission impacts as compared to the Project.
GEOLOGY AND COASTAL PROCESSES
No impacts to geology and coastal processes would occur. Under the No Project Alternative, the Phase 3 artificial reef would not be constructed and the surf characteristics, beach erosion rates, wave action, and natural coastal processes would remain the same as existing conditions. Existing surface conditions would not be altered; therefore, the water surface may be less smooth as compared to the site with the additional reef and kelp beds. In addition, the shape and direction of currents passing through the Project area would be the same, so there would be no change to the beach erosion rates or wave action as the suspension and deposition of sand would remain the same. Accordingly, potential impacts to geologic or coastal processes would be less than that created by the Project.
HAZARDS AND HAZARDOUS MATERIALS
No impacts related to hazards and hazardous materials would occur. Under the No Project Alternative, the Phase 3 artificial reef would not be constructed and existing conditions would remain the same as they are today. With no development in the Project area, there would be no potential for accidents caused by bad weather or accidental collision of marine vessels. Accidental hazardous material spills relating to construction or monitoring activities would not occur under this alternative. Accordingly, no significant adverse impacts would occur under this alternative, and potential impacts related to hazards and hazardous materials would be less than that created by the proposed Project.
LAND USE AND PLANNING
Under the No Project Alternative, no development would occur in the Project area. With no development, there would be no interference with both the existing offshore uses and the adjacent onshore designations. Onshore public open space, public access, and recreational areas would remain the same, as would the existing offshore recreational, commercial, or military uses in the Project study area. However, with no development in the Project area, the proposed expansion of the existing 174-acre Wheeler North Reef would not occur, and the Wheeler North Reef would continue to not meet all of the absolute performance standards specified in the SONGS CDP. This would adversely affect coastal zone resources and would go against the policy direction of the applicable environmental plans, policies, and regulations. Thus, the No Project Alternative would have an adverse impact on consistency with the Coastal Act by not allowing compliance with CDP requirements. Since an adverse impact would occur under this alternative, potential impacts to land use and planning would be more than that created by the proposed Project.

Table 5-2. Impact Summary: No Project Alternative

MINERAL RESOURCES
No impacts to mineral resources would occur. Under the No Project Alternative, no new development would occur and existing conditions in oil, gas, or geothermal wells or fields and sand, gravel, concrete and rock reserves would remain the same as they are today. This alternative would result in no new development within the planning area or no new use of construction rock reserves. Thus, the existing mineral resources demands and consumption would remain similar to existing levels, which would be less than the anticipated demand under the Project. As such, impacts to mineral resources would be less under the No Project Alternative as compared to the Project.
NOISE
No impacts to noise would occur. Under the No Project Alternative, no new development would occur and existing noise levels in the Project area would continue. No additional construction, vehicle, or vessel noise impacts would occur in comparison to full buildout under the proposed Project. Under the No Project Alternative, marine life would not be exposed to significant new construction noise sources. Potential noise impacts under this alternative would, therefore, be less than the potential noise impacts created by the Project.
OCEAN WATER QUALITY
No impacts to ocean water quality would occur. Under the No Project Alternative, no new artificial reef would be constructed and would result in no changes to the ocean's existing water quality. Temporary and localized impacts to ocean water quality as a result of construction-related discharges, mismanagement of materials, or accidental spills would not occur. Although no significant impacts are anticipated under the full buildout of the Project, impacts to ocean water quality would be less under the No Project Alternative.
PUBLIC SERVICES
No impacts to public services would occur. None of the potentially significant impacts related to the need for emergency services or beach cleanup would occur under the No Project Alternative. Since the No Project Alternative would avoid the potential adverse impacts, the potential impacts to public services would be less than that created by the Project.
RECREATION
No impacts to recreation would occur. Under the No Project Alternative, no new development would occur. Thus, none of the potentially significant impacts related to recreational resources would occur in the No Project Alternative. However, with no development in the Project area, the proposed expansion of the existing 174-acre Wheeler North Reef would not occur, and the Wheeler North Reef would continue to not meet all of the performance standards specified in the SONGS CDP, including the standing fish stock requirement. Project construction would improve the quality and quantity of fish stock in the local area through the creation of approximately 200 acres of rocky reef habitat. Under the No Project Alternative, this beneficial impact to recreational fishing would not occur; however, since the No Project Alternative would avoid the potential adverse impacts, the potential impacts to recreation would be less than that created by the Project.
TRANSPORTATION (MARINE)
No impacts to marine transportation would occur. Under the No Project Alternative, no new development would occur and existing conditions for navigating marine vessels would remain the same as they are today. Thus, none of the potentially significant impacts related to construction or operation-related marine accidents would occur. Thus, the No Project Alternative would avoid all adverse impacts, and the potential impacts to marine transportation would be less than that created by the proposed Project.

5.4.2 Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative

Compared to the proposed Project, this alternative would compress the northward design, extending only 1.9 miles northwest of the existing Wheeler North Reef, by placing approximately 150,000 tons of quarry rock within nine polygon areas up to a maximum area of 200 acres, with approximately 42 percent of the substrate covered within those polygons. The footprint of this alternative would be adjacent to and north of the existing reef. This compressed, northerly design would reduce the amount of reef face exposed to the ocean. The polygons would be larger and extend into deeper water and sand than the Project. Under this alternative, the rocks would be placed on sand approximately 3 feet thick, increasing the probability of reef burial. In addition, decreasing the perimeter-to-area ratio as compared to the Project would also decrease the fish biomass per unit of placed rock (Wilson et al. 1990).

Figure 5-1 shows the conceptual design of this alternative relation to the Project and other alternatives.

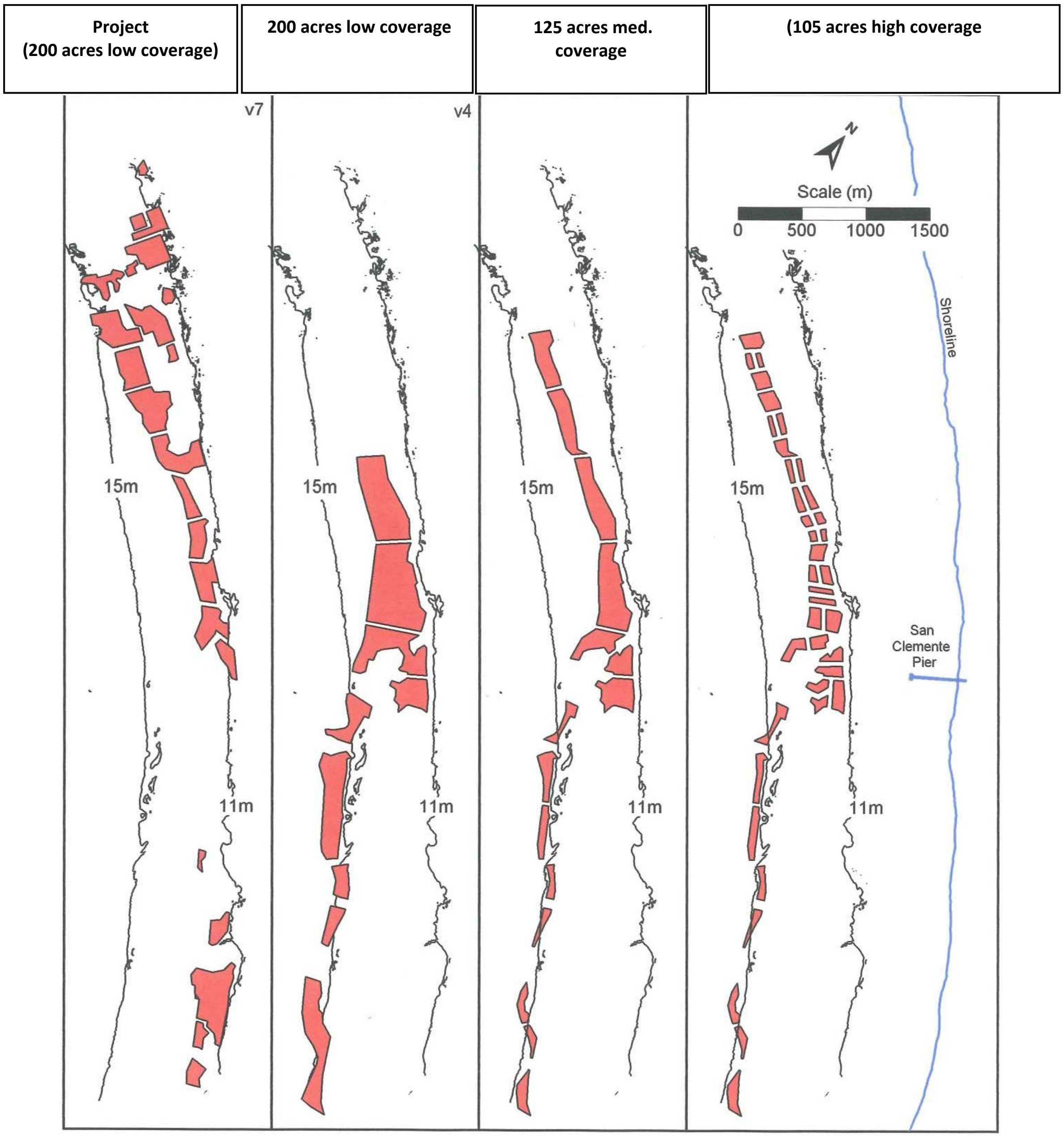

Figure 5-1. Configuration of Alternative Reef Designs Compared to the Project

1 Table 5-3 provides a summary of environmental impacts associated with this alternative.

Table 5-3. Impact Summary: Low-Relief, Low-Coverage Reef, Less Northward Expansion Reef Alternative

BIOLOGICAL RESOURCES (MARINE)
This alternative would have similar impacts as the Project to existing marine biological resources on the Phase 1 and Phase 2 reef, as well as the San Marcos Reef. Because construction would be in a more compressed area it would require less repositioning of the barge and would have a shorter construction duration, impacts to the sandy bottom community would be reduced as compared to the Project. The reduced construction duration would also reduce the duration of turbidity effects on marine biological resources, as compared to the Project. Because fewer barge trips would be required, there would also be incrementally reduced risk of introducing invasive non-native or nuisance species to the vicinity. MM BIO-2, as identified in Section 4.1, would reduce the potential for introduction or enhancement of invasive non-native or nuisance species during construction. The reduced number of barge trips and reduced amount of rock being placed would incrementally reduce the potential for adverse effects on marine mammals, or for habitat degradation and mortality related to accidental spills or pollutants or vessel grounding. MM BIO-3 and MM BIO-4, as identified in Section 4.1, would reduce the potential impacts to less than significant. Compared to the Project, beneficial effects from creating new areas of kelp reef would be reduced with this alternative due to the expected lower density of kelp canopy, and beneficial effects on the standing fish stock would be less as a result of the decreased reef perimeter to area ratio of the alternative design.
AESTHETICS
Under this alternative, the construction-related visual impacts would be similar to the proposed Project and would consist of impacts related to the presence of supply barges (present during construction and transport), a derrick crane barge, and associated tugboats. Reef construction would be short-term and temporary, similar to the proposed Project; however, due to the location and configuration of the reef, construction equipment would generally be located farther from the shoreline than the proposed Project. The visual area of impact from nearby onshore views would be somewhat smaller in the southern part of the Project area given the construction activities' distance to the shore. Construction activities near the San Clemente Pier would be more extensive than under the Project, increasing temporary impacts from that observation point. Overall, impacts to scenic resources and ocean views would be generally similar to the Project, and the temporary nature of the construction would still make impacts less than significant. Once the reef is fully constructed, some of the quarry rock would be placed on a sand thickness of about 3 feet, increasing the probability of reef burial in those areas and decreasing the overall acreage of kelp forest. Thus, the amount of kelp wrack found on nearby beaches may by slightly less than the proposed Project. Therefore, this alternative would have slightly less impacts on the existing visual character and quality of the site and the surrounding areas when compared to the proposed Project.
AIR QUALITY
This alternative is projected to use approximately the same amount of quarry rock as the Project. Therefore, the number of days the SCAQMD and San Diego Air Pollution Control District (SDAPCD) NO_X construction mass daily thresholds would be exceeded would be similar to the Project. Therefore, potential impacts to air quality for this alternative would remain significant without mitigation, same as for the Project. With implementation of MM AQ-1a and MM AQ-1b, as outlined in Section 4.3, NO_X emissions associated with this alternative

Table 5-3. Impact Summary: Low-Relief, Low-Coverage Reef, Less Northward Expansion Reef Alternative

would be reduced below the significance threshold, allowing the alternative to not conflict with or obstruct implementation of the SCAQMD 2016 Air Quality Management Plan (AQMP). In addition, the implementation of MM AQ-1a and MM AQ-1b would reduce construction emissions from this alternative within the SDAB and would allow the alternative not to exceed the SDAPCD thresholds.
CULTURAL RESOURCES
Under this alternative, minimizing the amount of northward expansion would mean that the area of potential effect (APE) would be smaller than the proposed Project, which would reduce the likelihood of disturbing any undocumented historical, archaeological, or paleontological resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, the site has a sand thickness of about 3 feet and is located in an area where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely than the proposed Project site. Furthermore, the depth of the sand at the site increases the probability that intact prehistoric or historic cultural deposits or artifacts may be found and decreases the likelihood that any that are found are in situ deposits that would have been deposited there by waves and currents. However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of finding and impacting artifacts, fragmentary shipwreck remains, or other archaeological remains that might be buried in the shallow sands would be unlikely. This alternative would be constructed similarly to the proposed Project; therefore, the placement of boulders will cap and preserve in place any paleontological resources that may be present in the Project area. Similar to the proposed Project, construction would not impact paleontological resources. Further, the site would also remain completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and have associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
CULTURAL RESOURCES—TRIBAL
Under this alternative, the APE would be smaller than the proposed Project, which would reduce the likelihood of disturbing any Tribal cultural resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, the site has a sand thickness of about 3 feet and is located in an area where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely than the proposed Project site. Furthermore, the depth of the sand at the site increases the probability that intact prehistoric or historic cultural deposits or artifacts may be found and decreasing the likelihood that any found are in situ deposits that would have been deposited there by waves and currents. However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of impacting Tribal cultural resources that might be buried in the shallow sands would be low. Further, the site would also remain completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and have associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
GREENHOUSE GAS EMISSIONS
Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would

Table 5-3. Impact Summary: Low-Relief, Low-Coverage Reef, Less Northward Expansion Reef Alternative

require a similar number of barge trips to the Project. Therefore, GHG emissions from construction would be approximately the same as the Project. Therefore, potential impacts to GHG emissions for this alternative would be the same as those described for the Project, and would remain less than significant.
GEOLOGY AND COASTAL PROCESSES
This alternative would have similar effects on geology and coastal processes as the Project. The alternative reef design would not inhibit natural coastal processes, such as erosion rates, wave action, or large-scale current patterns. Any changes in currents across the reef would not result in significant changes to beach erosion rates, as wave action is the primary contributor to the suspension and deposition of sand within the littoral and subtidal zones. This alternative would not have a significant impact on the swell waves that are the primary wave action that affects erosion rates along beaches and would not have a cumulatively considerable impact on coastal processes.
HAZARDS AND HAZARDOUS MATERIALS
Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would require a similar number of barge trips to the Project. Therefore, the likelihood of vessel accidents or spills that could result in impacts related to hazards and hazardous materials would be similar to that of the Project. As with the Project, with implementation of MM HAZ-1a and MM HAZ-1b, as outlined in Section 4.8, the impact would be reduced to a less-than-significant level.
LAND USE AND PLANNING
Similar to the Project, this alternative would have a beneficial impact on consistency with the Coastal Act by improving compliance with CDP requirements. However, because the alternative reef design would have fewer beneficial effects related to achieving the CDP performance standards (e.g., expected less kelp canopy and fish abundance), the beneficial effects to land use and planning would be less than under the Project.
MINERAL RESOURCES
This alternative would a similar amount of quarry rock compared to the Project. Each of the three quarries can provide the required tonnage of nominal 1,000-pound stones specified for the work and can meet or generally exceed the California Department of Fish and Wildlife (CDFW) specifications for artificial reef material. This impact would be similar to the Project, and would remain less than significant.
NOISE
Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would require a similar number of barge trips to the Project. The construction would occur farther from shore and sensitive receptors. Attenuation of construction noise would ensure that a temporary noise increase during construction would be well below the stated threshold of significance of 15 decibels (dB), and for the most part would be inaudible or barely audible. Therefore, temporary noise impacts from construction would be similar to or reduced as compared to the Project. As with the Project, temporary noise impacts from this alternative would be less than significant, and no mitigation is required.
OCEAN WATER QUALITY

Table 5-3. Impact Summary: Low-Relief, Low-Coverage Reef, Less Northward Expansion Reef Alternative

Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would require a similar number of barge trips to the Project. Therefore, this alternative would have a similar likelihood to the Project of vessel accidents or spills that could adversely affect ocean water quality. As with the Project, implementation of MM OWQ-1 and MM HAZ-1a outlined in Section 4.11, would ensure the impact would be reduced to a less-than-significant level.
PUBLIC SERVICES
Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would require a similar number of barge trips to the Project. Therefore, this alternative would have a similar likelihood to the Project of vessel accidents or other emergencies that would require response from emergency services. Although impacts to emergency services are not likely, implementation of MM PUB-1, as outlined in Section 4.12, would ensure the Orange County Harbor Patrol Marine Operations Bureau would be notified when construction plans and schedules are finalized and would reduce potential impacts to emergency services to a less-than-significant level. Because certain portions of this alternative site are closer to the shore than the proposed Project, this alternative could result in a greater amount of kelp washing onto shore and require additional public services to clean up the kelp. However, as stated for the Project, monitoring of the Phase 1 and 2 reef areas found that significant increases in kelp wrack would not likely be found on nearby beaches. Furthermore, much of the reef under this alternative would be placed in sand that is up to 3 feet in thickness, which would likely reduce the amount of kelp density on the reef as compared to the Project.
RECREATION
Like the proposed Project, construction of this alternative would only be performed in offshore waters, and as such, work would not impede access to recreation in city of San Clemente (City) parks and recreational areas and state beaches. Construction activities would also not result in permanent development onshore that would be capable of impeding access to onshore recreational facilities and areas. Construction would be farther away from the beach and surf zone in some areas when compared to the Project and would not interfere with nearshore recreation. Because the reef expansion would not extend as far north, the overall construction area would be smaller than for the Project and would not be seen by as many areas of the beach. Because certain portions of the site for this alternative are closer to the shore than the proposed Project, onshore and nearshore recreational resources may be slightly more impacted by increased amounts of kelp washing onto shore. However, as stated for the Project, monitoring of the Phase 1 and 2 reef areas found that significant increases in kelp wrack or rocks would not likely be found on nearby beaches. Furthermore, much of the alternative reef would be placed in sand that is up to 3 feet in thickness, which would likely reduce the amount of kelp on the reef as compared to the Project. Decreasing the perimeter-to-area ratio of the reef under this alternative would decrease the fish biomass per unit of placed rock. Therefore, beneficial impacts to recreational fishing would be reduced as compared to the Project. All other impacts to recreation would be as described for the Project and would be less than significant.

