FINAL
BASELINE ENVIRONMENTAL INVENTORY REPORT

IMPERIAL COUNTY
RENEWABLE ENERGY AND TRANSMISSION ELEMENT UPDATE

Prepared for:

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

Page

LIST OF TABLES

Page

1.0 – INTRODUCTION

The County of Imperial (County) received a Grant from the California Energy Commission's Renewable Energy and Conservation Planning Grant Program to update the 2006 Geothermal/Alternative Energy and Transmission Element (ICPDS 2006) of the Imperial County General Plan (ICPDS 2009) and the Implementing Ordinances and to complete the environmental documents required under the California (State) Environmental Quality Act (CEQA). This effort is required due to both the identification of new renewable energy opportunities and the need to assure that the General Plan can meet the needs for future development while remaining consistent with identified land use and environmental goals. While the existing element focused on geothermal renewable energy resources, the element update presents a broader focus that takes into account additional forms of renewable energy, including wind, solar, deep solar ponds, biofuel, biomass, algae production, concentrated solar-thermal power, and concentrated photovoltaics. Consequently, the new element has been retitled as the *Renewable Energy and Transmission Element* update.

The location of Imperial County is shown on Figure 1-1. This baseline inventory report serves as an essential component for preparing the *Renewable Energy and Transmission Element* update and updating other elements of the General Plan and for preparing the Programmatic Environmental Impact Report (PEIR) to allow future renewable energy projects that are consistent with the General Plan to be permitted in a more streamlined process. It should be noted that this baseline inventory report is a "snapshot" of current conditions. A list of the renewable energy projects in Imperial County is presented in Appendix A. A list of EAs, EIRs, and EISs completed for renewable energy projects within Imperial County that are incorporated by reference are presented in Appendix B.

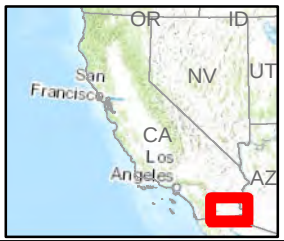

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Figure 1-1

Imperial County Renewable Energy and Transmission Element Update

Location and Vicinity Map

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2.0 – BASELINE INVENTORY ANALYSIS

The regulatory environment and existing conditions of each of the following topics were analyzed to determine what the potential opportunities and constraints are for planning and developing future renewable energy in Imperial County.

- Aesthetics and Glare
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural/Archaeological/Paleontological Resources
- Geology and Soils
- Greenhouse Gas Emissions/Climate Change
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Circulation
- Utilities and Services

It should be noted that the final baseline inventory report has combined the Health Risk Assessment section into the Air Quality section.

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2.1 AESTHETICS

2.1.1 Introduction

This section discusses the existing aesthetics and glare in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.1.2 Terminology

The following is a summary of aesthetics and glare terminology discussed in this section.

- **Glare** – A continuous source of bright light that can be produced by indirect reflection of sunlight or the reflection of the bright sky surrounding the sun.

- **Glint** – A momentary flash of bright light and a type of glare produced by direct reflection of sunlight.

- **Scenic Highway** – A segment of a state, county, or local highway that is designated as "scenic" by a federal, state, or local agency.

- **Scenic Vista** – A view of scenic resources from a specific point that is recognized as having superior visual and/or aesthetic qualities.

- **Sensitive Viewer Groups** – Groups of people who share a commonality, such as being a tourist, resident, or commuter, who are affected by the visual quality and character of viewsheds and scenic vistas.

- **Vantage Point** – The position from which a viewer looks at an observation point, viewpoint, or viewshed.

- **Viewshed** – An area composed of land, water, and cultural elements which may be viewed and mapped from one or more viewpoints and that has inherent scenic qualities and/or aesthetic values as determined by those who view it.

- **Viewshed Units** – A viewshed unit is a portion of the landscape that displays primarily homogenous visual characteristics of the basic landscape features (e.g., land and water forms, vegetation, and structures).

- **Visual Resource** – Visual resources are defined as those landscape patterns and features that are visually or aesthetically pleasing and that contribute positively to the definition of a distinct community or region including, but not limited to, trees, rock outcroppings, and historic buildings.

2.1.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to aesthetics and glare.

National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) is a federal law administered by the Environmental Protection Agency (EPA) that requires federal agencies to consider environmental values in the decision-making process. The federal agencies must consider environmental impacts and consequences of proposed actions and reasonable alternatives that could potentially reduce impacts (USEPA 2014a).

Bureau of Land Management

The Bureau of Land Management (BLM) operates under the Department of the Interior in managing 15.2 million acres of public land in California. The BLM's Strategic Framework is centered on sustainability, heritage, and community, which guide the BLM in its long-term management of public lands. Under its commitment to sustainability, the BLM is working to facilitate the development of solar, wind, and geothermal energy projects on BLM land including the implementation of the Desert Renewable Energy Conservation Plan (DRECP). Imperial County is located within the BLM California Desert District with a field office in El Centro (BLM 2014).

Federal Land Policy and Management Act of 1976

The Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [U.S.C.] 1701) and the U.S. Department of the Interior's (DOI) *Bureau of Land Management* (BLM) *Land Use Planning Handbook* (BLM 2005) both emphasize the importance of protecting the quality of scenic resources on public lands. FLPMA sections relevant to The Desert Renewable Energy Conservation Plan (DRECP or Plan) are:

> Section 102(a): "…The public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values..."
>
> Section 103(c): Identifies "scenic values" as resources for public management. Section 201(a): "…The Secretary shall prepare and maintain on a continuing basis and inventory of all public lands and their resources and other values (including…scenic values)..."
>
> Section 505(a): "…Each right-of-way shall contain terms and conditions which will…minimize damage to the scenic and aesthetic values..."

FLPMA's legal mandate to protect the quality of scenic resources on public lands is carried out by BLM and detailed in BLM's Visual Resource Management (VRM) system, described below.

Bureau of Land Management Visual Resource Inventory and Management Guidance

BLM, through FLPMA, is charged with protecting the scenic value of public lands. To accomplish this, BLM has developed and uses an analytical process, the VRM system, to identify, set, and maintain those scenic values. The VRM system has two key aspects: inventorying visual resources and managing those resources (DRECP 2014).

Through the inventory process, BLM identifies the visual resources of a given area and, based upon specific standards, assigns each area to an inventory class. This process involves rating the resource's visual qualities, measuring public concern, and determining the extent to which an area is visible from

travel routes and other observation points. This process is further described in detail in BLM Manual H-8410-1, Visual Resource Inventory (VRI) (DRECP 2014).

California Environmental Quality Act

CEQA is a State document that is part of the California Code of Regulations (C.C.R.). CEQA requires projects to undergo environmental review; depending on the potential effects, a more substantial review may need to be conducted in the form of an EIR. In an EIR, mitigation measures are proposed for any potentially significant impacts in order to reduce the level of impact, and feasible alternatives are considered (CNRA 2014). The County and consultant team will prepare a Programmatic EIR pursuant to CEQA Guidelines, Section 15168. Completion of the Programmatic EIR would allow future individual renewable energy projects to "tier" off this environmental document. Future renewable energy projects would be implemented on a "project-by-project" basis based on County approval of individual renewable energy projects. Future renewable energy projects would need to be reviewed in the context of this Programmatic EIR to determine if additional environmental documentation would be required.

California Department of Transportation

The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the scenic corridor (Caltrans 2008). No designated state scenic highways occur in Imperial County; however, State Route (SR-) 111 is an eligible state scenic highway from the County border to Bombay Beach. SR-78 is an eligible state scenic highway from the County border to SR-86 near Julian. Interstate 8 (I-8) is an eligible highway from the County border to SR-98 near Coyote Wells, and Borrego-Salton Seaway (County Highway S-22) is an eligible scenic highway from Salton City to Borrego Springs in San Diego County.

County of Imperial General Plan

The Imperial County General Plan includes policies which aim to protect and conserve scenic resources and open spaces within Imperial County. The *Conservation and Open Space Element* and the *Land Use Element* provide goals and objectives for protecting and maintaining the aesthetic character of the County. In addition, the *Circulation and Scenic Highways Element* contains policies geared toward the protection and enhancement of scenic highway resources.

The following policies are related to aesthetics and glare:

- Conservation And Open Space Element

  Goal 7: The aesthetic character of the region shall be protected and enhanced to provide a pleasing environment for residential, commercial, recreational, and tourist activity.

- Land Use Element

  Objective 3.4: Protect/improve the aesthetics of Imperial County and its communities.

- Circulation and Scenic Highways Element

Policy 9 (b): The County shall emphasize protection of scenic highway resources in all County actions affecting land use.

2.1.4 Existing Environmental Setting

Imperial County extends over 4,597 square miles between Riverside County, the Mexican border, San Diego County, and the State of Arizona. The visual character of Imperial County varies greatly. It includes natural scenic visual resources such as deserts, sand dunes, mountains, recreation areas, and the Salton Sea. It includes agricultural areas, urban areas, and areas of solar development.

Scenic Visual Resources

Imperial County contains several scenic visual resources, including desert areas, sand hills, mountains, and the Salton Sea. Each of these visual resources is described below.

Desert Areas

The desert areas include the Yuha Desert, the West Mesa, lower Borrego Valley, East Mesa, and Pilot Knob Mesa.

The Yuha Desert is located in the southwest portion of the County within the West Mesa area and is intersected east/west by I-8. As viewed from I-8, its seemingly barren landscape contrasts sharply against the surrounding mountains. The Yuha Desert contains unique geologic features including sand chimneys and painted gorge formations that add scenic value to the natural landscape. Cultural features in the Yuha Desert include large earth sculptures, or geoglyphs, that were constructed by prehistoric Native Americans. Geoglyphs are rare and are one of the most fragile archeological features known. The most visually prominent plant of the Yuha Desert is the ocotillo, which can stand up to 15 feet in height.

The desert of the West Mesa area is bordered on the east by Superstition Mountain and the surrounding Superstition Hills and on the west by the Fish Creek Mountains. The lower Borrego Valley desert area is located in the northwestern area of the County, bordered on the north by the Santa Rosa Mountains, on the south by the Vallecito Mountains, and on the east by the Salton Sea. The East Mesa area lies to the west of the Algodones Sand Dunes and to the east of the agricultural areas of the Imperial Valley. The Pilot Knob Mesa area is located just east of the Algodones Sand Dunes and west of the Cargo Muchacho Mountains.

The vegetation of these desert areas consists of the Creosote Scrub community. Dominant in this community is the creosote bush. Other plants include ocotillo, mesquite, palo verde, saltbush, and encelia. Also contributing to the scenic quality of the desert areas are the springtime blooms of desert wildflowers. In springtime, up to 60 species of annuals may be viewed. A typical scene would include large, white evening primroses gleaming over variegated carpets of sand verbena, sunny desert dandelion, and desert sunflower, which are often joined by desert marigold, coreopsis, and other daisy family species (ICPDS 2009).

Algodones Sand Dunes

The Algodones Sand Dunes are the largest mass of sand dunes in California. This dune system covers approximately 160 square miles, extending for more than 40 miles along the eastern edge of the Imperial Valley agricultural region in a band averaging 5 miles wide. They extend lengthwise in a

northwest by southeast direction and are situated between the East Mesa and Pilot Knob Mesa areas. They are currently bisected east/west by SR-78 between Brawley and Glamis and by I-8 between El Centro and Yuma. Consisting of shifting sands, the dunes attain a thickness of at least 200 feet in their central parts. Rising to heights of over 300 feet above the surrounding desert floor, the dunes are a well-known landmark to local residents and the thousands of highway travelers who pass by them every year. These dunes represent a unique visual resource of Imperial County.

Tremendous earth upheavals that elevated the area above the ocean some 200 million years ago and the constant action of erosional forces over the ancient Salton Sea shoreline have all had a part in sculpting this vast region of dunes. For millions of years, the climate of California's desert area was tropical; but as the earth's crust shifted along the San Andreas Fault, the coastal mountains were pushed up, cutting off the moisture-laden air coming from the ocean. At the same time, the interior plains of southern California began to drop, forming a basin known as the Salton Sink. The Colorado River meandered over a wide area, periodically diverted by silt deposits remaining after floods. Sometimes the river flowed into the Gulf of California as it does today, while at other times it turned westward into the Salton Sink. Each time the Salton Sink received the river flow, a large freshwater lake formed. Scientists refer to this ancient body of water as Lake Cahuilla. The last Lake Cahuilla covered much of the Imperial, Coachella, and Mexicali valleys as late as 1450.

The most popular theory holds that the Imperial Sand Dunes were formed from windblown beach sands of Lake Cahuilla. The prevailing westerly and northwesterly winds blew the sands eastward from the old lakeshore to their present location. This process continues to this day.

Prevailing winds cause the dunes to migrate toward the southeast at the rate of approximately 1 foot per year. The sand dunes played a major role in early exploration, travel, and development in Imperial County and have long been an obstacle to travelers moving east and west. Though a few pioneers did manage to cross with horse and mule pack trains, this natural barrier continued to hinder California's southern commerce until the first road across the dunes was built in 1911.

The first road, built by volunteers from Yuma, the Imperial Valley, and San Diego, was known as the “auto railroad.” In 1916, the California Highway Commission, which assumed responsibility for the trans-dunes highway in June 1915, built an improved plank road. The Plank Road lasted until 1926, when it was replaced by a new two-lane asphalt road. The Imperial Sand Dunes are considered a significant visual resource in the County due to their unique scenic qualities, historic features, and prominent visibility to a large number of people.

Mountains

Mountains are another significant visual resource in Imperial County. On the west side of the County are the eastern foothills of the Peninsular Range. These foothills include the In-Ko-Pah or Jacumba Mountains, the Coyote Mountains, and the Fish Creek Mountains. The Santa Rosa Mountains are located in the northwestern corner, and the Chocolate Mountains are in the northeastern part of the County. Superstition Mountain and the surrounding Superstition Hills, located in the West Mesa area southeast of lower Borrego Valley and west of Westmorland and Brawley, are visible from much of the County. Mount Signal, located along the International Border on the eastern edge of the Yuha Desert, west of Calexico, is visible from the entire Imperial Valley (ICPDS 2009).

The Chocolate Mountains, so named because of their dark color, are located in the northeastern portion of the County, stretching northwest by southeast between Riverside County and the Colorado River.

They are bisected by SR-78 between Glamis and the Palo Verde area. These mountains reach an elevation of 2,700 feet and are highly visible from throughout the County. They are extremely rugged and virtually undeveloped and used as a Naval Gunnery Range (ICPDS 2009).

Superstition Mountain and the surrounding Superstition Hills are prominent landmarks that are visible from most of Imperial County. They are located in the West Mesa area, southeast of lower Borrego Valley and west of Westmorland and Brawley. These are clearly visible looking north from I-8 west of El Centro and from SR-86 between El Centro and the Salton Sea. A major landmark is Mount Signal, located along the International Border on the eastern edge of the Yuha Desert, west of Calexico. Mount Signal is considered visible from the entire Imperial Valley (ICPDS 2009).

Salton Sea

The Salton Sea is located in the northwestern portion of the County and extends into Riverside County. The Salton Sea fluctuates in size and capacity, but is currently about 35 miles long, 15 miles wide, occupies 376 square miles, and contains about 7.5 million acre-feet of water (DRECP EIR/EIS 2014). The Salton Sea has been sustained by agricultural drainage from the Imperial, Coachella, and Mexicali valleys; rainfall; storm runoff from the surrounding mountains; and groundwater inflow. Because Salton Sea exists in a closed basin, the only outflow is evaporation, resulting in a rising level of salinity. Despite the salinity problems in the Salton Sea, the area represents an important wildlife habitat area and provides migrating and wintering habitat for thousands of waterfowl and other birds. Masses of these birds are visible from the shores of the Salton Sea. The Salton Sea represents a unique visual resource because of its massive size, its location in a desert area, and its value to wildlife.

Recreation Areas

The Picacho State Recreation Area contains some prominent visual resources as well. Unique scenic values are created by volcanic formations that rise several hundred feet from the valley floor.

Scenic Highways

Caltrans manages the California Scenic Highway Program.

The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the scenic corridor (Caltrans 2008). No designated state scenic highways occur in Imperial County; however, the following four routes within Imperial County are considered eligible for state Scenic Highway Designation:

- **I-8:** The initial segment for future Scenic Highway Designation status lies between the San Diego County line and its junction with SR-98 near Coyote Wells. This segment, known as Mountain Springs Grade, has a long, rapid elevation change, remarkable rock and boulder scenery, and plant life variations.

- **SR-78:** The portion of SR-78 from the junction with SR-86 near Julian to the San Diego County line is eligible for future Scenic Highway Designation. That area is considered scenic because of its desert characteristics and view of Salton Sea.

- **SR-111:** SR-111 travels along the northeast shore of the Salton Sea and is eligible for future Scenic Highway Designation from Bombay Beach to the County line. The drive contrasts the flat, wide portions of the Salton Sea with the rugged variations of the Chocolate Mountains.

- **Borrego-Salton Seaway**: County Highway S-22 is also known as Borrego-Salton Seaway; it begins in Salton City and ends at the community of Borrego Springs in San Diego County. This route includes views of Clay Point, the Anza Verde Wash, and scenic viewpoints (ICDPS 2008d).

Other Visual Characteristics

Agricultural Areas

It is estimated that approximately 20 percent (588,416 acres) of the land in Imperial County is made up of irrigated agricultural areas. The majority of the agricultural activity is concentrated in the Imperial Valley area (512,163 acres), followed by Bard Valley in the southeast corner of the County (14,737 acres), and Palo Verde Valley in the northeast corner of the County (7,428 acres). These areas are characterized by square or rectangular fields, typically 40 to 80 acres in area, that are sometimes interspersed with scattered farmhouses and related agricultural structures. These agricultural regions are crossed by irrigation canals and drainages that are paralleled by dirt farm roads. Several cattle feed yards, other animal ranches, and aquaculture farms are located throughout the Imperial Valley, as are a few agricultural processing/packaging plants including Spreckles Sugar, fertilizer/chemical plants, and other agricultural-related operations. Agricultural areas dominate the visual scenes along I-8 and sections of SR-78, SR-86, SR-111, and SR-115 (ICPDS 1996a, 2009; Brian F. Mooney Associates 1993).

Urban Areas

Imperial County's Urban Areas include the areas surrounding seven incorporated cities (Brawley, El Centro, Imperial, Westmorland, Holtville, Calipatria, and Calexico) and five unincorporated communities (Heber, Niland, Seeley, West Shores/Salton City, and Winterhaven). These areas are characterized by low-rise, mixed-use development and contain or propose a broad range of residential, commercial, and industrial uses.

The urban area of El Centro is characterized by strip commercial development along SR-86, Imperial Avenue, and Main Street. Industrial and residential development is located on the fringes of the strip commercial areas. The City of Imperial's urban layout is similar to that of El Centro but includes the Imperial County Airport on SR-86. The Brawley urban area is characterized by commercial development along SR-78, with residential development existing in the outlying areas. Calexico is characterized by strip commercial development along SR-111 and residential uses to the east and west. Urban development is not usually considered a visual resource, but it makes up an important segment of the existing visual environment of the County.

Solar Power Development

Many of the areas previously used as farmland have been entitled for solar power facilities. Imperial County has several solar projects in various stages of development; which are presented in Appendix A. Currently three solar power facilities for public use are operating in Imperial County. These are the IV Solar Company, Centinela Solar, and Imperial Solar South. The Campo Verde and Mount Signal solar facilities are currently under construction, and several others have already been approved for Conditional Use Permits from the County (ICPDS 2013e; SEIA 2013).

Sources of Light and Glare

Light and glare may be created day or night from various residential, commercial, and industrial uses throughout the County. Potential sources of glare during the day may include surface water, motor vehicles either parked or traveling on surrounding roadways, paved surfaces, building windows, and solar facilities. At night, light sources include street lamps, accent and security lighting on buildings, parking lot lighting, vehicle headlights, existing transmission lines, and some park facilities.

Bureau of Land Management Visual Resource Management Areas

Over 43 percent of the land in Imperial County is managed by BLM. The Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1701) requires BLM to protect the quality of scenic values on public lands and to consider those values before allowing uses that may have negative visual impacts. To accomplish that goal, BLM developed a Visual Resource Management (VRM) System to inventory and analyze visual resource values of an area. The VRM system serves two purposes: first, as a tool to inventory existing visual resources; and second, as a management tool by establishing objectives for the visual resource categories (BLM 1984a). The Visual Resource Inventory (VRI) process is described in detail in BLM Manual H-8410-1—*Visual Resource Inventory* (1984b). The four VRI classes are (I, II, III, and IV). These inventory classes represent the relative value of visual resources, Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least scenic value. Class I is assigned to wilderness and Wilderness Study Areas (WSAs), where the current management situation requires maintaining a natural environment essentially unaltered by human actions, even where exceptional scenic values are not exhibited. All other BLM-administered lands are then assigned one of the four visual resource inventory classes (Table 2.1-1) based on scenic quality, sensitivity level, and distance zones.

Table 2.1-1: Visual Resource Inventory Classification Matrix

Special Areas		**Visual Sensitivity Level**						
		High			**Medium**			**Low**
		I	**I**	**I**	**I**	**I**	**I**	**I**
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III*	III	IV	IV	IV
				IV				
	C	III	IV	IV	IV	IV	IV	IV
		f/m	b	s/s	f/m	b	s/s	s/s
		Distance Zones						

Source: BLM Manual H-8410-1
Key to Distance Zones:
f/m = foreground/middleground
b = background
s/s = seldom seen
* If adjacent areas are Class III or lower, assign Class III; if higher, assign Class IV.

A summary of how scenic quality, sensitivity level, and distance zones are rated is as follows:

Scenic Quality: The measure of an area's visual appeal. The area is divided into Scenic Quality Rating Units (SQRUs) on a basis of: like physiographic characteristics; similar visual patterns, texture, color,

variety, etc.; and areas which have similar impacts from man-made modifications. Each unit is rated A, B, or C (most to least scenic) based on seven key factors:

- Landform
- Vegetation
- Water
- Color
- Adjacent Scenery
- Scarcity
- Cultural Modifications

Sensitivity Level: —Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern. Sensitivity Level Rating Units (SLRUs) have no set formula, and their boundaries are determined by assessing the overall concern driving the unit. Distance zones can be important in this decision because distant disruptions to the landscape affect people less. The other factors considered for rating purposes are:

- Types of Users
- Amount of Use
- Public Interest
- Adjacent Land Uses
- Special Areas
- Other Factors

Distance Zones: Three distance zones are based on visibility from travel routes and observation points. These are determined by traveling in the field and physically testing what can be seen and how:

- Foreground-Middleground – includes areas visible from highways, rivers, or other viewing locations which are less than 3 to 5 miles away.

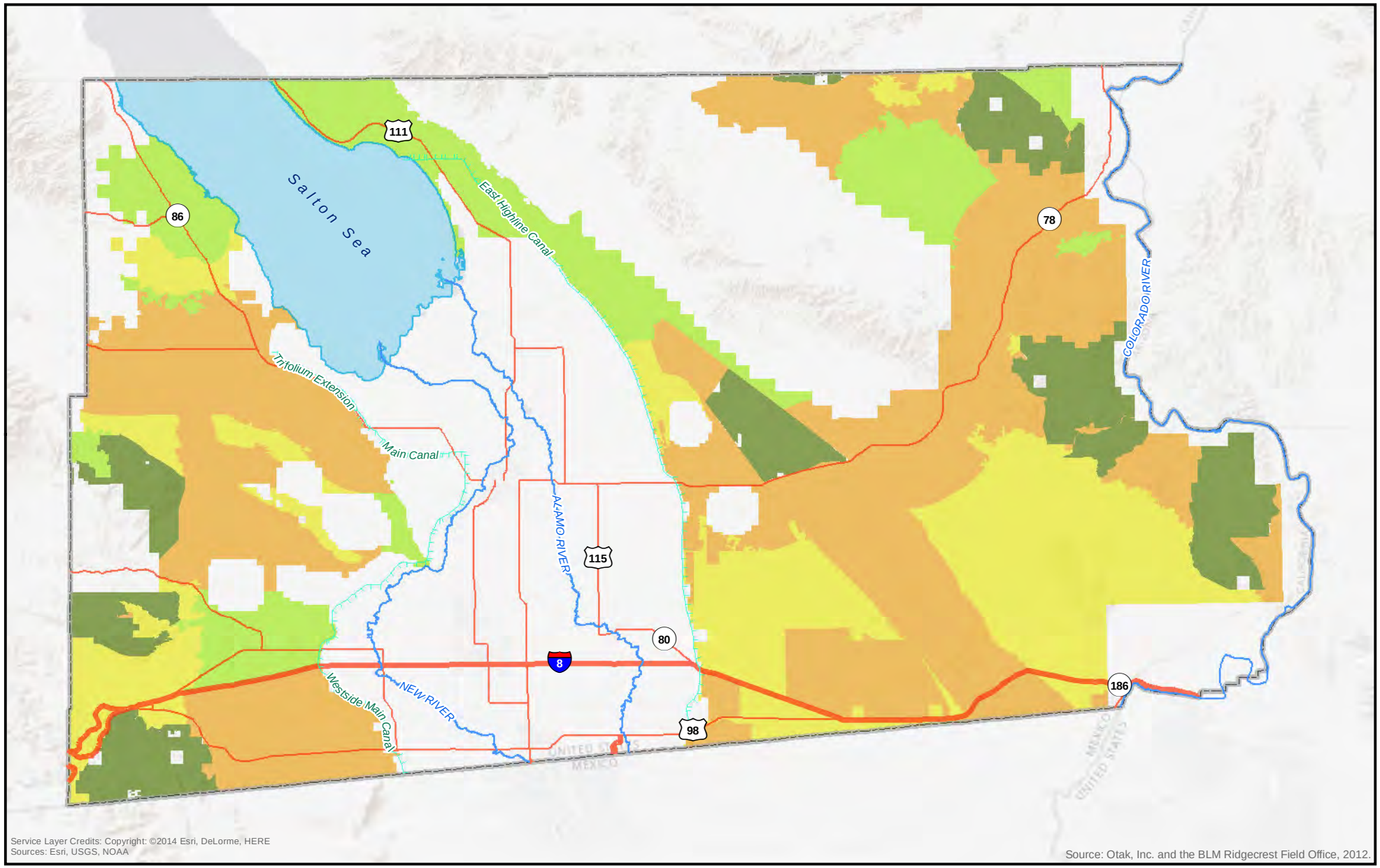
- Background – includes areas visible past the foreground-middleground zone and usually less than 15 miles away.

- Seldom Seen – includes areas that are not part of the foreground-middleground or the background and that are generally hidden from view.

The resulting VRI classes provide the basis for considering visual values in the BLM's planning process. It is through the Resource Management Plan (RMP) development process that management (or VRM) classes then get assigned. These management classes describe the visual management objectives of a given area, ranging from preservation to major modification, as well as the different degrees of modification to the basic elements of the landscape (form, line, color, texture) that are allowed. The management objectives established for each VRM class are shown in 2.1-2. Figure 2.1-1 shows the VRI Sensitivity Level Ratings for Imperial County.

Table 2.1-2: Visual Resource Management Objectives by Class

Visual Resource Class	Visual Management Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention; however, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.
Source: BLM Manual H-8410-1	



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: Otak, Inc. and the BLM Ridgecrest Field Office, 2012.

Legend

Visual Sensitivity Levels

- High
- Moderate
- Low

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Figure 2.1-1

Imperial County Renewable Energy and Transmission Element Update

VRI Sensitivity Level Ratings for BLM-managed Lands

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2.1.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

The Initial Study Environmental Checklist form in Appendix G of the CEQA Guidelines includes questions relating to aesthetics. New renewable energy projects would have to be analyzed for their potential effects to the surrounding existing visual character and quality including scenic vistas, natural environment and existing landscape, general built environment and historic buildings, and scenic highways and whether they would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Potential projects would need to take into consideration their locations in relation to key observation areas from where they would be viewed and what effects they would have to the existing aesthetics of the surrounding area.

Goals and objectives for the preservation of visual resources are included in the Imperial County General Plan Conservation and Open Space Element, the Circulation and Scenic Highways Element, and the specific area plans discussed in the Land Use Element. Some of these goals include protecting and enhancing the aesthetic character of the region and encouraging the preservation and enhancement of the natural beauty of the desert and mountain landscape.

Although BLM has assigned VRI classes to BLM-managed land in Imperial County, it is not BLM policy to determine, at the RMP level, which land uses or activities to restrict based on VRM Class. Rather, BLM must consider, at the site-specific (or project-specific) activity level, all uses proposed for an area with a given VRM Class and determine if those uses would be consistent with the objectives for that class. Therefore, any proposed renewable energy projects on BLM land would need to have a contrast rating conducted in order to determine that as part of the NEPA process. The contrast rating involves comparing the features of the proposed project to the features of the existing landscape focusing on form, line, color, and texture. This evaluation is then used to define potential project impacts and guide BLM regarding acceptance, denial, or modification of the proposed project.

Constraints Due to Existing Conditions

Much of the County is visible from major roadways. Therefore, aesthetics and potential impacts to existing visual resources from proposed renewable energy projects would need to be considered during siting, planning, and design. Recreational areas with scenic qualities such as the Salton Sea and Picacho State Recreation Area would need to be considered when siting potential projects. Although no highways in Imperial County are designated as state scenic highways, the routes considered eligible for designation are still recognized and would need to be taken into consideration for planning renewable energy projects. Additional constraints within Imperial County would include areas identified as having high visual sensitivity levels on Figure 2.1-1. Therefore, future renewable energy projects would need to evaluate compatibility with existing visual sensitivity levels and effects on scenic vistas and include modifications and mitigation to reduce impacts based on these aesthetic consideration if necessary, in order for a project to receive approval.

Opportunities

Areas of BLM-managed land in Imperial County rated Class III (moderate value) and Class IV (least scenic value) could represent opportunities for siting potential renewable energy projects due to fewer visual constraints than the Class I and Class II areas. Likewise, areas shown on Figure 2.1-1 that have a

moderate and low value for maintenance of visual quality could also represent opportunities for siting potential renewable energy projects.

Lands not federally owned or managed that have been previously disturbed or developed may present opportunities for developing renewable energy resources.

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2.2 AGRICULTURAL RESOURCES

2.2.1 Introduction

This section discusses the existing agricultural resources in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.2.2 Terminology

The following is a summary of agricultural resources terminology discussed in this section.

- **Prime Farmland** – land with the best combination of physical and chemical features able to sustain the long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been producing irrigated crops at some time during the two update cycles (a cycle is equivalent to two years) prior to the mapping date.

- **Farmland of Statewide Importance** – land similar to Prime Farmland but with minor shortcomings such as greater slopes or less ability to hold and store moisture. The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

- **Unique Farmland** – land of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include nonirrigated orchards or vineyards, as found in some climatic zones in California. The land must have been cultivated at some time during the two update cycles prior to the mapping date.

- **Farmland of Local Importance** – land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee. Farmland of Local Importance in Imperial County includes lands which do not qualify as Prime, Statewide, or Unique but are currently planted in irrigated crops or pasture or nonirrigated crops; lands that would meet the Prime or Statewide designation and have been improved for irrigation but are now idle; and lands that currently support confined livestock, poultry operations, and aquaculture.

- **Grazing Land** – land on which the existing vegetation, whether grown naturally or through management, is suited to the grazing of livestock. The minimum mapping unit for this category is 40 acres.

- **Urban and Built-Up Land** – land occupied with structures with a building density of at least 1 unit to 1.5 acres. Uses may include, but are not limited to, residential, industrial, commercial, construction, institutional, public administration purposes, railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities are mapped as part of this unit if they are part of a surrounding urban area.

- **Other Land** – land that is not included in any other mapping categories. The following uses are generally included: rural developments, brush, timber, government land, strip mines, borrow pits, and a variety of other rural land uses.

- **Areas of Critical Environmental Concern (ACEC)** – Certain lands managed by BLM have been designated ACECs. ACECs are areas that contain significant natural, archeological, or historical resources.

2.2.3 Regulatory Setting

Farmland Mapping and Monitoring Program

The goal of the Farmland Mapping and Monitoring Program (FMMP) is to provide consistent, timely, and accurate data to decision makers for use in planning for the present and future of California's agricultural land resources. To meet this goal, FMMP's objective is to provide maps and statistical data to the public; academia; and local, State, and federal governments to assist them in making informed decisions for the best utilization of California's farmland (CDC 2004).

FMMP was established in 1982 in response to a critical need for assessing the location, quality, and quantity of agricultural lands and conversion of these lands over time. Creation of FMMP was supported by the California Legislature and a broad coalition of building, business, government, and conservation interests. Government Code §65570 mandates FMMP to biennially report to the Legislature on the conversion of farmland and grazing land and to provide maps and data to local government and the public. FMMP was also directed to prepare and maintain an automated map and database system to record and report changes in the use of agricultural lands (CDC 2004).

FMMP was established to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). The intent of NRCS was to produce agricultural resource maps based on soil quality and land use across the nation. As part of this nationwide mapping effort, NRCS developed a series of definitions known as the Land Inventory and Monitoring (LIM) criteria. The LIM criteria classified the land's suitability for agricultural production, which included physical and chemical characteristics of soils, as well as specified land use characteristics. Important Farmland Maps are derived from NRCS soil survey maps using LIM criteria (CDC 2004). The Important Farmland Map Categories developed based on the LIM criteria include the following:

Prime Farmland: land with the best combination of physical and chemical features able to sustain the long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been producing irrigated crops at some time during the two update cycles (a cycle is equivalent to two years) prior to the mapping date.

Farmland of Statewide Importance: land similar to Prime Farmland but with minor shortcomings such as greater slopes or less ability to hold and store moisture. The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date.

Unique Farmland: land of lesser quality soils used for the production of agricultural crops of importance in Imperial County. This land is usually irrigated but may include nonirrigated orchards or vineyards, as found in some climatic zones in California. The land must have been cultivated at some time during the two update cycles prior to the mapping date.

Farmland of Local Importance: land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee. Farmland of Local Importance in Imperial County includes lands which do not qualify as Prime, Statewide, or Unique but are currently irrigated crops or pasture or nonirrigated crops; lands that would meet the Prime or Statewide designation and have been improved for irrigation but are now idle; and lands that currently support confined livestock, poultry operations, and aquaculture.

Grazing Land: land on which the existing vegetation, whether grown naturally or through management, is suited to the grazing of livestock. The minimum mapping unit for this category is 40 acres.

Urban and Built-Up Land: land occupied with structures with a building density of at least 1 unit to 1.5 acres. Uses may include, but are not limited to, residential, industrial, commercial, construction, institutional, public administration purposes, railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities are mapped as part of this unit if they are part of a surrounding urban area.

Other Land: land that is not included in any other mapping categories. The following uses are generally included: rural developments, brush, timber, government land, strip mines, borrow pits, and a variety of other rural land uses.

County of Imperial General Plan Agricultural Element

The *Agricultural Element* of the County of Imperial General Plan describes the status and trends of local agriculture and expresses community goals with regard to conserving agricultural lands within the County and minimizing or avoiding conflicts with urban and other land uses.

Imperial County Land Use Ordinance

Title 9, the Land Use Ordinance of the County of Imperial, adopted by the Board of Supervisors on November 24, 1998, provides land use regulations for all unincorporated areas of Imperial County. The regulations promote and protect the public health, safety, and general welfare through the regulation of land uses.

County of Imperial "Right to Farm" Ordinance

On August 7, 1990, the County Board of Supervisors approved the "Right-to-Farm" Ordinance, which permits operation of properly conducted agricultural operations within Imperial County after recognizing the potential threats to agricultural productivity posed by increased nonagricultural land uses throughout the County. The ordinance is intended to reduce the loss to the County of its agricultural resources and promote a good neighbor policy by advising purchasers and users of adjacent properties about the potential problems and inconveniences associated with agricultural operations. The ordinance also establishes a "County Agricultural Grievance Committee" to settle disputes between agriculturalists and adjacent property owners).

Williamson Act

The County of Imperial Board of Supervisors adopted the Williamson Act and the provisions established by California Revenue and Taxation Code, Section 423.3 in 2000. Additionally, the Board of Supervisors

adopted Resolution 2000-084, which established the County of Imperial "Rules of Procedure to Implement the California Land Conservation Act of 1965." Resolution 2000-084 established eligibility criteria and standards for the establishment of an agricultural preserve, expansion of an agricultural preserve, and removal of land from an agricultural preserve. Resolution 2000-084 also established requirements for Land Conservation Contracts and local monitoring requirements.

The County of Imperial Board of Supervisors voted to not accept any new Williamson Act contracts and not to renew existing contracts, due to the elimination of the subvention funding from the state budget in February 2010. This decision was reaffirmed by the County in October 2010, and notices of nonrenewal were sent to landowners with Williamson Act contracts following that vote. All Williamson Act contracts in Imperial County will terminate on or before December 31, 2018.

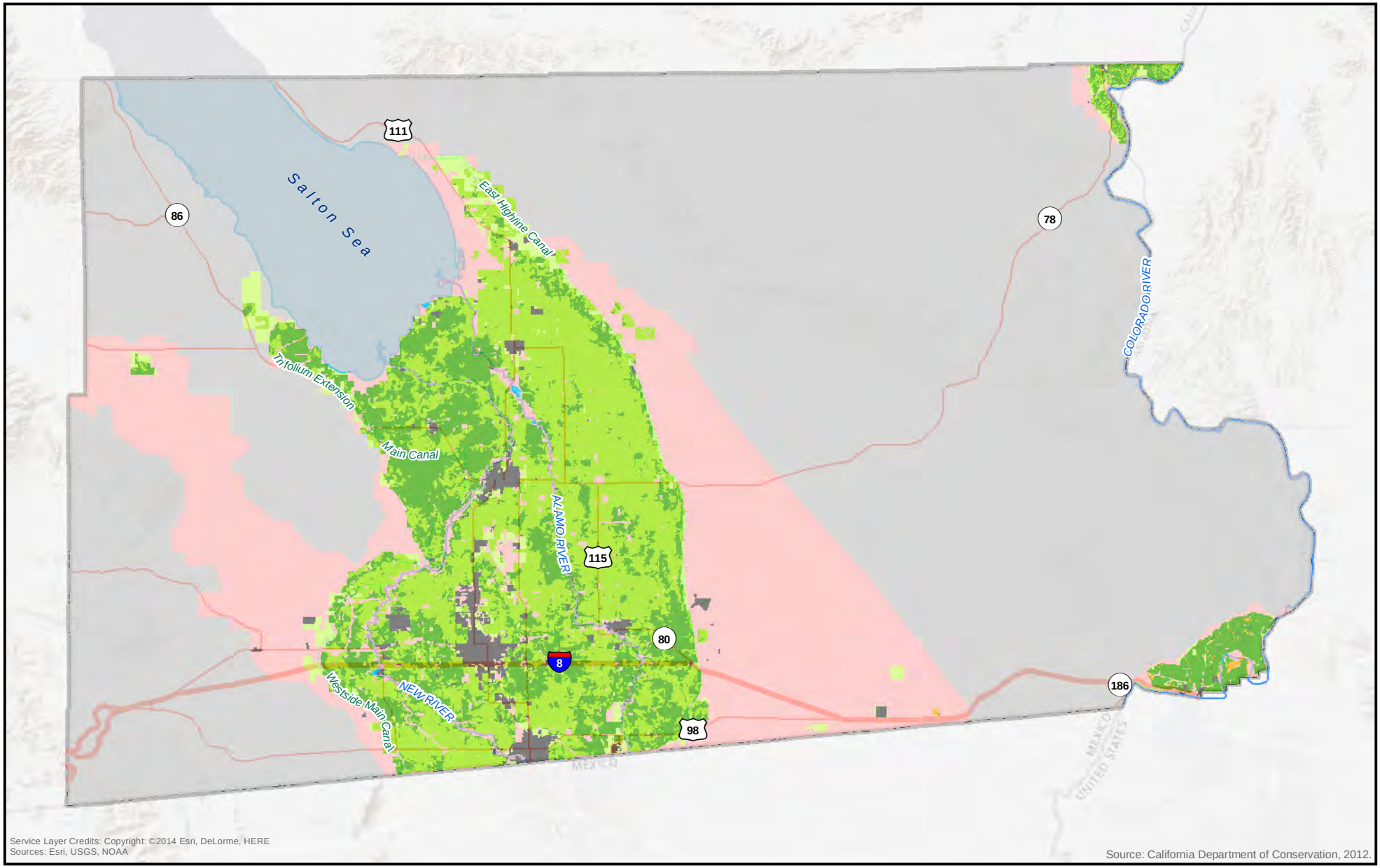
2.2.4 Existing Environmental Setting

Table 2.2-1 presents the acreages of farmland within Imperial County based on the NRCS Important Farmland Categories described in Section 2.2.1 above. Approximately 538,326 acres, or 19 percent, of the total land is classified as farmland, which includes Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland. Lands classified as Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland are concentrated in an approximately 30-mile-wide column near the center of the County, extending from the southern edge of the Salton Sea to the U.S.-Mexico border. As of 2012, Imperial County had 192,950 acres of Prime Farmland; 305,614 acres of Farmland of Statewide Importance; 2,074 acres of Unique Farmland; and 37,688 acres of Farmland of Local Importance. The locations of these designated farmlands are shown on Figure 2.2-1.

The farmland in Imperial County constitutes 4.4 percent of the total farm acreage in California. To meet the needs of the agricultural industry, it is estimated that approximately 588,416 acres, or 20 percent of the land in Imperial County, is irrigated. As noted by the County of Imperial, the three main irrigated areas consist of Imperial Valley with 512,163 acres, Bard Valley in the southeast corner of the County with 14,737 acres, and Palo Verde Valley in the northeast corner of the county with 7,428 acres. These irrigated lands may produce commodities such as alfalfa, Bermuda grass, broccoli, carrots, cauliflower, citrus, cotton, dates, lettuce, melons, onion, romaine, spinach, Sudan grass, sugar beets, wheat, and livestock.

Table 2.2-1: Farmland of Significance in Imperial County

Farmland Classification	Area (acres)	Percentage of Imperial County
Prime Farmland	192,950.48	6.73%
Farmland of Statewide Importance	305,614.38	10.65%
Unique Farmland	2,074.05	0.07%
Farmland of Local Importance	37,687.50	1.31%
Urban and Built-up Land	28,790.82	1.00%
Other Land	460,641.98	16.06%
Water	749.00	0.03%
Areas Not Mapped	1,839,917.38	64.14%
Total	2,868,425.58	100.00%
Source: California Department of Conservation, 2012		



Legend

Farmland Mapping and Monitoring Program

- Prime Farmland (P)
- Farmland of Statewide Importance (S)
- Unique Farmland (U)
- Farmland of Local Importance (L)
- Urban and Built-Up Land (D)
- Other Land (X)
- Water (W)
- Area not mapped (Z)

N

0 5 10 20

Miles

Figure 2.2-1

Imperial County Renewable Energy and Transmission Element Update
State of California Farmlands of Significance

Name: 20674 Background Fig 2.2-1 State Farms of Sig.Mxd
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Gross production of agricultural resources for Imperial County in 2013 was valued at $2,158,517,000. This represents an increase of $212,758,000 (11 percent) over the 2012 gross value of $1,945,759,000. Vegetables and melons were the County's top commodities, with sales of $865,401,000. The second major form of agricultural production in Imperial County is livestock, which generated $617,371,000 in 2013 (County 2013a).

2.2.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Farmland Protection Policy Act (FPPA) (7 USC 4201)

Projects with a federal nexus are subject to the requirements of the FPPA. The FPPA of 1984 (7 USC Sections 4201-4209), as amended, provides the statutory framework for considering important farmlands in federal decisions. The FPPA is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state and local units of government and private programs and policies to protect farmland. Pursuant to the FPPA, federal agencies must use the criteria and guidelines established in 7 C.F.R. Section 658.5 to identify and take into account the adverse effects of federal programs on the protection of farmland. Because the FPPA does not authorize the federal government in any way to regulate the use of private or nonfederal land or in any way affect the property rights of owners of such land, an opportunity still exists to develop renewable energy projects on these lands.

California Land Conservation Act

Commonly referred to as the Williamson Act, the California Land Conservation Act of 1965 enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. As compensation for the restriction on their property, landowners receive significantly lower property tax assessments based upon farming and open space uses rather than full market value.

In 2000, the Imperial County Board of Supervisors adopted the Williamson Act and the provisions established by California Revenue and Taxation Code Section 423.3. Then, on February 23, 2010, the Imperial County Board of Supervisors voted not to accept any new Williamson Act applications and not to renew any previous contracts under the program. While funding for the program has been discontinued, each contract lasts for 10 years. As such, several parcels still remain throughout Imperial County that are subject to the land use restrictions of the Williamson Act agreements.

Constraints Due to Existing Conditions

Currently, areas of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland are located throughout the County. With an estimated gross annual average of one billion dollars in revenue, agricultural production is a major portion of the County's overall economy. As such, development of renewable energy projects in the County could affect revenue produced by agricultural land.

Development of renewable energy resources will need to incorporate sensitivities with regard to the County's agricultural industry. Given the level of regional reliance on the industry, consideration of a

potential site for such facilities should include thoughtful deliberation regarding impacts to farm operations. To this end, general and specific standards include preservation of farm operations by minimizing surface land usage and by avoiding disruption to existing irrigation and drainage patterns.

Opportunities

Despite development constraints surrounding agricultural resources as a result of regulatory requirements and existing conditions, the County has opportunities to utilize these areas for renewable energy production. According to the California Department of Conservation (DOC), areas of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland are concentrated near the center of the County. In general, these agricultural resources extend from the southern edge of the Salton Sea to the U.S.-Mexico border in an approximately 30-mile-wide column. On either side of these farmlands is a region categorized by the DOC as Other Land. Renewable energy facilities developed in these areas would largely preclude impacts to agricultural lands currently irrigated and in use.

Under The Solar Programmatic Environmental Impact Statement (Solar PEIS) developed by the U.S. Department of Energy, Energy Efficiency and Renewable Energy Program and the U.S. Department of the Interior, Bureau of Land Management (the Agencies), six southwestern states were studied with regard to viable sites for the installation of solar energy facilities. The Solar PEIS labeled these types of sites Solar Energy Zones (SEZ). The investigation concluded that a specific area in the County with the least potential for impacts to the environment, including agricultural resources, could be developed as a SEZ.

Imperial East SEZ is located east of the area containing the concentration of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland. Situated adjacent to the intersection of I-8 and SR- 98, Imperial East SEZ contains 5,717 developable acres and 5 nondevelopable acres. A designated corridor extends east to Yuma, Arizona, from Imperial East SEZ, further avoiding impacts to agricultural resources.

Another opportunity for the County of Imperial to expand renewable energy production capacity lies with the current Williamson Act contract holders. As noted above, in 2010 the Imperial County Board of Supervisors voted against renewing any Williamson Act contracts or entering into any new contract agreements; however, in 2009 the County ranked sixth for the greatest number of new enrollments in the State. According to the DOC, that year Imperial County incorporated 1,684 additional acres of agricultural land into the program. As a result, the amount of agricultural land in the County under Land Conservation Act agreements totaled 138,333 acres.

Despite the Board of Supervisors' 2010 vote to discontinue the Williamson Act program, since the term of the agreement was for 10 years, thousands of acres of agricultural land remain under the conditions of the program. In October 2011, Governor Brown signed Senate Bill 618**,** which authorizes parties to a Williamson Act contract, under specific circumstances, after approval by the Department of Conservation and in consultation with the Department of Food and Agriculture, to mutually agree to rescind the contract in order to simultaneously enter into a solar-use easement. Typically, the easement requires that the land be used for solar photovoltaic facilities for a term no less than 20 years.

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2.3 AIR QUALITY

2.3.1 Introduction

This section discusses the existing air quality in Imperial County. The environmental setting includes a summary of applicable regulations and a discussion of the existing regional and local air quality.

2.3.2 Terminology

The following is a summary of air quality terminology discussed in this section.

- **Sensitive Receptors** – Individuals such as children, the elderly, and people with preexisting health conditions who are more susceptible to hazardous conditions. Examples of sensitive receptor sites are schools, day care facilities, nursing homes, and residences.

- **Criteria Pollutants** – Air pollutants have been identified by the United States Environmental Protection Agency (USEPA) as being of concern nationwide. These are ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead; and particulate matter (PM), which is subdivided into two classes based on particle size: PM equal to or less than 10 microns in diameter (PM_{10}) and PM equal to or less than 2.5 microns in diameter ($PM_{2.5}$).

- **Ozone** – Ozone is the principal component of smog and is formed in the atmosphere through a series of reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_X) in the presence of sunlight. ROG and NO_X are called precursors of ozone.

- **Carbon Monoxide (CO)** – CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles.

- **Nitrogen Dioxide (NO_2)** – NO_2 is a product of combustion and is generated in vehicles and in stationary sources, such as power plants and boilers. It is also formed when ozone reacts with nitrogen oxide (NO) in the atmosphere.

- **Sulfur Dioxide (SO_2)** – SO_2 is a combustion product, with the primary source being power plants and heavy industries that use coal or oil as fuel. SO_2 is also a product of diesel engine combustion.

- **Lead** – Lead is a highly toxic metal that may cause a range of human health effects. Lead emissions have significantly decreased due to the near elimination of leaded gasoline use.

- **Inhalable Particulate Matter (PM_{10})** – PM_{10} includes both fine and coarse dust particles. Coarse particles, such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.

- **Fine Particulate Matter ($PM_{2.5}$)** – Fine particles, such as those found in smoke and haze, are $PM_{2.5}$. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is also formed through reactions of gases such as SO_2 and NO_x in the atmosphere.

- **Air Contaminants** – Particles, liquids, and gases in the air which have harmful chemical properties that affect health.

- **Hazardous Substance** – Any biological agent and other disease-causing agent which, after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions, or physiological deformations in such persons or their offspring.

- **Asbestos** – Asbestos is a known carcinogen, and inhalation of asbestos may result in the development of lung cancer or mesothelioma. Naturally occurring asbestos-bearing serpentine is a mineral commonly found in seismically active regions of California, usually in association with ultramafic rocks and along associated faults.

2.3.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to air quality.

Ambient Air Quality Standards

Regulation of air quality in California is achieved through both federal and State ambient air quality standards and emission limits for individual sources of air pollutant emissions. Health-based air quality standards have been established for these pollutants by the United States Environmental Protection Agency (USEPA) at the national level and by the California Air Resources Board (CARB) at the State level. The National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution.

The Clean Air Act (CAA) requires the adoption of NAAQS to protect the public health and welfare from the effects of air pollution. USEPA established primary and secondary NAAQS that specify allowable ambient concentrations for criteria pollutants. Primary NAAQS are established at levels necessary, with an adequate margin of safety, to protect the public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Similarly, secondary NAAQS specify the levels of air quality determined appropriate to protect the public welfare from any known or anticipated adverse effects associated with air contaminants. Current standards are set for ozone (O_3), nitrogen dioxide ($NO_{2)}$, carbon monoxide (CO), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. CARB established CAAQS that are, in general, more restrictive than the NAAQS. CARB has also developed standards for sulfates, hydrogen sulfide (H_2S), visibility-reducing particulates, and vinyl chloride. Federal and State standards are shown in Table 2.3-1.

Imperial County is located in the Salton Sea Air Basin (SSAB). Specific geographic areas are classified as either "attainment," "nonattainment," or "unclassified" areas for each pollutant, based on the comparison of measured data with federal and State standards. The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. The SSAB is currently designated as a nonattainment area for the NAAQS and CAAQS for 8-hour ozone and PM_{10}. A portion of Imperial County is designated as a nonattainment area for the NAAQS for $PM_{2.5}$. The SSAB is in attainment or unclassified with the NAAQS and CAAQS for the other applicable criteria pollutants. Table 2.3-2 shows the federal and State attainment status for the SSAB.

Table 2.3-1: National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a]	National Standards [b]	
		Concentration [c]	Primary [c,d]	Secondary [c,e]
Ozone	1 hour	0.09 ppm (180 µg/m^3)	–	Same as primary standard
	8 hours	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	
Respirable particulate matter (PM_{10})[f]	24 hours	50 µg/m^3	150 µg/m^3	Same as primary standard
	Annual arithmetic mean	20 µg/m^3	–	
Fine particulate matter ($PM_{2.5}$) [f]	24 hours	–	35 µg/m^3	Same as primary standard
	Annual arithmetic mean	12 µg/m^3	12 µg/m^3	15 µg/m^3
Carbon monoxide	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
	8 hours (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
Nitrogen dioxide [g]	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary standard
	1 hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	None
Sulfur dioxide [h]	Annual arithmetic mean	–	0.030 ppm (for certain areas) [h]	–
	24 hours	0.04 ppm (105 µg/m^3)	0.14 ppm (for certain areas) [h]	–
	3 hours	—	–	0.5 ppm (1,300 µg/m^3)
	1 hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	–
Lead [i,j]	30-day average	1.5 µg/m^3	–	–
	Calendar quarter	–	1.5 µg/m^3 (for certain areas) [j]	Same as primary standard
	Rolling 3-month average	–	0.15 µg/m^3	
Visibility-reducing particles [k]	8 hours	See footnote j	No national standards	
Sulfates	24 hours	25 µg/m^3		
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)		
Vinyl chloride [i]	24 hours	0.01 ppm (26 µg/m^3)		

Notes: mg/m^3 = milligrams per cubic meter; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and 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. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations (C.C.R.).

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone 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 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% of the daily concentrations, averaged over 3 years, are equal to or less than the standards. Contact EPA for further clarification and current national policies.

[h] 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 1-hour national 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 for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California

Table 2.3-1: National and California Ambient Air Quality Standards

[c] Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°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 reference pressure of 760 torr; parts per million (ppm) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note the national 1-hour standard is in units of parts per billion (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.

[i] The California Air Resources Board (CARB) has identified lead and vinyl chloride as toxic air contaminants 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.

[j] 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 standards are approved.

[k] In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and the "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: CARB 2013a

Table 2.3-2: Federal and State Attainment Designations for Salton Sea Air Basin

Criteria Pollutant	State Designation	Federal Designation
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Nonattainment	Nonattainment
$PM_{2.5}$	Unclassified	Partial Nonattainment
Ozone (8-hour)	Nonattainment	Nonattainment
Lead	Attainment	Unclassified/Attainment
Sulfates	Attainment	Not Applicable
H_2S	Unclassified	Not Applicable
Visibility Reducing PM	Unclassified	Not Applicable
Source: CARB 2014		

Federal Regulations

USEPA, under the provisions of the CAA, requires each state with regions that have not attained the NAAQS to prepare a State Implementation Plan (SIP), detailing how these standards are to be met in each local area. The SIP is a legal agreement between each state and the federal government to commit resources to improving air quality. It serves as the template for conducting regional and project-level air

quality analysis. The SIP is not a single document but a compilation of new and previously submitted attainment plans, emissions inventory, emissions reduction programs, district rules, state regulations, and federal controls.

CARB is the lead agency for developing the SIP in California. Local air districts and other agencies prepare Air Quality Attainment Plans (AQAPs) or Air Quality Management Plans (AQMPs) and submit them to CARB for review, approval, and incorporation into the applicable SIP. The air districts develop the strategies stated in the SIPs for achieving air quality standards on a regional basis. The local air district with jurisdiction over the proposed plan update is the Imperial County Air Pollution Control District (ICAPCD).

General Conformity

General conformity requirements were adopted by the United States Congress as part of the CAA Amendments of 1990 and were implemented by USEPA regulations in 1993. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine State or local efforts to achieve and maintain NAAQS. The General Conformity Rule applies to "…any activity that a department…of the Federal government supports in any way, provides financial assistance for, licenses, permits, or approves…" (40 Code of Federal Regulations [C.F.R.] Section 51.852).

The General Conformity Rule (40 C.F.R. Sections 51.850–51.860 and 93.150–93.160) requires any federal agency responsible for an action in a federal nonattainment or attainment/maintenance area to demonstrate conformity to the applicable SIP. To do so, the federal agency must determine that the action is either exempt from General Conformity Rule requirements or subject to a formal conformity determination. All reasonably foreseeable emissions predicted to result from the action—both direct and indirect—must be considered, and the location and quantity of emissions must be identified. Only federal nonattainment and maintenance pollutant emissions are considered under a general conformity analysis.

State Regulations

CARB oversees activities of local air quality management agencies and is responsible for incorporating AQAPs and AQMPs from local air districts into the SIP for USEPA approval. CARB also maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by CARB to classify air basins as being in attainment or nonattainment with respect to each pollutant and to monitor progress in attaining air quality standards.

The California CAA requires that each area exceeding the CAAQS for O_3, CO, SO_2, and NO_2 must develop a plan aimed toward achieving those standards (California Health and Safety Code 40911, *et seq*.). The California Health and Safety Code, Section 40914, requires air districts to design a plan that achieves an annual reduction in district-wide emissions of 5 percent or more, averaged every consecutive 3-year period. To satisfy this requirement, the local air districts are required to develop and implement air pollution reduction measures described in their AQAPs/AQMPs and outline strategies for achieving the CAAQS for any criteria pollutants for which the region is classified as nonattainment.

CARB has established emission standards for vehicles sold in California and for various types of equipment. California gasoline specifications are governed by both State and federal agencies. During the past decade, federal and State agencies have imposed numerous requirements on the production and sale of gasoline in California. CARB has also adopted control measures for diesel particulate matter

(PM) and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators).