Table 5-3. Impact Summary: Low-Relief, Low-Coverage Reef, Less Northward Expansion Reef Alternative

TRANSPORTATION (MARINE)
Because this alternative would require a similar amount of quarry rock as compared to the Project, the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative would require a similar number of barge trips to the Project. Therefore, this alternative would have similar impacts to marine transportation as compared to the Project. Due to the short-term nature of the vessel trip increase and the limited number of trips, along with vessel safety-related programs and organizations put in place to enforce vessel transportation regulations and notifications such as the Local Notice to Mariners (LNM), the vessel safety and accident impacts resulting from the increase in marine vessel traffic would remain less than significant.

5.4.3 Low-Relief, Medium-Coverage Reef Alternative

This alternative would be a 125-acre, low-relief, medium-coverage reef. This alternative would place approximately 225,000 tons of quarry rock within 15 polygon areas totaling 125 acres, covering 63 percent of the area within those polygons. Due to the increased amount of quarry rock used (approximately 29 percent more), approximately 12 more barge trips would be required in 2019 to complete the reef, as compared to the Project. The conceptual design of this alternative in relation to the Project and the other alternatives is shown in Figure 5-1. Table 5-4 provides a summary of environmental impacts associated with the Low-Relief, Medium-Coverage Reef Alternative.

Table 5-4. Impact Summary: Low-Relief, Medium-Coverage Reef Alternative

BIOLOGICAL RESOURCES (MARINE)
This alternative would have similar types of impacts as the Project to existing marine biological resources on the Phase 1 and Phase 2 reef, as well as the San Marcos Reef. However, based on the conceptual plan for this alternative, less rock would be placed near the existing Wheeler North Reef or the San Marcos Reef; therefore, impacts to those resources could potentially be reduced compared to the Project. Construction would occupy a smaller area of the sandy bottom community, so permanent effects on that resource would be reduced compared to the Project. However, the extended construction schedule required to place the additional rock would increase the duration of turbidity effects on marine biological resources, as compared to the Project. Because more barge trips would be required, there would also be increased risk of introducing invasive non-native or nuisance species to the vicinity. MM BIO-2, as identified in Section 4.1, would reduce the potential for introduction or enhancement of invasive non-native or nuisance species during construction. The increased number of barge trips and greater amount of rock being placed would incrementally increase the potential for adverse effects on marine mammals, or for habitat degradation and mortality related to accidental spills or pollutants or vessel grounding. MM BIO-3, as identified in Section 4.1, would reduce the potential impacts to marine mammals and sea turtles. Finally, MM BIO-4, as identified in Section 4.1, would reduce the potential impact of an accidental spill of pollutants or the grounding of a vessel to a less-than-significant impact. Compared to the Project, beneficial effects from creating new areas of kelp reef would be reduced with this alternative due to the expected lower density of kelp canopy, and beneficial effects on the standing fish stock would be less as a result of the decreased reef perimeter-to-area ratio of the alternative design.
AESTHETICS

Table 5-4. Impact Summary: Low-Relief, Medium-Coverage Reef Alternative

Under this alternative, the construction-related visual impacts would be similar to the proposed Project and would consist of impacts related to the presence of supply barges (present during construction and transport), a derrick crane barge, and associated tugboats. Aesthetic impacts from the reef construction under this alternative would be short-term and temporary, similar to the proposed Project. As compared to the Project, this alternative would place the southern expansion of reef further away from the shoreline (Figure 5-1). Therefore, construction activities on the southern half of the reef would be located farther from observers, reducing aesthetic impacts and the light and glare impacts from safety lighting at night. However, the 29 percent increase in quarry rock would be expected to increase the duration of construction by approximately 29 percent, thus increasing the duration of adverse aesthetic impacts. Once the reef is fully constructed, some of the quarry rock would be placed on a sand thickness of about 2.5 feet, slightly increasing the probability of reef burial in those areas and decreasing the overall acreage of kelp forest. Thus, the amount of kelp wrack found on nearby beaches may by slightly less than the Project. Overall, this alternative would have similar impacts on the existing visual character and quality of the site and the surrounding areas when compared to the proposed Project.
AIR QUALITY
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Alternative would require approximately 12 more barge trips (29 percent more) than the Project. Therefore, the number of days the SCAQMD and SDAPCD NO_X construction mass daily thresholds would be exceeded would be increased by up to 29 percent compared to the Project. Therefore, potential impacts to air quality for this alternative would remain significant without mitigation and would be greater than those identified for the Project. With the implementation of MM AQ-1a and MM AQ-1b, as outlined in Section 4.3, NO_X emissions associated with this alternative would be reduced below the thresholds, allowing the alternative to not conflict with or obstruct implementation of the SCAQMD 2016 AQMP. In addition, the implementation of MM AQ-1a and MM AQ-1b would reduce construction emissions from this alternative within the SDAB and would allow the alternative not to exceed the SDAPCD thresholds.
CULTURAL RESOURCES
Under this alternative, the APE would be smaller than the proposed Project, which would reduce the likelihood of disturbing any undocumented historical, archaeological, or paleontological resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, some of the reef under this alternative would be constructed further offshore in areas that have a sand thickness of about 2.5 feet, and where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely under this alternative than for the Project. However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of finding and impacting artifacts, fragmentary shipwreck remains, or other archaeological remains that might be buried in the shallow sands would be low. This alternative would be constructed similarly to the Project; therefore, the placement of boulders would cap and preserve in place any paleontological resources that may be present in the Project area. Construction of this alternative would not impact paleontological resources, similar to the Project. Further, the site for this alternative has remained completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
CULTURAL RESOURCES—TRIBAL

Table 5-4. Impact Summary: Low-Relief, Medium-Coverage Reef Alternative

Under this alternative, the APE would be smaller than the proposed Project, which would reduce the likelihood of disturbing any Tribal cultural resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, the site for this alternative has a sand thickness of about 2.5 feet where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely than the proposed Project site. Furthermore, the depth of the sand at the site increases the probability that intact prehistoric or historic cultural deposits or artifacts may be found and decreasing the likelihood that any found are in situ deposits that would have been deposited there by waves and currents. However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of impacting Tribal cultural resources that might be buried in the shallow sands would be low. Further, the site for this alternative would also remain completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
GREENHOUSE GAS EMISSIONS
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Reef Alternative would require approximately 12 more barge trips than the Project. Therefore, GHG emissions from transport of rock would be increased by approximately 29 percent compared to the Project. With this increase, GHG emissions would remain well under the annual threshold of 3,000 metric tons of carbon dioxide equivalent (MT CO_2e) and would remain less than significant.
GEOLOGY AND COASTAL PROCESSES
This alternative would have similar effects on geology and coastal processes as the Project. The alternative reef design would not inhibit natural coastal processes, such as erosion rates, wave action, or large-scale current patterns. Any changes in currents across the reef would not result in significant changes to beach erosion rates, as wave action is the primary contributor to the suspension and deposition of sand within the littoral and subtidal zones. This alternative would not have a significant impact on the swell waves that are the primary wave action that affects erosion rates along beaches and would not have a cumulatively considerable impact on coastal processes.
HAZARDS AND HAZARDOUS MATERIALS
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Reef Alternative would require approximately 12 more barge trips than the Project, and construction duration would be approximately 29 percent longer. This increase in construction duration and marine transportation would increase the likelihood of vessel accidents or spills that could result in impacts related to hazards and hazardous materials. As with the Project, implementation of MM HAZ-1a and MM HAZ-1b, as outlined in the Section 4.8, the impact would be reduced to a less-than-significant level.
LAND USE AND PLANNING
Similar to the Project, this alternative would have a beneficial impact on consistency with the Coastal Act by improving compliance with CDP requirements. However, because the reef constructed under this alternative would have fewer beneficial effects related to achieving the CDP performance standards (e.g., expected less kelp canopy and fish abundance), the beneficial effects to land use and planning under this alternative would be less than under the Project.
MINERAL RESOURCES

Table 5-4. Impact Summary: Low-Relief, Medium-Coverage Reef Alternative

This alternative would require approximately 29 percent more quarry rock than the Project. Each of the three quarries can provide the required tonnage of nominal 1,000-pound stones specified for the work and can meet or generally exceed the CDFW specifications for artificial reef material. This impact would be increased as compared to the Project, but would remain less than significant.
NOISE
This alternative would require approximately 29 percent more quarry rock than the Project, and the construction duration would be approximately 29 percent longer. However, the construction in the southern portion of the reef area would occur farther from the shore and sensitive receptors. Nonetheless, attenuation of construction noise would ensure that temporary noise increase during construction would be well below the stated threshold of significance of 15 dB, and for the most part would be inaudible or barely audible. Therefore, temporary noise impacts from construction would be similar to or reduced as compared to the Project. As with the Project, temporary noise impacts from this alternative would be less than significant, and no mitigation is required.
OCEAN WATER QUALITY
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Reef Alternative would require approximately 12 more barge trips than the Project, and construction duration would be approximately 29 percent longer. This increase in construction duration and marine transportation would increase the likelihood of vessel accidents or spills that could adversely affect ocean water quality. As with the Project, implementation of MM OWQ-1 and MM HAZ-1a, as outlined in Section 4.11, would reduce this impact to a less-than-significant level.
PUBLIC SERVICES
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Reef Alternative would require approximately 12 more barge trips than the Project, and construction duration would be approximately 29 percent longer. This increase in construction duration and marine transportation would increase the likelihood of vessel accidents or other emergencies that would require response from emergency services. Although impacts to emergency services are not likely, implementation of MM PUB-1, as outlined in Section 4.12, would ensure the Orange County Harbor Patrol Marine Operations Bureau would be notified when construction plans and schedules are finalized and would reduce potential impacts to emergency services to a less-than-significant level. Because the southern portion of the site for this alternative is further from shore than the proposed Project, this alternative should result in less kelp washing onto shore and require less public services to clean up the kelp. However, as stated for the Project, monitoring of the Phase 1 and 2 reef areas found that significant increases in kelp wrack would not likely be found on nearby beaches.
RECREATION
Like the proposed Project, construction of this alternative would only occur in offshore waters, and as such, work would not impede access to recreation in City parks and recreational areas and state beaches. Construction activities would also not result in permanent development onshore that would be capable of impeding access to onshore recreational facilities and areas. Construction would generally be farther from the beach and surf zone when compared to the Project and would not interfere with nearshore recreation. The overall construction area would be smaller than for the Project and would not be seen by as many areas of the beach. However, construction would be expected to last approximately 29 percent longer than the Project as a result of more rock being placed and would have the potential to disrupt offshore

Table 5-4. Impact Summary: Low-Relief, Medium-Coverage Reef Alternative

recreation for that additional time. Because the southern portion of the site for this alternative are farther from the shore than the proposed Project, this alternative should result in less kelp washing onto shore and disrupting recreational activities on the beach. However, as stated for the Project, monitoring of the Phase 1 and 2 reef areas found that significant increases in kelp wrack would not likely be found on nearby beaches. Decreasing the perimeter-to-area ratio of the reef under this alternative would decrease the fish biomass per unit of placed rock. Therefore, beneficial impacts to recreational fishing would be reduced as compared to the Project. All other impacts to recreation would be as described for the Project and would be less than significant.
TRANSPORTATION (MARINE)
Because approximately 29 percent more quarry rock would be used for this alternative, the Low-Relief, Medium-Coverage Reef Alternative would require approximately 12 more barge trips in 2019 than the Project. Therefore, this alternative would have increased impacts to marine transportation as compared to the Project. Due to the short-term nature of the vessel trip increase and the limited number of trips, along with vessel safety-related programs and organizations put in place to enforce vessel transportation regulations and notifications such as the LNM, the vessel safety and accident impacts resulting from the increase in marine vessel traffic would remain less than significant.

5.4.4 Low-Relief, High-Coverage Reef Alternative

This alternative would be a 105-acre, low-relief, high-coverage reef (81 percent hard substrate coverage). This alternative would place approximately 288,750 tons of quarry rock within 37 polygon areas, covering 81 percent of the area within those polygons. This design would require almost 93 percent more rock than the Project. The analysis assumes that most of this additional rock would need to be obtained from a quarry in Ensenada, Mexico, as the Project design requirements are expected to maximize the Santa Catalina Island quarry’s output. The reef polygons would be smaller than under the Project, which would increase the perimeter-to-area ratio and thus could increase the fish biomass per unit of placed rock (Wilson et al. 1990). However, the condensed nature of this reef may make those perimeters less available to fish, as each perimeter area would be near another perimeter. The conceptual design of the Low-Relief, High Coverage Reef Alternative in relation to the Project and the other alternatives is shown in Figure 5-1. Table 5-5 provides a summary of environmental impacts associated with this alternative.

Table 5-5. Impact Summary: Low-Relief, High-Coverage Reef Alternative

BIOLOGICAL RESOURCES (MARINE)
This alternative would have similar types of impacts as the Project to existing marine biological resources on the Phase 1 and Phase 2 reef, as well as the San Marcos Reef. However, based on the conceptual plan for this alternative, less rock would be placed near the existing Wheeler North Reef or the San Marcos Reef; therefore, impacts to those resources could potentially be reduced compared to the Project. Construction would occupy a smaller area of the sandy bottom community, so permanent effects on that resource would be reduced compared to the Project. However, the substantially extended construction schedule required to place the additional rock would increase the duration of turbidity effects on marine biological resources,

Table 5-5. Impact Summary: Low-Relief, High-Coverage Reef Alternative

as compared to the Project. The increased number of barge trips and greater amount of rock being placed would incrementally increase the potential for adverse effects on marine mammals, or for habitat degradation and mortality related to accidental spills or pollutants or vessel grounding. MM BIO-2, as identified in Section 4.1, would reduce the potential impacts to marine mammals and sea turtles. Finally, MM BIO-~~3~~4, as identified in Section 4.1, would reduce the potential impact of an accidental spill of pollutants or the grounding of a vessel to a less-than-significant impact. Compared to the Project, beneficial effects from creating new areas of kelp reef may be reduced with this alternative due to the expected lower density of kelp canopy.
AESTHETICS
Under this alternative, the construction-related visual impacts would be similar to the proposed Project and would consist of impacts related to the presence of supply barges (present during construction and transport), a derrick crane barge, and associated tugboats. Aesthetic impacts from reef construction under this alternative would be short term and temporary, similar to the proposed Project. As compared to the Project, this alternative would place the southern expansion of reef further away from the shoreline (Figure 5-1). Therefore, construction activities on the southern half of the reef would be located farther from observers, reducing aesthetic impacts and the light and glare impacts from safety lighting at night. However, the 93 percent increase in quarry rock would be expected to increase the duration of construction by approximately double, thus increasing the duration of adverse aesthetic impacts. Once the reef is fully constructed, some of the quarry rock would be placed on a sand thickness of about 2.5 feet, slightly increasing the probability of reef burial in those areas and decreasing the overall acreage of kelp forest. Thus, the amount of kelp wrack found on nearby beaches may by slightly less than the Project. Overall, this alternative would have greater temporary impacts on the existing visual character and quality of the site and the surrounding areas when compared to the proposed Project, due to the extended duration of construction.
AIR QUALITY
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief High-Coverage Alternative would require approximately 41 more barge trips (93 percent more) than the Project. Therefore, the number of days the SCAQMD and SDAPCD NO_X construction mass daily thresholds would be exceeded would be increased by up to 93 percent compared to the Project. Therefore, potential impacts to air quality for this alternative would remain significant without mitigation and would be substantially greater than those identified for the Project. With the implementation of MM AQ-1a and MM AQ-1b, as outlined in Section 4.3, NO_X emissions associated with this alternative would be reduced below the threshold, allowing the alternative to not conflict with or obstruct implementation of the SCAQMD 2016 AQMP. In addition, the implementation of MM AQ-1a and MM AQ-1b would reduce construction emissions from this alternative within the SDAB and would allow the alternative not to exceed the SDAPCD thresholds.
CULTURAL RESOURCES
Under this alternative, the APE would be smaller than the proposed Project, which would reduce the likelihood of disturbing any undocumented historical, archaeological or paleontological resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, some of the reef under this alternative would be constructed further offshore in areas that have a sand thickness of about 2.5 feet, and where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely under this alternative than for the Project.

Table 5-5. Impact Summary: Low-Relief, High-Coverage Reef Alternative

However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of finding and impacting artifacts, fragmentary shipwreck remains, or other archaeological remains that might be buried the shallow sands would be unlikely. This alternative would be constructed similarly to the Project; therefore, the placement of boulders will cap and preserve in place any paleontological resources that may be present in the project area. Construction of this alternative would not impact paleontological resources, similar to the Project. Further, the project area for this alternative has remained completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and have associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
CULTURAL RESOURCES—TRIBAL
Under this alternative, the APE would be smaller than the proposed Project, which would reduce the likelihood of disturbing any Tribal cultural resources within the Project area. Unlike the proposed Project, which would be constructed in areas that are underlain by bedrock and thinly covered by sand in a high-energy dynamic environment, the site for this alternative has a sand thickness of about 2.5 feet where the sand is not as easily moved by waves and currents. As a result of these physical conditions, the presence of intact prehistoric cultural deposits is more likely than the proposed Project site. Furthermore, the depth of the sand at the site for this alternative increases the probability that intact prehistoric or historic cultural deposits or artifacts may be found and decreasing the likelihood that any found are in situ deposits that would have been deposited there by waves and currents. However, the construction process for this alternative would be similar to that of the proposed Project and would not involve any excavation. Thus, the likelihood of impacting Tribal cultural resources that might be buried in the shallow sands would be low. Further, the site for this alternative would also remain completely submerged and at a depth and distance from the shoreline that make it highly unlikely to have been occupied and have associated human burials or cemeteries prior to sea-level changes that have altered the coastline.
GREENHOUSE GAS EMISSIONS
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief, High-Coverage Alternative would require approximately 41 more barge trips (93 percent more) than the Project. Therefore, GHG emissions from transport of rock would be increased by approximately 93 percent compared to the Project. With this increase, GHG emissions would still remain under the annual threshold of 3,000 MT CO_2e, and would remain less than significant.
GEOLOGY AND COASTAL PROCESSES
The alternative would have similar effects on geology and coastal processes as the Project. The alternative reef design would not inhibit natural coastal processes, such as erosion rates, wave action, or large-scale current patterns. Any changes in currents across the reef would not result in significant changes to beach erosion rates, as wave action is the primary contributor to the suspension and deposition of sand within the littoral and subtidal zones. The Alternative would not have a significant impact on the swell waves that are the primary wave action that affects erosion rates along beaches, and the alternative would not have a cumulatively considerable impact on coastal processes.
HAZARDS AND HAZARDOUS MATERIALS
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief, High-Coverage Alternative would require approximately 41 more barge trips and construction duration would be approximately 93 percent longer. This increase in construction

Table 5-5. Impact Summary: Low-Relief, High-Coverage Reef Alternative

duration and marine transportation would substantially increase the likelihood of vessel accidents or spills that could result in impacts related to hazard and hazardous materials. However, as with the Project, implementation of MM HAZ-1a and MM HAZ 1b, as outlined in the Section 4.8, the impact would be reduced to a less-than-significant level.
LAND USE AND PLANNING
Similar to the Project, this alternative would have a beneficial impact on consistency with the Coastal Act by improving compliance with CDP requirements. However, because the reef constructed under this alternative would have fewer beneficial effects related to achieving the CDP performance standards (e.g., expected less kelp canopy), the beneficial effects to land use and planning under this alternative would be less than under the Project.
MINERAL RESOURCES
This alternative would require approximately 93 percent more quarry rock than the Project. Each of the three quarries can provide the required tonnage of nominal 1,000-pound stones specified for the work and can meet or generally exceed the CDFW specifications for artificial reef material. This impact would be increased as compared to the Project, but would remain less than significant.
NOISE
This alternative would require approximately 93 percent more quarry rock than the Project, and the construction duration would be approximately 93 percent longer. However, the construction in the southern portion of the reef area would occur farther from the shore and sensitive receptors. Attenuation of construction noise would ensure that a temporary increase in noise during construction would be well below the stated threshold of significance of 15 dB, and for the most part would be inaudible or barely audible. Therefore, temporary noise impacts from construction would be similar to or reduced as compared to the Project. As with the Project, temporary noise impacts from this alternative would be less than significant, and no mitigation is required.
OCEAN WATER QUALITY
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief, High-Coverage Alternative would require approximately 41 more barge trips and construction duration would be approximately 93 percent longer. This substantial increase in construction duration and marine transportation would increase the likelihood of vessel accidents or spills that could adversely affect ocean water quality. As with the Project, implementation of MM OWQ-1 and MM HAZ-1a, as outlined in Section 4.11, would reduce this impact to a less-than-significant level.
PUBLIC SERVICES
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief, High-Coverage Reef Alternative would require approximately 41 more barge trips than the Project and construction duration would be approximately 93 percent longer. This substantial increase in construction duration and marine transportation would increase the likelihood of vessel accidents or other emergencies that would require response from emergency services. Although impacts to emergency services are not likely, implementation of MM PUB-1, as outlined in Section 4.12, would ensure the Orange County Harbor Patrol Marine Operations Bureau would be notified when construction plans and schedules are finalized and would reduce potential impacts to emergency services to a less-than-significant level. Because the southern portion of the site under this alternative are farther from the shore than the proposed Project, this alternative should result in less kelp washing onto shore and require less public services to clean up the kelp. However, as stated for the Project, monitoring of the

Table 5-5. Impact Summary: Low-Relief, High-Coverage Reef Alternative

Phase 1 and 2 reef areas found that significant increases in kelp wrack would not likely be found on nearby beaches.
RECREATION
Like the proposed Project, construction of this alternative would only occur in offshore waters, and as such, work would not impede access to recreation in City parks and recreational areas and state beaches. Construction activities would also not result in permanent development onshore that would be capable of impeding access to onshore recreational facilities and areas. Construction would generally be farther from the beach and surf zone when compared to the Project and would not interfere with nearshore recreation. The overall construction area would be smaller than for the Project and would not be seen by as many areas of the beach. However, construction would be expected to last approximately 93 percent longer than the Project as a result of more rock being placed and would have the potential to disrupt offshore recreation for that additional time. Because the southern portion of the site under this alternative is farther from the shore than the proposed Project, this alternative should result in less kelp washing onto shore and disrupting recreational activities on the beach. However, as stated for the Project, monitoring of the Phase 1 and 2 reef areas found that significant increases in kelp wrack would not likely be found on nearby beaches. This alternative would increase the perimeter-to-area ratio of the reef as compared to the Project, which could increase the fish biomass per acre. However, these effects are uncertain and could be reduced because many of the reef edges are near other reef edges Therefore, beneficial impacts to recreational fishing would be approximately the same as the Project. All other impacts to recreation would be as described for the Project and would be less than significant.
TRANSPORTATION (MARINE)
Because approximately 93 percent more quarry rock would be used for this alternative, the Low-Relief, High-Coverage Alternative would require approximately 41 more barge trips (93 percent more) than the Project. Therefore, this alternative would have substantially increased impacts to marine transportation as compared to the Project. However, due to the short-term nature of the vessel trip increase and the limited number of trips, along with vessel safety-related programs and organizations put in place to enforce vessel transportation regulations and notifications such as the LNM, the vessel safety and accident impacts resulting from the increase in marine vessel traffic would remain less than significant.

5.4.5 Two-Season Construction 2019–2020 Period Alternative

If all rock needed to expand the existing reef cannot be obtained in 2019, the Project would be completed in two construction periods (2019 to 2020). This analysis assumes that all 44 barge trips would be to and from the Santa Catalina Island quarries (i.e., no trips to or from Mexico) given the additional time to stockpile the rock. Under this alternative, both the 2019 and 2020 construction seasons would begin in mid-May (after the lobster season) and continue through to September 30. The reef design, construction methods, and staffing under this alternative would be the same as described for the proposed Project. Table 5-6 provides a summary of environmental impacts associated with this alternative.

Table 5-6. Impact Summary: Two-Season Construction Alternative

BIOLOGICAL RESOURCES (MARINE)
Because this alternative would have the same reef design as the Project, adverse and beneficial impacts to marine biological resources would be the same as described for the Project. MM BIO-2, as identified in Section 4.1, would reduce the potential impacts to marine mammals and sea turtles. Finally, MM BIO-~~3~~4, as identified in Section 4.1, would reduce the potential impact of an accidental spill of pollutants or the grounding of a vessel to a less-than-significant impact.
AESTHETICS
Under this alternative, the construction-related visual impacts would be similar to the proposed Project and would consist of impacts related to the presence of supply barges (present during construction and transport), a derrick crane barge, and associated tugboats. Reef construction under this alternative would still be short term and temporary, similar to the proposed Project, and would occur in the same locations; however, the reef would be constructed in 2019 and 2020 as opposed to the 2019-only season associated with the proposed Project. Overall, impacts to scenic resources and ocean views would be generally similar to the Project, and the temporary nature of the construction would still make impacts less than significant. However, the expansion of construction to two seasons would increase the perceived duration of impacts, even if the number of days required would remain the same.
AIR QUALITY
Because this alternative would include construction in 2019 and 2020, the air emissions would occur in 2 years, compared to 1 year for the Project. The reef would be the same size and configuration as under the Project; therefore, the overall construction activity and number of days in exceedance of the SCAQMD NO_X threshold and SDAPCD NO_x threshold would be the same as the Project. Therefore, potential impacts to air quality for this alternative would remain significant without mitigation, and generally the same as described for the Project. With the implementation of MM AQ-1a and MM AQ-1b, as outlined in Section 4.3, NO_X emissions associated with this alternative would be reduced below the thresholds, allowing the alternative to not conflict with or obstruct implementation of the SCAQMD 2016 AQMP or SDAPCD plans. In addition, the implementation of MM AQ-1a and MM AQ-1b would reduce construction emissions from this alternative within the SDAB and would allow the alternative not to exceed the SDAPCD thresholds.
CULTURAL RESOURCES
Under this alternative, the APE would be the same as under the Project and impacts would be the same as described for the Project in Section 4.4.
CULTURAL RESOURCES—TRIBAL
Under this alternative, the APE would be the same as under the Project and impacts would be the same as described for the Project in Section 4.4.
GREENHOUSE GAS EMISSIONS
Because this alternative would include construction in 2019 and 2020, the GHG emissions associated with reef construction would occur over the course of 2 years, compared to 1 year for the Project. Because trips to Mexican quarries would not be required under this alternative, GHG emissions for this alternative would be less than those identified for the Project. When this alternative's GHG emissions are amortized over the 30-year minimum life of the mitigation reef, impacts would be even further below the 3,000 MT CO_2e annual threshold established by SCAQMD than the Project. Impacts would remain less than significant.
GEOLOGY AND COASTAL PROCESSES

Table 5-6. Impact Summary: Two-Season Construction Alternative

The alternative would have the same reef design as the Project and would have similar effects on geology and coastal processes as the Project.
HAZARDS AND HAZARDOUS MATERIALS
This alternative would include the same number of barge trips as the Project, though they would occur in two construction seasons in 2019 and 2020 as opposed to the single 2019 season for the proposed Project. This alternative would not require the six barge trips down to the quarry in Mexico because more time would be available to stockpile quarry rock from the Santa Catalina Island quarries. The elimination of the six longer barge trips to Mexico means that there is less likelihood that vessel accidents or spills would occur compared to the Project. As with the Project, implementation of MM HAZ-1a and MM HAZ-1b, as outlined in Section 4.8, potential impacts would be reduced to a less-than-significant level. Thus, impacts to hazards and hazardous materials would continue to be less than significant, but would be slightly less impactful than the Project.
LAND USE AND PLANNING
The alternative would have the same reef design as the Project and would have similar effects on land use and planning as the Project.
MINERAL RESOURCES
This alternative would require the same amount of rock as the Project, but because this alternative would allow more time to stockpile quarry rock from the Santa Catalina Island quarries, this alternative would not require the six barge trips to the quarry in Mexico. Therefore, the rock required for this alternative would have fewer sources than the rock described for the Project. However, all of the proposed quarries have adequate rock for this Project and all others, so impacts would be similar to the proposed Project and less than significant.
NOISE
This alternative would require the same amount of quarry rock and barge trips as the Project. Construction would be split between 2019 and 2020 instead of within the single 2019 season. Therefore, temporary noise impacts from construction would be similar to those described for the Project, but distributed over 2 years. As with the Project, temporary noise impacts from this alternative would be less than significant, and no mitigation is required.
OCEAN WATER QUALITY
This alternative would include the same number of barge trips as the Project, though they would occur in two construction seasons over 2019 and 2020 as opposed to the single 2019 season for the Project. This alternative would not require the six barge trips down to the quarry in Mexico because more time would be available to stockpile quarry rock from the Santa Catalina Island quarries. The elimination of the six longer barge trips to Mexico means that there is less likelihood that vessel accidents or spills would occur compared to the Project. As with the Project, with the implementation of MM OWQ-1 and MM HAZ-1a, as outlined in Section 4.11, potential impacts would be reduced to a less-than-significant level. Thus, impacts to ocean water quality would continue to be less than significant, but would be slightly less impactful than the Project.
PUBLIC SERVICES
The construction period under this alternative would be split between 2019 and 2020; therefore, this alternative would increase the potential demand for emergency services in both 2019 and 2020 as compared to the Project which would only potentially increase demand for emergency services in 2019. Although impacts to emergency services are not likely, implementation of MM

Table 5-6. Impact Summary: Two-Season Construction Alternative

PUB-1 as outlined in Section 4.12 would ensure the Orange County Harbor Patrol Marine Operations Bureau would be notified when construction plans and schedules are finalized and would reduce potential impacts to emergency services to less-than-significant. All other impacts to public services would be the same as described for the Project.
RECREATION
Impacts to recreation from the Two-Season Construction Alternative would be similar to the Project, as the reef design would be the same. However, because construction would be split over two seasons in 2019 and 2020, impacts to recreation would occur over two construction seasons in 2019 and 2020 as opposed to the one construction season in 2019 for the Project. All other impacts to recreation would be as described for the Project and would be less than significant.
TRANSPORTATION (MARINE)
Under the Two-Season Construction Alternative, barge trips would be split over two seasons in 2019 and 2020. However, the same number of barge trips would be required to construct the reef as under the Project, and these trips would be incremental in comparison to the volume of vessel traffic. This alternative would not require the six barge trips to the quarry in Mexico because more time would be available to stockpile quarry rock from the Santa Catalina Island quarries. The elimination of the six longer barge trips to Mexico means that there is less likelihood that vessel accidents or spills would occur compared to the Project. Therefore, this Alternative would have slightly fewer impacts to marine transportation as compared to the Project. Due to the short-term nature of the increase in vessel trips and the limited number of trips, along with vessel safety-related programs such as the LNM and organizations put in place to enforce vessel transportation regulations and notifications, the vessel safety and accident impacts resulting from the increase in marine vessel traffic would remain less than significant, similar to the Project.

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6.0 OTHER REQUIRED CEQA SECTIONS AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As lead agency under the California Environmental Quality Act (CEQA), the California State Lands Commission (Commission) has prepared this Subsequent Environmental Impact Report (EIR) to evaluate the potential significant environmental effects of the Wheeler North Reef Expansion Project (Project). As discussed in Sections 6.1 through 6.4, the State CEQA Guidelines[34] state that an EIR shall:

- Identify and focus on the significant environmental effects of a proposed project (§ 15126.2, subd. (a))
- Describe any significant impacts, including those that can be mitigated but not reduced to a level of insignificance (§ 15126.2, subd. (b))
- Identify significant irreversible environmental changes that would be caused by a proposed project should it be implemented (§ 15126.2, subd. (c))
- Identify any growth-inducing impacts of a proposed project such as the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment (§ 15126.2, subd. (d))
- Identify any known areas of controversy or unresolved issues (§ 15123, subd. (b))
- Identify the environmentally superior alternative (§ 15126.26, subd. (e)(2))

6.1 SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

The significant environmental impacts anticipated as a result of the Project and mitigation measures identified to reduce impacts are discussed in Section 4.0, *Environmental Impact Analysis*. The State CEQA Guidelines (§ 15126.2, subd. (b)) require that an EIR describe any significant impacts that cannot be avoided, even with the implementation of feasible mitigation measures. The Project would have no significant impacts that cannot be avoided, as demonstrated in the analysis in Section 4.0.

6.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES CAUSED BY THE PROJECT IF IMPLEMENTED

Significant irreversible environmental changes that would be involved with a proposed project may include the following (State CEQA Guidelines section 15126.2(c)):

- Uses of non-renewable resources during the initial and continued phases of the project, which would be irreversible because a large commitment of such resources makes removal or non-use thereafter unlikely

[34] The State CEQA Guidelines are found in California Code of Regulations, title 14, sections 15000 et seq.

- Primary impacts and, particularly, secondary impacts that generally commit future generations to similar uses
- Irreversible damage that may result from environmental accidents associated with the project

The purpose of the proposed Project is to create new artificial rocky reef area adjacent to an existing artificial reef area. Placement of the quarry rock on the seafloor would commit future generations to a similar use for the Project area, as removal of the rocks would be very challenging. Numerous beneficial long-term impacts were identified in Section 4.0, *Environmental Impact Analysis*, including those related to biological resources, recreation, and ocean water quality. Some non-renewable resources in the form of fuels and quarry rocks would be used, but these would be nominal amounts. No commitment of future generations due to impacts or irreversible damages would occur.

6.3 GROWTH-INDUCING IMPACTS OF THE PROPOSED ACTION

In general terms, should a project meet any one of the criteria listed below, it can be considered growth-inducing. A project may induce spatial, economic, or population growth in a geographic area if it meets any one of the four criteria identified below:

- Removal of an impediment to growth (e.g., establishment of an essential public service or the provisions of new access to an area)
- Economic expansion or growth (e.g., changes in revenue base or employment expansion)
- Establishment of a precedent-setting action (e.g., an innovation, a change in zoning, or general plan amendment approval)
- Development or encroachment in an isolated area or one adjacent to open space (i.e., being different from an “infill” type of project)

The impacts of the Project would not produce a removal of an impediment to growth as the current conditions of the seafloor do no limit growth in the area, would not produce an economic expansion or changes in revenue base or employment, would not establish a precedent-setting action (e.g., no changes in zoning), and would not involve development or encroachment into an isolated area. Therefore, the Project would not have growth-inducing impacts.

6.4 KNOWN AREAS OF CONTROVERSY OR UNRESOLVED ISSUES

There are no known areas of controversy, including issues raised by agencies and the public. During public scoping, concern was expressed about the Project’s effects on waves, and the effectiveness of the Project in increasing the standing fish stock. See

Appendix A, *Public Scoping Documents*, for the Notice of Preparation (NOP), copies of the NOP comment letters, and transcripts from the public meeting.

6.5 COMPARISON OF PROPOSED ACTION AND ALTERNATIVES AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

State CEQA Guidelines section 15126.6 subdivision (e)(2) states, in part, that an EIR shall identify an environmentally superior alternative among the other alternatives "if the environmentally superior alternative is the 'No Project' alternative." Table 6-1 compares the proposed Project impacts with those of the alternatives. Based on the analysis contained within the Subsequent EIR, the Commission has determined that the proposed Project is the environmentally superior alternative.

6.5.1 Proposed Project

The proposed Project would include construction of approximately 210 acres of low-relief, low-coverage reef. As described in Section 2.3, *Proposed Project*, the new reef would be created through the placement of up to 175,000 tons of quarried rock on top of the ocean bottom, which has a thin layer of sand present. The quarry rock would be transported to the site via tugboat and barge and obtained primarily from two quarries at Santa Catalina Island. However, a portion of the rock would be obtained from a quarry in Ensenada, Mexico. The Applicant expects to use construction methods to place the rock that are similar to those used for Phase 2 of reef construction, which included the use of a Global Positioning System (GPS)-positioned barge and the "push-off" method of rock placement using a front-end loader. Project construction is proposed to take place over the 2019 season between May 1 and October 30, 2019.

6.5.2 No Project Alternative

Under the No Project Alternative, the existing Wheeler North Reef would not be expanded and would likely continue to be out of compliance with the San Onofre Nuclear Generating Station (SONGS) Coastal Development Permit (CDP) requirements for standing fish stock on the reef. Therefore, Southern California Edison would continue to receive no mitigation credit for the construction of the reef, and SONGS operations would not be fully mitigated. Because the Project has no significant and unavoidable impacts, the No Project Alternative would not avoid any significant and unavoidable impacts. In addition, the Project's beneficial impacts to recreational fishing and fish community assemblages would not occur. Therefore, the proposed Project would be environmentally superior to the No Project Alternative.

6.5.3 Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative

This alternative would place approximately 150,000 tons of quarry rock within nine polygon areas. The footprint of this alternative is adjacent to and north of the existing reef.

Unlike the proposed Project, this alternative would compress the northward extent of the reef, extending only approximately 2 miles northwest of the existing Wheeler North Reef. This compressed, northerly design would reduce the ocean edge (the edges of the reef are the most productive for fish) as compared to the Project. The polygons would be larger, and they would extend into deeper water and deeper sand than the Project.

This alternative would require less quarry rock than the proposed Project, so it would involve reduced impacts to mineral resources, air quality, greenhouse gas (GHG) emissions, and energy use. However, the proposed Project's impacts to those resource areas are also less than significant. Further, while this alternative may satisfy the Project purpose and need, some of the rocks would be placed on a sand thickness of approximately 3 feet, increasing the probability of reef burial. In addition, the reef polygons would be wider than under the proposed Project, which would decrease the perimeter-to-area ratio. This means that because the proposed Project reef structure is elongated, there is more productive edge habitat. Reducing this amount of edge habitat as compared to the proposed Project would decrease the fish biomass per unit of placed rock (Wilson et al. 1990). Therefore, the proposed Project would be environmentally superior to the Low-Relief, Low-Coverage, Less Northward Expansion Reef Alternative.