Toxic Air Contaminants

Toxic air contaminants (TACs) are airborne substances that are capable of causing short-term or long-term adverse health effects to humans. TACs are usually present in minute quantities in ambient air; however, their high toxicity may pose a threat to public health even at low concentrations. TACs include both organic and inorganic chemical substances. TACs may be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Research and teaching facilities where a variety of chemicals are used for various experiments may also be a source of TACs.

The CAA Amendments of 1990 expanded the regulation of hazardous air pollutants (HAPs, the federal government terminology for TACs), establishing a list of 172 individual compounds and 17 compound categories to be regulated as HAPs. USEPA established stringent, technology-based emissions standards for stationary sources of emissions of these listed substances.

At the state level, TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). CARB continues to implement an ongoing program to identify toxic air contaminants, assess their public health risks, and develop air toxics control measures to reduce toxic emissions from specific source categories statewide. Local air districts then must adopt and implement the State-approved emission reduction measures.

Regional and Local Regulations

Imperial County Air Pollution Control District

The ICAPCD attains and maintains air quality conditions in Imperial County through a comprehensive program of planning, regulation, enforcement, and promotion of the understanding of air quality issues. The ICAPCD develops air quality plans that address State and federal requirements. The air quality plans include strategies and tactics to be used to attain and maintain acceptable air quality in Imperial County. The ICAPCD is also responsible for monitoring air pollution and adopting rules and regulations. The rules and regulations include procedures and requirements to control the emission of pollutants and prevent significant adverse impacts.

Ozone Air Quality Management Plan

As a result of the new ozone standards adopted by USEPA in 1997, strategies to decrease higher ozone concentrations were required. In response, the ICAPCD adopted the 8-hour Ozone AQMP in 2008. Subsequently, the ICAPCD requested further modifications to the AQMP. The final 2009 8-Hour Ozone Modified AQMP was adopted by the ICAPCD on July 13, 2010 (ICAPCD 2010). The AQMP includes control measures which are an integral part of how the ICAPCD currently controls the reactive organic gases (ROG) and NO_x emissions within the nonattainment area.

The local strategy of the ICAPCD is to rely on the reductions associated with the implementation of the Imperial County CEQA Air Quality Handbook (CEQA Handbook). The CEQA Handbook provides guidance to all interested parties on the significance of impacts resulting from the development of new

residential, commercial, and industrial projects. Once the significance of the impact is determined, the CEQA Handbook provides a list of feasible mitigation measures that may be implemented to achieve a reduction of those direct and indirect emissions created by the development project. Specifically, the CEQA Handbook requires mitigation of construction and operational air emissions (ICAPCD 2007).

PM_{10} State Implementation Plan

The final PM_{10} SIP was adopted by the ICAPCD on August 11, 2009 (ICAPCD 2009). The PM_{10} nonattainment status required the ICAPCD to begin the development of Best Available Control Measures (BACM) for fugitive dust. This process began prior to the development of the SIP. In November 2005, the ICAPCD adopted revised fugitive dust control measures (Regulation VIII) which are the primary control strategy for the PM_{10} SIP. On April 23, 2013, USEPA fully approved Regulation VIII fugitive dust rules into the Imperial County portion of the California SIP as BACM.

ICAPCD Rules and Regulations

ICAPCD regulations are primarily focused on stationary sources, indirect sources, and BACM to minimize air pollutants within their jurisdiction. The ICAPCD has established Regulation VIII to prevent, reduce, or mitigate the fugitive dust emissions. Compliance with Regulation VIII is mandatory on all construction sites regardless of the size of the project.

Imperial County

The *Conservation and Open Space Element* of the existing General Plan contains goals, policies, and programs that contribute to reducing criteria air pollutant emissions:

- Protection of Air Quality

  Goal 9. The County shall actively seek to improve and maintain the quality of air in the region.

  Objective 9.1. Ensure that all facilities shall comply with current federal and State requirements for attainment of air quality objectives.

  Objective 9.2. Cooperate with all federal and State agencies in the effort to attain air quality objectives.

2.3.4 Existing Environmental Setting

Air quality is defined by the concentration of pollutants related to human health. Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and sunlight. Therefore, ambient air quality conditions within the local air basin are influenced by such natural factors as topography, meteorology, and climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources.

Environmental Setting, Climate, and Meteorology

Imperial County is located in the southeastern corner of California and is surrounded by mountain ranges to the north, east, and west with vast open land containing desert sand. It is bordered by

Riverside County to the north, Mexico to the south, San Diego County to the west, and Arizona to the east. Imperial County is a desert community with a warm, dry climate. Summers are extremely hot and dry, while winters are temperate.

Rainfall at the El Centro Station, which represents the area's climate in the SSAB, averages approximately 2.64 inches annually (WRCC 2014). The heaviest precipitation occurs from January through March. The mean annual air temperature ranges from 55 degrees Fahrenheit (°F) in January to 92°F in July, with an annual average temperature of approximately 73°F (WRCC 2014).

Regional and Local Air Quality

Ambient air pollutant concentrations in Imperial County are measured at air quality monitoring stations operated by CARB and the ICAPCD. Five air quality monitoring stations are located in Imperial County. Table 2.3-3 lists the stations and the pollutants that are monitored at each station. Table 2.3-3 shows the locations of the monitoring stations.

Table 2.3-3: Ambient Air Quality Monitoring Stations – Imperial County

Monitoring Station	Location	Pollutants
El Centro	150 South 9th Street El Centro, CA 92243	O_3, CO, NO_2, PM_{10}, $PM_{2.5}$
Brawley	220 Main Street Brawley, CA 92227	$PM_{10,}$ $PM_{2.5}$
Westmorland	570 Cook Street Westmoreland, CA 92281	$O_{3,}$ PM_{10}
Niland	7711 English Road Niland, CA 92257	$O_{3,}$ PM_{10}
Calexico – Ethel Street	1029 Belcher Street Calexico, CA 92231	O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$
Source: CARB 2014b		

While pollutant concentrations vary at each station, the El Centro monitoring station is considered representative of the air quality conditions in Imperial County. The station monitors ozone, CO, NO_2, PM_{10}, and $PM_{2.5}$.

Table 2.3-4 summarizes the exceedances of the NAAQS and CAAQS and the highest pollutant levels recorded at this station from 2010 through 2012. As shown in Table 2.3-4, ambient air concentrations of CO and NO_2 at the El Centro monitoring station have not exceeded the NAAQS or the CAAQS in the past three years. Ozone concentrations have exceeded the NAAQS and CAAQS in 2010 through 2012. Concentrations of PM_{10} exceeded the CAAQS in2012, and $PM_{2.5}$ exceeded the NAAQS in 2011.

Table 2.3-4: Ambient Air Quality Monitoring Data

Pollutant Standards	2010	2011	2012
Carbon Monoxide			
Maximum 8-hour concentration (ppm)	5.61	9.01	3.64
Number of days standard exceeded			
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0
Nitrogen Dioxide			
Maximum 1-hour concentration (ppm)	0.141	0.117	0.059
Annual average (ppm)	0.004	0.009	*
Number of days standard exceeded			
NAAQS 1-hour	0	0	0
CAAQS 1-hour	0	0	0
Ozone			
Maximum 1-hour concentration (ppm)	0.122	0.103	0.111
Maximum 8-hour concentration (ppm)	0.082	0.084	0.091
Number of days standard exceeded			
CAAQS 1-hour (>0.09 ppm)	3	5	9
CAAQS 8-hour (>0.070 ppm)	29	21	26
NAAQS 8-hour (>0.075 ppm)	10	12	14
Particulate Matter (PM_{10})[a]			
National maximum 24-hour concentration ($\mu g/m^3$)	69.4	81.9	75.6
State maximum 24-hour concentration ($\mu g/m^3$)	70.2	80.3	72.1
National annual average concentration ($\mu g/m^3$)	32.9	32.6	33.4
State annual average concentration ($\mu g/m^3$)	*	*	33.5
Number of days standard exceeded			
NAAQS 24-hour (>150 $\mu g/m^3$)	0	0	0
CAAQS 24-hour (>50 $\mu g/m^3$)	*	*	6
Particulate Matter ($PM_{2.5}$)[a]			
National maximum 24-hour concentration ($\mu g/m^3$)	19.9	54.4	26.4
State maximum 24-hour concentration ($\mu g/m^3$)	19.9	54.4	26.4
National annual average concentration ($\mu g/m^3$)	6.5	7.5	7.5
State annual average concentration ($\mu g/m^3$)	6.6	7.5	*
Number of days standard exceeded			
NAAQS 24-hour (>35 $\mu g/m^3$)	0	2	0

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[a] State and national statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. State statistics are based on local conditions, while national statistics are based on standard conditions. State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

* Insufficient or no available data available.

Source: CARB 2014c

Health Risk Assessment

Potential Health Risk Assessment (HRA) issues were identified for Imperial County in accordance with the California Air Resources Board (CARB) and the Office of Environmental Health Hazard Assessment (OEHHA). The CARB mission is to protect the environment and public health by providing safe and clean air by reducing emissions of air contaminants through the fair, consistent, and comprehensive enforcement of air pollution laws and by providing training and compliance assistance. OEHHA's mission is to protect human health and the environment through scientific evaluation of risks posed by hazardous substances.

According to the HRA process on the California Air Pollution Control Officers Association (CAPCOA) Guidance Document *Health Risk Assessments for Land Use Projects* (CAPCOA 2009), basically two types of land use projects have the potential to cause long-term public health risk impacts: **Type A** - Land use projects with toxic emissions that impact receptors, and **Type B -** Land use project that will place receptors in the vicinity of existing toxics sources. Examples of these are listed below.

- **Type A** project examples (project impacts receptors):
  - combustion-related power plants
  - gasoline-dispensing facilities
  - asphalt batch plants
  - warehouse distribution centers
  - quarry operations
  - other stationary sources that emit toxic substances

- **Type B** project examples (project impacted by existing nearby toxic sources):
  - residential, commercial, and institutional developments proposed to be located in the vicinity of existing toxic emission sources such as:
    - stationary sources
    - high-traffic roads
    - freeways
    - rail yards
    - ports

Air quality analyses focus on impacts associated with criteria pollutant emissions, TACs, and odors. Project-related air quality impacts can be regional, as well as have more localized impacts. Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. Sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Health risks in Imperial County would include air pollution, toxins in the air, water, and soil potential cancer risks from some common sources of toxic emissions such as:

- freeways and high-traffic-volume roads
- goods distribution centers
- rail yards
- ports
- refineries
- chrome platers

- dry cleaners using perchloroethylene
- gasoline dispensing facilities

The Imperial Valley/Salton Sea Basin in southeastern California is one of the state's most productive agricultural areas, the result of a year-round growing season and rich supply of water that is carried from the Colorado River to the region by way of an extensive and complex irrigation network. A wide variety of crops is grown throughout the year in the region, which results in the use of large amounts of multiple pesticides. Previous studies by federal, State, and local agencies have documented elevated levels of both current-use and organochlorine pesticides in water associated with suspended and bed sediments in the Alamo and New rivers, which drain the majority of the Imperial Valley. Additional studies have found increased levels of aquatic toxicity in these rivers. Since 1996, a series of studies has been conducted to determine concentrations of current-use and organochlorine pesticides in water and suspended sediments in the Alamo and New rivers.

2.3.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Projects developed in Imperial County must meet the requirements of the ICAPCD CEQA Handbook. Any project with the potential to have a significant impact on regional and local air quality is required to develop a Comprehensive Air Quality Analysis Report. Specifically, the CEQA Handbook requires analysis and mitigation of construction and operational air emissions. The ICAPCD recommends the implementation of effective and comprehensive mitigation measures to reduce air quality impacts.

Development of facilities associated with General Plan update could increase criteria pollutant emissions and lead to increases in the frequency or severity of existing air quality violations. A change in land use (e.g., agricultural to industrial) could also lead to inconsistency in the assumptions used for development of regional transportation plans and SIPs. New stationary sources would need to meet the permitting requirements of the ICAPCD.

Constraints Due to Existing Conditions

The climate of Imperial County is characterized as a semiarid desert with hot, dry summers and warm winters. The combination of the flat terrain of the valley and the strong diurnal temperature differentials created by solar heating produce moderate winds and deep thermal convection. The high temperatures combined with low humidity produce hot, dry summers that contribute to the buildup of ozone. These conditions are attractive for wind and solar renewable energy development. Renewable energy development would not be constrained directly by the ozone conditions.

As mentioned earlier, Imperial County is currently designated as a nonattainment area for the NAAQS and CAAQS for 8-hour ozone and PM_{10}. A portion of Imperial County is also designated a nonattainment area for the NAAQS for $PM_{2.5}$. Air quality within the SSAB and Imperial County is also affected by air pollutants transported from the South Coast Air Basin to the northwest and from Mexico to the south. Similarly, wind blowing in a northeast direction transports pollutants from Mexicali into Calexico. Additional emissions generated from development of renewable energy projects within the air basin, particularly during construction, have the potential to contribute to conditions that already exceed air quality standards.

CARB recommends avoiding siting new sensitive land uses such as residences, schools, daycare centers, playgrounds, or medical facilities within 500 feet of a freeway, urban roads with traffic volumes exceeding 100,000 vehicles per day, or rural roads with volumes greater than 50,000 vehicles per day. Therefore, siting a residential project within 500 feet of a freeway, and the associated public health risks, should be disclosed as such in a CEQA document. Redesigning the project so that sensitive receptors are moved greater than 500 feet away from such roadways may mitigate the risk. Other nonsensitive land uses such as commercial uses may be sited in this area.

Opportunities

Air quality analyses focus on impacts associated with criteria pollutant emissions, TACs, and odors. Project-related air quality impacts can be regional as well as have more localized impacts. Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. Sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

CARB has developed the *Air Quality and Land Use Handbook: A Community Health Perspective* to provide guidance on land use compatibility with sources of TACs (CARB 2005). These sources include freeways and high-traffic roads, commercial distribution centers, rail yards, refineries, dry cleaners, gasoline stations, and industrial facilities. The General Plan update can address policies and recommendations for buffers and appropriate siting distances related to the construction and operation of renewable energy projects. Coordination with the ICAPCD on policies that address emissions from these could continue to improve air quality in the County.

The SSAB is currently designated as a nonattainment area for the NAAQS and CAAQS for 8-hour ozone and PM_{10}. A portion of Imperial County is designated as a nonattainment area for the NAAQS for $PM_{2.5}$. The development of renewable energy sources (wind, solar, geothermal, biofuel, biomass, and algae production sources) would contribute to bringing those areas into attainment.

As emphasized in the CARB Handbook, community involvement is an important part of the overall land use approval process. Public participation is critical when proposed projects could create increased health risk to the individuals or the community. To that extent, engaging community members during the initial phase of the project evaluation process provides a communication conduit between impacted individuals, project proponents, and the decision makers.

Areas that have an existing higher health risk would create an opportunity to develop renewable energy sources because those areas would be less prone to higher density residential development, schools, senior homes, etc. Those areas would provide for less conflicted land uses.

2.4 BIOLOGICAL RESOURCES

2.4.1 Introduction

This section discusses the existing biological resources in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.4.2 Terminology

The following is a summary of biological resources terminology discussed in this section.

- **Biological Resources** – Genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity (CBD 2013).

- **Sensitive Habitats** – Habitats labeled by federal and State agencies as sensitive based on their rarity; because they support sensitive plant and wildlife species; and/or for their ecologic, economic, and social value.

- **Sensitive Species** – Plant and animal species that are recognized by federal and/or State resource agencies, as well as private conservation organizations, as having a special status due to the concern for their continued existence as a result of decline or limitation of its size or population, geographic range, and/or distribution, resulting in most cases from habitat loss.

- **Habitat Conservation Areas** – Designated ecosystems to provide large-area protection of plants, animals, and their habitats while allowing for compatible and appropriate economic activity.

- **Migration Corridors** – Small or large habitat sections connecting wildlife populations and are important for genetic diversity, population reestablishment, and population sustainability.

2.4.3 Regulatory Setting

Federal Laws and Requirements

Federal Endangered Species Act

Enacted in 1973, the federal Endangered Species Act (ESA) provides for the conservation of threatened and endangered species and their ecosystems. The ESA prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from the U.S. Fish and Wildlife Service (USFWS) through a permit under Section 4(d), 7 or 10(a) of the Act. Under the ESA, "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended, prohibits anyone without a permit to "take" bald or golden eagles. "Take" is defined as "…pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb…" "Disturb" is defined as "…to agitate or bother a bald or

golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior…"

Migratory Bird Treaty Act

Congress passed the Migratory Bird Treaty Act (MBTA) in 1918 to prohibit the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA. The prohibition applies to birds included in the respective international conventions between the United States and Great Britain, the United States and Mexico, the United States and Japan, and the United States and Russia.

Clean Water Act

The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged and/or fill material into waters of the United States under Section 404 of the federal Clean Water Act. The term "waters of the United States" is generally defined to include navigable waters as well as other waters (such as streams and seeps) and wetlands that meet applicable regulatory criteria.

Executive Order 11990 - Protection of Wetlands

The basic requirement of Executive Order 11990 is that federal agencies avoid construction or management practices that would adversely affect wetlands unless that agency finds that (1) no practicable alternative can be found, and (2) the proposed action includes all practicable measures to minimize harm to the wetlands. Executive Order 11990 directs all federal agencies to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural beneficial values of wetlands in the conduct of the agency's responsibilities for (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act authorizes the secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The act also directs the Bureau of Fisheries to use impounded waters for fish-culture stations and migratory-bird resting and nesting areas and requires consultation with the Bureau of Fisheries prior to the construction of any new dams to provide for fish migration. In addition, this act authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and the acceptance by the federal agencies of funds or lands for related purposes provided that land donations received the consent of the state in which they are located.

Bureau of Land Management Policy

The Bureau of Land Management (BLM) also manages special status species in accordance with *Manual 6840, Special Status Species Management*. The manual establishes policy to manage species listed or

proposed for listing pursuant to the ESA and BLM sensitive species which are found on BLM-administered lands. The BLM special status species policy aims to conserve and/or recover listed species and their habitats and to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to prevent them from requiring listing in the future (BLM 2008). A supplement to this manual, *BLM Manual Handbook 6840-1 Special Status Plant Management,* focuses on management of BLM sensitive plants. It includes details on survey coverage methods, in relation to likelihood of species occurring and intensity of impact that should guide plant surveys on BLM lands (BLM 1996).

State Regulations and Policies

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Wildlife Code, Section 2050 *et seq*.) is administered by the California Department of Fish and Wildlife (CDFW). CESA includes threatened, endangered, and candidate species. Under Section 2062 of the California Fish and Wildlife Code, the term "endangered species" refers to "…a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease..." Under Section 2067, the term "threatened species" refers to "…a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts..." Under Section 2068, the term "candidate species" refers to "…a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list…"(CDFW 2013b).

CESA prohibits the take of listed species except as otherwise provided in State law. Unlike its federal counterpart, CESA applies the take prohibitions to species that are candidates for State listing. The California Fish and Game (CFG) Code defines "take" as "…hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill…"

CDFW may authorize the incidental take of listed species under CESA through issuance of an incidental take permit pursuant to CFG Code, Section 2081, subdivisions (b) and (c). These provisions of the code, coupled with CDFW's "CESA Implementing Regulations" (14 C.C.R. 783.0 *et seq*.), authorize CDFW to issue an incidental take permit for a project as proposed if (1) the take is incidental to an otherwise lawful activity; (2) the impacts of the taking are minimized and fully mitigated by measures that are roughly proportional in extent to the project-related impact to the species, maintain the applicant's objectives to the maximum extent possible and are capable of successful implementation; (3) the applicant ensures adequate funding to implement the measures and for monitoring compliance with and effectiveness of those measures; and (4) the issuance of the permit would not jeopardize the continued existence of the species.

California Environmental Quality Act

Title 14 California Code of Regulations (C.C.R.) 15380 requires that endangered, rare, or threatened species or subspecies of animals or plants be identified within the influence of the project. If any such

species are found, appropriate measures should be identified to avoid, minimize, or mitigate to the extent possible the effects of the project.

Natural Communities Conservation Planning Act

The California Legislature established the statutory framework for Natural Community Conservation Plans (NCCPs) through its enactment of the Natural Community Conservation Planning Act (NCCPA) (CFG Code, Section 2800 *et seq*.). The NCCP program is designed to support voluntary, collaborative planning efforts involving landowners, local governments, State and federal agencies, environmental organizations, and interested members of the public in the formulation and approval of NCCPs. NCCPs provide long-term, large-scale protection of natural vegetation communities and wildlife diversity while allowing compatible land uses and appropriate development and growth. The NCCP process provides an alternative to "single species" conservation efforts. The shift in focus from single species, project-by-project conservation efforts to large-scale conservation planning at the natural community level is intended to facilitate regional and subregional protection of a range of species (listed and unlisted) that inhabit a designated natural community or communities.

California Desert Native Plants Act

The California Food and Agriculture Code, Sections 80071–80075, provides protection for native desert plants. Plants protected or regulated by the California Desert Native Plants Act include (1) Joshua tree (*Yucca brevifolia*), (2) all species in the Agavaceae family (yuccas, nolinas, century plants), (3) all species of cactus, including cholla, (4) stands of creosote rings with a diameter of 10 feet or wider, (5) *Psorothamnus* [*Dalea*] *spinosa* (smoketree), (6) all species of the genus *Prosopis* (mesquites), (7) all species of the family Fouquieriaceae (ocotillo, candlewood), (8) all species of the genus *Cercidium* (palos verdes), (9) *Acacia greggii* (catclaw), (10) *Atriplex hymenelytra* (desert-holly), and (11) *Olneya tesota* (desert ironwood), including both dead and live desert ironwood (California Food and Agriculture Code, Sections 80071–80075).

California Department of Fish and Game Code, Section 1600–1616 (as amended)

Under Section 1602 of the CFG Code, CDFW requires formal notification for activities that divert or obstruct the natural flow or substantially change or use materials from the bed, channel, or bank of any river, stream, or lake. Desert washes, distributary networks, and riparian habitats (e.g., microphyll woodland) associated with watercourses are included in this requirement as they are part of the bed, channel, or bank. If CDFW determines that the project may substantially adversely affect existing fish and wildlife resources, the project proponent must enter into a lake or streambed alteration agreement (LSAA) with CDFW before the project can proceed. The LSAA includes measures developed by CDFW necessary to protect the fish and wildlife resources present at the site, which must be followed in the course of the project activity.

California Department of Fish and Game Code, Sections 3503, 3503.5, and 3513

CFG Code, Sections 3503, 3503.5, and 3513 protect migratory birds, bird nests and eggs including raptors (birds of prey) and raptor nests from take unless authorized by CDFW. Additionally, the State further protects certain species of fish, mammals, amphibians and reptiles, birds, and mammals through CDFW's Fully Protected Animals designation, which prohibits any take or possession of classified species. No licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Most Fully Protected

Species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations.

California Department of Fish and Game Code, Sections 1900-1913 — Native Plant Protection Act

The Native Plant Protection Act (NPPA) prohibits the taking, possessing, or sale within the State of any plant listed by CDFW as rare, threatened, or endangered. An exception to this prohibition in the Act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify CDFW at least 10 days prior to the initiation of activities that would destroy them. The NPPA exempts from "take" prohibition "…the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way…"

Regional and Local Requirements

Desert Renewable Energy Conservation Plan

The Desert Renewable Energy Conservation Plan (DRECP) is a landscape-scale, multi-agency, joint planning effort for 22.5 million acres in California's desert. Within the plan area, the DRECP will: (1) preserve, restore, and enhance natural communities and ecosystems and conserve sensitive species; (2) protect and enhance other resources and values on BLM-administered lands, including cultural resources, recreation opportunities, visual landscapes, etc.; (3) identify appropriate areas for siting utility-scale renewable energy projects; and (4) provide efficient and predictable environmental review and permitting for projects sited in these areas.

The plan consists of three components that will each support the DRECP's overall goals of efficient and predictable renewable energy development while providing for conservation of critical desert ecosystems:

- A Natural Community Conservation Plan (NCCP) under the California NCCP Act and the California Endangered Species Act
- A General Conservation Plan (GCP) under the Federal Endangered Species Act
- BLM Land Use Plan Amendments (LUPA) under the Federal Land Policy and Management Act

The NCCP component of the plan identifies specific areas as reflected by the biological goals and objectives for the conservation and management of the proposed covered species. The reserve design will be created to provide both compensation for impacts from renewable energy projects within the DRECP plan area and to support the overall Conservation Strategy.

Imperial Irrigation District HCP and NCCP

Imperial Irrigation District (IID) is preparing an HCP and NCCP to support applications for incidental take authorizations for the Transfer Project pursuant to FESA, Section 10 and CFG Code Section 2835 of the California Natural Communities Conservation Planning Act. The HCP/NCCP is anticipated to cover 96 fish, wildlife, and plant species for a term of up to 75 years. Covered activities include all water conservation projects and mitigation measures, whether undertaken by IID or by farmers, tenants, or landowners, in connection with both the conservation and transfer of up to 300,000 acre-feet/year of Colorado River water pursuant to the Transfer Project and/or the Quantification Settlement Agreement

(QSA), compliance with the cap on IID's annual diversions of Colorado River water established by the QSA, and adaptive habitat management and monitoring activities. All activities related to IID Water Department operations including water delivery, drainage, and operation and maintenance will also be covered by these permits.

The Lower Colorado River Multi-Species Conservation Program HCP

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is a multi-stakeholder, federal and non-federal partnership which seeks to balance the use of Colorado River water resources with the conservation of native species and their habitats in compliance with the federal ESA. The LCR MSCP area extends over 400 miles of the lower Colorado River from the lower end of the Grand Canyon to the Southerly International Boundary with Mexico. The LCR MSCP, which was enacted in 2006, provides ESA compliance for covered actions undertaken by federal agencies and non-federal partners. Covered actions include operations and maintenance activities on the lower Colorado River; the delivery of up to 9 million acre-feet of water to Arizona, California, Nevada, and Mexico; and power produced by six dams located on the lower Colorado River. ESA compliance is obtained through the implementation of a Habitat Conservation Plan (HCP) that describes conservation measures for 31 native species, including 6 currently listed under the ESA as endangered.

County of Imperial General Plan

The *Conservation and Open Space Element* provides detailed plans and measures for the preservation and management of biological and cultural resources, soils, minerals, energy, regional aesthetics, air quality, and open space. The purpose of the *Conservation and Open Space Element* is to promote the protection, maintenance, and use of the County's natural resources with particular emphasis on scarce resources and to prevent wasteful exploitation, destruction, and neglect of the State's natural resources. Additionally, the purpose of the *Conservation and Open Space Element* is to recognize that natural resources must be maintained for their ecological value for the direct benefit to the public; to protect open space for the preservation of natural resources; and to manage production of resources for outdoor recreation and for public health and safety.

2.4.4 Existing Environmental Setting

Vegetation Communities

The County of Imperial is located within the Colorado Desert Subregion of the Sonoran Floristic Province. This region mixes an array of geographic substrates, topographic features, climatic regimes, soil types, and other physical factors which have combined to produce a mosaic of floristic components and associated natural habitats. Characteristic of this area is the presence of vast expanses of creosote bush *(Larrea tridentata)* and brittle bush *(Encelia farinosa)* on broad alluvial bajadas and adjacent mountain slopes interspersed with large washes containing several species of small microphyllous trees and shrubs. In addition to perennials, more than half of the desert's plant species are herbaceous annuals; and appropriately timed winter rains produce abundant early spring wildflowers. Over 365 plant species from 81 families are present within the Colorado Desert.

The vegetation communities within the County of Imperial are mapped and described using data and descriptions from the 2013 DRECP vegetation map (Menke et al. 2013) according to methodologies and nomenclature adopted by the U.S. National Vegetation Classification System (US-NVCS) and Federal Geographic Data Committee (FGDC). Data for unmapped areas in the western portion of the County

were supplemented with LANDFIRE vegetation data (LANDFIRE 2013). In this effort, a total of 20 vegetation communities are recognized and mapped within the County of Imperial (Table 2.4-1). These 20 vegetation communities can be grouped into nine general land cover types. These include Chaparral and Coastal Scrub, Desert Scrub, Dune, Grassland, Riparian, Wetland, Desert Outcrop and Badlands, Agriculture**,** and Developed and Disturbed Areas. Land cover types and vegetation communities mapped within the County of Imperial are depicted in Figure 2.4-1 and briefly described below. Documents that detail the DRECP Land Covers and Natural Communities are included as Appendices C and D.

Chaparral and Coastal Scrub Communities

The chaparral and coastal scrub communities make up less than 1 percent (4,563 acres) of the County of Imperial (Figure 2.4-1). One scrub natural community (Central and South Coastal California Coastal Sage Scrub) and one chaparral natural community (Western Mojave and Western Sonoran Desert Borderland Chaparral) are found in the County (Table 2.4-1).

The Central and South Coastal California Coastal Sage Scrub natural community falls within the California coastal scrub macrogroup, which is characterized by a dominance of drought-deciduous shrubs and sometimes deep-rooted sclerophyllous shrubs (woody plants with small leathery evergreen leaves). This community is limited in its extent and occurs in a few scattered locations within the County (Figure 2.4-1).