6.5.4 Low-Relief, Medium-Coverage Reef Alternative

This alternative would be a 125-acre, medium-coverage reef. This alternative would place approximately 225,000 tons of quarry rock within 15 polygon areas totaling 125 acres, covering 63 percent of the area within those polygons. This alternative would use substantially more quarry rock than the proposed Project, resulting in increased impacts to mineral resources, air quality, and GHG emissions. By covering less acreage, this alternative would have less impact on the sandy bottom biological community; however, Project impacts to that community were also found to be less than significant. In addition, the reef polygons would be wider than under the proposed Project, which would reduce the more productive reef edge habitat (Wilson et al. 1990). Therefore, the proposed Project would be environmentally superior to the Low-Relief, Medium-Coverage Reef Alternative.

6.5.5 Low-Relief, High-Coverage Reef Alternative

This alternative would be a 105-acre, high-coverage reef (81 percent hard substrate coverage). This alternative would place approximately 288,750 tons of quarry rock within 37 polygon areas, covering 81 percent of the area within those polygons. This alternative would use substantially more quarry rock than the proposed Project, resulting in increased impacts to mineral resources, air quality, and GHG emissions. By covering less acreage, this alternative would have less impact on the sandy bottom biological community; however, Project impacts to that community were also found to be less than significant. The reef polygons would be smaller than under the proposed Project, which would increase reef edge habitat (Wilson et al. 1990). However, the condensed nature of this reef may make edges less available to fish, as the habitats would be closer together. Therefore, the proposed Project would be environmentally superior to the Low-Relief, High-Coverage Reef Alternative.

6.5.6 Two-Season Construction 2019–2020 Period Alternative

In the event that the entire reef could not be constructed in 2019, SCE would propose to construct the Project over two construction seasons in 2019 and 2020. The number of trips associated with this alternative would be the same as in the Project and the rock would be sourced from the same quarries. In addition, the reef size and shape would be the same as the Project reef. Because this alternative would include construction in 2019 and 2020, the GHG emissions associated with construction of the project would occur over the course of two years, compared to a single year for the Project. The two-year GHG emissions for this alternative would be less than those identified for the Project; therefore, the GHG emissions associated with this alternative's level of construction, when amortized over the 30-year minimum life of the mitigation reef, would be even further below the 3,000 MT CO2e annual threshold established by SCAQMD than the Project. Therefore, this alternative would be slightly environmentally superior to the proposed Project.

Table 6-1. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
SECTION 4.1, BIOLOGICAL RESOURCES (MARINE)						
BIO-1: Existing Giant Kelp Habitat Quality	LTS	NI	LTS	LTS	LTS	LTS
BIO-2: Introduction or Enhancement of Non-Native Species	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-4: Accidental Spills or Vessel Grounding may result in Habitat Degradation or Species Mortality	LTSM	NI	LTSM	LTSM	LTSM	LTSM
BIO-5: Monitoring Activities	NI	NI	NI	NI	NI	NI
BIO-6: Adverse Effects to Soft Sediment Habitat and Managed Fish Species	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.2, AESTHETICS						
AES-1: Effect on a Scenic Vista	LTS	NI	LTS	LTS	LTS	LTS
AES-2: Damage to Scenic Resources	NI	NI	NI	NI	NI	NI
AES-3: Degrading the Existing Visual Character or Quality of the Site and its Surroundings	LTS	NI	LTS	LTS	LTS	LTS
AES-4: Creating a New Source of Light or Glare Affecting Day or Nighttime Views	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.3, AIR QUALITY						
AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan	LTSM	NI	LTSM	LTSM	LTSM	LTSM

Table 6-1. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
AQ-2: Violation of Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation	LTSM	NI	LTSM	LTSM	LTSM	LTSM
AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for Which the Project Region is Nonattainment	LTSM	NI	LTSM	LTSM	LTSM	LTSM
AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentrations	LTS	NI	LTS	LTS	LTS	LTS
AQ-5: Create Objectionable Odors Affecting a Substantial Number of People	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.4, CULTURAL AND PALEONTOLOGICAL RESOURCES						
CR-1: Cause a substantial adverse change in the significance of an archaeological or historical resource	LTSM	NI	LTSM	LTSM	LTSM	LTSM
CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	LTSM	NI	LTSM	LTSM	LTSM	LTSM
CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries	LTSM	NI	LTSM	LTSM	LTSM	LTSM
SECTION 4.5, CULTURAL RESOURCES—TRIBAL						
TCR-1: Cause a substantial adverse change in the significance of a Tribal cultural resource	LTSM	NI	LTSM	LTSM	LTSM	LTSM

Table 6-1. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives: Low- Coverage, Less Northward Expansion	Low-Relief Reef Type Alternatives: Medium-Coverage	Low-Relief Reef Type Alternatives: High-Coverage	Two-Season Construction
SECTION 4.6, GEOLOGY AND COASTAL PROCESSES						
GEO-1: Substantial Increase or Decrease in Rates of Beach Erosion	LTS	NI	LTS	LTS	LTS	LTS
GEO-2: Substantial Change in Surf Characteristics	LTS	NI	LTS	LTS	LTS	LTS
GEO-3: Substantially Inhibit Natural Coastal Processes	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.7, GREENHOUSE GAS EMISSIONS						
GHG-1: Directly or Indirectly Generate GHG Emissions	LTS	NI	LTS	LTS	LTS	LTS
GHG-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing GHG Emissions	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.8, HAZARDS AND HAZARDOUS MATERIALS						
HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials	LTSM	NI	LTSM	LTSM	LTSM	LTSM
HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment	LTSM	NI	LTSM	LTSM	LTSM	LTSM
SECTION 4.9, MINERAL RESOURCES						
MIN-1: Availability of Oil, Gas, or Geothermal Resources	NI	NI	NI	NI	NI	NI
MIN-2: Availability of a Local Sand, Gravel, or Concrete Aggregate Mineral Resource Recovery Site	NI	NI	NI	NI	NI	NI

Table 6-1. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
MIN-3: Availability of Local and Regional Construction Rock Resources	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.10, NOISE						
NOI-1: Expose Persons to or Generation of Noise Levels in Excess of Standards	LTS	NI	LTS	LTS	LTS	LTS
NOI-2: Expose Persons to or Generation of Excessive Groundborne Vibration or Noise Levels	LTS	NI	LTS	LTS	LTS	LTS
NOI-3: Substantial Permanent, Temporary, or Periodic Increase in Ambient Noise Levels	LTS	NI	LTS	LTS	LTS	LTS
SECTION 4.11, OCEAN WATER QUALITY						
OWQ-1: Impairment of Marine Water Quality	LTSM	NI	LTSM	LTSM	LTSM	LTSM
OWQ-2: Discharge of Pollutants into an “Impaired” Waterbody under Clean Water Act Section 303(d)	NI	NI	NI	NI	NI	NI
SECTION 4.12, PUBLIC SERVICES						
PUB-1: Need for Emergency Response Services during Construction of the Artificial Reef	LTSM	NI	LTSM	LTSM	LTSM	LTSM
PUB-2: Need for Beach Cleanup as a Result of Accumulated Kelp Wrack, Rock, or Concrete from the Artificial Reef	LTS	NI	LTS	LTS	LTS	LTS

Table 6-1. Summary of Impacts: Proposed Project and Alternatives

Impact	Impact Class[1]					
	Proposed Project	No Project	Low-Relief Reef Type Alternatives			Two-Season Construction
			Low- Coverage, Less Northward Expansion	Medium-Coverage	High-Coverage	
SECTION 4.13, RECREATION						
REC-1: Prevent Access to Recreational Sites or Disturb Users of Recreational Facilities during Times of Peak Use	LTS	NI	LTS	LTS	LTS	LTS
REC-2: Degradation of a Significant Recreational Resource	LTS	NI	LTS	LTS	LTS	LTS
REC-3: Substantial Change in the Type, Quality or Quantity of Recreational Fishing Activity or Yield	B	NI	B	B	B	B
SECTION 4.14, TRANSPORTATION (MARINE)						
Impact MT-1: Reduce the Existing Level of Safety for Navigating Vessels or Increase the Potential for Marine Vessel Accidents	LTS	NI	LTS	LTS	LTS	LTS

Notes:[1] B = Beneficial (Green); LTS = Less than Significant; LTSM = Less than Significant with Mitigation; NI = No Impact.

7.0 MITIGATION MONITORING PROGRAM

As the lead agency under the California Environmental Quality Act (CEQA), the California State Lands Commission (Commission or CSLC) is required to adopt a program for reporting or monitoring regarding the implementation of mitigation measures (MMs). As proponent for the Wheeler North Reef Expansion Project (Project), the CSLC will also ensure the implementation of the adopted MMs defined in this Subsequent Environmental Impact Report (EIR). This lead agency responsibility originates in Public Resources Code section 21081.6, subdivision (a) (Findings), and the State Guidelines for Implementing CEQA sections 15091, subdivision (d) (Findings), and 15097 (Mitigation Monitoring or Reporting).

7.1 MONITORING AUTHORITY

The purpose of a Mitigation Monitoring Program (MMP) is to ensure that measures adopted to mitigate or avoid significant impacts are implemented. A MMP can be a working guide to facilitate the implementation of the MMs and associated monitoring, compliance and reporting activities. The CSLC staff may delegate duties and responsibilities for monitoring to environmental monitors or consultants as deemed necessary, and some monitoring responsibilities may be assumed by responsible agencies, such as affected jurisdictions and cities. The number of construction monitors assigned to the Project will depend on the number of concurrent construction activities and their locations. The CSLC staff will ensure that appropriate agency reviews and approvals are obtained, that each person delegated any duties or responsibilities is qualified to monitor compliance, and that it is aware of and has approved any deviation from the MMP.

7.2 ENFORCEMENT RESPONSIBILITY

The CSLC, as lead agency, is responsible for enforcing the procedures adopted for monitoring through the environmental monitor. Any assigned environmental monitor shall note problems with monitoring, notify appropriate agencies or individuals about any problems, and report the problems to the CSLC staff or its designee.

7.3 MITIGATION COMPLIANCE RESPONSIBILITY

The CSLC is responsible for successfully implementing all the MMs in the MMP, and shall ensure that these requirements are met by all construction contractors and field personnel. Standards for successful mitigation also are implicit in many MMs that include such requirements as obtaining permits or avoiding a specific impact entirely. Other MMs include detailed success criteria. Additional mitigation success thresholds may be established by applicable agencies with jurisdiction through the permit process and through the review and approval of specific plans for the implementation of MMs.

7.4 GENERAL MONITORING PROCEDURES

7.4.1 Environmental Monitors

Many of the monitoring procedures will be conducted prior to or during the construction phase of the Project. The CSLC staff and its environmental monitor(s) are responsible for integrating the mitigation monitoring procedures into the construction process in coordination with the contractor. To oversee the monitoring procedures and to ensure success, the environmental monitor must be on site during that portion of construction that has the potential to create a significant environmental impact or other impact for which mitigation is required. The environmental monitor is responsible for ensuring that all procedures specified in the monitoring program are followed.

7.4.2 General Reporting Procedures

Site visits and specified monitoring procedures performed by other individuals will be reported to the environmental monitor. A monitoring record form will be submitted to the environmental monitor by the individual conducting the visit or procedure so that details of the visit can be recorded and progress tracked by the environmental monitor. A checklist will be developed and maintained by the environmental monitor to track all procedures required for each mitigation measure and to ensure that the timing specified for the procedures is adhered to. The environmental monitor will note any problems that may occur and take appropriate action to rectify the problems.

7.4.3 Public Access to Records

The public is allowed access to records and reports used to track the monitoring program. Monitoring records and reports will be made available for public inspection by the CSLC or its designee on request.

7.5 MITIGATION MONITORING TABLE

This section presents the mitigation monitoring table (Table 7-1) for each environmental discipline that requires MMs. Impacts that do not require mitigation are not included (see *Executive Summary* for summary description of all Project impacts). Each table lists the following information, by column:

- Impact (impact number, title, and impact class);
- Mitigation Measure (full text of the measure);
- Location (where the impact occurs and the mitigation measure should be applied);
- Monitoring/reporting action (the action to be taken by the monitor or lead agency);
- Effectiveness criteria (how the agency can know if the measure is effective);

- Responsible agency; and
- Timing (before, during, or after construction; during operation, etc.).
- Applicant-Proposed Measures (APMs) are presented at the end of the table.

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
Impact BIO-2: Introduction or Enhancement of Nonindigenous Species Nonindigenous species could be introduced or enhanced as a result of the proposed Project (Less than Significant with Mitigation).	**MM BIO-2: Prevent Import of Nonindigenous Species**. In order to control the import of non-native species to the Project location, the following ~~recommendations shall be considered~~ requirements shall be implemented as part of the detailed Project planning. All Project vessels shall: • Originate from Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay • Be continuously based out of Oceanside Harbor, Dana Point Harbor, the Ports of Long Beach/Los Angeles, or San Diego Bay since last dry docking • Have hulls with antifouling coatings • Remain at ports no longer than 5 days ~~• Have underwater surfaces cleaned before entering Southern California at vessel origination point and immediately prior to transiting to the Project site~~ Underwater surfaces of barge vessels shall be subject to	Project vessels	Monitor verification of compliance with measure	Implementation will limit spread of nonindigenous species	Contractor, CSLC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	evaluation by California State Lands Commission (CSLC) Marine Invasive Species Program (MISP) staff, through a Risk Assessment process and pre-construction inspection prior to use for the construction. Pre-construction inspections shall include use of underwater remotely operated vehicles with cameras, or similarly detailed inspection methods, including but not limited to review of the vessel's dry dock and cleaning records, most recent application of antifouling hull coatings, review of Biofouling Removal and Hull Husbandry Reporting Forms, and any other measures to prevent the spread on non-native species. Should vessels fail to pass Risk Assessment or pre-construction inspection screening as determined by CSLC MISP, cleaning of vessels prior to construction may be required. Additionally, and regardless of vessel size, ballast water for all Project vessels must be managed consistent with ~~California State Lands Commission~~ ~~(~~CSLC~~)~~ ballast management regulations, and Biofouling Removal and Hull					

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	Husbandry Reporting Forms shall be submitted to CSLC MISP staff. ~~Project vessels shall also be available for inspection by CSLC staff for compliance.~~ Further, as part of the Project kickoff meeting, a qualified marine biologist, approved by CSLC staff, shall provide information to all Project personnel about the spread of non-native species in California waters and the programs (i.e., CSLC Ballast Water Management Program and Biofouling Removal and Hull Husbandry Reporting) that would be implemented to minimize this hazard.					
Impact BIO-3: Disturbance or Injury to Marine Mammals and Turtles from Construction Construction activities (including noise) could impact marine mammals and turtles (Less than Significant with Mitigation).	**MM BIO-3: Marine Wildlife Monitoring Plan.** A Marine Wildlife Monitoring Plan (Plan) shall be prepared by a qualified marine mammal biologist and submitted to California State Lands Commission (CSLC) staff for review and approval 60 days prior to commencement of activities. The Plan is intended to reduce the chance of a significant impact to marine mammals and sea turtles during construction activities. It may also form the basis of a permit application to the relevant agencies (National Marine Fisheries Services	Project site, including barge route	CSLC to confirm receipt of satisfactory plan. Monitor to confirm implementation of plan.	Implementing MM will reduce the potential for impacts to marine mammals and sea turtles	Contractor and CSLC	Prior to starting Project construction activities and during all marine vessel use

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	and U.S. Fish and Wildlife Service). The Plan should include: • Determination of the exclusion zone for eliminating the risk of crushing as a result of rockfall. • Procedures for monitoring marine mammals and sea turtles and specifications for Marine Wildlife Observers (MWO) within the rockfall exclusion zone. ~~• Procedures for measuring in-water noise output from rocks being pushed into the water and landing on the seafloor during the first week of construction to determine if Level B harassment criteria are exceeded.~~ ~~• If Level B harassment thresholds are exceeded, procedures to determine an appropriate zone of influence and subsequent radius for an exclusion zone, which in turn should be monitored by an MWO for the duration of construction activities.~~ • Methods for communicating with contractors to stop work if there is a risk that any marine mammals or sea turtles active in the area may move closer to the construction site and inside a designated exclusion zone.					