Table 2.4-1: Land Cover Types and Vegetation Communities within the County of Imperial

Land Cover Type	Vegetation Community	Acres within the County	Percent within the County
Agriculture	Agriculture	548,444	19.1
Total		**548,444**	**19.1**
Chaparral and Coastal Scrub Community	Central and South Coastal Californian Coastal Sage Scrub	2,400	0.1
	Western Mojave and Western Sonoran Desert Borderland Chaparral	2,163	0.1
Total		**4,563**	**0.2**
Desert Outcrop and Badlands	North American Warm Desert Bedrock Cliff and Outcrop	461,129	16.1
Total		**461,129**	**16.1**
Desert Scrub	Arizonan Upland Sonoran Desert Scrub	12,940	0.5
	Inter-Mountain Dry Shrubland and Grassland	2	0.0
	Lower Bajada and Fan Mojavean - Sonoran Desert Scrub	817,640	28.5
	Shadscale - Saltbush Cool Semi-Desert Scrub	22,842	0.8
Total		**853,429**	**29.8**
Developed and Disturbed Areas	Developed and Disturbed Areas	37,566	1.3
	Rural	53,991	1.9
Total		**91,557**	**3.2**
Dunes	North American Warm Desert Dunes and Sand Flats	175,466	6.1
Total		**175,466**	**6.1**
Grassland	California Annual and Perennial Grassland	9,327	0.3
Total		**9,327**	**0.3**
Riparian	Madrean Warm Semi-Desert Wash Woodland/ Scrub	429,211	15.0
	Mojavean Semi-Desert Wash Scrub	326	0.0
	Sonoran-Coloradan Semi-Desert Wash Woodland/ Scrub	42,762	1.5
	Southwestern North American Riparian/Wash Scrub	38,682	1.3
Total		**510,982**	**17.8**
Wetland	North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat	7,134	0.2
	Open Water	199,591	7.0
	Playa	188	0.0
	Southwestern North American Salt Basin and High Marsh	37	0.0
Total		**206,951**	**7.2**
Unmapped	Unmapped	6,417	0.2
Total		**6,417**	**0.2**
Grand Total		**2,868,265**	**100.0**

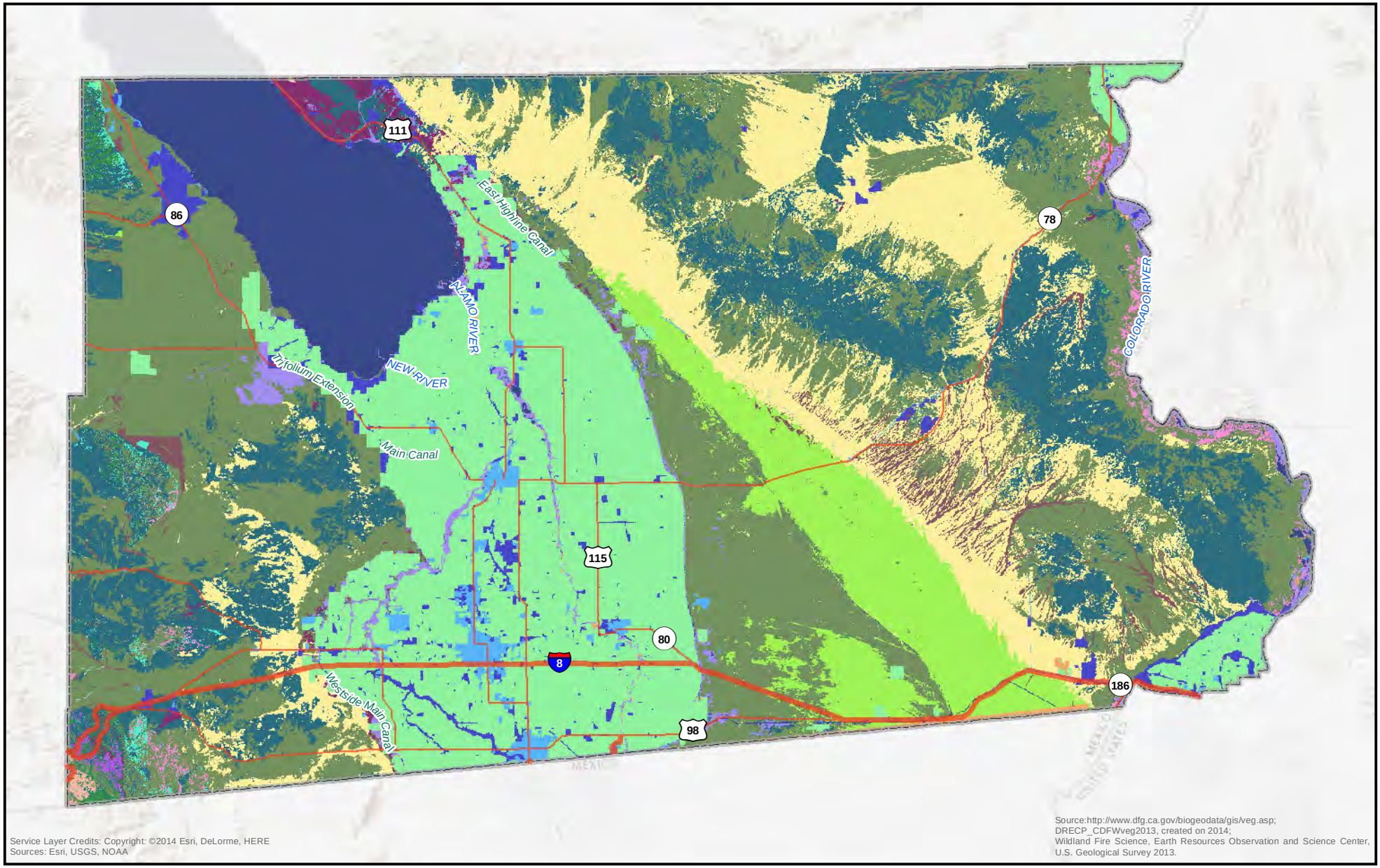

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Figure 2.4-1

Imperial County Renewable Energy and Transmission Element Update

Vegetation Communities

Page 1 of 2

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General Community, Group Community

- Agriculture, Agriculture
- Chaparral and coastal scrub community (Cismontane scrub), Central and South Coastal Californian coastal sage scrub
- Chaparral and coastal scrub community (Cismontane scrub), Western Mojave and Western Sonoran Desert borderland chaparral
- Desert Outcrop and Badlands, North American warm desert bedrock cliff and outcrop
- Desert Scrub, Arizonan upland Sonoran desert scrub
- Desert Scrub, Inter-Mountain Dry Shrubland and Grassland
- Desert Scrub, Lower Bajada and Fan Mojavean - Sonoran desert scrub
- Desert Scrub, Shadscale - saltbush cool semi-desert scrub
- Developed and Disturbed Areas, Developed and Disturbed Areas
- Developed and Disturbed Areas, Rural
- Dunes, North American warm desert dunes and sand flats
- Grassland, California Annual and Perennial Grassland
- Not Mapped, Not Mapped
- Riparian, Madrean Warm Semi-Desert Wash Woodland/Scrub
- Riparian, Mojavean semi-desert wash scrub
- Riparian, Sonoran-Coloradan semi-desert wash woodland/scrub
- Riparian, Southwestern North American riparian/wash scrub
- Wetland, North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat
- Wetland, Open Water
- Wetland, Playa
- Wetland, Southwestern North American salt basin and high marsh

Source: http://www.dfg.ca.gov/biogeodata/gis/veg.asp; DRECP_CDFWveg2013, created on 2014; Wildland Fire Science, Earth Resources Observation and Science Center, U.S. Geological Survey 2013.

Figure 2.4-1
Imperial County Renewable Energy and Transmission Element Update
Vegetation Communities

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The California chaparral macrogroup includes a single group: Western Mojave and Western Sonoran Desert Borderland Chaparral. This community occurs in a few scattered locations of Smoketree and Imperial Borrego valleys (Figure 2.4-1).

Desert Scrub Communities

The desert scrub communities cover approximately 29.8 percent, or 853,429 acres, of the County of Imperial (Figure 2.4-1). Three groups are mapped in the County and one community is mapped at the broader macrogroup level: Inter-mountain Dry Shrubland and Grassland (Table 2.4-1). Inter-mountain Dry Shrubland and Grassland vegetation is extremely limited within the County and occurs in a few small places in the Imperial Borrego Valley (Figure 2.4-1).

The majority of the scrub communities in Imperial County consist of two groups: Lower Bajada and Fan Mojavean–Sonoran Desert Scrub and Arizonan Upland Sonoran Desert Scrub (Table 2.4-1). Lower Bajada and Fan Mojavean–Sonoran Desert Scrub is found throughout most of the County of Imperial; but it is most common in the East Mesa, West Mesa, and Yuha Desert regions of the County (Figure 2.4-1).

Arizonan Upland Sonoran Desert Scrub primarily occurs along the Colorado River but also occurs in several small areas in the Chocolate Mountains and Imperial Borrego Valley (Figure 2.4-1). Shadscale–Saltbush Cool Semi-Desert Scrub is scattered throughout much of Imperial County but is most concentrated northeast of the Salton Sea near the Imperial-Riverside County border (Figure 2.4-1).

Dune Community

Dune communities make up approximately 6.1 percent, or 175,466 acres, of Imperial County and include one natural community: North American Warm Desert Dunes and Sand Flats (Table 2.4-1). This community is primarily limited to the Algodones Dune system, located in the East Mesa–Sand Hill portion of the County of Imperial, although several smaller stabilized dunes area exist west of Imperial Valley. (Figure 2.4-1).

Grassland Communities

Grassland communities cover only a small portion (less than 1 percent, or 9,327 acres) of the County and include the macrogoup California Annual and Perennial Grassland (Table 2.4-1). California Annual and Perennial Grassland occurs in small scattered areas in the western portion of the County (Figure 2.4-1).

Riparian Communities

Riparian communities constitute approximately 17.8 percent, or 510,982 acres, of the County and consist of four natural communities: Madrean Warm Semi-Desert Wash Woodland/Scrub, Mojavean Semi-Desert Wash Scrub, Sonoran–Coloradan Semi-Desert Wash Woodland/Scrub, and Southwestern North American Riparian/Wash Scrub (Table 2.4-1). About 84 percent of the riparian community is mapped only at the macrogroup level as Madrean Warm Semi-Desert Wash Woodland/Scrub.

Madrean Warm Semi-Desert Wash Woodland/Scrub is mapped in defined desert washes and is characterized by distinctly different plant composition and/or cover compared to adjacent upland communities in areas that did not receive alliance level mapping. This conglomerate group has been defined as a natural community in the DRECP and occurs in most areas in the County but is most

common in the Chocolate Mountains and Smoketree Valley areas and in the West Mesa area. (Figure 2.4-1). Microphyll woodlands may occur within this natural community.

Mojavean Semi-Desert Wash Scrub is one of two groups or communities within the Madrean Warm Semi-Desert Wash Woodland/Scrub macrogroup. This community occurs in a number of scattered locations, including the southeastern corner of the County (Figure 2.4-1), and is differentiated from the Sonoran–Coloradan Semi-Desert Wash Woodland/Scrub by specific alliances.

Sonoran–Coloradan Semi-Desert Wash Woodland/Scrub is the second group or community within the Madrean Warm Semi-Desert Wash Woodland/Scrub macrogroup. This community occurs in several smaller areas in the Palo Verde Valley and in the Imperial Borrego Valley area (Figure 2.4-1). Microphyll woodlands, as defined in the DRECP, are comprised of four alliances within this natural community.

Southwestern North American Riparian/Wash Scrub is characterized by native or non-native riparian shrubs and lacks a significant cover or presence of riparian trees. This natural community primarily occurs in Imperial Valley but occurs elsewhere throughout the County (Figure 2.4-1).

Wetland Communities

Wetland communities cover approximately 7.2 percent or 206,951 acres of Imperial County and include four land cover types or natural communities: North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat, Southwestern North American Salt Basin and High Marsh, Open Water, and Playa (Table 2.4-1). North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat occurs in small areas throughout the county and is primarily located in Imperial Borrego Valley, West Mesa, and Yuha Desert (Figure 2.4-1). Southwestern North American Salt Basin and High Marsh is limited within the County of Imperial and primarily occurs in several small areas west of the Salton Sea (Figure 2.4-1). Open water accounts for over 99 percent (199,431 acres) of the wetland communities in the County (Table 2.4-1), nearly all of which is associated with the Salton Sea. Playa consists of less than 1 percent of the wetland communities and is limited to several small areas in Imperial Borrego Valley and West Mesa (Figure 2.4-1).

Desert Outcrop and Badlands Communities

Desert outcrop and badlands cover approximately 16.1 percent, or 461,129 acres, of the County. This community includes a single group: North American Warm Desert Bedrock Cliff and Outcrop (Table 2.4-1). North American Warm Desert Bedrock Cliff and Outcrop is characterized by areas in which vegetation is largely absent. This natural community occurs throughout much of the County but is most prevalent in the Chocolate Mountains, Cargo Muchacho Mountains, Black Hills, Coyote Mountains, and Carrizo Badlands (Figure 2.4-1).

Agriculture

As described in Section 2.2.2 above, Approximately 538,326 acres, or 19 percent, of the total land within Imperial County is classified as farmland. As noted by the County of Imperial, the three main irrigated areas consist of Imperial Valley with 512,163 acres, Bard Valley in the southeast corner of the County with 14,737 acres, and Palo Verde Valley in the northeast corner of the County with 7,428 acres. These irrigated lands may include alfalfa, Bermuda grass, broccoli, carrots, cauliflower, citrus, cotton, dates, lettuce, melons, onion, romaine, spinach, Sudan grass, sugar beets, wheat, and livestock (County 2014).

Developed and Disturbed Areas

Developed and disturbed land is mapped over approximately 3.2 percent, or 91,557 acres, of the County and includes low- to high-intensity urban development and open space associated with developed areas, including uses such as golf courses (Table 2.4-1). Developed areas are primarily concentrated around the Calexico, El Centro, Imperial, and Brawley areas of the Imperial Valley and Salton City immediately west of the Salton Sea. Lands mapped as developed and disturbed also include areas of rural development.

General Wildlife and Wildlife Habitats

The Colorado Desert Subregion supports a variety of natural vegetation communities and landscape features that offer a diversity of wildlife habitat types. While these habitat types correspond with the general vegetation community types described above, they are also defined by a number of distinct landscape features such as washes and gullies, rocky outcrops and hillsides, cliffs and taluses, and cave and mine entrances. All contribute to the diversity and abundance of wildlife in the area as they provide for permanent residency and breeding, serve as a buffer from surrounding development, and function as movement corridors and connection with adjacent areas.

The diverse wildlife inhabiting the Colorado Desert includes many species specially adapted to the unique desert habitats. There are 481 vertebrate species that inhabit the Colorado Desert region at some point in their life cycle, including 282 species of birds, 82 species of mammals, 66 species of reptiles, 16 species of amphibians, and 35 species of fish (Bunn et al. 2007).

Small- to medium-sized mammals found within the County include the black-tailed jackrabbit (*Lepus californicus eremicus*), bobcat (*Felis rufus baileyi*), coyote (*Canis latrans mearnsi*), Botta's pocket gopher (*Thomomys bottae growlerensis*), canyon mouse (*Peromyscus crinitus disparilis*), desert cottontail (*Sylvilagus audubonii arizonae*), desert pocket mouse (*Perognathus penicillatus pricei*), desert kangaroo rat (*Dipodomys deserti*), kit fox (*Vulpes macrotis macrotis*), and California myotis (*Myotis californicus stephensi*). Representative bird species found in the County include the white-crowned sparrow (*Zonotrichia leucophris*), sage thrasher (*Oreoscoptes montanus*), rock wren (*Salpinctes obsoletus*), rock pigeon (*Columba livia*), pyrrhuloxia (*Cardinalis sinuatus*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), blue-gray gnatcatcher (*Polioptila caerulea*), burrowing owl (*Athene cunicularia*), cactus wren (*Campylorhynchus brunneicapillus*), crissal thrasher (*Toxostoma crissale*), Gambel's quail (*Callipepla gambelii*), hermit thrush (*Catharus guttatus*), horned lark (*Eremophila alpestris*), killdeer (*Charadrius vociferus*), and loggerhead shrike (*Lanius ludovicianus*). Common reptile species found in the County include the chuckwalla (*Sauromalus ater*), desert horned lizard (*Phrynosoma platyrhinos*), desert night lizard (*Xantusia vigilis*), desert spiny lizard (*Sceloporus magister*), gopher snake (*Pituophis catenifer*), side-blotched lizard (*Uta stansburiana*), western diamondback (*Crotalus atrox*), and western whiptail lizard (*Aspidoscelis tigris*).

Many unique communities, particularly aquatic and dune systems, are limited in distribution within the Colorado Desert and are separated by vast expanses of arid desert terrain. Aquatic and wetland habitats are limited in extent but are critically important to wildlife. Runoff from seasonal rains and groundwater springs forms desert arroyos, desert fan palm oases, freshwater marshes, brine lakes, desert washes, ephemeral and perennial streams that provide conditions for desert riparian vegetation communities dominated by cottonwood, willow, and non-native tamarisk. Two of the region's most significant aquatic systems are the Colorado River and Salton Sea.

Some of the greatest changes to wildlife habitat in the region have resulted from the water diversions and flood control measures along the Colorado River. These measures have dramatically altered the region's hydrology by redistributing the water supply to large expanses of irrigated agriculture and metropolitan coastal areas. With the natural aquatic and wetland systems of the Colorado River dramatically altered and diminished, many wildlife species in the region have become increasingly dependent on the features of irrigated agricultural lands. With the majority of natural vegetation communities converted to agricultural uses, the Imperial Valley is now transected by a network of water delivery and drainage canals. In this context, the fields and orchards within agricultural areas, floodplain margins, and the weedy edges of fields and irrigation canals comprise the majority of wildlife habitats in the Imperial Valley.

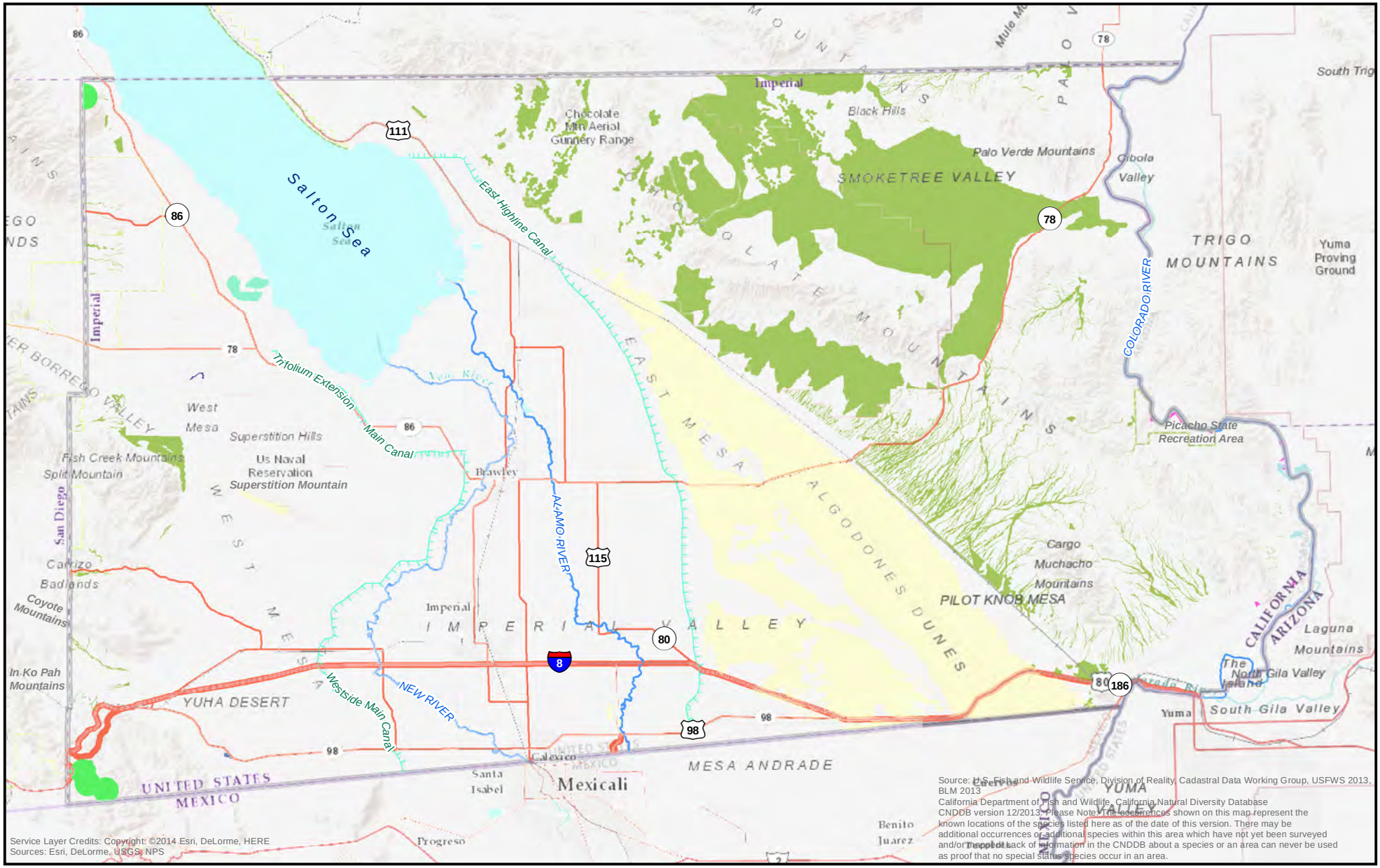
The Salton Sea is a critical component of the wildlife habitat in the County that currently sustains migratory birds of the Pacific Flyway, a major north-south route of travel for migratory birds in the Americas, extending from Alaska to Patagonia. Wetlands loss within California exceeds 90 percent of the acreage present at the time of statehood and is one of the reasons why the Salton Sea has become an important wintering and staging area for migratory birds. Populations of up to 1.5 million eared grebes (*Podiceps nigricollis*) have been documented at the sea during recent years along with up to one-half of California's wintering white-faced ibis (*Plegadis chihi*), tens of thousands of shorebirds, waterfowl, and white pelicans (*Pelecanus erythrothynchos*). Nearly 40 percent of the nesting black skimmers (*Rynchops niger*) in California are found at the sea, along with significant breeding colonies of double-crested cormorants (*Phalacrocorax auritus*), Caspian terns (*Hydroprogne caspia*), and the largest breeding population of gull-billed terns (*Gelochelidon nilotica*) in western North America.

Sensitive Habitats

Sensitive habitats are generally considered by local, State or federal agencies as those habitats that support special status species, provide important habitat values for wildlife, represent areas of unusual or regionally restricted habitat types, and/or provide high biological diversity. Habitat types considered sensitive include those listed on the California Natural Diversity Data Base (CNDDB) working list as "high priority" habitats (i.e., those habitats that are rare or endangered within California). Lead and trustee agencies may request that impacts to these communities be addressed in environmental documents. According to the CNDDB, seven sensitive habitat types comprising some 53,141 acres total are present within the County (CNDDB 2014). The locations of these sensitive habitats are shown on Figure 2.4-2, while their associated acreages are presented in Table 2.4-2.

Migratory Corridors and Linkages

Migratory corridors are linear features that connect large patches of natural open space and provide avenues for the immigration and emigration of animals. Habitat linkages are patches of native habitat that function to join larger patches of habitat. They serve as connections between habitat patches and help reduce the adverse effects of habitat fragmentation. Although individual animals may not move through a habitat linkage, the linkage does represent a potential route for gene flow and long-term dispersal. Habitat linkages may serve as both live-in habitat and avenues of gene flow for small animals such as reptiles and amphibians.



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Sources: Esri, DeLorme, USGS, NPS

Source: U.S. Fish and Wildlife Service, Division of Reality, Cadastral Data Working Group, USFWS 2013, BLM 2013
California Department of Fish and Wildlife, California Natural Diversity Database
CNDDB version 12/2013. Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

Legend

CNDDB_November2014

CNDDB Terrestrial Communities

- Active Desert Dunes
- Crucifixion Thorn Woodland
- Desert Fan Palm Oasis Woodland
- Mesquite Bosque
- Sonoran Cottonwood Willow Riparian Forest
- Stabilized and Partially Stabilized Desert Dunes
- Transmontane Alkali Marsh
- Microphyll Woodland
- Dunes/Sand

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Figure 2.4-2

Imperial County Renewable Energy and Transmission Element Update
CNDDB Sensitive Habitats

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Table 2.4-2: CNDDB Sensitive Habitats within Imperial County

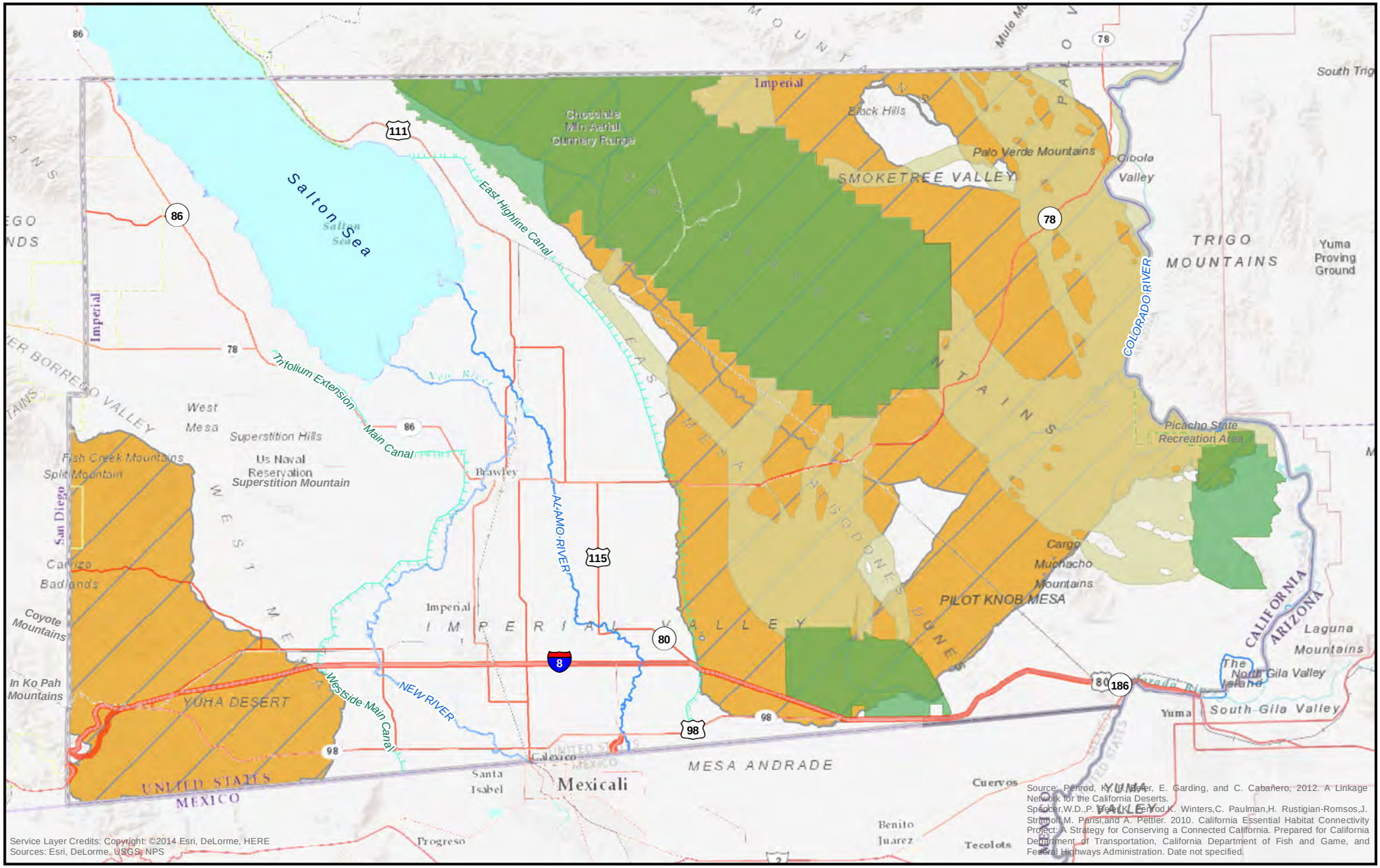
CNDDB Sensitive Habitats	Total Acreage
Crucifixion Thorn Woodland	93
Desert Fan Palm Oasis Woodland	7,110
Mesquite Bosque	42
Microphyll Woodlands	42,762
Sonoran Cottonwood Willow Riparian Forest	818
Active and Partially Stabilized Desert Dunes	2,234
Transmontane Alkali Marsh	82
Total Acreage of Sensitive Habitats	**53,141**

Several connectivity assessment efforts have been undertaken to identify areas where maintaining or restoring ecological connectivity is essential to conserving the biological diversity in the State of California. These include the California Desert Connectivity Project (CDCCP) and California Essential Habitat Connectivity Project (CEHCP), both of which are briefly described below.