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• Procedures for MWO monitoring of barge transport, if necessary. • Methods for communicating with the ship's captain if there is a risk of collision with a marine mammal or sea turtle. • Limitations that work occur only during daylight hours when visual monitoring of marine mammals and sea turtles can be conducted.					
Impact BIO-4: Accidental Spills or Vessel Grounding May Result in Habitat Degradation or Species Mortality Boat and ship activity may result in accidental spills or the grounding of vessels, which could lead to habitat degradation or species mortality (Less than Significant with Mitigation).	**MM BIO-4: Spill and Grounding Contingency Plan.** The Applicant shall prepare and submit for approval to California State Lands Commission staff at least 60 days prior to the commencement of construction activities a Spill and Grounding Plan that includes, at a minimum, the following features: • A list of key contacts in the event of an accidental spill that will include senior Project management. • Identification of potential pollutants used in the construction process. These are likely to include diesel fuel, lube oil, hydraulic oil, waste oil, and oil leaking from pipes on the vessels. • Detailed procedures for averting and responding to a spill of these pollutants.	N/A	Review and approve Spill and Grounding Contingency Plan	Implementation of the approved plan will minimize effects of accidental spills and grounding	Contractor, CSLC	Prior to construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• Detailed procedures for addressing a vessel grounding scenario for both vessels underway and vessels that have broken free of moorings at the construction site.					
AIR QUALITY						
Impact AQ-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan Project construction could conflict with the SCAQMD 2016 AQMP or SDAPCD 2016 RAQS as a result of Project-generated emissions (Less than Significant with Mitigation).	**MM AQ-1a: Nitrogen Oxides (NOX) Emission Reduction.** Prior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff that tugboats used for the Project meet or exceed the Tier 3 emission standards<u>, if such tugboats with the capabilities to construct the project are available. If Tier 3 compliant tugboats with the capabilities to construct the project are not available, Tier 2 compliant tugboats may be used and the difference in NOx emissions shall be offset through purchase of additional NOx emission offset credits.</u>	Project site	Project monitor confirms that all equipment meets the emission standards<u>, or CSLC confirm receipt of evidence of credit purchase for the difference in NOx emissions.</u>	Implementing MM will reduce emissions from construction equipment and vehicles	Contractor, CSLC	Prior to construction
	MM AQ-1b: Nitrogen Oxides (NOX) Emission Offset Credits. <u>At least 30 days</u> <u>p</u>rior to the commencement of any construction activities, Southern California Edison or its designee shall provide evidence to California State Lands Commission staff <u>and the South Coast Air Quality Management District</u> that NO_X emission offset credits have	N/A	CSLC confirms receipt of evidence of credit purchase.	Purchasing credits will offset the Project's unavoidable NOx emissions.	Contractor, CSLC, <u>SCAQMD</u>	Prior to construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	been purchased to offset the Project's NO_X emissions below the South Coast Air Quality Management District construction threshold for NO_X, in compliance with South Coast Air Quality Management District's *Revised CEQA Policy and Procedure in Allowing the Use of Emission Credits to Mitigate Significant Air Quality Impacts from Construction Phase* (as revised 2007). The Project's NOx emissions will be based on those calculated in the SEIR. At the discretion of the South Coast Air Quality Management District, at the end of each construction year Southern California Edison may reconcile the amount of credits purchased with the amount of actual Project emissions subject to review and approval by California State Lands Commission and South Coast Air Quality Management District staff, and receive NOx emission credits based on the excess credits paid. Actual emissions would be calculated at the end of a year's construction, based on documentation of hours of construction operations, number of barge trips, types of equipment used, and other factors.					
Impact AQ-2: Violation of Any Air Quality Standard or	Implementation of **MM AQ-1a** and **MM AQ-1b**	See specific MMs in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
Contribute Substantially to an Existing or Projected Air Quality Violation Project construction could exceed the SCAQMD construction emission thresholds for VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ (Less than Significant with Mitigation).						
Impact AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Air Pollutant for Which the Project Region is Nonattainment Project construction could result in a cumulatively considerable net increase in NO_X emissions (Less than Significant with Mitigation).	Implementation of **MM AQ-1a** and **MM AQ-1b**	See specific MMs in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				
Impact AQ-4: Expose Sensitive Receptors to Substantial	Implementation of **MM AQ-1a** and **MM AQ-1b**	See specific MMs in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
Pollutant Concentrations Project construction could result in exposure of sensitive receptors to substantial pollutant concentrations (Less than Significant with Mitigation).						
CULTURAL AND PALEONTOLOGICAL RESOURCES						
Impact CR-1: Cause a substantial adverse change in the significance of a historical or archeological resource The Project could cause a substantial adverse change in the significance of a historical resource (Less than Significant with Mitigation).	**MM CR-1a: Archaeological and Tribal Monitoring.** <u>To ensure that impacts to archaeological and tribal cultural resources remain less than significant, the following will occur:</u> • <u>A tribal monitor that is culturally affiliated with the area may be present during Project activities. For safety reasons, the monitor would not be able to be in the water during rock placement. During the first week of rock placement, the Applicant will make arrangements so that the tribal monitor can, if desired, dive on the areas where rock has been placed to examine the area and the effects of rock placement.</u> • <u>The Applicant will conduct a post-reef expansion dive with interested tribes to re-assess</u>	Project site	Completion of daily monitoring forms, submittal of weekly summary to CSLC staff.	Implementing MM will reduce the potential for impacts to archaeological resources and tribal resources.	Contractor and CSLC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	the Project area and compare with data obtained from the eighteen reconnaissance survey dives; and, • The Applicant and CSLC will document the tribal consultation process and present it as professional paper to benefit future submerged projects. ~~A California State Lands Commission (CSLC) staff-approved archaeological monitor that meets the Secretary of the Interior's Professional Qualifications Standards (as defined in 36 Code of Federal Regulations Part 61), and a tribal monitor that is culturally affiliated with the area may also be present during Project activities. The archaeological monitor shall complete daily monitoring forms and prepare a summary monitoring report to be submitted weekly to CSLC staff. The archaeological and Tribal monitors have the authority to increase or decrease the monitoring effort should the monitoring results indicate that a change is warranted.~~					
	MM CR-1b: Unanticipated Cultural/Tribal Resources. The Applicant shall prepare a Cultural Resources Management Plan (CRMP), subject to review and approval by CSLC. The CRMP shall	Project site	Applicant notification of CSLC staff and other agencies, retention of	Implementing MM will reduce the potential for impacts to archaeological	Contractor and CSLC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	<u>be prepared in coordination with the CSLC and a California Native American tribe that is culturally affiliated to the Project site. The CRMP will include, at a minimum:</u> • <u>Specific discussion on the process for identifying unanticipated discoveries in a submerged context, including how unanticipated tribal cultural resources are identified during project activities, when the project area is not visible.</u> • <u>Specific procedures for handling, recording and treating unanticipated cultural or tribal cultural resources in the event they are found.</u> • <u>Specific procedures for keeping the location of any such finds confidential and what measures will be taken to ensure that the area is secured to minimize site disturbance and potential vandalism.</u> • <u>Discussion of the successful tribal cultural resource consultation process for future submerged project consultation efforts</u> <u>To facilitate proper identification and treatment of potential resources that</u>		monitor. Construction contracts and plans to include appropriate treatment of human remains notes.	resources and tribal resources.		

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	may be discovered, the Applicant shall retain both an archaeologist (approved by the CSLC) and a monitor from a California Native American tribe that is culturally-affiliated to the Project site for coordination, monitoring, and notification purposes. The Applicant shall provide a minimum 5-day notice to the archaeologist and tribal monitor prior to all scheduled activities. In addition, should intact cultural or tribal cultural deposits be uncovered during Project implementation, CSLC staff, the archaeologist, and the tribal monitor shall be contacted as soon as possible, and in no event later than 24 hours, to allow them to evaluate the nature, extent, and significance of the discovery. Impacts to previously unknown significant Tribal cultural resources shall be avoided through preservation in place if feasible.~~If potentially significant archaeological or Tribal cultural resources are discovered during construction or monitoring activities, work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery. The Applicant shall notify California State Lands Commission (CSLC) staff and any local, state, or federal agency with approval or permitting authority over the Project that has requested/required notification within~~					

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	~~48 hours of discovery, consistent with guidelines for Tribal involvement stated in the CSLC Tribal Policy (www.slc.ca.gov/About/Tribal.html). The Applicant shall retain a CSLC-approved archaeologist and request a culturally affiliated Tribal representative to evaluate the nature and significance of the discovery. In addition, the following shall apply:~~ • ~~Impacts to previously unknown significant archaeological or Tribal cultural resources shall be avoided through preservation in place if feasible.~~ • ~~If the lead archaeologist and culturally affiliated Tribal representative believe that damaging effects to archaeological or Tribal cultural resources will be avoided or minimized, then work in the area may resume. Damaging effects shall be avoided or minimized following the measures in Public Resources Code section 21084.3, subdivision (b), unless other measures that would be as or more effective are mutually agreed to by the lead archaeologist and culturally affiliated Tribal representative.~~ • ~~If resources cannot be avoided, a Treatment Plan developed by~~					

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	~~the archaeologist and culturally affiliated Tribal representative shall be submitted to CSLC staff for review and approval prior to further disturbance of the area. The plan shall:~~ • ~~State requirements for professional qualifications of all cultural resources specialists and Tribal cultural resource workers.~~ • ~~Identify appropriate methods of resource recording, artifact cataloguing, and analyses.~~ • ~~Determine appropriate levels of recovery or stabilization of resources.~~ • ~~Provide documentation of a curatorial facility or museum that will be responsible for the permanent preservation of any unique or sensitive cultural materials resulting from site recovery or stabilization efforts.~~					
Impact CR-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature The Project could directly or indirectly	**MM CR-2: Unanticipated Paleontological Resources**. <u>The Applicant shall develop a Paleontological Resources Management Plan (PRMP), subject to review and approval by CSLC, which will include:</u> • <u>Specific discussion procedures for on the identification of unanticipated</u>	Project site	Applicant retention of monitor. CSLC approval of plan, if needed. Construction contracts and plans to include appropriate treatment of	Implementing MM will reduce the potential for impacts to paleontological resources.	Contractor and CSLC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
destroy a unique paleontological resource or unique geological feature (Less than Significant with Mitigation).	discoveries in a submerged context, including how unanticipated paleontological resources are identified during project activities, when the Project area is not visible. The procedures must reduce the likelihood of disturbing unanticipated paleontological resources or unique geologic resources to the extent feasible, considering the difficulty of observing the submerged Project area during rock placement and that the rocks are likely to cap and preserve paleontological resources in place. Specific procedures for handling, recording and treating unanticipated paleontological resources in the event they are found. The procedures must include retaining a qualified paleontologist to evaluate the nature and significance of any discovery.~~In the event unanticipated paleontological resources or unique geologic resources are encountered during demolition activities, work within 100 feet of the find shall be temporarily suspended or redirected away from the discovery until the Applicant retains a qualified paleontologist, who has demonstrated experience in carrying paleontological projects to~~		paleontological resources notes.			

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	~~completion, to evaluate the nature and significance of the discovery. If the resource cannot be avoided, the paleontologist shall develop and implement a Paleontological Resources Management Plan for the proposed Project area that includes specimen identification to the lowest taxonomic level possible, analysis, curation, and the preparation of a final report. The plan shall be submitted to California State Lands Commission staff for review and approval prior to further disturbance of the area.~~					
Impact CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries The Project could result in disturbance of any human remains (Less than Significant with Mitigation).	**MM CR-3: Appropriate Treatment of Human Remains.** In accordance with state law (Health & Saf. Code, § 7050.5; Pub. Resources Code, § 5097.98), if human remains are found, all ground disturbing activities shall halt within 165 feet (50 meters) of the discovery. The County Coroner will be notified within 24 hours of the discovery. No further excavation or disturbance of the discovery or any nearby area reasonably suspected to overlie potential remains shall occur until the County Coroner has determined whether the remains are subject to his or her authority. The County Coroner must make this determination within 2 working days of notification of the discovery (pursuant to Health & Saf. Code, § 7050.5 subd.	Project site	Applicant notification of CSLC staff and other agencies, as directed in measure. Compliance with CSLC direction after consultation with MLD, if applicable. Construction contracts and plans to include appropriate treatment of human remains notes.	Implementing MM will reduce the potential for impacts to human remains.	Contractor, CSLC, County Coroner, NAHC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	(b)). If the County Coroner determines that the remains do not require an assessment of cause of death and that the remains are, or are believed to be Native American, the Coroner must notify the Native American Heritage Commission by telephone within 24 hours, which must in turn immediately notify those persons it believes to be the Most Likely Descendant (MLD) of the deceased Native American. The MLD shall complete its inspection and make recommendations within 48 hours of being granted access to the site. The MLD may recommend means for treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods. California State Lands Commission staff will discuss and confer with the MLD regarding their recommendations (pursuant to Pub. Resources Code, § 5097.98 subds. (b) and (c)).					
CULTURAL RESOURCES –TRIBAL						
TCR-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource	Implementation of **MM CR-1a**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
The Project could cause a substantial adverse change in the significance of a tribal cultural resource (Less than Significant with Mitigation).	Implementation of **MM CR-1b**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				
	Implementation of **MM CR-3**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				
HAZARDS AND HAZARDOUS MATERIALS						
Impact HAZ-1: Routine Transport, Use, or Disposal of Hazardous Materials Construction of the expansion reef could create a hazard to the public or environment through the routine transport, use, or disposal of hazardous materials (Less than Significant with Mitigation).	**MM HAZ-1a: Spill Prevention and Response Plan.** At least 60 days prior to commencement of construction, a Spill Prevention and Response Plan for all Project vessels shall be prepared by Southern California Edison or its contractor and submitted to California State Lands Commission (CSLC) staff for review and approval. The plan shall include at a minimum the following elements: • A list of all fuels and hazardous materials that will be used or might be used during construction, along with material safety data sheets for each material • Specific protocols for monitoring and minimizing the use of fuel and hazardous materials during	N/A	Review and approve Spill Prevention and Response Plan	Implementation of the approved plan will minimize effects of accidental spills	Contractor, CSLC	Prior to construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	offshore construction Project operations, including best management practices that will be implemented to ensure minimal impacts to the environment • An estimate of a reasonable worst-case release of fuel or other hazardous materials at the offshore construction Project site or into coastal waters resulting from the construction activities • A list of all spill prevention and response equipment that will be maintained on the vessels performing the construction activities • The designation of the on-site person with responsibility for implementing the plan • A detailed response and clean-up plan in the event of a spill or accidental discharge or release of fuel or hazardous materials • A telephone contact list of all regulatory and trustee agencies, including CSLC and California Coastal Commission staffs, having authority over the development or Project site and its resources to be notified in the event of a spill or material release.					

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	MM HAZ-1b: Prepare for Inclement Weather Condition. Southern California Edison (SCE) or its contractor shall tie down or provide secondary containment for any deck equipment that may discharge contaminants to minimize the potential for unanticipated release of pollutants due to inclement weather or rough sea conditions. In addition, SCE or its contractor shall monitor weather conditions and tsunami warnings and cease work if it they determine that existing or forecast sea states or weather conditions would create unsafe working conditions for personnel or equipment.	Project site	Monitor to confirm appropriate procedures followed in event of inclement weather	Appropriate preparations will minimize likelihood of spills or unsafe conditions.	Contractor, CSLC	Project construction
Impact HAZ-2: Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment Construction of the expansion reef could create a hazard to the public or environment through the release of hazardous material into the environment	Implementation of **MM HAZ-1a**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				
	Implementation of **MM HAZ-1b**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
during accidents or adverse weather conditions (Less than Significant with Mitigation).						
OCEAN WATER QUALITY						
OWQ-1: Impair Marine Water Quality Temporary and localized impacts to ocean water quality could occur as a result of construction related discharges, mismanagement of materials, or accidental spills (Less than Significant with Mitigation).	**MM OWQ-1: Compliance with Vessel General Permit.** Vessel discharges must comply with California State Lands Commission requirements for ballast water discharges and hull fouling to control and prevent the introduction of non-indigenous species. Vessel discharges must not result in violations of water quality objectives in the Ocean Plan. Vessels subject to the federal National Pollutant Discharge Elimination System Vessel General Permit (VGP) must follow the best management practices for graywater as required in the VGP, including the use of only those cleaning agents (e.g., soaps and detergents) that are phosphate-free, non-toxic, and non-bioaccumulative.	Project site	Monitor to confirm appropriate procedures followed related to vessel discharges	Appropriate preparations will minimize impactful discharges	Contractor, CSLC	Project construction
	Implementation of **MM HAZ-1a**	See specific MM in MMP for details on Location, Monitoring/Reporting, Action, Effectiveness Criteria, Responsible Agency, and Timing				

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
PUBLIC SERVICES						
Impact PUB-1: Need for Emergency Response Services during Construction of the Artificial Reef Construction and monitoring of the expansion reef could have a short-term impact on emergency response services (Less than Significant with Mitigation)	**MM PUB-1. Notification of Harbor Patrol.** The Orange County Harbor Patrol Marine Operations Bureau shall be notified when construction plans/schedules for the artificial reef are finalized. The Orange County Harbor Patrol Marine Operations Bureau shall also be given notification 2 weeks prior to the start of construction activities for both the experimental and mitigation reefs.	Orange County Harbor Patrol Marine Operations Bureau	Project monitor to confirm notification of Harbor Patrol	Implementing MM will ensure effective coordination and response	Contractor and CSLC	Prior to Project construction
APPLICANT-PROPOSED MEASURES						
APM-1. Anchoring Plan. The Applicant shall prepare an Anchoring Plan to reduce impacts sensitive marine areas. • Anchors should be designed to minimize drag on the seabed. Each anchor should be ~~connected to a 10-ton concrete block~~ located on the ocean floor. The cable to the barge would travel via a foam filled can (surge-can) to lift the anchor chains off the seafloor. • Anchors ~~and concrete blocks~~ should be placed on areas of seabed less than 30 percent hard substrate. • All anchoring hardware moves would be conducted with ocean-capable tugboats with sufficient capacity to remove anchors from the seafloor ~~without causing~~ <u>to minimize</u> drag damage. Anchors should be checked periodically to ensure movement has not occurred.		Project site	CSLC to review and approve plan, monitor to verify anchoring is consistent with plan.	Implementation will reduce impacts to seafloor communities	Contractor, CSLC	Project construction

Table 7-1. Mitigation Monitoring Program

Impact (Class)	Mitigation Measure (MMs)	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
APM-2. Forecast Notification. Based on reputable weather forecasts, 24 hours before forecasts indicate conditions that would generate ground swells (waves) greater than 5 feet, all construction vessels would be withdrawn to a safe location. A safe location could include a nearby area where vessels can be anchored safely, deeper waters, or Long Beach Harbor**.**		Project site	Monitor to confirm appropriate procedures followed after forecast	Appropriate preparations will minimize likelihood of spills or unsafe conditions.	Contractor, CSLC	Project construction
APM-3: Local Notice to Mariners. A Local Notice to Mariners will be published with the U.S. Coast Guard (USCG) Waterways Branch prior to Project construction to ensure that other vessels in the area, as well as the USCG and area harbor personnel, would be advised of the locations of the vessels and the approximate dates and duration of the construction. A similar notice shall be posted at several locations at Dana Point Harbor, including providing copies to the Sheriff's Harbor Patrol, charter boat businesses, and dive shops. Temporary signs should also be posted at recreational sites, such as the San Clemente Pier and the mouth of San Mateo Creek, to inform recreational users about the Project.		Area harbors, vessel routes, and recreation areas	Project monitor to confirm notification to area harbors and USCG	Implementing MM will ensure effective coordination and response	Contractor and CSLC	Prior to Project construction

8.0 OTHER COMMISSION CONSIDERATIONS

In addition to the environmental review required pursuant to the California Environmental Quality Act (CEQA), a public agency may consider other information and policies in its decision-making process. This section presents information relevant to the California State Lands Commission's (Commission's) consideration of the proposed Wheeler North Reef Expansion Project (Project). The considerations included below address:

- Climate Change and Sea-Level Rise
- Environmental Justice
- Commercial Fishing
- State Tide and Submerged Lands Possessing Significant Environmental Values

Other considerations may be addressed in the staff report presented at the time of the Commission's consideration of the Project.

8.1 CLIMATE CHANGE AND SEA-LEVEL RISE

While the scientific understanding and projections of climate change and sea-level rise (SLR) are advancing at a rapid pace, impacts are already being felt in our oceans and along the California coast. Climate change has been found to have many effects on our oceans and coasts including, but not limited to, ocean acidification, hypoxia, increased storm surge, and SLR. Refer to Section 4.7 regarding Project emissions of greenhouse gases (GHGs).

8.1.1 Climate Change

High anthropogenic global carbon dioxide (CO_2) emissions over the last 250 years have significantly altered atmospheric and oceanic chemistry, resulting in harmful ecosystem and ecological impacts. One of the most relevant effects of climate change on the Project will be ocean acidification. The ocean has absorbed nearly one-third of human-generated CO_2 and has become 30 percent more acidic, measured by the drop of mean global oceanic pH from 8.2 to 8.1 (Sabine 2004, Fabry et al. 2008). The problem is more acute along the West Coast of North America because the area already contains waters highly enriched with CO_2 naturally due to ocean currents and coastal upwelling (Feely et al. 2004, Chan et al. 2016). Ocean acidification suppresses the formation of calcium carbonate and therefore many marine organisms, including those that create the structure of natural reefs, cannot survive in conditions of higher acidity. This can have a negative cascade effect on entire food webs that rely on primary producers like diatoms and zooplankton as a foundation, as well as on niche structural habitats, like reefs.

The detrimental effects of ocean acidification may be compounded by local factors, including warmer water temperatures, changes in salinity, and high levels of organic nutrients, like nitrogen and phosphorus (Chan et al. 2016). These factors can lead to low dissolved oxygen levels in sea water, a condition called hypoxia. In some cases, vast stretches of coastal water become hypoxic and unable to support life. These dead zones may cause die-offs of fish, shellfish, corals, and aquatic plants. Ocean acidification and hypoxia combined increase the vulnerability of critical habitats like reefs, kelp forests, and sea grass beds.

Kelp has been found to help absorb CO_2 and reduce acidity in the ocean. Although scientists have not found a link between ocean acidification and reduction in kelp populations, scientists have found that growing these plants in local waters could help mitigate the damaging impacts of acidification on marine life (Chan et al. 2016). For example, kelp forests in Monterey Bay show strong week-to-week, site-to-site, and seasonal variability in pH, with some indication that the presence of giant kelp increases pH (Koweek et al. 2017). This may help the proposed Project's success by creating local hot spots where marine life can thrive. Scientists are now beginning large-scale projects to plant and grow kelp to absorb CO_2 and reduce acidity in local waters.

Underwater current and circulation patterns and processes are anticipated to change as a result of warmer water temperatures and changes in density and salinity. This atmospheric and oceanic interaction (i.e., storm-related water turbulence) could change the character of submerged lands in shallow nearshore environments, as the seafloor would be subjected to stronger energy forces as a result of inshore wave propagation during extreme storm events. Changes to nearshore currents (and water chemistry) in Southern California are being monitored by the Southern California Coastal Ocean Observing System.

Similarly, storm surges are anticipated to increase in both strength and frequency with climate change (Tebaldi, Strauss, and Zervas 2012; Burkett and Davidson 2012). Strong storms events and storm-generated waves have previously rocked the kelp forests along the San Clemente coast according to National Aeronautics and Space Administration (NASA) reports. NASA reported that these waves "decimated the giant kelp communities, leaving just a few sparse patches still visible in the March 29 image" (NASA Earth Observatory 2015). NASA has now determined that storm surges are getting a boost from climate change, and that it has opened the doors for more-frequent and severe storms. More frequent and intense storms can lead to greater amounts of runoff, turbidity, decreased salinity, and direct physical damage to submerged structures and habitats (Short 2016). The frequency and severity of El Niño Southern Oscillation–related storm events may increase over time with climate change, which could be harmful to kelp communities.

8.1.2 Sea-Level Rise

SLR is function of the global climate change process. Climate change causes both thermal expansion of water in the oceans and land ice to melt (i.e., ice sheets and glaciers), both of which are attributed to SLR. SLR has occurred on a global and local scale over the last century, and projections suggest that the rate might accelerate into future planning horizons (e.g., 2050, 2100, and beyond). These accelerating rates of SLR are attributed to increasing global temperatures from climate change. Estimates of projected SLR vary regionally and are a function of different GHG emissions scenarios, rates of ice melt, and local vertical land movement. Recently, proposed projects within the coastal zone have been required by regulatory, resource, and funding agencies to incorporate SLR considerations into project planning and design.

These planning agencies will periodically re-examine and update SLR projections as they evolve with the release of new scientific reports and information on local and regional sea level trends. The California Coastal Commission released their SLR policy guidance document in August 2015, which uses the 2012 National Research Council (NRC) report as the best available projections of regional SLR in California (NRC 2012). The document is intended to provide guidance on how to address SLR in new and updated Local Coastal Programs and Coastal Development Permits according to the policies of the California Coastal Act. The full range of SLR projections from the NRC report is provided below in Table 8-1.

Table 8-1. Sea-Level Rise Projections for California[1]

Year	South of Cape Mendocino
2030	2–12 in (4–30 cm)
2050	5–24 in (12–61 cm)
2100	17–66 in (42–167 cm)

Source: NRC 2012.
Acronyms: cm = centimeter; in = inch.
Note: [1] SLR values relative to year 2000 water level.

Compared to year 2000 levels, the Southern California region could see up to 1 foot of SLR by 2030, 2 feet by 2050, and possibly over 5 feet by 2100. The range of SLR projections reflects uncertainties in future GHG emissions, future changes in the rate of ice sheet melt, and uncertainties related to the data. The low end of the range is based on the lowest Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4) future CO_2 emissions scenario (B1), and the high end is based on the highest IPCC AR4 emissions scenario (A1FI) (2007). Again, given current GHG emission levels and projections of future ice sheet loss, the lowest range of the SLR projections likely underrepresents future SLR (Rahmstorf et al. 2012). The high end of the range is based on high fossil fuel usage, and the low end of the range is a change in lifestyle resulting in a lower mean SLR scenario.

The NRC report did not, however, tie these projections to specific emission scenarios. The IPCC adopted a set of emissions scenarios known as representative concentration pathways (RCPs). These are a set of four future pathways, named for the associated radiative forcing level (the globally averaged heat-trapping capacity of the atmosphere measured in watts/square meter) in 2100 relative to pre-industrial values: RCP 8.5, RCP 6.0, RCP 4.5, and RCP 2.6. RCP 8.5 is consistent with a future in which there are no significant global efforts to limit or reduce emissions, while RCP 2.6 is a stringent emissions-reduction scenario and assumes that global GHG emissions will be significantly curtailed. Under the RCP 2.6 scenario, global CO_2 emissions decline by about 70 percent between 2015 and 2050, to zero by 2080, and below zero thereafter.

RCP 2.6 most-closely corresponds to the aspirational goals of the United Nations Framework Convention on Climate Change's 2015 Paris Agreement, which calls for limiting global mean warming to less than 2 degrees Celsius (°C) and achieving net-zero GHG emissions in the second half of this century. This pathway would be very challenging to achieve, and most simulations of such stringent targets require widespread deployment of nascent carbon-negative technologies, such as sustainable bioenergy coupled to carbon capture and storage, or direct air capture of CO_2. As such, RCP 2.6 emission pathways will likely not be met.

Three of these RCPs were used to predict SLR in the Ocean Protection Council's newest SLR analysis, *State of California Sea-Level Rise Guidance: 2018 Update* (OPC 2018). These pathways are shown in Table 8-2. The table does not have RCP breakdowns for 2030 and 2050 because changes in emission scenarios were found to be minor prior to 2050. However, after 2050, the projections increasingly depend on GHG emissions. Table 8-2 also includes a newly developed extreme SLR scenario, H++. This is an unknown-probability, high-consequence scenario that is expected to occur if high rates of Antarctic ice loss develop in the last half of this century.

Table 8-2. Projected Sea-Level Rise for Tide Gage Locations in La Jolla[1]

Year/Percentile	Feet above 1991–2009 Mean			
	Median	**Likely Range**	**1-in-20 Chance**	**1-in-200 Chance**
	50% Probability SLR Meets or Exceeds …	**66% Probability SLR Meets or Exceeds …**	**5% Probability SLR Meets or Exceeds …**	**0.5% Probability SLR Meets or Exceeds …**
2030	0.5	0.4–0.6	0.7	0.9
2050	0.9	0.7–1.2	1.4	2.0
2100 (RCP 2.6)	1.7	1.1–2.5	3.3	5.8
2100 (RCP 4.5)[2]	2.0	1.3–2.8	3.6	6.0
2100 (RCP 8.5)	2.6	1.8–3.6	4.6	7.1
2100 (H++)	10.2			
2150 (RCP 2.6)	2.5	1.5–3.9	5.7	11.1
2150 (RCP 4.5)[2]	3.1	1.9–4.8	6.5	11.8

Year/Percentile	Feet above 1991–2009 Mean			
	Median	Likely Range	1-in-20 Chance	1-in-200 Chance
	50% Probability SLR Meets or Exceeds …	66% Probability SLR Meets or Exceeds …	5% Probability SLR Meets or Exceeds …	0.5% Probability SLR Meets or Exceeds …
2150 (RCP 8.5)	4.3	3.0–6.1	7.9	13.3
2150 (H++)	22			

Sources: Griggs et al. 2017, OPC 2018.
Acronym: SLR = sea-level rise.
Notes:
[1] Projections are based on the methodology of Kopp et al. (2014) with the exception of the H++ scenario. The "likely range" is consistent with the terms used by the IPCC meaning that it has about a 2-in-3 chance of containing the correct value. All values are with respect to a 1991–2009 baseline. The H++ scenario is a single scenario, not a probabilistic projection, and does not have an associated distribution in the same sense as the other projections; it is presented in the same column for ease of comparison.
[2] Projected SLR for RPC 4.5 can be found in Griggs et al. 2017, which is the science update used to inform the OPC 2018 guidance. The OPC 2018 guidance focuses on high and low SLR scenarios (RPC 2.5 and 8.5); thus, RPC 4.5 was not included.

The NOAA Digital Coast Sea Level Rise Viewer models sea-level rise projections and shows that coastal communities in the Project vicinity will be strongly affected by SLR and its associated hazards. As the proposed Project is offshore, the depth of water covering the reef will increase as sea levels rise and there will be a reduction in the availability of light for photosynthesis. Additionally, SLR could incrementally contribute to the loss of beaches, contribute to coastal erosion, and increase sedimentation and turbidity within the littoral cell, which would also result in a net loss of light availability. In addition, higher water levels combined with warmer water temperatures and more frequent storms could combine for greater wave force reaching the Project area.

8.2 ENVIRONMENTAL JUSTICE

8.2.1 Background

Environmental justice is defined by California law as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." This definition is consistent with the Public Trust Doctrine principle that the management of trust lands is for the benefit of all people. The Commission adopted an environmental justice policy in October 2002 to ensure that environmental justice is an essential consideration in the agency's processes, decisions, and programs. Through its policy, the Commission reaffirms its commitment to an informed and open process in which all people are treated equitably and with dignity, and in which its decisions are influenced by environmental justice considerations.

In keeping with its commitment to environmental sustainability and access to all, California was one of the first states to codify the concept of environmental justice in statue. Beyond the fair-treatment principles described in statute, leaders in the environmental justice movement work to include in the decision-making process those individuals disproportionately impacted by project effects. The goal is that, through equal access to the decision-making process, everyone has equal protections from environmental and health hazards and can live, learn, play, and work in a healthy environment.

Legislation enacted in 2016 required local governments with disadvantaged communities, as defined in statute, to incorporate environmental justice into their general plans when two or more general plan elements (sections) are updated. The Governor's Office of Planning and Research, the lead agency on planning issues, is developing updated guidance for local jurisdictions to incorporate environmental justice matters into their general plans and will be working with state agencies, local governments, and many partners throughout 2017 to create a technical assistance document.

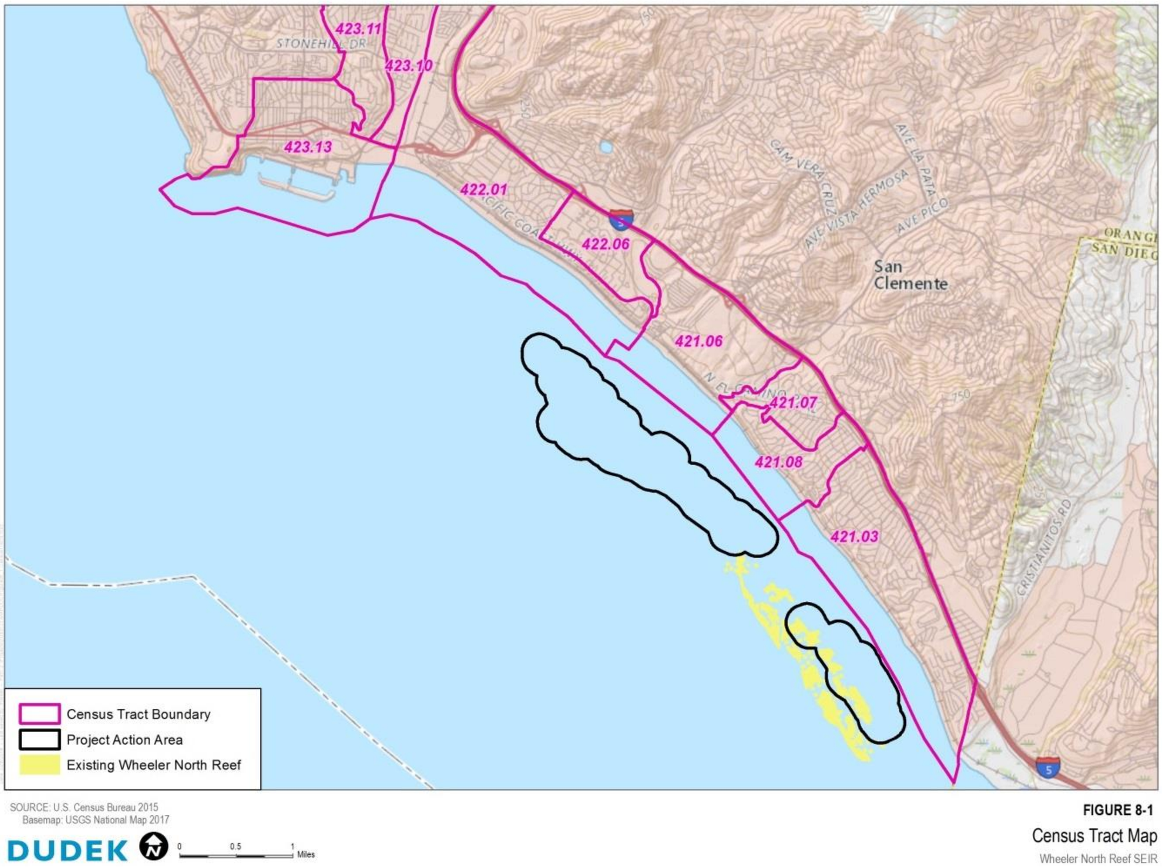
The U.S. Council on Environmental Quality (CEQ 1997) Environmental Justice Guidance defines "minorities" as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, or Hispanic. The total minority population is calculated by subtracting the white-alone, not Hispanic or Latino, population from the total population. According to the CEQ environmental justice guidelines, minority populations should be identified if:

- A minority population percentage exceeds 50 percent of the population of the affected area.
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (for example, a governing body's jurisdiction, neighborhood census tract, or other similar unit).

In addition, the CEQ Environmental Justice Guidance defines "low-income populations" as populations with mean annual incomes below the annual statistical poverty level (CEQ 1997). CEQ does not provide a discrete threshold for determining when a low-income population should be identified for environmental justice; however, for this analysis, an environmental justice population is identified if the low-income percentage of a census tract was found to be meaningfully greater than those of Orange County, San Clemente, or Dana Point.

The current population of the county and cities, in terms of its ethnicity (minority populations) and income (low-income populations), is defined based on the U.S. Census. For the purpose of this analysis, the potentially affected environmental justice populations were determined to be the communities onshore and near the coastline adjacent to construction activities. Figure 8-1 identifies census tracts to be evaluated for the proposed Project.

Figure 8-1 Census Tract Map



8.2.2 Minority Population

Table 8-3 presents the minority population composition of the regional and local study areas in the vicinity of the proposed Project, based on the most-recently available minority population information from the U.S. Census 2010–2016 American Community Survey (ACS) data.[35] The non-white population percentage of Census Tract 421.07, while below the county percentage, is above 50 percent and almost double the minority percentage of San Clemente; therefore, it qualifies for environmental justice consideration.

[35] U.S. Census 2010–2016 ACS estimates come from a sample population, but are more current statistics than the most recent full census of 2010. Because they are based on a sample population, a certain level of variability is associated with the estimates. Supporting documentation on ACS data accuracy and statistical testing can be found on the ACS website in the Data and Documentation section available here: https://www.census.gov/programs-surveys/acs/technical-documentation.html.

Table 8-3. Minority Population Data

Geographic Area	Total Population	Total Minority Population	Percent Minority Population
Orange County	3,132,211	1,8157,539	58
City of San Clemente	65,082	17,663	27
Census Tract 421.03	7,826	1,943	25
Census Tract 421.06	1,320	120	9
Census Tract 421.07	4,390	2,468	56
Census Tract 421.08	4,928	1,669	34
Census Tract 422.06	3,169	784	25
City of Dana Point	34,009	8,120	24
Census Tract 422.01	5,320	1,555	29
Census Tract 423.10	8,931	3,355	38
Census Tract 423.11	5,695	1,566	27
Census Tract 423.13	7,651	2,435	32

8.2.3 Low-Income Population

To determine poverty, the U.S. Census Bureau uses a set of official income thresholds that vary by family size and composition. These poverty thresholds are updated for inflation and do not vary geographically. If a family's total income is less than the family's threshold, then that family and every individual in it is considered to be in poverty (U.S. Census Bureau 2016). CEQ does not set a discrete threshold for qualifying a population as low income. As shown in Table 8-4, 7.1 percent of individuals in San Clemente, 7.9 percent of individuals in Dana Point, and 12.5 percent of individuals in Orange County had incomes below the poverty threshold.

Table 8-4. Low-Income Population Data

Geographic Area	Population for Whom Poverty Status Is Determined	Total Low-Income Population	Percent Low-Income Population
Orange County	3,094,893	385,556	12.5
City of San Clemente	64,965	4,589	7.1
Census Tract 421.03	7,826	431	5.5
Census Tract 421.06	1,288	139	10.8
Census Tract 421.07	4,390	1,108	25.2
Census Tract 421.08	4,928	616	12.5
Census Tract 422.06	3,098	130	4.2
City of Dana Point	33,919	2,673	7.9
Census Tract 422.01	5,320	375	7
Census Tract 423.10	8,931	1,309	14.7
Census Tract 423.11	5,695	574	10.1
Census Tract 423.13	7,651	903	11.8

8.2.4 Effects of the Project

The proposed Project's potential impact on the human environment is analyzed in Section 4.0, *Environmental Impact Analysis*, of this document. The proposed Project is located offshore with construction-related activities that are generally diffuse in nature and would not specifically target any of the census tracts analyzed. While Census Tract 421.07 qualifies as both a minority and low-income population, the proposed Project is unlikely to disproportionately affect this location. Census Tract 421.08, neither a minority nor a low-income qualifying census tract, is situated between the Project location and Census Tract 421.07 and would, at minimum, be equally affected by Project-related activities. Finally, the offshore location of Project construction and the temporary nature of potential impacts ensures that impacts to all nearby communities would not qualify as high and adverse.