The CDCCP (Penrod et al. 2012) was developed to provide a comprehensive and detailed habitat connectivity analysis for the California deserts. The CDCCP included both models for least-cost corridor habitat permeability for several focal species and identification of a Desert Linkage Network using "land facet" methods based on the approach described by Beier and Brost (2010). The land facet method is designed to identify "swaths" of habitat of fairly uniform physical conditions that will interact with uncertain climate changes to maintain habitat for species and species' movement (Penrod et al. 2012). Each identified linkage consists of a corridor for each land facet and a corridor for high diversity of land facets and should support movement of species associated with that facet (Penrod et al. 2012).

The CEHCP (Spencer et al. 2010) was developed at a coarser scale than the CDCCP. The CEHCP did not use focal species to identify areas needing connection; rather, it used indices of environmental integrity and other biological inputs to identify large "Natural Landscape Blocks" and "Essential Connectivity Areas" throughout California. These are particularly useful in identifying important areas to conserve outside of conservation priority areas not already conserved or mapped by other efforts.

As shown on Figure 2.4-3, important linkage networks identified by the CDCCP cover approximately 402,863 acres within Imperial County and include the Chocolate Mountains, East Mesa, and Picacho regions. These linkages are primarily located along the desert valleys, providing connectivity between isolated mountain ranges within the eastern portion of the County. Important linkage networks identified by the CEHCP cover approximately 1.8 million acres within the County and include the Chocolate Mountains, East Mesa, and Picacho regions in the east and Imperial Borrego Valley, West Mesa, and Yuha Desert regions in the west—providing a north-south connectivity between eastern and western Imperial County deserts (Figure 2.4-3).



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Sources: Esri, DeLorme, USGS, NPS

Source: Penrod, K., J. Meaney, E. Garding, and C. Cabañero, 2012. A Linkage Network for the California Deserts.
Spencer,W.D.,P. Beier,K. Penrod,K. Winters,C. Paulman,H. Rustigian-Romsos,J. Strittholt,M. Parisi,and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration. Date not specified.

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- CDCCP Desert Linkage Network
- Landscape Blocks
- CEHCP Essential Connectivity Areas

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Figure 2.4-3

Imperial County Renewable Energy and Transmission Element Update
Habitat Connectivity Areas
Within Imperial County

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Special Management Areas and Designated Critical Habitat

Approximately 1.1 million acres within the County of Imperial, including federally designated critical habitat, designated wilderness areas, desert wildlife management areas (DWMAs), areas of critical environmental concern (ACECs), national wildlife refuges, State parks and State wildlife management areas (WMAs), and other special areas are managed in whole or in part for the conservation and management of biological resources. BLM is the County of Imperial's largest land manager, with about 559,187 acres, or 19.5 percent of lands in the County designated as wilderness areas, DWMAs, and ACECs. Federally designated critical habitat and National Wildlife Refuge lands account for about 416,125 acres or 14.5 percent and 47,096 acres or 1.6 percent of lands in the County, respectively. State parks account for 71,645 acres or 2.5 percent of lands, while State WMAs account for 7,808 acres or less than 1 percent of lands within the County of Imperial. A list of the special management areas and designated critical habitats along with their respective acreages in the County are presented in Table 2.4-3. The location of these special management areas and designated critical habitat areas within the County are shown in Figure 2.4-4.

Table 2.4-3: Special Management Areas Including Designated Critical Habitat

Land Designation	Total Acreage
Federally Designated Critical Habitat	
desert pupfish	770
razorback sucker	2,458
desert tortoise	340,645
Peninsular bighorn sheep	50,268
Peirson's milk-vetch	21,984
Total	**416,125**
National Wildlife Refuge Lands	
Cibola National Wildlife Refuge	4,977
Imperial National Wildlife Refuge	10,332
Sonny Bono Salton Sea National Wildlife Refuge	31,787
Total	**47,096**
ACECs and DWMAs	
Chuckwalla DWMA	169,164
Coyote Mountains Fossil Site	5,875
East Mesa	42,140
Indian Pass	1,886
Lake Cahuilla - A	1,231
Lake Cahuilla - B	2,528
Lake Cahuilla - C	5,592
Lake Cahuilla - D	4,722
Pilot Knob	869
Plank Road	297
San Sebastian Marsh/San Felipe Creek	6,568

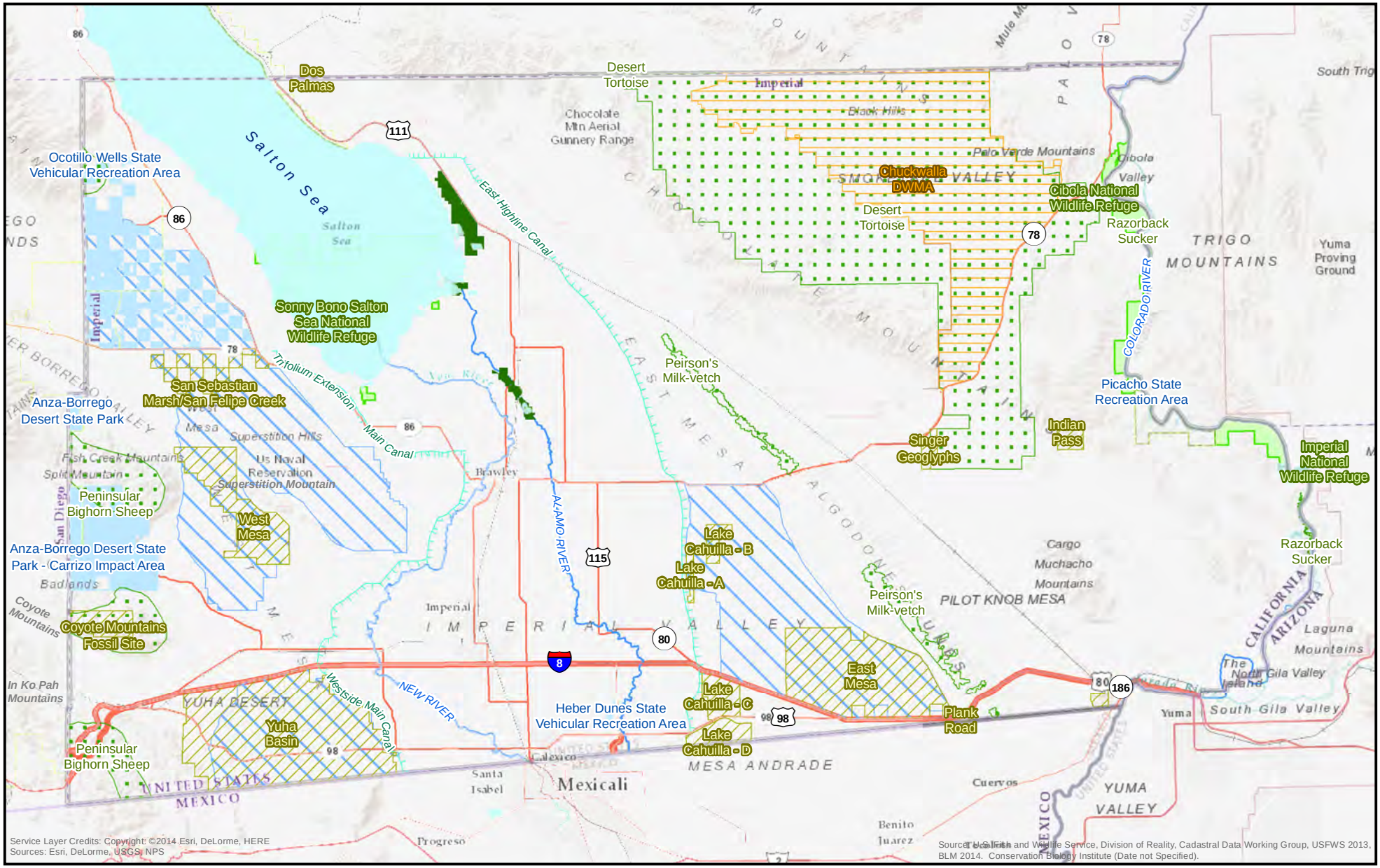
Table 2.4-3: Special Management Areas Including Designated Critical Habitat

Land Designation	Total Acreage
Singer Geoglyphs	1,884
West Mesa	20,304
Yuha Basin	71,847
Total	**334,907**
Designated Wilderness Areas	
Coyote Mountains Wilderness	18,197
Fish Creek Mountains Wilderness	22,457
Imperial Refuge Wilderness	7,903
Indian Pass Wilderness	33,909
Jacumba Wilderness	33,454
Little Chuckwalla Mountains Wilderness	2,624
Little Picacho Wilderness	39,584
North Algodones Dunes Wilderness	26,144
Palo Verde Mountains Wilderness	31,026
Picacho Peak Wilderness	8,982
Total	**224,280**
State Parks and WMAs	
Anza-Borrego Desert State Park	1,966
Anza-Borrego Desert State Park - Carrizo Impact Area	28,633
Heber Dunes State Vehicular Recreation Area	325
Ocotillo Wells State Vehicular Recreation Area	40,160
Picacho State Recreation Area	561
Imperial Wildlife Area	7,808
Total	**71,645**

Special Status Plant and Animal Species

A number of plant and animal species known to occur within Imperial County and elsewhere in California are accorded “special status” designation because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these receive specific protection defined in federal or State endangered species legislation. Others have been designated as “sensitive” on the basis of adopted policies and expertise of State resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as “special status species” in this Programmatic EIR.

Special status plant and animal species include those listed as threatened or endangered under the Federal/California Endangered Species Acts (FESA/CESA), species proposed for listing, species that are fully protected or of special concern to the California Department of Fish and Wildlife (CDFW), and other



Legend

Agency Designated Habitat

- BLM ACEC Designated Areas
- BLM DWMA Designated Areas
- U.S. Fish & Wildlife Service National Wildlife Refuge
- CDFW Wildlife Management Areas
- California State Parks
- BLM Flat-tailed Horned Lizard Reserve

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Miles

Figure 2.4-4

Imperial County Renewable Energy and Transmission Element Update
Special Management Areas Including Designated Critical Habitat

Name: 20674 Background Fig 2.4-4 Management Areas CH.Mxd
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species identified either by the U.S Fish and Wildlife Service (USFWS), California Native Plant Society (CNPS), or the California Native Plant Protection Act (NPPA) Section 1901 as unique or rare. For plants, this includes species that would meet the criteria for listing but have not yet been formally listed, such as plants included in Lists 1A, 1B, and 2 of the CNPS's Inventory (Skinner and Pavlik 1994). Plant species on CNPS Lists 3 and 4 generally do not qualify for protection under CESA and NPPA.

Special Status Plant Species

The Colorado Desert region is known for a high degree of biological diversity and includes many threatened and endangered species as well as animals known only to this part of the State. The CNDDB and CNPS together list some 57 special status plant species that occur within Imperial County, listed below in Table 2.4-4. Three of these special-status plant species are federally or state listed as threatened or endangered. CNDDB occurrence data for special-status plant species within Imperial County are shown on Figure 2.4-5.

Table 2.4-4: Special Status Plant Species with CNDDB and CNPS Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements (CDFW 2013a)
chaparral sand-verbena (*Abronia villosa* var. *aurita*)	CRPR - 1B.1, BLM-S	Found in sandy areas within chaparral and coastal scrub (80-1600 meters).
pygmy lotus (*Acmispon haydonii*)	CRPR - 1B.3	Found in rocky sites within Sonoran desert scrub and pinyon-juniper woodland (520-1200 meters).
Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*)	CRPR - 2B.2	Found in open sandy flats and sandy or stony desert washes within desert dunes (0-710 meters).
Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*)	FT, SE, DRECP	Found in slopes and hollows in mobile dunes, usually from windblown sands within desert dunes (60-225 meters).
gravel milk-vetch (*Astragalus sabulonum*)	CRPR - 2B.2	Found in sandy or gravelly flats of washes and roadsides within desert dunes, Mojavean desert scrub, and Sonoran desert scrub (60-930 meters).
California ayenia (*Ayenia compacta*)	CRPR - 2B.3	Found in sandy and gravelly washes on the desert floor and in dry desert canyons within Mojavean desert scrub and Sonoran desert scrub (150-1095 meters).
little-leaf elephant tree (*Bursera microphylla*)	CRPR - 2B.3	Found on hillsides, in washes, and canyon sides within Sonoran desert scrub (200-700 meters).
pink fairy-duster (*Calliandra eriophylla*)	CRPR - 2B.3	Found in sandy or rocky sites within Sonoran desert scrub (120-1500 meters).
saguaro (*Carnegiea gigantea*)	CRPR - 2B.2	Found in rocky sites within Sonoran desert scrub (50-1500 meters).
Emory's crucifixion-thorn (*Castela emoryi*)	CRPR - 2B.2	Found in gravelly soils and at times in playas and washes within Mojavean desert scrub, Sonoran desert scrub, and playas (85-770 meters).
Peirson's pincushion (*Chaenactis carphoclinia* var. *peirsonii*)	CRPR - 1B.3	Found in open sandy or rocky sites within Sonoran desert scrub (3-500 meters).
Abrams' spurge (*Chamaesyce abramsiana*)	CRPR - 2B.2	Found in sandy areas within Mojavean desert scrub and Sonoran desert scrub (5-915 meters).
Arizona spurge (*Chamaesyce arizonica*)	CRPR - 2B.3	Found in sandy soils within Sonoran desert scrub (50-300 meters).
flat-seeded spurge (*Chamaesyce platysperma*)	CRPR - 1B.2, BLM-S, DRECP	Found within sandy areas and shifting dunes possible in California but more common in Arizona and Mexico, within Mojavean desert scrub and desert dunes (395-730meters).
sand evening-primrose (*Chylismia arenaria*)	CRPR - 2B.2	Found in sandy or rocky areas within Sonoran desert scrub (70-915 meters).

Table 2.4-4: Special Status Plant Species with CNDDB and CNPS Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements (CDFW 2013a)
Las Animas colubrine (*Colubrina californica*)	CRPR - 2B.3	Found on narrow, steep, rocky ravines or washes within Mojavean desert scrub (10-1000 meters).
Wiggins' croton (*Croton wigginsii*)	RARE, CRPR- 2B.2, BLM-S, DRECP	Found on sand dunes and sandy arroyos within desert dunes and Sonoran desert scrub (50-100 meters).
Munz's cholla (*Cylindropuntia munzii*)	CRPR - 1B.3, BLM-S, DRECP	Found in sandy and rocky desert flats and hills within Sonoran desert scrub (15-600 meters).
Arizona cottontop (*Digitaria californica var. californica*)	CRPR - 2B.3	Found on rocky hillsides within Sonoran desert scrub and Mojavean desert scrub (290-1490 meters).
glandular ditaxis (*Ditaxis claryana*)	FE, SE, CRPR- 2B.2	Found in dry washes and rocky hillsides with sandy soils within Mojavean and Sonoran desert scrub (0-465 meters).
San Diego button-celery (*Eryngium aristulatum var. parishii*)	CRPR - 1B.1	Found in hardpan and claypan vernal pools within coastal scrub and valley and foothill grasslands.
annual rock-nettle (*Eucnide rupestris*)	CRPR - 2B.2	Found within Sonoran desert scrub (500-600 meters).
sticky geraea (*Geraea viscida*)	CRPR - 2B.3	Found in coarse sand to gravelly sand soils, often in post-burn areas, within chaparral (450-1700 meters).
Algodones Dunes sunflower (*Helianthus niveus ssp. Tephrodes*)	SE, CRPR -1B.2, BLM-S, DRECP	Found in partialized stabilized desert dunes (50-100 meters).
curly herissantia (*Herissantia crispa*)	CRPR - 2B.3	Found within Sonoran desert scrub (700-725 meters).
Mexican hulsea (*Hulsea mexicana*)	CRPR - 2B.3	Found in volcanic soils or burns and disturbed sites within chaparral (665-1200meters).
bitter hymenoxys (*Hymenoxys odorata*)	CRPR - 2B.1	Found in sandy sites within riparian scrub and Sonoran desert scrub (45-150 meters).
California satintail (*Imperata brevifolia*)	CRPR - 2B.1	Found in mesic sites, alkali seeps, and riparian areas within coastal scrub, riparian scrub, Mojavean scrub, and meadows and seeps (0-500 meters).
Baja California ipomopsis (*Ipomopsis effusa*)	CRPR - 2B.1	Found in alluvial washes within Sonoran desert chaparral (0-100 meters).
slender-leaved ipomopsis (*Ipomopsis tenuifolia*)	CRPR - 2B.3	Found on rocky or gravelly slopes within chaparral, pinyon- juniper woodland, and Sonoran desert scrub (100-1200 meters).

Table 2.4-4: Special Status Plant Species with CNDDB and CNPS Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements (CDFW 2013a)
slender-spined all-thorn (*Koeberlinia spinosa* ssp. *Tenuispina*)	CRPR - 2B.2	Found in sandy washes within Sonoran desert scrub and riparian woodland (145-510 meters).
Little San Bernardino Mtns. Linanthus (*Linanthus maculatus*)	CRPR - 1B.2, BLM-S, DRECP	Found in sandy areas (usually light quartz sand) in washes and bajadas within desert dunes, Mojavean desert scrub, and Joshua Tree woodland (195-2075 meters).
Mountain Springs bush lupine (*Lupinus excubitus* var. *medius*)	CRPR - 1B.3, BLM-S	Found in dry, sandy, or gently sloping canyon washes and flats in steeper slopes and drainages within pinyon-juniper woodland and Sonoran desert scrub (425-1370 meters).
Parish's desert-thorn (*Lycium parishii*)	CRPR - 2B.3	Found within coastal scrub and Sonoran desert scrub (300-1000 meters).
brown turbans (*Malperia tenuis*)	CRPR - 2B.3	Found in sandy areas and rocky slopes within Sonoran desert scrub (15-335 meters).
spear-leaf matelea (*Matelea parvifolia*)	CRPR - 2B.3	Found on dry, rocky ledges and slopes within Mojavean and Sonoran desert scrub (440-1095 meters).
hairy stickleaf (*Mentzelia hirsutissima*)	CRPR - 2B.3	Found in washes, fans, slopes, and rocky areas within Sonoran desert scrub (5-800 meters).
Darlington's blazing star (*Mentzelia puberula*)	CRPR - 2B.2	Found in sandy crevices in cliffs or rocky slopes within Mojavean desert scrub (90-1280 meters).
spiny-hair blazing star (*Mentzelia tricuspis*)	CRPR - 2B.1	Found in sandy or gravelly slopes or washes within Mojavean desert scrub (150-1280 meters).
mud nama (*Nama stenocarpum*)	CRPR - 2B.2	Found on lake shores, river banks, and in intermittently wet areas within marshes and swamps (5-500 meters).
slender cottonheads (*Nemacaulis denudata* var. *gracilis*)	CRPR - 2B.2	Found in dunes or sand within coastal dunes, desert dunes, and Sonoran desert scrub (0-560 meters).
Wiggins' cholla (*Opuntia wigginsii*)	CRPR - 3.3	Found in sandy soils within Sonoran desert scrub (30-885 meters).
giant Spanish-needle (*Palafoxia arida* var. *gigantea*)	CRPR - 1B.3, BLM-S	Found in active and stable sand dunes within desert dunes (15-100 meters).
roughstalk witch grass (*Panicum hirticaule* ssp. *Hirticaule*)	CRPR - 2B.1	Found in desert dunes, Joshua tree woodland, Mojavean and Sonoran desert scrub (45-1315 meters).

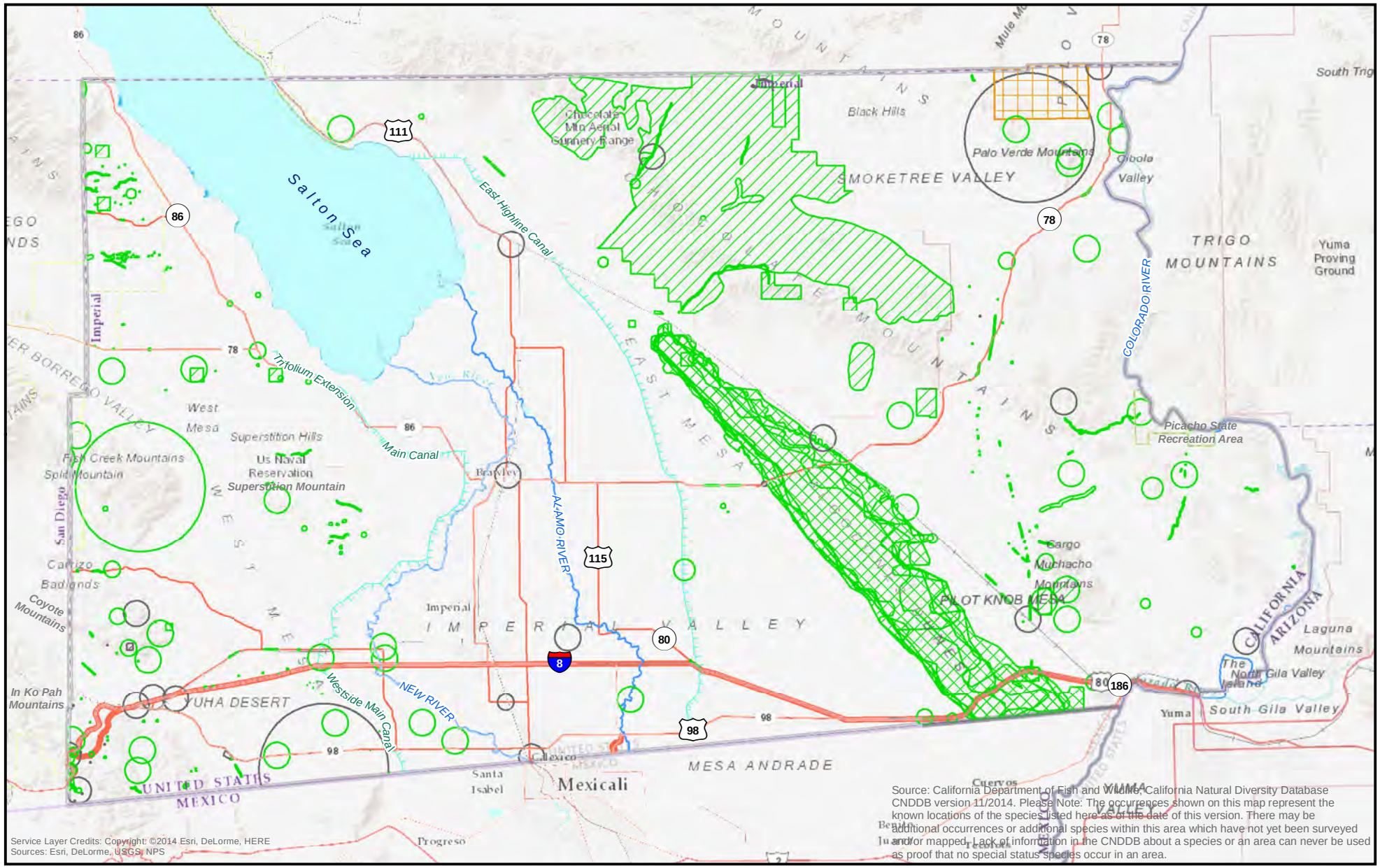
Table 2.4-4: Special Status Plant Species with CNDDB and CNPS Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements (CDFW 2013a)
desert beardtongue (*Penstemon pseudospectabilis* ssp*., Pseudospectabilis*)	CRPR - 2B.2	Found in sandy washes and sometimes rocky slopes within Mojavean and Sonoran desert scrub (80-1935 meters).
sand food (*Pholisma sonorae*)	CRPR - 1B.2, BLM-S, DRECP	Found in loose and deep sand dunes on the more stable and windward faces of slopes within desert dunes (0-200 meters).
Arizona pholistoma (*Pholistoma auritum* var. *arizonicum*)	CRPR - 2B.3	Found at one site in California within Mojavean desert scrub with *Larrea, Acacia, Hyptis*, and *Cercidium* (300-700 meters).
Thurber's pilostyles (*Pilostyles thurberi*)	CRPR - 4.3	A parasite on *Psorothamnus emoryi* and found in alluvial plains and sandstone talus within Sonoran desert scrub.
Deep Canyon snapdragon (*Pseudorontium cyathiferum*)	CRPR - 2B.3	Found in Sonoran desert scrub (0-80 meters).
Orocopia sage (*Salvia greatae*)	CRPR - 1B.3, BLM-S, DRECP	Found in broad alluvial bajadas and fans adjacent to washes in gravelly or rocky slopes of canyons within Mojavean and Sonoran desert scrub (-40-825 meters).
desert spike-moss (*Selaginella eremophila*)	CRPR - 2B.2	Found in shady areas with gravelly soils in crevices or rocky areas within Sonoran desert scrub and chaparral (200-900 meters).
Cove's cassia (*Senna covesii*)	CRPR - 2B.2	Found in dry, sandy desert washes within Sonoran desert scrub (305-1070 meters).
southern jewel-flower (*Streptanthus campestris*)	CRPR - 1B.3	Found in open rocky areas within chaparral, lower montane coniferous forest, and pinyon-juniper woodland (600-2790 meters).
San Bernardino aster (*Symphyotrichum defoliatum*)	CRPR - 1B.2, BLM-S	Found in mesic grassland or near ditches, in streams and disturbed areas within meadows and springs seeps, marshes and swamps, coastal scrub, cismontane woodland, lower montane coniferous forest, and grassland (2-2040 meters).
dwarf germander (*Teucrium cubense* ssp. *depressum*)	CRPR - 2B.2	Found in dunes and playa margins and scrub within desert dunes, playas, and Sonoran desert scrub (45-400 meters).
Orcutt's woody-aster (*Xylorhiza orcuttii*)	CRPR - 1B.2, BLM-S	Found in arid canyons, often in washes, within Sonoran desert scrub (265-365 meters).

Table 2.4-4: Special Status Plant Species with CNDDB and CNPS Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements (CDFW 2013a)

* Status Codes
FE = Federally Listed Endangered
FT = Federally Listed Threatened
FC = Federal Candidate
FD = Federally Delisted
SE = State Listed Endangered
ST = State Listed Threatened
CRPR = California Rare Plant Rank
BLM-S = BLM Sensitive
DRECP = Species considered "Adequately Conserved" by DRECP.



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, DeLorme, USGS, NPS

Source: California Department of Fish and Wildlife, California Natural Diversity Database CNDDB version 11/2014. Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

Legend

CNDDB Documented Species Occurrence

- Plant (80m) - 100s
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Multiple (80m) - 800s
- Multiple (specific)
- Multiple (non-specific)
- Multiple (circular)
- 900s Sensitive EO's (Commercial only)

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Figure 2.4-5

Imperial County Renewable Energy and Transmission Element Update
CNDDB and CNPS Special-Status Plant Species Occurrences within Imperial County

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Special-Status Animal Species

Of the 481 vertebrate species that inhabit the Colorado Desert region, the CNDDB lists some 82 special status animal species that occur within Imperial County, listed below in Table 2.4-5. These include 39 species of birds, 22 species of mammals, 11 species of reptiles, 4 species of fish, and 6 invertebrate species. Twenty-one of the 82 special status animal species within Imperial County are federally or state listed as threatened, endangered, or fully protected. CNDDB occurrence data for special status animal species within Imperial County are shown on Figure 2.4-6.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
Invertebrates		
Carlson's dune beetle (*Anomala carlsoni*)	None	Occurs on north- or east-facing slip faces. Inhabits creosote bush scrub, psammophytic scrub, and microphyll woodland habitats.
Hardy's dune beetle (*Anomala hardyorum*)	None	Occurs on north- or east-facing slip faces and troughs of loose, drifting sand between the dune crests. Inhabits creosote bush scrub, psammophytic scrub, and microphyll woodland habitats.
Algodones sand jewel beetle (*Lepismadora algodones*)	None	Found along the eastern edge of the Imperial Sand Dunes in the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodland habitats.
California mellitid bee (*Melitta californica*)	None	No data available for this species.
cheeseweed owlfly (*Oliarces clara*)	None	Populations occur on or near bajadas. Larvae are associated with creosote-bush roots, upon which they likely feed. Adults typically aggregate at local high topographic features to mate.
Andrews' dune beetle (*Psuedocotalapa andrewsi*)	BLM-S	Found along the eastern edge of the Imperial Sand Dunes in the transitional zone between creosote bush scrub, psammophytic scrub, and microphyll woodland habitats.
Fish		
desert pupfish (*Cyprinodon macularius*)	FE, SE, DRECP	Inhabits salt and fresh water ponds, springs, marshes and streams of southern California deserts with up to 68 PPT of salt, in temperatures ranging from 9-45 Celsius, and dissolved oxygen levels down to 0.
bonytail (*Gila elegans*)	FE, SE	Found in the Colorado River bordering California. Requires gravel riffles for spawning. Adapted for swimming in swift water but young and adults hang out in backwater and eddies.
Colorado pikeminnow (*Ptychocheilus lucius*)	FE, SE	Found in the Colorado River bordering California. Adults are typically found in the main channel while smaller fish are found in shallow, quiet waters.
razorback sucker (Xyrauchen texanus)	FE, SE	Found in the Colorado River bordering California. Spawn in areas with sand/gravel/rock in shallow water. Adapted to swift moving water but need quiet waters as well.
Reptiles and Amphibians		
barefoot gecko (*Coleonyx switaki*)	ST, BLM-S, DRECP	Found only in areas of massive rock and rock outcrops at the heads of canyons within cracks and crevices.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
red-diamond rattlesnake (*Crotalus ruber*)	SSC	Found in rocky, dense areas with rodent burrows, cracks or surface cover objects within chaparral, woodland, grassland, and desert areas.
desert tortoise (*Gopherus agassizii*)	FT, ST, DRECP	Requires friable soil for burrow and nest construction. Occurs within desert habitats and mostly within creosote scrub with wildflower blooms, desert washes, and Joshua tree habitats.
banded Gila monster (*Heloderma suspectum cinctum*)	SSC, BLM-S	Inhabits lower slopes of rocky canyons and arroyos and desert flats among succulents and scrubs. Requires sandy or friable soils for egg laying. Occurs in areas moister than the surroundings.
Sonoran Desert toad (*Incilius alvarius*)	SSC	Breeds in temporary pools and irrigation ditches along the Colorado River and southern Imperial County.
Sonoran mud turtle (*Kinosternon sonoriense*)	None	Inhabits springs, creeks, ponds, the water holes of intermittent streams of oak and piñon-juniper woodlands, foothills, grasslands, and deserts.
northern leopard frog (*Lithobates pipiens*)	SSC	Requires near permanent or semi-permanent water source with shoreline cover and submerged and emergent aquatic vegetation.
lowland leopard frog (*Lithobates yavapaiensis*)	SSC, BLM-S	Found along the Colorado River and in streams near the Salton Sea.
flat-tailed horned lizard (*Phrynosoma mcallii*)	SSC, BLM-S, DRECP	Requires fine sand and vegetation cover for burrowing to avoid temperature extremes. Restricted to desert washes and desert flats.
Couch's spadefoot (*Scaphiopus couchii*)	SSC, BLM-S	Inhabits temporary desert rain pools that last at least 7 days, with water temperatures greater than 15 Celsius, subterranean refuge sites close by, and an insect food base, especially termites.
Colorado Desert fringe-toed lizard (*Uma notata*)	SSC, BLM-S	Requires fine, loose, windblown sand for burrowing. Found in sand dunes, dry lakebeds, sandy beaches and riverbeds, and sparse desert scrub in the Colorado desert region.
Birds		
Cooper's hawk (*Accipiter cooperii*)	WL	Inhabits open or marginal woodland habitats, with nest sites mainly in riparian growths of deciduous trees in canyon bottoms or river flood-plains but also in live oaks.
golden eagle (*Aquila chrysaetos*)	BCC, FP, BLM-S, DRECP	Inhabits rolling foothills and mountains areas, sage-juniper flats and deserts with nest sites including cliff-walled canyons and large trees in open areas.
great egret (*Ardea alba*)	None	Inhabits marshes, tide flats, irrigated pastures, and margins of rivers and lakes.
great blue heron (*Ardea herodias*)	None	Inhabits marshes, lake margins, tide-flats, rivers, streams, and wet meadows.
short-eared owl (*Asio flammeus*)	SSC	Inhabits fresh and saltwater swamp lands, lowland meadows and irrigated alfalfa fields. Requires tule patches or tall grass for nest building and nests on the ground in depressions concealed by vegetation.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
burrowing owl (*Athene cunicularia*)	BCC, SSC, BLM-S, DRECP	Inhabits open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. Depends on burrowing mammals, mainly California ground squirrel, for nest sites.
ferruginous hawk (*Buteo regalis*)	BCC, WL	Inhabits open grasslands, sagebrush flats, desert scrub, low foothills, and fringes of open pinyon-juniper habitats with Lagomorphs, squirrels, and mice for a food source.
western snowy plover (*Charadrius alexandrinus nivosus*)	FT, BCC, SSC	Inhabits sandy beaches, salt pond levees, and shores of large alkali lakes with sandy, gravelly, or friable soils for nesting.
mountain plover (*Charadrius montanus*)	BCC, SSC, BLM-S, DRECP	Inhabits areas with short vegetation, bare ground, and flat topography including: short grasslands, freshly plowed fields, newly sprouting grain fields, and sod farms with burrowing rodents.
western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FT, BCC, SE, BLM-S, DRECP	Nests in riparian forests along the broad, lower flood-bottoms of larger river systems with willow and cottonwoods.
gilded flicker (*Colaptes chrysoides*)	BCC, SE, BLM-S, DRECP	Inhabits Sonoran desert habitat and riparian woodlands along the Colorado River. Nests in willows, cottonwood, tree yucca, and saguaro cactus.
yellow warbler (*Dendroicha petechia brewsteri*)	BCC, SSC	Inhabits riparian areas with willows, cottonwoods, aspens, sycamores, and alders for nesting. Also nests in montane shrubbery in open coniferous forests.
Sonoran yellow warbler (*Dendroicha petechia sonorana*)	BCC, SSC	Inhabits desert areas, especially scrub habitats with friable soils for digging. Feeds almost exclusively on arthropods, especially scorpions and Orthopteran insects.
southwestern willow flycatcher (*Empidonax traillii extimus*)	FE, SE, DRECP	Inhabits riparian woodlands within southern California.
merlin (*Falco columbarius*)	WL	Inhabits seacoast, tidal estuaries, woodlands, savannahs, edges of grasslands and deserts, farms and ranches with clumps of trees or wind breaks required for roosting.
prairie falcon (*Falco mexicanus*)	BCC, WL	Inhabits dry, open terrain, either level or hilly. Nests on cliffs and forages far afield.
gull-billed tern (*Gelochelidon nilotica*)	BCC, SSC	Occurs in Riverside and Imperial counties, nests on sandy islets and known to feed on fish at the mouth of the Colorado River and on grasshoppers in alfalfa fields.
bald eagle (*Haliaeetus leucocephalus*)	FD, BCC, SE, FP, DRECP	Nests mostly within 1 mile of water in large, old-growth, or dominant live trees with open branches, especially ponderosa pine. Roosts communally along ocean shores, lake margins, and rivers for both nesting and wintering.
Caspian tern (*Hydroprogne caspia*)	BCC	Inhabits freshwater lakes and marshes and brackish or salt waters of estuaries and bays. Nests on sandy or gravelly beaches and shell banks in small colonies inland and along the coast.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
yellow-breasted chat (*Icteria virens*)	SSC	Summer resident that inhabits riparian thickets of willows and other brushy tangles near water courses. Nests in low, dense riparian areas consisting of willow, blackberry, wild grape. Forages within 10 feet of the ground.
least bittern (*Ixobrychus exilis*)	BCC, SSC	Colonial nester inhabiting marshlands and borders of ponds and reservoirs that provide ample cover. Nests usually placed in tules over water.
loggerhead shrike (*Lanius ludovicianus*)	BCC, SSC	Inhabits broken woodlands, savannah, pinyon-juniper, Joshua tree, riparian woodlands, desert oasis, scrub, and washes within open country with perches for hunting and scanning. Nests in fairly dense shrubs.
California gull (*Larus californicus*)	WL	Inhabits littoral waters, sandy beaches, waters, and shorelines of bays, tidal mud-flats, marshes, lakes, etc. Nests in colonies on islets in large interior lakes, fresh or alkaline.
California black rail (*Laterallus jamaicensis coturniculus*)	BCC, ST, FP, BLM-S, DRECP	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat
Gila woodpecker (*Gila woodpecker*)	BCC, SE, BLM-S, DRECP	In California, inhabits cottonwoods and other desert riparian trees, shade trees, and date palms. Cavity nester in riparian trees or saguaro cactus.
elf owl (*Micrathene whitneyi*)	SE, BCC, BLM-S, DRECP	In California, nesting area limited to cottonwood-willow and mesquite riparian zone along the Colorado River. Nests in deserted woodpecker holes, often in larger trees which offer insulation from high daytime temperatures.
brown-crested flycatcher (*Myiarchus tyrannulus*)	WL	Inhabits desert riparian areas along Colorado River. Requires riparian thickets, trees, snags, and shrubs for foraging perches, nesting cavities, and cover.
Lucy's warbler (*Oreothlypis luciae*)	BCC, SSC, BLM-S	Partial to thickets of mesquite, riparian scrub, and even stands of tamarisk within the Lower Colorado River valley and the washes and arroyos emptying into it.
California brown pelican (*Pelecanus occidentalis californicus*)	FD, SD, FP, BLM-S	Colonial nester just outside the surf line of coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators.
summer tanager (*Piranga rubra*)	SSC	Summer resident requiring cottonwood-willow riparian along lower Colorado River, and locally elsewhere in California deserts. Prefers older, dense stands along streams.
white-faced ibis (*Plegadis chihi*)	WL	Occurs in dense tule thickets for nesting interspersed with areas of shallow water for foraging. Shallow fresh-water marsh.
black-tailed gnatcatcher (*Polioptila melanura*)	SSC	Inhabits mixed desert scrub, creosote scrub, mesquite scrub, dry washes, and desert ravines.
vermilion flycatcher (*Pyrocephalus rubinus*)	SSC	Nests in cottonwood, willow, mesquite, and other large desert riparian trees. During nesting, inhabits desert riparian adjacent to irrigated fields, irrigation ditches, pastures, and other open, mesic areas.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
Yuma clapper rail (*Rallus longirostris yumanensis*)	FE, ST, FP, DRECP	Prefers stands of cattails and tules dissected by narrow channels of flowing water; principle food is crayfish. Nests in freshwater marshes along the Colorado River and along the south and east ends of the Salton Sea.
black skimmer (*Rynchops niger*)	BCC, SSC	Nests on gravel bars, low islets, and sandy beaches in unvegetated sites. Nesting colonies usually include less than 200 pairs.
crissal thrasher (*Toxostoma crissale*)	SSC	Nests in dense vegetation along streams/washes; mesquite, screwbean mesquite, ironwood, catclaw acacia, arrowweed, and within deserts in desert riparian and desert wash habitats.
Le Conte's thrasher (*Toxostoma lecontei*)	BCC, SSC	Commonly nests in a dense, spiny shrubs or densely branched cactus in desert wash habitat, usually 2 to 8 feet above ground. Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats.
Arizona Bell's vireo (*Vireo bellii arizonae*)	BCC, SE, BLM-S, DRECP	Nests in willow, mesquite, or other small tree/shrub, within 8 feet (usually 2 to 3 feet) of ground. Summer resident along Colorado River. Chiefly inhabits willow thickets with undergrowth of *Baccharis glutinosa*.
least Bell's vireo (*Vireo bellii pusillus*)	FE, SE, DRECP	Nests placed along margins of bushes or on twigs projecting into mesquite pathways, usually willow, Baccharis and mesquite. Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 feet.
Mammals		
pallid bat (*Antrozous pallidus*)	SSC, BLM-S, DRECP	Inhabit deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.
pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*)	SSC	Inhabits desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Within sandy herbaceous areas, usually in association with rocks or coarse gravel.
Townsend's big-eared bat (*Corynorhinus townsendii*)	SC, SSC, BLM-S, DRECP	Roosts in the open, hanging from walls and ceilings. Roosting sites limited. Extremely sensitive to human disturbance. Occurs in a variety of habitats throughout California. Most common in mesic sites.
western mastiff bat (*Eumops perotis californicus*)	SSC, BLM-S, DRECP	Inhabits many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.
hoary bat (*Lasiurus cinereus*)	None	Inhabits foothills, deserts, mountains, lowlands, and coastal valleys. Needs dense foliage in sites that are hidden from above with few branches below, near water for roosting.
western yellow bat (*Lasiurus xanthinus*)	SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.
California leaf-nosed bat (*Macrotus californicus*)	SSC, BLM-S, DRECP	Inhabits desert riparian, desert wash, desert scrub, desert succulent scrub, alkali scrub, and palm oasis habitats. Needs rocky, rugged terrain with mines or caves for roosting.

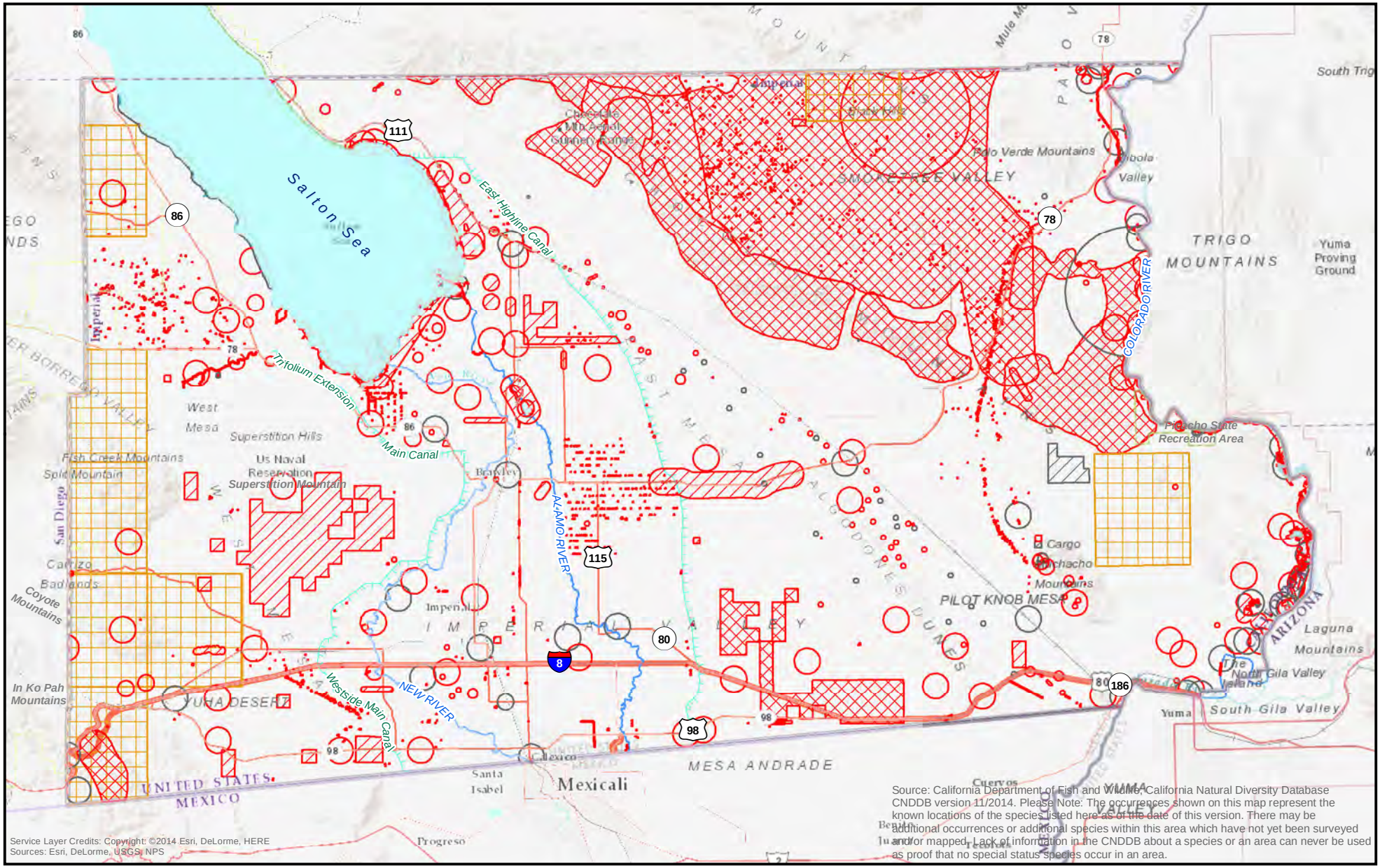
Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
western small-footed myotis (*Myotis ciliolabrum*)	BLM-S	Prefers open stands in forests and woodlands. Requires drinking water. Feeds on a wide variety of small flying insects. Wide range of habitats, mostly arid wooded and brushy uplands near water. Seeks cover in caves, buildings, mines, and crevices.
Arizona myotis (*Myotis occultus*)	SSC	Found in lowlands of the Colorado River and adjacent desert mountain ranges. Needs roosting areas in tree hollows, rock crevices, under bridges, etc.
cave myotis (*Myotis velifer*)	SSC, BLM-S	Found in lowlands of the Colorado River and adjacent mountain ranges. Requires caves or mines for roosting.
Yuma myotis (*Myotis yumanensis*)	BLM-S	Optimal habitats are open forests and woodlands. Closely associated with sources of water over which it feeds. Maternity colonies occur in caves, mines, buildings, or crevices.
Colorado Valley woodrat (*Neotoma albigula venusta*)	None	Inhabits low-lying areas with patches of beaver-tail cacti (*Opuntia* spp.) and mesquite.
pocketed free-tailed bat (*Nyctinomops femorosaccus*)	SSC	Found in lowlands of the Colorado River and adjacent mountain ranges within a variety of arid areas in southern California including; pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian. Requires caves or mines for roosting.
big free-tailed bat (*Nyctinomops macrotis*)	SSC	Occurs in low-lying arid areas in southern California. Requires high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.
southern grasshopper mouse (*Onychomys torridus ramona*)	SSC	Inhabits desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover. Feeds almost exclusively on arthropods, especially scorpions and Orthopteran insects.
desert bighorn sheep (*Ovis canadensis nelsoni*)	FP, BLM-S, DRECP	Widely distributed from the White Mountains in Mono County to the Chocolate Mountains in Imperial County within open, rocky, steep areas with available water and herbaceous forage.
Peninsular bighorn sheep DPS (*Ovis canadensis nelson*)	FE, ST, FP, DRECP	Optimal habitat includes steep-walled canyons and ridges bisected by rocky or sandy washes, with available water. Eastern slopes of the peninsular ranges below 4,600 feet elevation. This DPS of the subspecies inhabits the peninsular range.
Palm Springs pocket mouse (*Perognathus longimembris bangsi*)	SSC, BLM-S	Occurs in all canopy coverage classes within desert riparian, desert scrub, desert wash, and sagebrush habitats. Most common in creosote-dominated desert scrub. Rarely found on rocky sites.
Yuma mountain lion (*Puma concolor browni*)	SSC	Lives in dense bottomland vegetation, also found in adjacent, rocky uplands. Low elevations in the Colorado River valley of California.
Colorado River cotton rat (*Sigmodon arizonae plenus*)	SSC	Inhabits isolated sections of alluvial bottom along the Colorado River in areas supporting sedges, rushes, and other marsh plants. Colorado River floodplain from the Nevada border to about bard. Distribution is spotty.
Yuma hispid cotton rat (*Sigmodon hispidus eremicus*)	SSC	Inhabits wetlands and uplands with dense grass and herbaceous plants. Makes runways through vegetation. Nests on surface and in burrows along the Colorado River and in grass and agricultural areas near irrigation waters.

Table 2.4-5: Special Status Animal Species with CNDDB Occurrences within Imperial County

Species Common Name (*Scientific Name*)	Species Status*	Species Habitat Requirements
American badger (*Taxidea taxus*)	SSC	Needs sufficient food, friable soils, and open, uncultivated ground. Preys on burrowing rodents. Digs burrows; most abundant in drier open stages of most shrub, forest, and herbaceous habitats with friable soils.

* Status Codes
CDFW WL = Watch List
FE = Federally Listed Endangered
FT = Federally Listed Threatened
FP = Federally Protected
FC = Federal Candidate
FD = Federally Delisted
BCC = Federal Birds of Conservation Concern
SE = State Listed Endangered
ST = State Listed Threatened
SSC = State Species of Special Concern
WL = State Watch List
BLM-S = BLM Sensitive
DRECP = Species considered "Adequately Conserved" by DRECP
None = Listed in CNDDB but has no formal listing status.



Legend

CNDDB Documented Species Occurrence

- Animal (80m) - 200s
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Multiple (80m) - 800s
- Multiple (specific)
- Multiple (non-specific)
- Multiple (circular)
- 900s Sensitive EO's (Commercial only)

N

0 5 10 20

Miles

Figure 2.4-6

Imperial County Renewable Energy and Transmission Element Update
CNDDB Special-Status Animal Species Occurrences within Imperial County

Name: 20674 Background Fig 2.4-6 Sensitive Wildlife.Mxd
Date Saved: 1/6/2015, Author: msimmons

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2.4.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Constraints due to regulatory requirements include actions that would result in adverse or detrimental affects to species requiring protection under federal, State, or local law including; federal or State listed as endangered, threatened, or otherwise sensitive plant or wildlife species and their habitat.

Constraints Due to Existing Conditions

Constraints due to existing conditions are defined in this document as areas of high biological resource importance and are based on existing conditions. These areas include sensitive habitats and agency designated or protected areas shown on Figure 2.4-4. Conclusions reached in this analysis are consistent with those reached in the DRECP (2014), Renewable Energy Transmission Initiative (RETI) Phase 2B (RETI 2010), and Solar PEIS (EERE et al. 2012).

Other areas of constraint include the following.

- Water associated habitats directly adjacent to the Salton Sea and Colorado, Alamo, and New rivers, as these habitats are rare and provide habitat for sensitive and listed species

- Agricultural ditches and canals, as they contain wetlands, riparian habitat, and wildlife corridors and attract insects which provide food for migratory birds, burrowing owls, and a number of bat species

These areas would not necessarily be excluded from the development of renewable energy projects but would be subject to the agency regulations and requirements for permitting and approval. Projects with a federal nexus would require preparation of a NEPA document and public involvement, preparation of restoration plans, and specific mitigation that would contribute to schedule and cost constraints.

Opportunities

Areas of opportunity are areas within the County that would have lower impacts to biological resources when compared to surrounding areas or where impacts may occur due to the conservation of similar habitat nearby. Areas of opportunity include areas outside sensitive and agency designated habitats shown on Figure 2.4-4. Although these areas of opportunity are areas considered less sensitive compared to the above-mentioned sensitive and designated habitats, the areas may contain sensitive habitats and/or listed species may be present; and appropriate surveys and permitting may still need to take place for any given development.

2.5 CULTURAL RESOURCES

2.5.1 Introduction

This section discusses the existing cultural and archaeological resource areas in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.5.2 Terminology

The following is a summary of cultural and archaeological resource terminology discussed in this section.

- **Archaeological Resource** – The material remains of an area's prehistoric (aboriginal/Native American) or historical (European or Euro-American) human activity.

- **Historic Resource** – A resource included in a local register of historical resources or identified as significant in an historical resource survey. (California Public Resources Code §5024.1, Title 14 C.C.R., Section 4852).

- **Geologic Time** – The period of time extending from the formation of the earth to the present day.

- **Paleontological Resource** – The fossil evidence of past life on earth, such as fossilized remains of vertebrate and invertebrate organisms, fossil tracks and track ways, and plant fossils.

- **Paleontology** – The study of organic life forms through geologic time.

2.5.3 Regulatory Settings

The following is a list of laws, policies, and plans relevant to cultural and paleontological resources.

Federal

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966, as amended, as required by the Advisory Council on Historic Preservation (ACHP), and with regulations contained in 36 Code of Federal Regulations (C.F.R.) Part 800, requires that federal agencies consider the effects of proposed projects on historic properties as part of the environmental assessment process.

Section 106 of the NHPA defines "historic properties" as:

> Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian

> organization and that meet the National Register criteria (36 C.F.R. Part 800 Protection of Historic Properties, Section 800.16 Definitions [l] [1]).

According to 36 C.F.R. 60.4, a resource may be considered *historically significant* if it retains integrity and meets at least one of the following criteria. A property may be eligible for the NRHP if the resource:

A. is associated with events that have made a significant contribution to the broad patterns of our history; or

B. is associated with the lives of persons significant in our past; or

C. embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

D. has yielded, or may be likely to yield, information important in prehistory or history.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) established a means for Native Americans, including Indian Tribes, to request the return of human remains and other sensitive cultural items held by federal agencies or federally assisted museums or institutions. NAGPRA also contains provisions regarding the intentional excavation and removal of, inadvertent discovery of, and illegal trafficking in Native American human remains and sensitive cultural items.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act (AIRFA) established federal policy for protecting and preserving the inherent right of individual Native Americans to believe, express, and exercise their traditional religions including, but not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

Religious Freedom Restoration Act

The Religious Freedom Restoration Act (RFRA) is a 1993 U.S. federal law aimed at preventing laws that substantially burden a person's free exercise of their religion.

Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. for Indian Tribes or Indian individuals. The Secretary of the Interior, acting as the trustee, holds many assets in trust. Examples of objects that may be trust assets are lands, minerals, hunting and fishing rights, and water rights. While most ITAs are on reservations, they also may be found off reservations. The U.S. has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian Tribes or Indian individuals by treaties, statutes, and Executive Orders (EOs). These sources of trust responsibility are sometimes further interpreted through court decisions and regulations. Management of ITAs is based on, but not limited to, the following EOs and memorandums:

Executive Order 13175

EO 13175, Consultation and Coordination with Indian Tribal Governments, 63 F.R. 96 (November 6, 2000). EO 13175 was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications. When implementing such policies, agencies shall consult with tribal officials as to the need for federal standards and any alternatives that limit their scope or otherwise preserve the prerogatives and authority of Indian tribes.

Executive order 13007

EO 13007 requires federal agencies to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions to: (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and (2) avoid adversely affecting the physical integrity of such sacred sites. It also requires agencies to develop procedures for reasonable notification of proposed actions or land management policies that may restrict access to or ceremonial use of, or adversely affect, sacred sites. Sacred sites are defined in the executive order as "any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." It should be noted that a sacred site may not meet the NRHP criteria for a historic property and, conversely, a historic property may not meet the criteria for a sacred site.

Government-to-Government Relations

Government-to-Government Relations with Native American Tribal Governments is a memorandum signed by President Clinton on April 29, 1994. The Memorandum directs federal agencies to consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments. Federal agencies must assess the impact of federal government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during such development.

Omnibus Public Land Management Act Paleontological Resources Preservation of 2009

The Public Land Management Act Paleontological Resources Preservation (OPLMA-PRP) calls on the Secretary of the Interior to provide protection for vertebrate paleontological resources on federal lands by limiting the collection of vertebrate fossils and scientifically important fossils to permitted and qualified researchers.

State

California Environmental Quality Act

CEQA requires that local agencies consider potential significant environmental impacts to cultural resources as a result of proposed projects. Significant resources are those that are listed in or considered eligible for listing in the California Register of Historical Resources (CRHR). Nevertheless, a resource or property not listed on the CRHR does not exclude it from being a significant resource and does not make it exempt from CEQA evaluation. Specific to Imperial County, this includes historic districts and prehistoric and historic archaeological sites within the County. The County and consultant

team will prepare a Programmatic EIR pursuant to CEQA Guidelines, Section 15168. Completion of the Programmatic EIR would allow future individual renewable energy projects to "tier" off this environmental document. Future renewable energy projects would be implemented on a "project-by-project" basis based on County approval of individual renewable energy projects. Future renewable energy projects would need to be reviewed in the context of this Programmatic EIR to determine if additional environmental documentation would be required.

The California Register of Historic Resources (Public Resources Code, Section 5020 et seq.)

Properties expected to be directly or indirectly affected by a proposed project must be evaluated for CRHR eligibility. The purpose of the CRHR is to maintain listings of the State's historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from material impairment and substantial adverse change.

The term "historical resources" includes a resource listed in, or determined to be eligible for listing in, the CRHR; a resource included in a local register of historical resources; and any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (C.C.R. Section 15064.5[a]). The criteria for listing properties in the CRHR were expressly developed in accordance with previously established criteria developed for listing in the NRHP.

The California Office of Historic Preservation (OHP 1995:2) regards "…any physical evidence of human activities over 45 years old…" as meriting recordation and evaluation. According to Public Resources Code (P.R.C.) Section 5024.1(c) (1–4), a resource may be considered historically significant if it retains integrity and meets at least one of the following criteria. A property may be listed in the CRHR if the resource:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with the lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of installation, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

California Public Resources Code, Sections 21083.2 and 21084.1

Under CEQA, if an archaeological site is not a historical resource but meets the definition of a "unique archeological resource" as defined in P.R.C. Section 21083.2, then it should be treated in accordance with the provisions of that section. A unique archaeological resource is defined as follows:

An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Resources that neither meet any of these criteria for listing in the CRHR nor qualify as a "unique archaeological resource" under CEQA P.R.C. Section 21083.2 are viewed as not significant. Under CEQA, "…A non-unique archaeological resource need be given no further consideration, other than the simple recording of its existence by the lead agency if it so elects…" (P.R.C. Section 21083.2[h]).