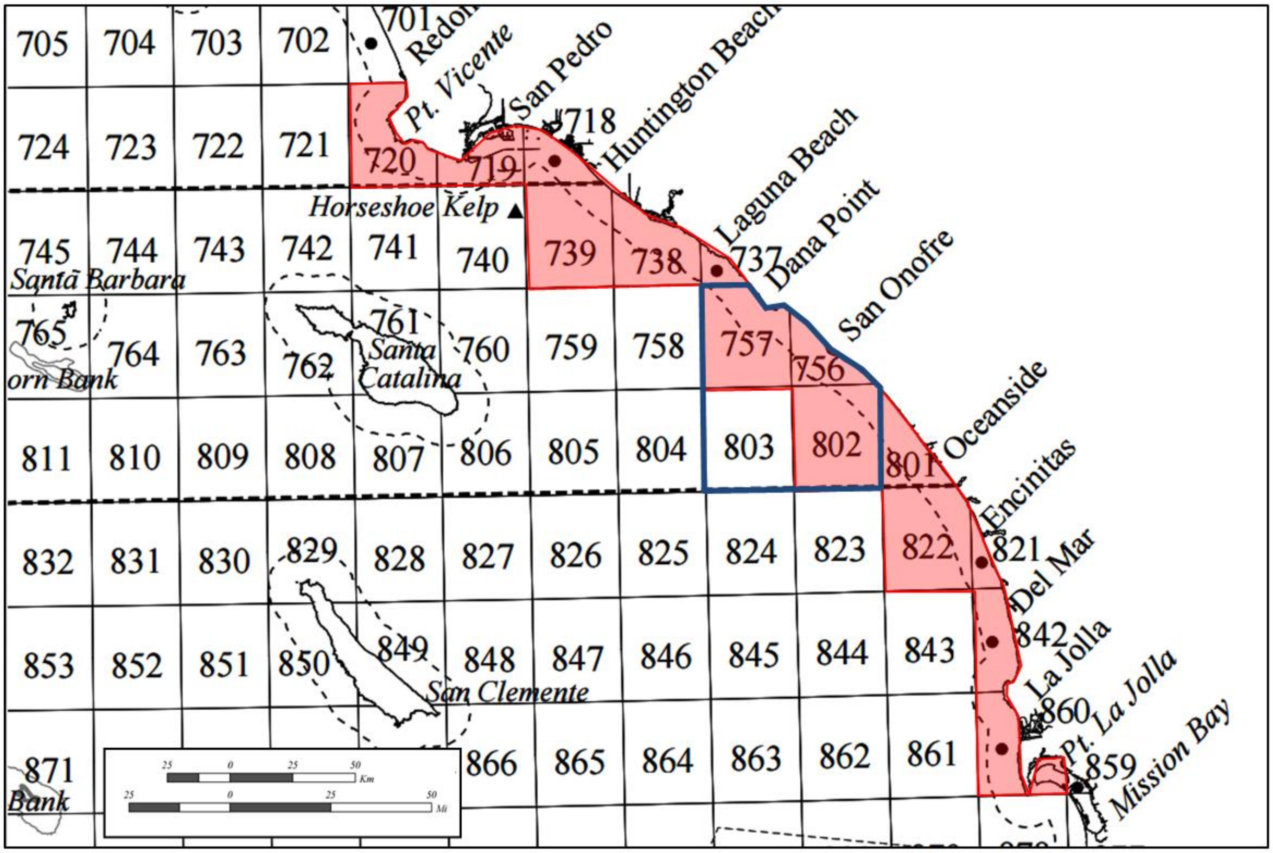
8.3 COMMERCIAL FISHING

This section describes commercial fishery activity surrounding the Project site, evaluates potential impacts to those commercial fishery activities, and, where appropriate, identifies mitigation measures related to implementation of the proposed Project. Commercial fishing is an important economic and cultural activity in California. Commercial fishing along the California coast uses several gear types that target a wide variety of fish and invertebrate species. The most-common commercial gear types include trawls, trolling, longlines, and gillnets. In 2016, a total of 167,094,157 pounds of fish worth $199,832,054 were landed in California. Of this total, 39,144,922 pounds (equivalent to $31,583,846) were landed in the Los Angeles and San Diego areas (California Department of Fish and Wildlife [CDFW] 2018d).

8.3.1 Fish Block Information

Information for commercial fisheries was taken from the CDFW California Fishery Information System that maintains data on where fish are caught and landed. Information is provided below for commercial catch data for CDFW Catch Blocks (blocks), including nearshore and adjacent blocks (Figure 8-2) from 2012 through 2016. The entire Project area occurs within block 756. This block, along with three neighboring blocks (757, 802, and 803), is summarized to provide an indication of the types of commercial fishing activity likely to occur in the immediate vicinity of the proposed Project. These blocks are referred to hereafter as the adjacent blocks. These data are compared, in turn, to 14 blocks spanning an area north and south of the proposed Project site between Pt. Vicente and Pt. La Jolla (indicated in red in Figure 8-2). These blocks are referred to hereafter as the nearshore blocks. Comparisons are also made to statewide fishery data that include all catch blocks for which CDFW collects data.

Figure 8-2. CDFW Catch Blocks



Source: CDFW 2001.
Note: Red highlighted blocks are nearshore fishery blocks used in this analysis. Blue border indicates blocks including and adjacent to the Project area used in this analysis (Blocks 757, 756, 802, and 803). Dashed line indicates 3 nautical miles from shoreline.

The 10 top-ranked fisheries by catch value for the area, including and adjacent to the Project area, are shown in Table 8-5. These 10 top-ranked fisheries by value constitute 96 percent of the total average annual value for this period and these blocks. Table 8-6 includes the 10 top-ranked fisheries by catch value for the nearshore blocks.

- **Market squid** (*Dorytheuthis opalescence*) dominates the average annual catch value in the adjacent and nearshore blocks. The average annual value reported for adjacent blocks was greater than $1.7 million and constituted 81 percent of the total average annual catch value. Market squid also ranked first among the nearshore blocks, with an annual average value constituting 62 percent of the total average annual catch value. Market squid is California’s largest fishery (Protasio et al. 2014), ranking highest throughout the state for average annual value between 2012 and 2016 (CDFW 2018d). Approximately 185 permits are issued within the California fleet; however, around 40 vessels report most landings (CDFW 2005). Typically, market squid are commercially harvested during spawning aggregations and at night in California.

Table 8-5. Fishery Value and Rank for the 10 Most Highly Ranked Fisheries in Adjacent CDFW Blocks

Fishery	Adjacent Blocks			Nearshore Blocks		
	Value ($)	Proportion Value (%)	Value Rank	Value ($)	Proportion Value (%)	Value Rank
Market squid (*Dorytheuthis opalescence*)	$1,732,449	81	1	$16,794,006	62	1
Red sea urchin (*Mesocentrotus franciscanus*)	$83,941	4	2	$983,373	4	4
Shortspine thornyhead (*Sebastolobus alascanus*)	$65,850	3	3	$872	<1	55
California spiny lobster (*Panulirus interruptus*)	$52,413	2	4	$319,854	1	6
Pacific hagfish (*Eptatretus stoutii*)	$33,671	2	5	$68,417	<1	7
Sablefish (*Anoplopoma fimbria*)	$28,352	1	6	$2,280	<1	40
Ridgeback prawn (*Sicyonia ingentis*)	$27,728	1	7	$27,813	<1	13
Spot prawn (*Pandalus platyceros*)	$18,513	<1	8	$44,684	<1	11
Pacific mackerel (*Scomber japonicus*)	$14,986	<1	9	$673,504	3	5
Yellow rock crab (*Metacarinus anthonyi*)	$12,480	<1	10	$54,561	<1	9

Source: CDFW 2018e.
Note: See Figure 8-2 for blocks.

Table 8-6. Top-10 Ranked Fisheries by Value from 2012 through 2016 for Nearshore CDFW Blocks

Fishery	Value ($)	Proportion Value (%)
Market squid (*Dorytheuthis opalescence*)	$16,794,006	62
Pacific sardine (*Sardinops sagax caerulea*)	$5,560,027	21
Northern anchovy (*Engraulis mordax*)	$1,971,821	7
Red sea urchin (*Mesocentrotus franciscanus*)	$983,373	4
Pacific mackerel (*Scomber japonicus*)	$673,504	3
California spiny lobster (*Panulirus interruptus*)	$319,854	1
Pacific hagfish (*Eptatretus stoutii*)	$68,417	<1
Rock crab (unspecified)	$54,836	<1
Yellow rock crab (*Metacarinus anthonyi*)	$54,561	<1
Bluefin tuna (*Thunnus thynnus*)	$53,356	<1

Source: CDFW 2018e.
Note: See Figure 8-2 for blocks.

Fishing gear used by commercial fishermen for harvesting market squid usually involves seine (purse-, drum-, or lampara-style) or brail nets combined with lights to attract the animals near to the boat (CDFW 2005). The fishery occurs year-round, although Protasio et al. (2014) report increased activity from October to May at the Channel Islands, and CDFW (2005) indicates activity throughout Southern California is greatest in the late fall and early winter. Squid fishing supplements the income of many seine boats from California that also participate in the tuna fishery and the coastal pelagic species (CPS) fishery dominated by Pacific sardine (*Sardinops sagax caerulea*) and Pacific mackerel (*Trachurus symmetricus*). Many vessels that target market squid in Southern California have home ports in Alaska, Washington, and Oregon and participate in salmon, herring, and sardine fisheries in these other states.

- **Red sea urchin** (*Mesocentrotus franciscanus*) is the second-most-valuable fishery for the adjacent blocks and ranked fourth for the nearshore blocks. The red sea urchin fishery constituted 4 percent of the catch by average annual weight and represented a value of $83,941 on average each year in blocks adjacent to the proposed Project. The red sea urchin fishery is a nearshore shallow-water fishery. Red sea urchin are commercially harvested by divers from kelp reefs and red urchin from both Wheeler North Reef and San Mateo kelp beds are likely to be included in these fishery value estimates. The abundance of red sea urchin habitat (giant kelp forests) in the adjacent blocks compared to the nearshore blocks may explain the lower ranking of red sea urchin in the nearshore blocks than the adjacent blocks. Red sea urchin are harvested year round, and divers target larger urchins, typically checking the quality of their harvest while collecting to ensure they are maximizing the value of their harvest. Quality depends on gonad size, color, texture, and firmness. The highest prices are obtained during the Japanese New Year holidays in late December/early January, and during the urchin spawning time around June and July. The primary fishery in Southern California for sea urchins is the Channel Islands because they produce a higher-quality product due to the pristine nature of the kelp forest environment around the islands. The mainland fishery constitutes less than a third of landings within Southern California (CDFW 2003a). Between 2012 and 2016, red sea urchin ranked fifth throughout the state for average annual fishery value (CDFW 2018d).

- **Shortspine thornyhead** (*Sebastolobus alascanus*) ranked third for value in the adjacent blocks, which is high considering it ranked 55th for the nearshore blocks. Shortspine thornyhead is a deep-water species of rockfish popular in the Japanese market. Fishing is typically by bottom trawl and longline gear on sand and fine sediment at depths between 1,800 and 3,600 feet, although some fishing grounds may be as shallow as 600 feet. Most thornyheads landed in California are taken in central and northern parts of the state, particularly Fort Bragg, Eureka, and Morro Bay (Barnes et al. 2001). The majority (99.8 percent) of the shortspine thornyheads reported as caught in the adjacent blocks was reported in the offshore block (block 803, in Figure 8-2). Most likely, these were caught at the most-offshore extent of these blocks in deeper water and are likely to be a considerable distance from the Project area.

- The **California spiny lobster** (*Panulirus interruptus*) fishery, which ranked fourth in value for the adjacent blocks, was valued at $52,413 amongst the adjacent blocks. This value was only 2 percent of the average annual catch value reported (Table 4.13-1). California spiny lobster are exclusively harvested south of Point Conception. Commercial fishermen use baited wire traps to harvest lobster from waters shallower than approximately 100 feet (31 meters), although some can be deployed as deep as 300 feet (93 meters). Traps must be serviced every 96 hours, weather conditions permitting (Fish and Game Code section 9004). Approximately 150 individuals are active licensed commercial lobster fishermen in California. Commercial lobster season is limited to the months of October through March (CDFW 2016a).
- **Pacific hagfish** (*Eptatretus stoutii*) ranked fifth in average annual value in the adjacent blocks and seventh in the nearshore blocks. The average annual value for the adjacent blocks was $33,671, representing 2 percent of the fishery value on average for the adjacent blocks. Hagfish are typically harvested in California with 5-gallon (19-liter) bucket traps, Korean traps, or 40-gallon (150-liter) barrel traps. There are no quotas, minimum size limits, or seasons for this fishery. The traps are typically deployed over muddy or sandy habitat and often at relatively deep-water habitats. The fish are landed in live condition from the traps and typically packaged for live export to the Korean market (CDFW 2016b).

The remaining fisheries that occur within the top 10 most-valuable fisheries for the adjacent blocks individually constituted 1 percent or less of the average annual value for the adjacent blocks.

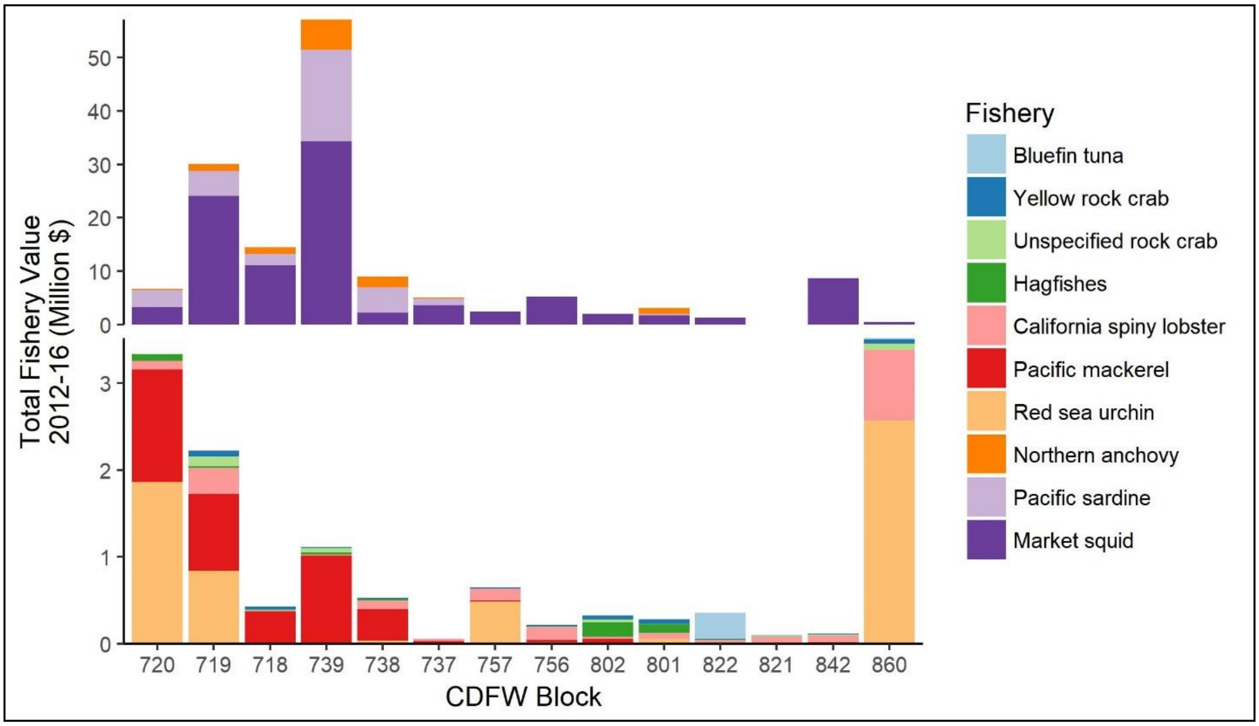
- Like the thornyhead fishery, **sablefish** (*Anoplopoma fimbria*) is also a deep-water fishery. As with thornyhead, the majority of fish reported as caught in the adjacent blocks (99.5 percent) occurred in the offshore block (block 803, in Figure 8-2). This fishery ranked 40th in value for the nearshore blocks. Fishermen harvest sablefish using trawl gears and, to a lesser extent, trap gear, at depths typically greater than 1,600 feet (500 meters). The fish are usually found on muddy seabed habitats.
- **Ridgeback** (*Sicyonia ingentis*) and **spot prawn** (*Pandalus platyceros*) ranked seventh and eighth by average annual value, respectively. Both species historically were targeted by trap-and-trawl methods; however, the trawl fishery for spot prawn was closed in 2003. Spot prawn trapping continues year-round, and restrictions apply primarily to trap designs and number. Spot prawn traps are set in a line attached to a buoy and anchor at depths of 400 to 1,000 feet (122 to 305 meters), typically along submarine canyons and shelf breaks. The species depth range is

from approximately 150 to 1,600 feet (46 to 488 meters). In 2006, the last time CDFW reported on the spot prawn fishery, 30 permits had been issued, and 22 of which were considered active. CDFW estimated employment for the spot prawn fishery to have created approximately 122 jobs and generated $3.2 million in wages (CDFW 2006a). The Ridgeback prawn fishery was also reported on by CDFW in 2006 (CDFW 2006b). This smaller fishery was estimated to be the equivalent of about 11 jobs and $295,000 in wages. The Santa Barbara channel is the center of this fishery. The fishery for ridgeback prawn uses trawl gear, and no trawling is allowed within 3 miles of the coast, so the fishing activity within the nearshore and adjacent blocks is likely to be further offshore than the Project area.

- **Pacific mackerel** (*Scomber japonicus*) are targeted using seine net gear (particularly purse seine nets) by commercial fishermen. They are part of the coastal pelagic fishery and are often caught along with sardines, anchovies, jack mackerel (*Trachurus symmetricus*), and other schooling pelagic species. They are also taken as bycatch in midwater trawls, gillnets, hook-and-line, and a number of other fishing types (Pacific Fishery Management Council [PFMC] 2016c).
- **Yellow rock crab** (*Metacarinus anthonyi*) are one of three species of rock crab fished along the coast and at the Channel Islands in Southern California. Rock crabs are targeted by commercial fisherman using single-baited traps marked with surface buoys. Traps are usually fished for 24 to 96 hours. At the Channel Islands, yellow rock crab fishermen deploy traps inshore of brown and red rock crab fisherman. Brown (*Romaleon antennarium*) and red (*Cancer productus*) rock crab are more typically found near rocky reef habitat, although traps typically are deployed on sandy seabed adjacent to these habitats to avoid snagging traps under ledges and other reef features. Yellow rock crab prefers open sand and soft bottom habitat (CDFW 2003b).

Fishery values for the nearshore blocks up coast and down coast of the Project site were dominated by the market squid fishery (Table 8-6). Pacific sardine and northern anchovy (*Engraulis mordax*) also represented a large proportion of the fishery value for these nearshore blocks. Fishery value was higher at the northern extent of the range of blocks (Figure 8-3). Block 860, which is adjacent to the San Diego harbor entrance, accounted for a large red sea urchin and California spiny lobster fishery value compared with the other nearshore blocks (CDFW 2003c). This pattern is likely to be a combination of the proximity of these blocks to major landing harbors (typically fishermen will limit the distance they travel to save fuel) and the abundance of the catch, which in turn is likely to be associated with habitat in these blocks.

Figure 8-3. Top 10 Fisheries by Value for Nearshore Blocks (2012–2016)



Source: CDFW 2018d.

8.3.2 Essential Fish Habitat

The Magnuson-Stevens Act (MSA) of 1976 (Public Law 104-267) as amended by the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-297) requires that the National Marine Fisheries Service (NMFS), regional Fishery Management Councils, and other federal agencies identify and protect important marine, estuarine, and anadromous fish habitat. To that end, the regional Fishery Management Councils are required to prepare Fishery Management Plans (FMPs) for the identification, protection, and enhancement of Essential Fish Habitat (EFH) for federally "managed species."

EFH is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1802 (10)). In 2002, NMFS further clarified EFH with the following definitions:

- *Waters* includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate.
- *Substrate* includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
- *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10).

Four FMPs include species of fishes occurring in the Project area: Coastal Pelagic Species (CPS) FMP; Pacific Coast Groundfish (PCG) FMP; Pacific Coast Salmon (PCS) FMP; and Highly Migratory Species (HMS) FMP. Table 8-7 provides a complete species list of those groups of fishes that are covered under these four FMPs that could occur within the Project area. Not all these species have been directly recorded in published information reviewed as part of this assessment; however, their presence can be expected due to the habitat types in the area and the known life history, including range and habitat use, of these groups. The taxa listed may occur in the area in egg, larvae, juvenile, or adult forms.

Table 8-7. Fishes by Broad Habitat Use (Constituting Essential Fish Habitat) Listed under Fishery Management Plans Applicable to Project Area

Taxa[1]	Fishery Management Plan				Likelihood of Occurrence[2]
	HMS	PCG	CPS	PCS	
Nearshore Benthic					
Ratfish (*Hydrolagus colliei*)		X			High
Rock sole (*Lepidopsetta bilineata*)		X			Low
Nearshore Benthic and Pelagic					
Leopard shark (*Triakis semifasciata*)		X			High
Spiny dogfish (*Squalus suckleyi*)		X			High
Smelts (Osmeridae)		X	X		High
Nearshore Benthic—Hard Substrate					
Cabezon (*Scorpaenichthys marmoratus*)		X			High
Rockfishes		X			High
Lingcod (*Ophiodon elongates*)		X			High
Kelp greenling (*Hexagrammos decagrammus*)		X			Low
Nearshore Benthic—Soft Substrate					
Curlfin sole (*Pleuronichthys decurrens*)		X			High
English sole (*Parophrys vetulus*)		X			High
Pacific sanddab (*Citharichthys sordidus*)		X			High
Sand sole (*Psettichthys melanostictus*)		X			High
Starry flounder (*Platichthys stellatus*)		X			High
Big skate (*Raja binoculata*)		X			High
California skate (*Raja inornata*)		X			High
All other skates (Endemic species in the family Arhynchobatidae)		X			High
Dover sole (*Microstomus pacificus*)		X			Low
Nearshore Pelagic/Water Column					
Pacific sardine (*Sardinops sagax*)			X		High
Pacific (chub) mackerel (*Scomber japonicas*)			X		High
Northern anchovy (*Engraulis mordax*)			X		High
Jack mackerel (*Trachurus symmetricus*)			X		High
Jacksmelt (*Atherinopsis californiensis*)			X		High
Market squid (*Doryteuthis opalescens*)			X		High
Silversides (Atherinopsidae)		X	X		High
Pacific whiting (hake) (*Merluccius productus*)		X			High
Sablefish (*Anoplopoma fimbria*)		X			High

Table 8-7. Fishes by Broad Habitat Use (Constituting Essential Fish Habitat) Listed under Fishery Management Plans Applicable to Project Area

Taxa[1]	Fishery Management Plan				Likelihood of Occurrence[2]
	HMS	PCG	CPS	PCS	
Round herring (*Etrumeus teres*)	X	X	X	X	High
Mesopelagic fishes Families: Myctophidae, Bathylagidae, Paralepididae, and Gonostomatidae	X	X	X	X	High
Great white shark (*Carcharodon carcharias*)	X				High
Common thresher shark (*Alopias vulpinus*)	X				High
Soupfin shark (*Galeorhinus zyopterus*)		X			High
Basking shark (*Cetorhinus maximus*)	X				Low
Megamouth shark (*Megachasma pelagio*)	X				Low
Chinook salmon (*Oncorhynchus tshawytscha*)	X			X	Low
North Pacific albacore (*Thunnus alalunga*)	X				Low
Yellowfin tuna (*Thunnus albacares*)	X				Low
Bigeye tuna (*Thunnus obesus*)	X				Low
Skipjack tuna (*Katsuwonus pelamis*)	X				Low
Northern bluefin tuna (*Thunnus orientalis*)	X				Low
Shortfin mako or bonito shark (*Isurus oxyrinchus*)	X				Low
Blue shark (*Prionace glauca*)	X				Low
Striped marlin (*Tetrapturus audax*)	X				Low
Swordfish (*Xiphias gladius*)	X				Low
Dorado or dolphinfish (*Coryphaena hippurus*)	X				Low
Thread herring *(Opisthonema libertate, O. medirastre)*	X	X	X	X	Low
Pacific saury (*Cololabis saira*)	X	X	X	X	Low
Pelagic squids Families: Cranchiidae, Gonatidae, Histioteuthidae, Octopoteuthidae, Ommastrephidae except Humboldt squid (*Dosidicus gigas*), Onychoteuthidae, and Thysanoteuthidae	X	X	X	X	Low
Krill or euphausiids			X		Low

Sources: PFMC 2016a, 2016b, 2016c, 2016d; Love 2011; Miller and Lea 1972; Allen 2006; MBC 2007.
Acronyms: CPS = Coastal Pelagic Species; HMS = Highly Migratory Species; PCG = Pacific Coast Groundfish; PCS = Pacific Coast Salmon.
Notes:
[1] Includes both Fishery Management Unit and Ecosystem Component taxa.
[2] Likelihood of occurrence is relative to the taxa population distribution. If the species is less common in the Project area than other parts of its range, likelihood of occurrence is classified as Low.

A total of 16 taxa from the HMS FMP are listed as potentially occurring within the Project area. EFH for all of these species is the pelagic or water column habitat around the Project area, typically used for feeding and growth to maturity. Some may also be found spawning or breeding in the area. Of these 16 taxa, only great white (*Carcharodon carcharias*) and common thresher (*Alopias vulpinus*) sharks are considered highly likely to occur. Juveniles are the most likely to occur within the Project area as both shark species are believed to use the area as a nursery ground (Dewar et al. 2004, Cartamil et al. 2011). In the case of great white sharks, Dewar et al. (2004) believe this is due to the abundance and diversity of prey, warm water, and separation from adults.

The remaining 13 taxa are assessed as having a low likelihood of occurrence. Many of these taxa primarily occur further offshore in deeper water and are unlikely to be found as close to shore as the Wheeler North Reef Phase 3 expansion. However, they are included due to the possibility that they could occur, as this would be considered sufficient to indicate that the habitat is “necessary” and, therefore, would be considered EFH for these species. These taxa include five species of tuna (yellowfin [*Thunnus albacares*], bigeye [*Thunnus obesus*], skipjack [*Katsuwonus pelamis*], bluefin [*Thunnus thynnus*], and Pacific albacore [*Thunnus alalunga*]), two shark species (blue [*Prionace glauca*] and bonito [*Isurus oxyrinchus*]), striped marlin (*Kajikia audax*), swordfish (*Xiphias gladius*), and dorado (*Coryphaena hippurus*). Chinook salmon (*Oncorhynchus tshawytscha*) are the only federally managed salmonid likely to occur in the area. They have a low likelihood of occurrence on the basis that the location of the proposed Project is at the very southern extent of their typical range. These salmonids typically occur in the nearshore environment from the central coast north, although Love (2011) states that reasonable numbers can occur in some years in Southern California, even as far south as Newport Canyon (~35 miles up coast of the proposed Project). Megamouth sharks (*Megachasma pelagios*) are typically a deep-water species and are unlikely to occur within the Project area. Basking shark are typically more common north of Point Conception, and numbers in the Santa Barbara Channel are significantly less; hence, the Project area is anticipated to be the southern extent of their typical range (Squire 1990).

The PCG FMP contains the largest number of fish species of all four FMPs that concern Pacific Coast fisheries. Twenty-seven taxa are included from the PCG as potentially occurring within the Project area. These include fishes that use both benthic and pelagic habitats in the nearshore area, which includes the Project site for at least one stage in their life history. The majority of benthic-associated taxa is most typically associated with either hard- or soft-sediment benthic habitat; however, five taxa have no clear association with either soft or hard substrate, but are associated with benthic habitats. Ratfish (*Hydrolagus colliei*), rock sole (*Lepidopsetta bilineata*), leopard shark (*Triakis semifasciata*), spiny dogsfish (*Squalus suckleyi*) and smelts (Osmeridae) are all associated with benthic EFH as adults. The latter three groups are typically found in small to large schools or loosely associated groups. Smelts in particular will school and will also forage, reproduce, and spawn in pelagic or water column EFH. Rock sole and smelts produce planktonic larvae that inhabit a pelagic or water column EFH. Leopard sharks give birth to live offspring, although young and juvenile leopard sharks are often within sheltered bays and estuaries around shallow muddy and vegetated habitats such as eelgrass beds, which are not found in the Project area.

Greater than 80 percent of the subtidal benthic habitat that dominates the immediate Project area is soft sediment. Nine taxa listed in the PCG FMP are associated predominantly with soft sediment habitat, and eight of these are assessed as highly likely to occur. All nine groups are either flatfishes or skates. Only Dover sole (*Solea solea*) was assessed as having a low likelihood of occurrence as it is at the southern end of its typical range and is typically a deeper-water species. As their name clearly implies, flatfishes are dorsally flattened fishes that use the seabed both to forage (typically consuming infaunal species such as polychaetes, bivalves, crustaceans, snails, brittlestars, seapens, etc.) and to take refuge, using their body shape plus their often highly cryptic skin markings to hide against the uniform soft sediment seabed. Skates are similar in that they have a dorsally flattened body type that allows them to use the seabed for both forage and refuge. Both groups will also bury themselves just below the sandy surface when hiding. Many of the other flatfishes and skates included in the PCG FMP that do not appear in Table 8-7 are more typical of the middle and outer continental shelf (the Project area is located within the inner shelf zone) or are stocks occurring further north of the Project area. All flatfishes listed have planktonic eggs and larvae in addition to their benthic juvenile and adult forms and, therefore, are also considered as associating with pelagic or water column EFH. Skates, listed in Table 8-7, and ratfish typically lay eggs with keratinous shells that will hatch small juveniles and, therefore, are not considered as associating with pelagic or water column EFH.

Hard benthic substrate is found within the immediate Project area, including the existing Wheeler North Reef and San Mateo kelp forests. In addition to the five taxa with general benthic habitat associations described above, four taxa are included in Table 8-7 as likely to associate with the hard benthic substrate found adjacent to the Project site. Of these four taxa, kelp greenling have a low likelihood of occurrence in the area as they are more typically associated with Central California kelp forests. The three remaining taxa are likely to be present and associate with the hard substrate benthic EFH that lies immediately adjacent to the Project area.

Cabezon are a characteristic fish within Southern and Central California reefs. Adults are ambush predators, using their cryptic form to lie in wait on rocky substrate for prey. Females spawn eggs onto algae-free rocky substrate from late October through March in California. The nests are guarded by males for 2 weeks as the embryos develop. Juveniles are pelagic after hatching for up to 3 months; hence, this species is also associated with the pelagic or water column EFH.

Rockfishes constitute potentially the single largest group of fishes in Table 8-7. California rockfishes are an extremely diverse group of fishes, with greater than 60 species (including members from the *Sebastes*, *Scorpaena*, *Scorpaenodes*, and *Sebastolobus* genera) occurring within the Southern California Bight. Of these species, many are located in deeper water than those of the Project area. All rockfishes are viviparous, meaning they birth live young that were supplied nutrition by the mother during development. Once born, the larvae are planktonic for a period of time; therefore, many members of this group are also associated with the pelagic or water column EFH of the Project area. Both benthic crustaceans and encrusting epifauna, as well as pelagic prey sources such as euphasiids, copepods, mysid shrimp, and gelatinous zooplankton, will constitute much of the diet of these fishes.

The final group of fishes are associated as adults with pelagic or water column EFH at the Project site. Of the 33 taxa included in Table 8-7 associated with this EFH (including the taxa categorized as benthic and pelagic described previously), 18 are listed in the PCG FMP. A further 12 taxa associated with pelagic or water column EFH are listed in the CPS FMP. Six of these CPS taxa are also listed in the PCG FMP. Of the six taxa listed in both the CPS and PCG FMP, three (thread herring [*Opisthonema oglinum*], Pacific saury [*Cololabis saira*], and pelagic squids) are considered to have a low likelihood of occurrence in the Project area. This is due to these taxa occurring more commonly to the north of Point Conception or, in the case of Pacific saury, further offshore of the Project area.

Round herring (*Spratelloides gracilis*), silversides, and the group of mesopelagic fishes have a high likelihood of occurrence in the pelagic or water column EFH around the Project site. While adult mesopelagic fishes are more likely to occur at night, their larval forms are frequently one of the most-highly abundant taxa in entrainment samples collected during SONGS larval fish surveys, which occurred approximately 3.4 miles down coast of the Wheeler North Reef.

Many of the taxa groups listed in the CPS FMP occur in relatively high abundance compared to other species typically found both within the Project area and throughout the region. Northern anchovy and Pacific sardine are abundant throughout California and are federally managed species under the CPS FMP. There is a commercial fishery for northern anchovy that, on average from 2012 through 2016, has brought in $17,370,280 in revenue per year in California (CDFW 2018d). They are also heavily fished for the live-bait fishery. Anchovies are an important forage fish for predatory fishes, seabirds, and marine mammals. Pacific sardine is an important commercially harvested fish and, on average from 2012 through 2016, has annually brought in $24,888,651 in revenue (CDFW 2018d). Sardines are a prevalent fish in the live-bait fishery and are important in the diet of many predatory animals such as fishes, seabirds, and marine mammals.

Krill (*euphausiids*) are also listed as a species in the CPS FMP and have a low likelihood of occurrence in the Project area. Krill are a small pelagic crustacean that constitutes an important food source for many species from fishes to marine mammals. Typically, peaks in concentration of krill occurs further offshore than the Project area, particularly in Southern California where the coastal shelf is much broader, as they tend to associate with the shelf break (PFMC 2008). On that basis, the likelihood of occurrence is qualified as low for this group, although they are likely to occur frequently in samples of the pelagic/water column EFH.

None of the EFH identified as occurring within the Project area would be considered as a habitat area of particular concern under (50 CFR 600.815(a)(8)) as they are widespread throughout the local and regional area and are, therefore, not considered rare habitats for the area. While habitat areas of particular concern provide refuge and forage and constitute areas in which species will spawn and reproduce, they are not restricted for specialized breeding, foraging, or refuge areas and would not constitute a habitat area of particular concern under those conditions.

8.3.3 Effects of the Project

8.3.3.1 Loss of Potential Fishing Grounds

Soft sediment habitat will be lost due to the construction of the artificial reef. Soft sediment habitat is also the dominant nearshore habitat throughout California. Coastal Environments (2016) completed a comprehensive geophysical survey of the area to determine soft- and hard-sediment habitat extent. The area surveyed encompassed the existing Wheeler North Reef (Phases 1 and 2) and the area intended for expansion of the reef (Phase 3), encompassing a total survey area of approximately 3,200 acres. Within this surveyed area, soft sediment habitat constituted greater than 80 percent of the seabed (2,584 acres). The loss of soft sediment habitat due to the expansion of Wheeler North Reef is anticipated to cause the loss of just 200 acres of habitat, which constitutes 7.7 percent of the soft sediment habitat that exists within the survey area. In turn, this is a very small proportion of the soft sediment habitat available to commercial fishermen who are likely to use the area. Because alternative fishing areas exist, this effect is not anticipated to cause loss of fishing grounds for commercial fishermen.

8.3.3.2 Loss of Essential Fish Habitat

Several managed fishery species are associated with the soft sediment habitat type that would be lost following construction of the reef. The managed fisheries include the flatfishes likely to occur in the area: curlfin sole (*Pleuronichthys decurrens*), English sole (*Parophrys vetulus*), Pacific sanddab (*Citharichthys sordidus*), sand sole (*Psettichthys melanostictus*), and starry flounder (*Platichthys stellatus*). Several managed skates are also closely associated with soft-sediment environments. These include big skate (*Raja binoculata*) and California skate (*Raja inornata*), as well as several other skate species from the family Arhynchobatidae.

As discussed for "Loss of Potential Fishing Grounds," the loss of this amount of soft sediment habitat is sufficiently small as to have a negligible impact on fish stocks and, subsequently, is unlikely to be considered as having a substantial effect on EFH.

8.3.3.3 Restricted Access During Construction

Several fishing activities will be required to find alternative fishing areas during the construction period. This includes the mainland crab trap fishery and some of the smaller fisheries that may target species in the Wheeler North Reef and San Mateo kelp beds such as Kellet's whelk (*Kelletia kelletii*) and sea urchin fisheries. These fisheries operate year round. However, lobster fishing, which is an important commercial fishery with a limited fishing season, will not be disturbed because the construction activity will be stopped to allow this fishery to occur uninterrupted. Because these other fisheries represent a smaller share of the fishery at the Project site, this temporary closure is not anticipated to have substantial effects.

8.4 STATE TIDE AND SUBMERGED LANDS POSSESSING SIGNIFICANT ENVIRONMENTAL VALUES

The proposed Project involves lands identified as possessing significant environmental values within the CSLC's Significant Lands Inventory, pursuant to Public Resources Code section 6370 et seq. The Project area is located in the Significant Lands Inventory as parcel numbers 30-062-000 and 30-062-200, which include the tide lands of the Pacific Ocean lying below the ordinary high-water mark for the entire Orange County coastline (30-062-000) and from the San Diego County boundary line to the south extending north to the Dana Point (30-062-200). The subject lands are classified in use category Class B, which authorizes limited use (30-062-200), and Class C, which authorizes multiple use (30-062-000).

The parcels were identified as having significant environmental values regarding biological resources (endangered species, marine biotic community, large kelp beds, fishery and wildlife support, migratory bird feeding and resting areas), and recreational activities (swimming, fishing, surfing, diving, boating). Although the Project would result in temporary impacts to these values during construction of the reef, the long-term impact of increasing kelp habitat would be beneficial and consistent with the environmental values and use.

Based upon CSLC staff's review of the Significant Lands Inventory and through the CEQA analysis provided in this EIR, the Project will not significantly affect those lands and is consistent with the use classification.

9.0 REPORT PREPARATION SOURCES AND REFERENCES

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