Impacts that adversely alter the significance of a resource listed in or eligible for listing in the CRHR are considered a significant effect on the environment. Impacts to historical resources from a proposed project are thus considered significant if the project: (1) physically destroys or damages all or part of a resource; (2) changes the character of the use of the resource or physical feature within the setting of the resource which contributes to its significance; or (3) introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

Senate Bill 18

Senate Bill (SB) 18, which went into effect on January 1, 2005, requires local governments to consult with Native American tribes prior to making certain planning decisions and to provide notice to tribes at certain key points in the planning process. The purpose of involving tribes at these early planning stages is to allow consideration of cultural places in the context of broad local land use policy before individual site-specific, project-level land use decisions are made by a local government. The consultation requirements of SB 18 apply to general plan or specific plan processes proposed on or after March 1, 2005. This regulation is of particular importance to the *Renewable Energy and Transmission Element* update, since several tribes live within Imperial County.

California Health and Safety Code, Sections 7050.5, 8062, 7052, and 7054

This collection of State of California Health and Safety Codes (HSC) addresses the unanticipated discovery of human remains. The code states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to P.R.C. Section 5097.98.

California Public Resources Code, Section 5097.98 and Section 15064.5(e)

Under these code sections, the County Coroner must be notified of an unanticipated discovery of human remains immediately. If the human remains are determined to be prehistoric, the County Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307-4309

These code sections prohibit the removal and destruction of geological features and any object of archaeological or historical interest or value. Section 4309 provides that the Department of Parks and

Recreation may grant a permit to remove, treat, disturb, or destroy plants or animals or geological, historical, archaeological, or paleontological materials.

2.5.4 Existing Environmental Setting

Cultural Setting

Prehistoric

The prehistoric background of the Colorado Desert, including Imperial County, consists of three major periods: the San Dieguito (10,000 to 1200 B.C.), the Gypsum/Amargosa (1200 B.C. to A.D. 1200), and the Protohistoric/Shoshonean (A.D. 1200 to European Contact). Although some would argue the presence of an earlier Malpais period (prior to 10,000 B.C.), dating methods of artifacts associated with these sites remain subjective and have been commented on by numerous critics (Taylor and Payen 1979; McGuire and Schiffer 1982; Taylor 1991; Schaefer 1994). Recent redating analysis of the Yuha Man and other previously believed "early man" inhumations have resulted in more reliable dates that fall within the San Dieguito period (Schaefer 1994: 62). Evidence of a Malpais period in the Colorado Desert is, therefore, still subjective.

The San Dieguito Period

The San Dieguito complex, first defined by Malcolm J. Rogers (1966), has been identified at prehistoric sites throughout California as well as sites in the Great Basin, Mojave Desert, western Arizona, and the Colorado Desert (Rogers 1966; Warren and True 1961; Laylander 2005). The period is characterized by three distinct horizons (San Dieguito I, II, and III) with differences represented through typological changes in tool production and technology. Presence of one or more of these horizons at a site is determined by the presence of heavily patinated scrapers and cores as well as "sleeping circle" features. Extensive presence of occupation within the Colorado Desert during the San Dieguito period is limited, likely the combined result of highly mobile early settlement patterns as well as the instability of landforms in the Salton Basin and Colorado River Valley (Schaefer and Laylander 2007: 247).The San Dieguito period is considered to overlap and/or coincide with several other prominent cultural identities including the Playa culture, Lake Mohave Complex, Western Pluvial Lakes tradition, and the Western Lithic co-tradition (Laylander 2005). Toward the end of the San Dieguito period, cultures were affected by environmental conditions, including fluctuating temperatures and levels of precipitation.

The Gypsum/Armargosa Period

The Gypsum/Amargosa Period is distinctively different from prior periods in that it is recognizably widespread with a diversity of projectile types and tools, as well as clear indications of external influences from the Southwest. The artifactual assemblage is diverse at single sites and denotes localized variants ranging across three horizons: Gypsum/Amargosa I, II, and III. Although archaeological evidence of the Gypsum/Amargosa I and II horizons is not substantial, sites indicating highly mobile groups used to logistical foraging are known in Riverside and San Diego counties (Schaefer and Laylander 2007; Love and Dahdul 2002). The Gypsum/Amargosa III horizon is characterized by the introduction of the bow and arrow (replacing the *atlatl*) as well as increased influence of Southwestern cultural traditions and technology (Schroeder 1951, 1961; Wallace 1962; Bettinger and Taylor 1975).

Several important sites belonging to the Gypsum/Amargosa III horizon are known in the area surrounding the shorelines of ancient Lake Cahuilla within the Salton Basin. One such site, the Salton Sea

Naval Test Base along the western edge of the man-made Salton Sea, contained a cluster of early projectile point types including Lake Mojave, Pinto, and Elko forms (Schaefer and Laylander 2007). Although chronology of Lake Cahuilla's intermittent rises and falls is still debated, archaeological assemblages surrounding the ancient shoreline are important indicators of settlement patterns during this period. Few studies have been conducted around the southern shores of Lake Cahuilla (Schaefer and Laylander 2007: 250-251). Also closely associated with ancient Lake Cahuilla is Obsidian Butte, which acted as a prominent obsidian procurement site for peoples of the Colorado Desert.

The Protohistoric/Shoshonean Period

The period between A.D. 1200 and European contact, commonly referred to as the Protohistoric/Shoshonean period, was a continuation of the prehistoric Gypsum/Amargosa II period, with similar subsistence and settlement patterns. Common within the artifact assemblage are flaked stone tools, basketry, groundstone, Desert Side-notched and Cottonwood Triangular projectile points, and wooden items (Carrico et al. 1982: 8-12). Basketry is common among cultural deposits for this period, although evidence from within the Great Basin area indicates basket weaving was practiced in California at least 5,000 years ago (Elsasser 1978: 634). Shell beads and knife blades can also be found commonly among artifact assemblages from this period.

The final recession of ancient Lake Cahuilla (ca. 1640) prompted migratory shifts of prehistoric populations within the Colorado Desert, with some groups moving westward into the Anza-Borrego region as well as north into San Bernardino and Riverside counties. Formation of distinct regional ethnic groups also is believed to have occurred during this period.

Ethnographic

The following Tribal Groups described below are historically known to have inhabited the Imperial County area at the point of European contact.

Cahuilla

The Cahuilla people are known to have occupied a territory of south-central California, geographically spread between the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, east to the Colorado Desert, and west into the San Jacinto Plain near Riverside and the Palomar Mountains (Bean 1978). Numerous pre-European contact trade routes existed through the Cahuilla territory, with trade contact extending as far west as Santa Catalina and east as far as the Gila River.

Cahuilla subgroups are typically defined by the topographical settings in which they lived: Pass, Mountain, and Desert. Although linguistic variations between the subgroups are known, all belong within the Cupan division of the Takic family (Bean 1978; Mithun 2006). Permanent settlements of the Cahuilla were typically situated in canyons or on alluvial fans where sustenance and water was consistently adequate. They relied heavily on faunal and floral resources for sustenance; temporary camp or settlement sites were used for seasonal hunting and gathering activities dependent on climate and weather conditions. Cahuilla political organization was complex, with organization into two non-territorial and nonpolitical patrimoieties. Patrimoieties were further subdivided into political-ritual-corporate units or clans comprised of several villages. Leadership positions among clans were usually inherited through patrilineal succession.

While the Cahuilla likely came into contact with Europeans during explorations of the late sixteenth and seventeenth centuries, few interactions between the groups were recorded until the establishment of the Mission System between 1774 and 1819 (Bean 1978). Several *asistencias* were established within the Cahuilla territory beginning in 1819. Since the introduction of the reservation system within the territory circa 1865, the Cahuilla people have typically lived within the reservation systems established within Riverside County. Programs have been developed to encourage the continuation of the Cahuilla cultural identity, including community language and skill classes as well as ethnographic centers such as the Malki Museum on the Morongo Reservation (Bean 1978; Morongo Band of Mission Indians 2013).

Tipai

Tipai, previously called Diegueño or Kamia, territory roughly extended from the Pacific Coast at San Diego eastward to the Sand Hills of Imperial County as well as south into modern-day Mexico (Luomala 1978). Although the Tipai traded primarily among themselves and with the closely linked Ipai to the north, extensive trade routes through their territory expanded their interaction between other coastal groups and as far inland as New Mexico (Pritzker 2000).

The Tipai language is still designated as Diegueño and is part of the Yuman-Cochimi family. The Quechan and Ipai languages to the east and north, respectively, share close ties with that of the Tipai (Mithun 2006; Luomala 1978). Political organization was divided into 30 autonomous, seminomadic bands. Leaders were selected through patrilineal succession (Luomala 1978; Pritzker 2000). Villages were predominantly seasonal, consisting of campsites rather than permanent settlements. A Tipai member of the Jacumba-Campo region once estimated that his large clan occupied over 19 settlements during the 1850s (Luomala 1978:597). Winter villages were typically found within sheltered foothills and valleys. Subsistence of the Tipai consisted primarily of seasonal vegetal foods with opportunistic hunting practiced during gathering. Clans within the Imperial Valley also practiced some farming of maize, beans, and tobacco (Pritzker 2000).

Contact between Tipai and Europeans was, as with the Cahuilla, not largely recorded until the implementation of the Mission System. The Tipai were historically part of the native populations rounded up and brought to the mission. In 1775, a Tipai-Ipai revolt resulted in the destruction of Mission San Diego de Alcalá. The mission was later rebuilt, and conversion practices continued. The Tipai were continually treated poorly through the Mexican and American periods, though many of the small reservations founded towards the end of the nineteenth century remained within the area of traditional villages (Pritzker 2000).

Quechan

The Quechan, also known as the Yuma, continue to occupy their traditional territory at the confluence of the Gila and Colorado rivers at the edge of the California, Arizona, and Mexican borders; from here their territory stretched north along the Colorado River and to the east of the Gila River (Bee 1978). Trade interactions prior to European contact are not well known; however, warfare was emphasized within the Quechan traditional myths and histories. The Cocopah and Maricopa were major enemies of the Quechan, while the group frequently allied themselves with the Mohave. The number of war parties may have increased post contact due to economic reasons (Bee 1978).

The Quechan are linguistic members of the Yuman-Cochimi language family (Mithun 2006; Bee 1978). People living within the territory were geographically divided into a series of settlements or *rancherías* north and south of the confluence of the Colorado and Gila rivers. *Rancherías* were comprised of

extended family groups with populations ranging into the hundreds. A 1774 Spanish observation counted over 800 inhabitants of the largest, *Ranchería xuksíl* (Bee 1978:88). Subsistence primarily consisted of cultivated plants rather than gathered resources, which allowed for larger populations. Quechans were able to plant their fields multiple times throughout a year with crops including teparies, maize, watermelons, black-eyed beans, pumpkins, muskmelons, and winter wheat. The Quechan recognized several patrilineal clan groups; however, a clan name was born only by females. Tribal structure, rather than *ranchería* or clan structure, played a crucial role during war expeditions against neighboring tribes. Post contact sources noted two separate leadership positions among the Quechan: the first for civil affairs, the second for war (Bee 1978: 92).

Although the Quechans were not listed in the accounts of the de Alcarón expedition of 1540, their position at the confluence of the two rivers made relationships between the Quechan and Europeans of crucial importance. Documentation of Quechan traditions and life began in the late seventeenth century, and Spanish relations with the group remained positive until 1780 and 1781 when a small contingency of priests, soldiers, and farming families established the settlements of Mission San Pedro y San Pablo de Bicuñer and Mission Puerto de Purísima Concepción within the territory. Both settlements were short-lived, razed by Quechans (Bee 1978; Brian F. Mooney Associates 1993; OHP 2013). Continued attempts at settlements were made during the Mexican and American periods, with only Fort Yuma (established 1852) remaining. The Quechan reservation was established in 1884, while disputes over allotments continued until 1912. A school was created within the reservation at the old Fort Yuma around the same time. The Quechan continue to occupy the reservation to this day (Inter-Tribal Council of Arizona, Inc. 2013).

Historic

Within the last 250 years, patterns of land use in southern California have fallen under three major periods. These periods are used to describe the land use activities associated with the time period: the Spanish period (1769 to 1821), the Mexican period (1821 to 1848), and the American period (1848 to present).

The Spanish Period

The first Europeans arrived in Imperial County with the Hernando de Alcarón Expedition of 1540; however, the Spanish did not begin to colonize what was then known as Alta California until 1769. Several exploratory land routes were established through the County. The first was led by Pedro Fages (1772) while chasing deserters of the Spanish army. A second was led by Juan Bautista de Anza (1774-75) and was so well received, a second Anza expedition followed (1775). Spanish settlements were largely restricted to the West Mesa, now known as the Yuha Desert. Inhospitable sand dunes of the East Mesa discouraged early exploration and colonization of the eastern portions of the County. Included in the early settlement sites of the Spanish period are the Mission Puerto de Purísima Concepción (1780) and Mission San Pedro y San Pablo de Bicuñer (1781) along the Anza Trail. Both missions were destroyed in 1781 conflicts between the Spanish and Quechan Native Americans (OHP 2013; Brian F. Mooney Associates 1993).

The Mexican Period

Efforts were made during the Mexican Period to reestablish an overland route from Sonora to the California coast. Following several expeditions, the Sonora Road was founded in 1825, following portions of the Anza Trail through the County before turning westward through the Carrizo Corridor and

branching toward both San Diego and Temecula. The Mexican government established a small adobe post, Fort Romualdo Pacheco, along this route in 1825. The fort was abandoned the next year following an attack by the Kumeyaay (OHP 2013).

The Sonora Road would not gain in popularity until the late 1830s when the southwestern portion of the route shifted north of the U.S.-Mexico border. In 1846, U.S. General Stephen W. Kearny led his troops across the Yuha Desert and through the Carrizo Corridor during the Mexican-American War (1846-1848). Several weeks following Kearny's march, a portion of the Mormon Battalion was led by Colonel Phillip St. George Cooke from Iowa to San Diego with the plan to establish a wagon route to California (Brian F. Mooney Associates 1993).

The American Period

The signing of the Treaty of Guadalupe Hidalgo in 1848 and the U.S. acquisition of California was immediately marked by the establishment of the Southern Emigrant Trail, which largely followed the old Sonora Road (Lech 2012; Brian F. Mooney Associates 1993). This route was extensively used by settlers and miners eager to move to California as well as the military. A mail route following the Southern Emigrant Trail from Yuma was established in 1848; the Butterfield Overland Mail (1858-1861) would also make use of the route. Camp Salvation, established near present-day Calexico, was one of many stops along the Southern Emigrant Trail to provide water to travelers along the trail (OHP 2013). The Southern Emigrant Route was used as the primary overland route into this region of California until the establishment of the Smith-Groom Country Road in 1865. Until the twentieth century, few people permanently settled within Imperial County.

Irrigation measures, vital to the development of the County during this period, were first made by the California Development Corporation using water from the Colorado River, which was then diverted to the Alamo River via the Alamo Canal. Irrigation from the Alamo Canal Project soon prompted a large population boom in the area; the townsites of Imperial, Brawley, Calexico, Heber, and Silsbee were constructed by irrigation projects to entice settlers to become permanent residents. In 1904, heavy silting greatly reduced the amount of water reaching the Imperial Valley farmers. Under stress, the California Development Company attempted to create a breach at the banks of the Colorado River; however, this action caused uncontrolled flooding of the Salton Sink through 1905 and resulted in the creation of the Salton Sea. Flooding to the region was not completely halted until 1907 (Brian F. Mooney Associates 1993; Sperry 1975).

Railroad lines, including a branch of the Southern Pacific Railroad extending through the Imperial Valley to Calexico (1903), were constructed throughout portions of the County. The introduction of automobiles also prompted the development of new and better roads. One such road included Plank Road, a 7-mile-long, movable road built over the sand dunes between Imperial Valley and Yuma in 1914. Portions of the road were added and improved on through the 1920s and 1930s (OHP 2013; Brian F. Mooney Associates 1993).

Existing Prehistoric, Ethnographic, and Historic Sites

Prehistoric Archaeological Sites

The previous studies conducted within the planning area identified sites including villages, rock shelters, habitation sites, lithic scatters, and milling stations. Isolated artifacts not associated with the larger sites have also been identified within Imperial County. Previously identified archaeological sites can be used

as a general guideline to understanding the nature of localized prehistoric inhabitation and provide assistance in determining areas of known sensitivity for prehistoric archaeological resources.

The site definitions provided in Table 2.5-1 provide general guidelines for understanding the nature of prehistoric sites in the region. In addition, the identification of known areas of sensitivity does not preclude the possibility of locating additional prehistoric sites in other portions of the County.

Table 2.5-1: Types of Previously Identified Prehistoric Archaeological Sites within Imperial County

Site Type	Site Definitions
Villages	Villages are sites typically located along watercourses that exhibit a level of sustained residency with resources suitable for sustaining long-term or seasonal habitation. Associated artifact assemblages may include (but are not limited to) bedrock outcrops, lithic artifacts, groundstone, shell, animal bone, fire-affected rock, ceramics, pictographs and petroglyphs, house rings, and evidence of funerary practices.
Rock Shelters	Rock shelters are typically located in higher elevations in areas that sustain habitable rock overhangs that can support brief habitation episodes or be utilized for ceremonial purposes. Associated artifacts can include (but are not limited to) pictographs and petroglyphs, fire-affected rock, lithic artifacts, midden soil, animal bone, bedrock milling features, ceramics.
Seasonal Habitation Sites	Temporary camps or transition areas, usually located near watercourses, were used to exploit an immediate or seasonal resource. Associated artifact assemblages may include (but are not limited to) ground stone, lithic debitage, and bedrock milling features. Near the ancient Lake Cahuilla shoreline, this site type may also include stone fish traps.
Lithic Scatters	Flaking stations may indicate possible opportunistic quarrying activities or tool reduction stations. Clusters can be identified in isolation or in association with other site types and are not restricted in geographic location.
Bedrock Milling Features	Grinding stations are typically located along watercourses near exposed bedrock outcrops (typically granite or granodiorite) with suitable resources in the area for processing.
Geoglyphs	Geoglyphs are large designs or motifs most often created by moving rocks or earth to create an image on the ground. This type of site is well known in the Yuha Desert area of Imperial County. Geoglyphs may be more easily identified through the use of aerial imagery, but they can also be identified on the ground.
Isolates	Isolated artifacts were not included in the study group.

Ethnographic Sites

Ethnographic studies previously prepared within Imperial County suggest the concept of sacred geography has always been important to the desert cultures of this region. From the earliest times, native peoples have attributed special significance to geographic features, which play important roles in religious and cultural practices. Many of these features are remembered in songs passed down through oral tradition, serving as “maps” of mythological traditions, as well as economic sites such as quarry sites, etc. Examples of these types of sites include:

- Ceremonial Site: A prehistoric or historic area of sacred character. Physical evidence of ceremonial activities are usually present in the form of dance patterns, vision quest circles, intaglios, rock cairns, etc.

- Sacred Area: A prehistoric or historic area of sacred character. Evidence of physical activities is not always present. Certain mountaintops, power places, and vision quest locations are examples of sacred areas.

- Traditional Use Area: An area of traditional use for hunting, gathering (of food or medicinal plants), fishing, or traveling.

Historic Archaeological Sites

Identified historical archaeological sites represent a range of activities including (but not limited to) mining, transportation, and ranching/homesteading and are represented throughout the County. The number of previously identified historical archaeological sites is smaller than prehistoric sites, making determination of areas of known or established sensitivity difficult. It is possible, however, to make informed deductions about the types of resources likely to be encountered based on the previously identified sites in combination with the documented history of the area.

The site definitions provided in Table 2.5-2 provide general guidelines for understanding the nature of historic sites in the region. In addition, the identification of known areas of sensitivity does not preclude the possibility of locating additional historic sites in other portions of the County.

Table 2.5-2: Types of Previously Identified Historic Archaeological Sites within Imperial County

Site Type	Site Definitions
Towns	Towns are sites that exhibit a built environment which may indicate a permanent population with established economic and social structures. Associated structures may include (but are not limited to) buildings used for residential, trade, government, or religious purposes.
Military Sites	Military sites include permanent settlements, temporary camps, or extensive training areas that exhibit a military presence in the region. Associated artifact assemblages may include (but are not limited to) military issued debris and refuse or landscape modified by use of military equipment such as tanks.
Mining	Mining related sites are representative of extractive operations focused on the acquisition of mineral materials. Such sites may include (but are not limited to) individual shafts and prospecting pits with associated tailings or mining complexes with extraction and processing elements. Mining complexes may also be considered as small towns.
Ranches/Homesteads	Ranch/homestead sites consist of a variety of material that may indicate rural habitation and land use patterns. This material may include (but is not limited to) building foundations, fence lines, rock walls, orchards and agricultural fields, landscaping elements, or outbuildings.
Religious Sites	Religious sites are closely linked with the Spanish and Mexican periods of California. Such sites may include (but are not limited to) intact or razed missions and chapel outposts. This site type may also be linked with military or ranching sites.

Table 2.5-2: Types of Previously Identified Historic Archaeological Sites within Imperial County

Site Type	Site Definitions
Refuse Scatters	Historic refuse deposits may indicate land use patterns such as settlement and travel. Scatters can be identified in isolation or in association with other site types. Associated artifact assemblages most commonly include (but are not limited to) cans, glass bottles, ceramics, or household items and debris.
Transportation Routes	Transportation routes (trails, roads, and rail lines) are often linked to significant historic events or are shown to have impacted trade and settlement patterns. Many of these routes can be identified through historic records; however, they may also be indicated by stone markers and lines, tracks left by wheels, railroad ties and debris, or refuse.
Isolates	Isolated finds are not included in the study group.

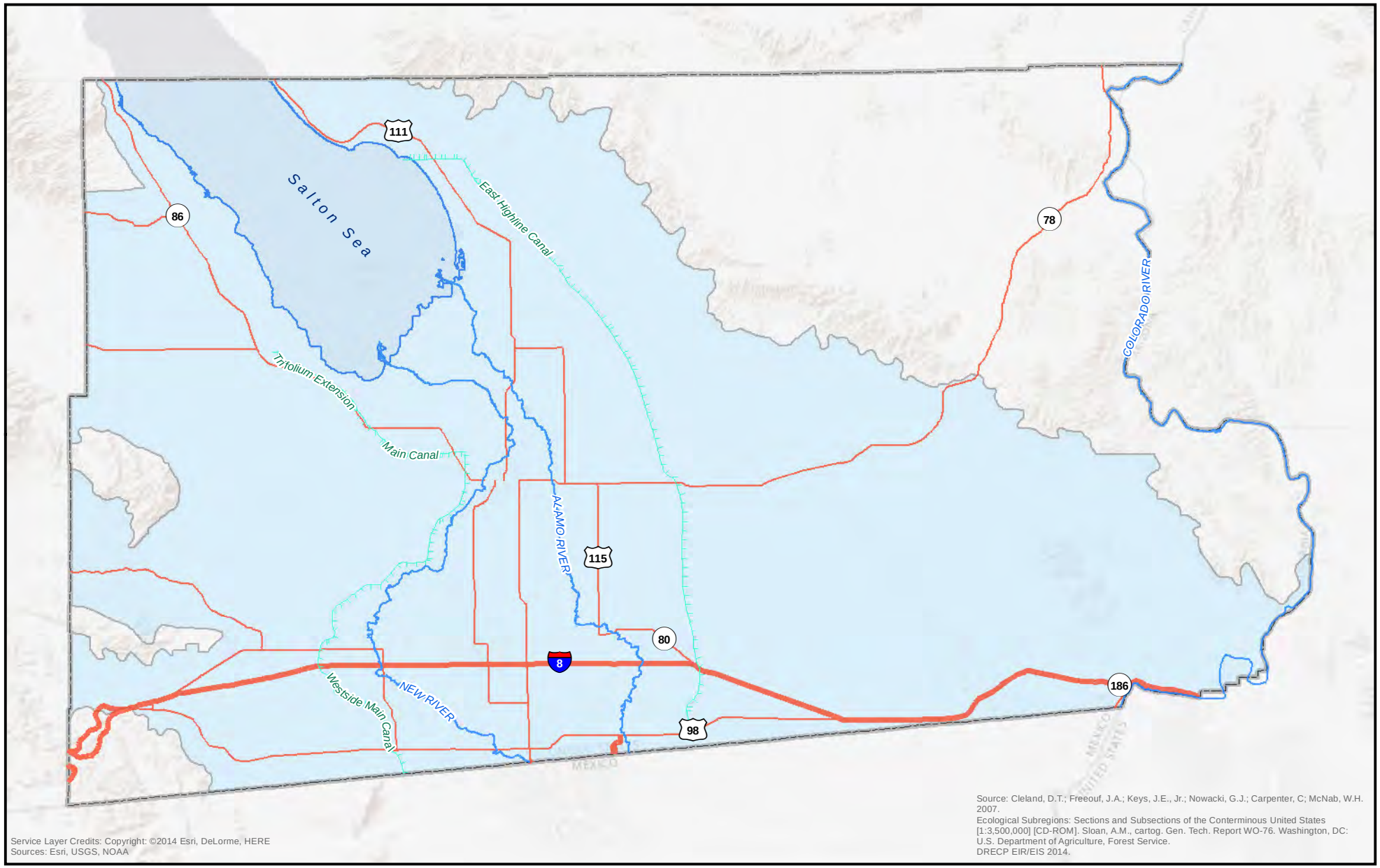
Documented Cultural Resources

Existing cultural resources within Imperial County were documented in the Draft EIR/EIS prepared for the DRECP. These previously recorded resources were documented based on information obtained from the California Desert Conservation Area (CDCA) Plan, the BLM Cultural Resources Geodatabase, and the results of additional surveys unrelated to these data sources. It should be noted that the cultural resources data presented in the Draft EIR/EIS does not correspond entirely to the jurisdictional boundaries of Imperial County. The Draft EIR/EIS presents data for a land area described as the Imperial Borrego Ecoregion Subarea, which excludes the northeastern portion of Imperial County and small pieces of the westernmost regions of the County (Figure 2.5-1). Additionally, the Imperial Borrego Ecoregion Subarea includes some portions of San Diego County located just west of Imperial County; however, the geographic boundaries of the Imperial Borrego Ecoregion Subarea include the entire area covered by the DRECP preferred alternative and, therefore, include all known cultural resources that could be impacted by the *Renewable Energy and Transmission Element* update. The results of the cultural resources inventory for the Imperial Borrego Ecoregion Subarea by cultural resource site type and eligibility status are presented in Table 2.5-3, while a list of NRHP, California Landmarks, CRHR, and Points of Interest are presented in Table 2.5-4.

Paleontological Setting

Paleontological resources comprise fossil evidence used to study forms of life existing in prehistoric or geologic times. They are most often found in subterranean rock formations that millions of years ago sat at the earth's surface but have since been covered by newer layers of rock, sand, and soil. Paleontological resources are closely related to an area's geological history.

The vast majority of the central section of Imperial Valley, which lies within Imperial County, is underlain by Quaternary lake deposits associated with ancient Lake Cahuilla. Lakebed deposits of ancient Lake Cahuilla have yielded fossil remains from numerous localities in Imperial Valley. These include extensive freshwater shell beds, fish, seeds, pollen, diatoms, foraminifera, sponges, and wood. Lake Cahuilla deposits have also yielded vertebrate fossils, including teeth and bones of birds, horses, bighorn sheep, and reptiles (County 2011). Paleontological surveys conducted for the Ocotillo Wind Energy Facility in the southwestern portion of Imperial County documented 36 fossil localities. This survey documented paleontological resources including three scientifically significant vertebrate fossils consisting of turtle, camelid, and unidentified mammal bones (County 2012b).



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Source: Cleland, D.T.; Freeouf, J.A.; Keys, J.E., Jr.; Nowacki, G.J.; Carpenter, C; McNab, W.H. 2007.
Ecological Subregions: Sections and Subsections of the Conterminous United States [1:3,500,000] [CD-ROM]. Sloan, A.M., cartog. Gen. Tech. Report WO-76. Washington, DC: U.S. Department of Agriculture, Forest Service.
DRECP EIR/EIS 2014.

Legend

Imperial Borrego Valley Ecoregion Subarea

N

0 5 10 20
Miles

Figure 2.5-1
Imperial County Renewable Energy and Transmission Element Update
Imperial Borrego Valley Ecoregion Subarea

Name: 20674 Background Fig 2.5-1 Cultural Survey Areas.Mxd
Date Saved: 1/6/2015, Author: msimmons

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Table 2.5-3: Cultural Resource By Site Type and NRHP Status

	Prehistoric	Historic	Multi-Component	Unknown Type	Isolate	Total	Acres Surveyed	Percent Surveyed
Unknown Status	474	128	64	5,254	0	5,920		
Not Evaluated	2	2	0	0	0	4		
Ineligible	0	0	0	0	13	13		
Eligible	243	30	23	13	0	309		
Listed	0	0	0	0	0	0		
Subtotal	**719**	**159**	**87**	**5,199**	**13**	**6,246**	**446,272**	**18.5%**

Table 2.5-4: NRHP, California Landmarks, CRHR, and Points of Interest

Name	National Register	California Historical Landmark	California Register	POHI
Calexico Carnegie Library	1		1	
Camp Pilot Knob (Desert Training Center)		1	1	
Camp Salvation		1	1	
Crucifixion Thorn				1
Fort Yuma		1	1	
Hernando de Alarcón expedition		1		
Hotel Barbara Worth Site				1
Mission La Purísima Concepción Site		1		
Picacho Mines		1		1
Plank Road		1	1	
Site of Fort Romualdo Pacheco		1	1	
Site of Mission San Pedro y San Pablo de Bicuñer		1	1	
Southwest Lake Cahuilla Recessional Shoreline Archaeological District	1		1	
Spoke Wheel Rock Alignment	1		1	
Stonehead (L-7)	1		1	
Tecolote Rancho Site		1	1	
Townsite of Silsbee and Indian Well				1
Tumco Mines		1		
20th Century Folk Art Environments-Charley's World of Lost Art			1	
U.S. Inspection Station - Calexico				1
U.S. Post Office - El Centro Main				1
Winterhaven Anthropomorph (L-8)	1		1	
Winterhaven Anthropomorph and Bowknow (L-9)	1		1	
Yuha Basin Discontiguous District	1		1	
Yuha Well		1	1	
Imperial County Totals	7	12	16	6

Knowledge of the geological formations and records of previous fossils recovered from localities within Imperial County are the basis for determining the paleontological sensitivity of projects. Current professional practice utilizes three categories recommended by the Society of Vertebrate Paleontology, which are presented in Table 2.5-5 (SVP 2010).

Table 2.5-5: Sensitivity Categories

Category	Definition
High sensitivity or potential	Areas underlain by rock units from which significant fossils have been recovered.
Undetermined sensitivity or potential	Areas underlain by rock units for which little information or presence or absence of fossils is available.
Low sensitivity or potential	Areas underlain by deposits which are known not to produce fossils include plutonic, intrusive, and highly metamorphosed rocks.

Additionally, BLM has developed the Potential Fossil Yield Classification (PFYC) system based on the potential for the occurrence of significant paleontological resources in a geologic unit and the associated risk for impacts to the resource based on federal management actions. The PFYC system classifies geologic units by five classes ranging between Class 1 (very low) to Class 5 (very high) based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. A higher class number indicates a higher potential for occurrence of paleontological resources. BLM also uses the PFYC system to set management policies and does not intend it to be applied to specific paleontological localities or small areas within geologic units (DRECP EIR/EIS 2014). The BLM PFYC classifications and recommended management actions are presented below in Table 2.5-6.

Table 2.5-6: BLM Potential Fossil Yield Classification System Class Definitions

Class	Definition
Class 1 (very low)	Geologic units not likely to contain recognizable fossil remains. Management concern is negligible or not applicable; and assessment or mitigation requirements are usually not necessary, with the exception of isolated circumstances.
Class 2 (low)	Sedimentary geologic units not likely to contain vertebrate fossils or significant nonvertebrate fossils. Management concern is generally low; and assessment of mitigation is usually not necessary, with the exception of isolated circumstances.
Class 3 (moderate or unknown)	Fossil-bearing sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or units of unknown fossil potential. Management concern is moderate or cannot be determined from existing data. Ground-disturbing activities may require field assessment to determine the appropriate course of action.
Class 3a (moderate potential)	Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low but somewhat higher for common fossils.

Table 2.5-6: BLM Potential Fossil Yield Classification System Class Definitions

Class	Definition
Class 3b (unknown potential)	Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this class may eventually be placed in another class when sufficient surveys and research are performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management actions.
Class 4 (high)	Geologic units containing a high occurrence of significant fossils. The probability for impacting significant paleontological resources is moderate to high and depends on the proposed action. Anticipated impacts to significant fossils would usually require a field survey, followed by onsite paleontological monitoring or spot-checking.
Class 5 (very high)	Fossil-rich geologic units that regularly produce vertebrate fossils or significant nonvertebrate fossils at risk of natural degradation or human-caused adverse impacts. The probability of impacting significant fossils is high, and fossils are known or can reasonably be expected to occur in the impacted area. Anticipated impacts to significant fossils would usually require a field survey, followed by onsite paleontological monitoring or spot-checking.

2.5.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Federal, State, and local government regulations and policies concerning cultural and paleontological resources have the potential to constrain the distribution land uses associated with the Imperial County General Plan Update.

Cultural

Section 106 of the National Historic Preservation Act requires that all federal agencies review and evaluate how their actions or undertakings may affect historic properties. For Imperial County, Section 106 may apply if federal funding or federal approval is involved. Examples include the U. S. Army Corps of Engineers 404 permit, Federal Emergency Management Agency (FEMA) funds, Community Development Block Grant (CDBG) funds, or involvement with agencies such as BLM, United States Forest Service (USFS), and the National Park Service.

CEQA requires that local agencies consider potential significant environmental impacts to cultural resources as a result of proposed projects. Significant resources are those that are listed in or considered eligible for listing in the California Register of Historical Resources (CRHR). Nevertheless, a resource or property not listed on the CRHR does not exclude it from being a significant resource and does not make it exempt from CEQA evaluation. Specific to Imperial County, this includes historic districts and prehistoric and historic archaeological sites within the county.

SB 18, which went into effect on January 1, 2005, requires local governments to consult with Native American tribes prior to making certain planning decisions and to provide notice to tribes at certain key points in the planning process. The purpose of involving tribes at these early planning stages is to allow consideration of cultural places in the context of broad local land use policy before individual site-

specific, project-level land use decisions are made by a local government. The consultation requirements of SB 18 apply to general plan or specific plan processes proposed on or after March 1, 2005. This regulation is of particular importance to the County General Plan, since several tribes live within Imperial County.

Paleontological

Proper surveys in areas identified as suitable renewable energy sites may need to be conducted in order to comply with BLM regulations. Sites identified as potential renewable energy sites may not have current paleontological records; therefore, a survey of proposed sites is recommended prior to ground disturbance due to the high concentration of paleontological resources in the Imperial Valley.

Constraints Due to Existing Conditions

Cultural

Future renewable energy project would be constrained by existing cultural resources described in Section 2.5.4 above. Similarly, sensitive prehistoric and historical cultural resource sites that have not been systematically surveyed, including built environment resources, are likely to exist in areas within Imperial County. Previously identified and newly identified archaeological sites will require further study and avoidance to ensure that the cultural and scientific value present at these sites is not adversely affected by potential geothermal land uses.

Paleontological

It is recommended that potential renewable energy sites be cross-referenced with known boundaries of the Lake Cahuilla site due to the higher abundance of paleontological resources known to occur within those areas.

Opportunities

Cultural

The County has opportunities to change the land use designation in potential renewable energy areas with important Native American cultural resources to allow for preservation for these cultural resources while also implementing development of renewable energy projects. In addition, the County has the opportunity to update any historical preservation ordinances that will preserve significant archaeological sites that will improve understanding of the cultural history of California.

Paleontological

Providing a master overlay zone of suitable renewable energy sites within Imperial County will increase preservation of paleontological resources within Imperial County by further including preconstruction paleontological resource surveys to provide baseline information for sites where no known records exist.

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2.6 GEOLOGY AND SOILS

2.6.1 Introduction

This section discusses the existing geology and soils in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.6.2 Terminology

The following is a summary of geology and soils terminology discussed in this section.

- **Corrosive Soils** – Soil corrosion is a complex phenomenon; chemical reactions between existing elements take place in soils, many of which are not fully understood. The relative importance of variables changes for different materials, making a universal guide to corrosion impossible.

- **Expansive Soils** – Expansive soils are composed of a significant amount of clay particles which can expand (absorb water) or contract (release water). These shrink and swell characteristics can result in structural stress and place other loads on these soils. Expansive soils are often associated with geological units having marginal stability and can occur in low-lying alluvial basins as well as along hillsides.

- **Facies** – A distinctive rock feature with specific characteristics that form under certain conditions of sedimentation.

- **Fault Rupture** – The California Geological survey places active faults with surface expression within a zone referred to as an Alquist-Priolo Earthquake Fault Zone. Earthquake Fault Zones are regulatory zones around active faults. These zones are defined by turning points connected by straight lines. The delineation of the Earthquake Fault Zones is intended to prohibit construction of new habitable structures near or on active faults within California, for the purposes of protecting human health and safety.

- **Ground Lurching** – Lurching typically results where loose to poorly consolidated soil deposits on or adjacent to steep slopes move laterally as the result of strong ground shaking during a seismic event. Areas that are underlain by steep contacts of dissimilar bearing materials at depth, such as compacted fill caps that have been placed over a transition from bedrock to Holocene age alluvium, are also subject to lurching.

- **Landslides** – Landslides are large movements of the underlying ground that include rock falls, shallow slumping and sliding of soil, and deep rotational or transitional movement of soil or rock.

- **Imperial Fault Zone** – The Imperial Fault zone is a right lateral-moving strike-slip fault, representing the northernmost fault associated with the East Pacific Rise. The Imperial Fault Zone is connected to the San Andreas Fault Zone.

- **Lateral Spreading** – Lateral spreading is caused by the lateral displacement of surficial blocks of sediment as a result of liquefaction in subsurface layers. Lateral spreading is associated with areas prone to liquefaction, as described above.

- **Liquefaction** – Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause underlying soils to liquefy and temporarily behave as a dense fluid. For liquefaction to occur, intense seismic shaking, the presence of loose granular soils prone to liquefaction, and the saturation of soils due to shallow groundwater need to occur simultaneously.

- **San Andreas Fault Zone** – Because of its relatively frequent, large earthquakes, the San Andreas Fault is considered the Master Fault, controlling the seismic hazard in southern California. In the vicinity of Imperial County, the San Andreas Fault Zone comprises three segments.

- **Seismically Induced Ground Settlement** – Ground shaking can result in ground settlement as sediment particles become more tightly packed, thereby reducing pore space. Such unconsolidated, loosely packed alluvial deposits are especially susceptible to seismically induced ground shaking. In addition, artificial fills are especially susceptible to seismically induced ground shaking. In addition, artificial fills that are poorly compacted may also be subject to seismically induced settlement.

- **Subsidence** – The over drafting of aquifers is the major cause of subsidence in the southwestern United States; and, as groundwater pumping increases, land subsidence also will increase. In many aquifers, groundwater is pumped from pore spaces between grains of sand and gravel. If an aquifer has beds of clay or silt within or next to it, the lowered water pressure in the sand and gravel causes slow drainage of water from the clay and silt beds. The reduced water pressure is a loss of support for the clay and silt beds. Because these beds are compressible, they compact (become thinner), and the effects are seen as lowering of the land surface. The lowering of land surface elevation from this process is permanent.

2.6.3 Regulatory Setting

Federal Laws and Requirements

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency as the lead agency of the program and assigns several

planning, coordinating, and reporting responsibilities. Other NEHRP agencies include the National Institute of Standards and Technology, National Science Foundation, and United States Geological Survey (USGS).

State Regulations and Policies

Alquist-Priolo Special Studies Zone Act (1972)

The Alquist-Priolo Special Studies Zone Act (AP Act) was passed into law following the destructive February 9, 1971, San Fernando earthquake. The AP Act provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the AP Act is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. The State Geologist (Chief of the California Division of Mines and Geology) is required to identify "earthquake fault zones" along known active faults in California. Counties and cities must withhold development permits for human occupancy projects within these zones unless geologic studies demonstrate that no issues would be associated with the development of a project.

California Building Code

The California Building Standards Commission is responsible for coordinating, managing, adopting, and approving building codes in California. In July 2007, the Commission adopted and published the 2006 International Building Code as the 2007 California Building Code (CBC). This new code became effective on January 1, 2008, and updated all the subsequent codes under the California Code of Regulations (C.C.R.) Title 24. The State of California provides minimum standards for building design through the 2007 CBC (C.C.R., Title 24). Where no other building codes apply, Chapter 29 of the 2007 CBC regulates excavation, foundations, and retaining walls. The CBC applies to building design and construction in the State and is based on the Federal Uniform Building Code (UBC) used widely throughout the country (generally adopted on a state-by-state or district-by-district basis).

The CBC replaces the previous "seismic zones" (assigned a number from 1 to 4, where 4 required the most earthquake-resistant design) with new Seismic Design Categories A through F (where F requires the most earthquake-resistant design) for structures. With the shift from seismic zones to seismic design, the CBC philosophy has shifted from "life safety design" to "collapse prevention," meaning that structures are designed for prevention of collapse for the maximum level of ground shaking that could reasonably be expected to occur at a site. Chapter 16 of the CBC specifies exactly how each seismic design category is to be determined on a site-specific basis through the site-specific soil characteristics and proximity to potential seismic hazards. The 2013 CBC is currently being used in the County of Imperial.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act aims to reduce the threat of seismic hazard to public health and safety by identifying and mitigating seismic hazards. Through the Act, the California Department of Conservation, Division of Mines and Geology, is directed to delineate seismic hazard zones. State, county, and city agencies are directed to utilize such maps in land use and permitting processes. The Act also requires geotechnical investigations particular to the site be conducted before permitting occurs on sites within seismic hazard zones.

Regional and Local Requirements

County of Imperial General Plan

The *Seismic and Public Safety Element* identifies goals and policies that will minimize the risks associated with natural and human-made hazards. The purpose of the *Seismic and Public Safety Element* is directly concerned with reducing the loss of life, injury, and property damage that might result from disaster or accident. Additionally, known as the Imperial Irrigation District Lifelines, the Imperial Irrigation District (IID) has formal Disaster Readiness Standard Operating Procedures for the Water Department, Power Department, and the entire IID staff for response to earthquakes and other emergencies. The Water Department cooperates with the Imperial County Office of Emergency Services (OES) and lowers the level in canals after a need has been determined and only to the extent necessary.

2.6.4 Existing Environmental Setting

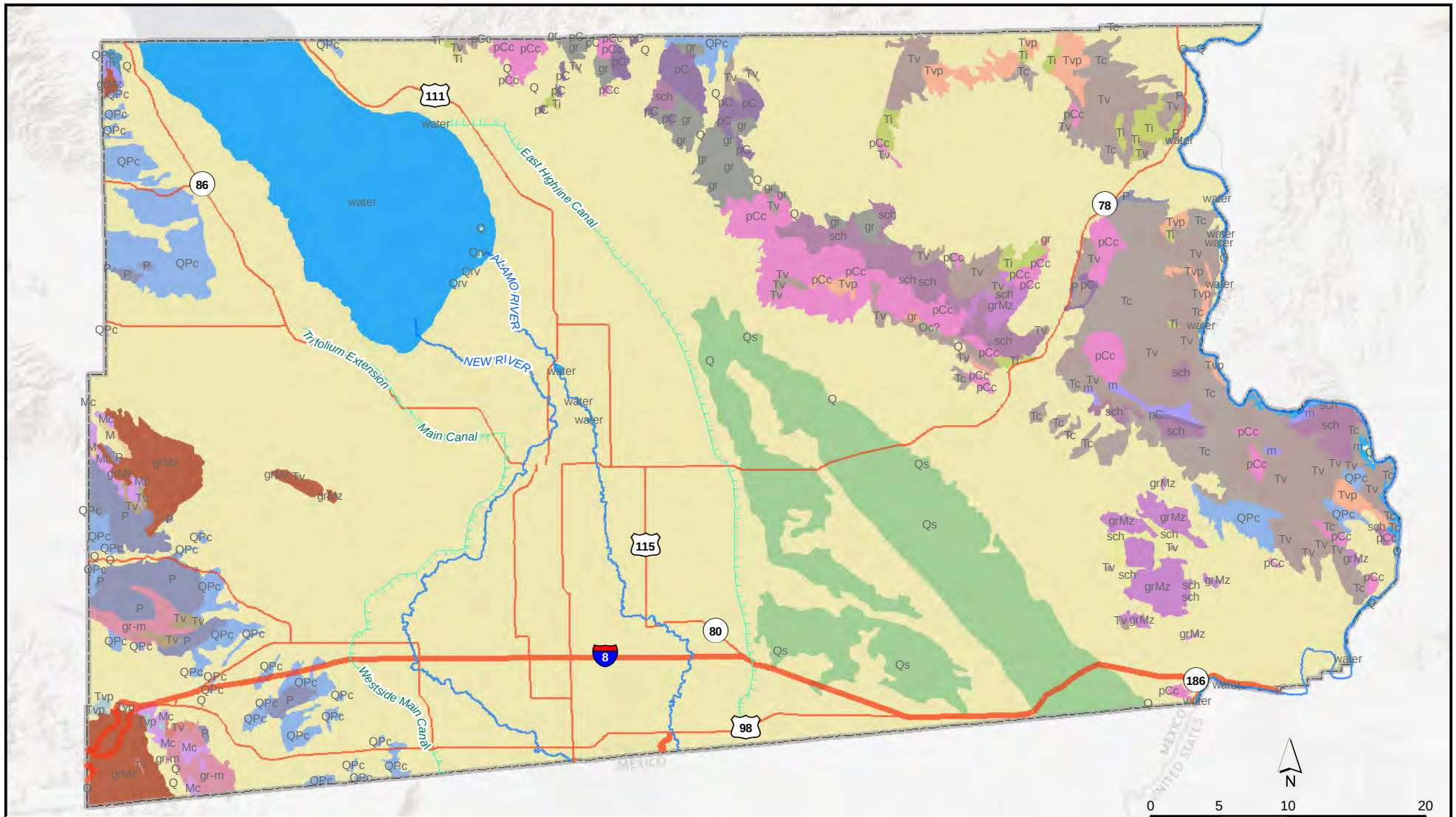
Geology

Imperial County lies within the Imperial Valley, a region of the State of California that occupies lowland in southeastern California. Elevations in Imperial County range from 235 feet below sea level at the surface of the Salton Sea to 4,548 above mean sea level (amsl) at Blue Angel Peak. On average the elevation range in Imperial County is between 1,000 to 2,000 feet amsl.

Most of the central part of the Imperial Valley lies below sea level and drains northwest from Mexico to the Salton Sea. Mountain ranges within the western portion of the County include Superstition Mountain and the surrounding Superstition Hills and the Yuha Buttes. The eastern edge of the County encompasses the Algodones Sand Hills, a belt of sand dunes that expands through the County at approximately 5 miles wide and stretches 45 miles from the Mexican border to the Salton Sea. The area was once occupied by an inland sea known as Lake Cahuilla. The northeastern part of Imperial County includes several mountain ranges, including a northwest-by-southeast-trending mountain range known as the Chocolate Mountains, a low-level mountain chain that includes pre-Tertiary plutonic and metamorphic rocks. The mountain range generally reaches 2,500 feet in elevation. A smaller mountain range, the Cargo Muchacho Mountains, occurs between the San Hills and the Chocolate Mountains. Three smaller mountain chains occur north of the Chocolate Mountains: the Little Mule Mountains, the Black Hills, and the Palo Verde Mountains. Four low volcanic hills rise 100 feet above the Salton Sea lakebed along the southeast edge of the Salton Sea.

The mountains of Imperial County consist mainly of metamorphic and igneous rocks of pre- Cambrian to Tertiary age, and sediments in the intervening valleys are generally weakly consolidated to unconsolidated sediments of late Cenozoic age (Figure 2.6-1).

Imperial County can generally be divided into three geomorphic provinces: the Peninsular Range, the Salton Trough, and the Mojave Desert. Each of these provinces is a geologic feature with a distinct physiographic unit with a geologic history. The Salton Trough is the most significant of the three provinces, as it underlies a majority of Imperial County. Variously described as the Salton Sink, Cahuilla Basin, and Salton Basin, it is basically a northwestern landward continuation of the Gulf of California rift, which was formed by gradual settling in association with uplift of the surrounding mountains during the Miocene, Pliocene, and Pleistocene epochs. Much of the land surface within this province is below sea level, and the Trough trends from the southeast to the northwest. It is bounded on the northeast and



Legend

Unit Age, Map Label

- Cretaceous(?) to Oligocene(?), Oc?
- Early Proterozoic to Cretaceous, m
- Early Proterozoic to Late Cretaceous, gr-m
- Early Proterozoic to Miocene, pC
- Early Proterozoic to Miocene, pCc
- Holocene, Qrv
- Holocene, water
- Jurassic(?) to Cretaceous(?), gr
- Jurassic(?), sch
- Late Cretaceous to Eocene, sch
- Middle Jurassic to Late Cretaceous, grMz
- Miocene to Pleistocene, P
- Miocene to Pleistocene, QPc
- Oligocene to Miocene, gr
- Oligocene to Pleistocene, Mc
- Oligocene to Pliocene, M
- Paleocene to Pliocene, Tc
- Paleozoic to Mesozoic, ls
- Permian to Tertiary; most Mesozoic, grMz
- Pliocene to Holocene, Q
- Quaternary, Qs
- Tertiary (12-19 Ma), Tv
- Tertiary (12-19 Ma), Tvp
- Tertiary (14-18 Ma), Tv
- Tertiary (8-28 Ma), Tv
- Tertiary (8-28 Ma), Tvp
- Tertiary, Ti

Source: Arizona, Geological Society; U.S. Geological Survey 2005.

Figure 2.6-1

Imperial County Renewable Energy and Transmission Element Update
Geology of Imperial County

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east by the Chocolate and Cargo Muchacho mountains and on the southwest and west by the Jacumba, Coyote, Fish Creek, and Santa Rosa mountains.

An ancient shoreline nearly surrounds the Salton Trough. The shoreline has a major break roughly 14 miles wide at the southeast end. This breach has been the entrance point for large amounts of Colorado River water and for upstream sedimentary materials that were occasionally diverted from their historically normal flows south into the Gulf of California. An unexposed succession of Tertiary- and Quaternary-age sedimentary rocks lies below the alluvial and lake bottom sediment. These sediments have basement depths ranging from 15,400 to 11,000 feet at the east and west margins to over 20,000 feet in the central portions of the Salton Trough province.

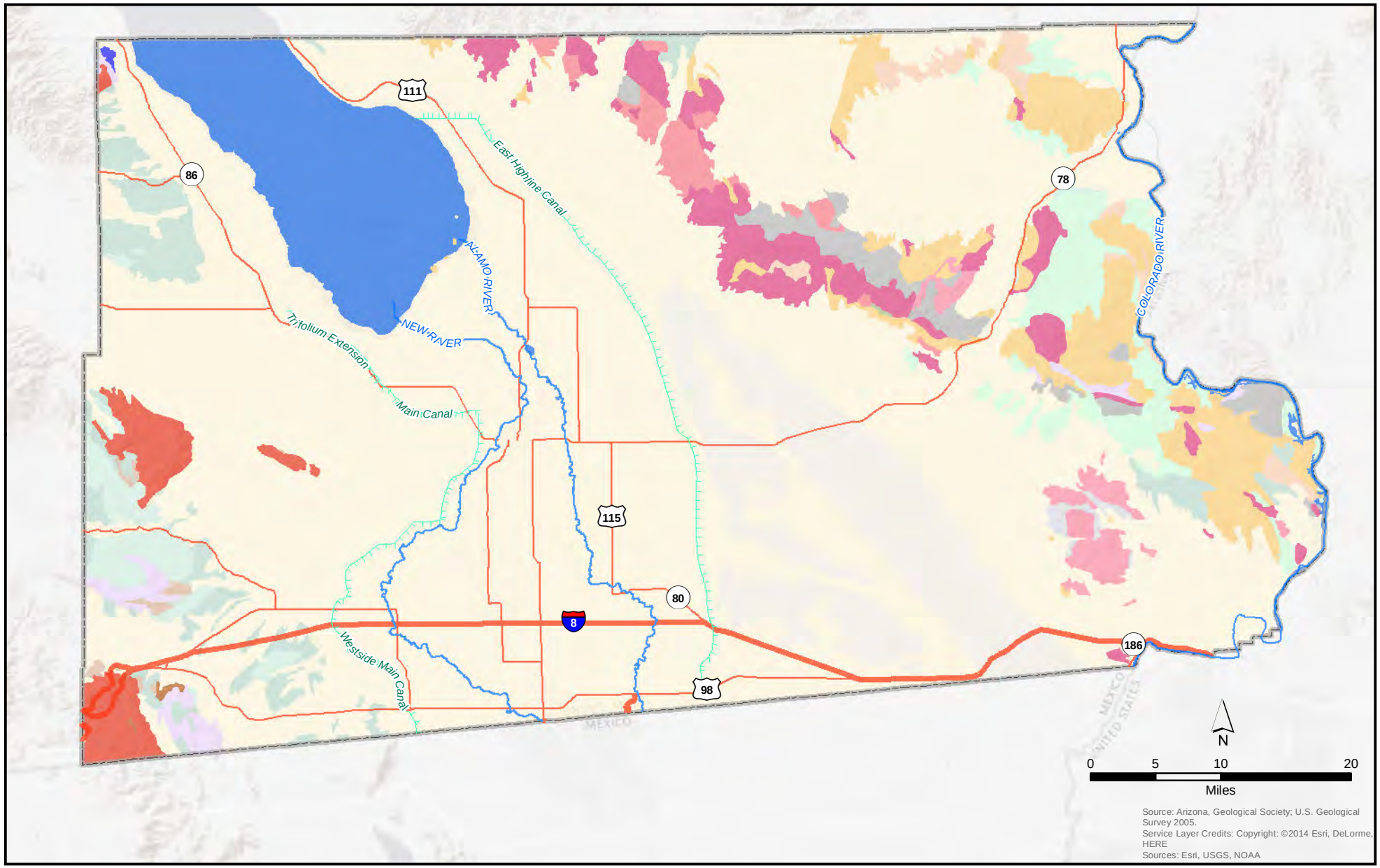
The Salton Trough has experienced continual in-filling with both marine and nonmarine sediments since its formation in the Miocene epoch (30 million years before present). The specific stratigraphy incorporates Middle and/or Lower Pliocene marine, undivided Pliocene nonmarine, and Quaternary nonmarine terrace deposits. The Middle and/or Lower Pliocene marine deposits consist of light-gray claystone containing some arkosic sandstones, calcareous oyster-shell reefs, and fossiliferous calcareous sandstone. The undivided Pliocene nonmarine formations consist of interbedded arkosic sandstones and reddish clays. The Quaternary nonmarine terrace deposits are believed to be Pleistocene in age (see Figure 2.6-1).

The Imperial Formation is a geologic area that occurs within Imperial County and is exposed in the southeast Coyote Mountains on three major facies. Facies A includes shoreline deposits associated with alluvial fans. Facies B includes supratidal gypsum to low-tide terraces. Facies C includes siltstones and clays, indicating a filling of the Salton Trough by fine clastic material from the Colorado River (see Figure 2.6-1).

Rock units in Imperial County can be described as Precambrian. Rocks that are described as Precambrian in age are placed into two groups, the Chuckwalla complex and the Orocopia Schist. The rocks in the Chuckwalla complex include quartz biotite gneiss and various foliated hybrid granitic rocks and granophyres which range in composition from gabbro to granite. Rocks in the Orocopia Schist include weatherized mica-covered surfaces. The rock units are sericite-albite schist, quartz sericite schist, phyllite, and quartzite. Marble occurs in the schist in the Orocopia Mountains. Rock types or geological material known to occur within Imperial County include: Alluvium, Andesite, Basalt, Conglomerate, Dune Sand, Gneiss, Granodiorite, Limestone, Mica schist, Plutonic rock, Rhyolite, Sandstone, Schist, and Tonalite (Figure 2.6-2).

Seismicity

Similar to most areas of southern California, Imperial County is seismically active. Numerous active faults traverse the Salton Trough and the County. Figure 2.6-3 shows the known active and potentially active faults and epicenters of earthquakes that occurred within the last 100 years in the County. The most notable fault in the County is the San Andreas, extending northward from Mexico through the Imperial Valley and on into northern California. Other major, active faults are in the San Jacinto and Elsinore fault zones in the southwest and northwest portions of the County. These northwest-trending fault zones are extensive and are a major factor in determining the configurations of the land. In addition to these major active fault zones, a number of minor inactive faults are located within the County. These include (but are not limited to) the Brawley, Wienent, Imperial, Laguna Salada, and Superstition Hills faults.



Legend

Rock Units

- Andesite
- Basalt
- Conglomerate
- Dacite
- Gneiss
- Granitoid
- Lake Or Marine Deposit (Non-Glacial)
- Marble
- Mica Schist
- Mudstone
- Plutonic Rock (Phaneritic)
- Quartz Diorite
- Quartz Monzonite
- Rhyolite
- Sandstone
- Schist
- Sedimentary Breccia
- Terrace
- Water

Figure 2.6-2
Imperial County Renewable Energy and Transmission Element Update
Rock Units within Imperial County

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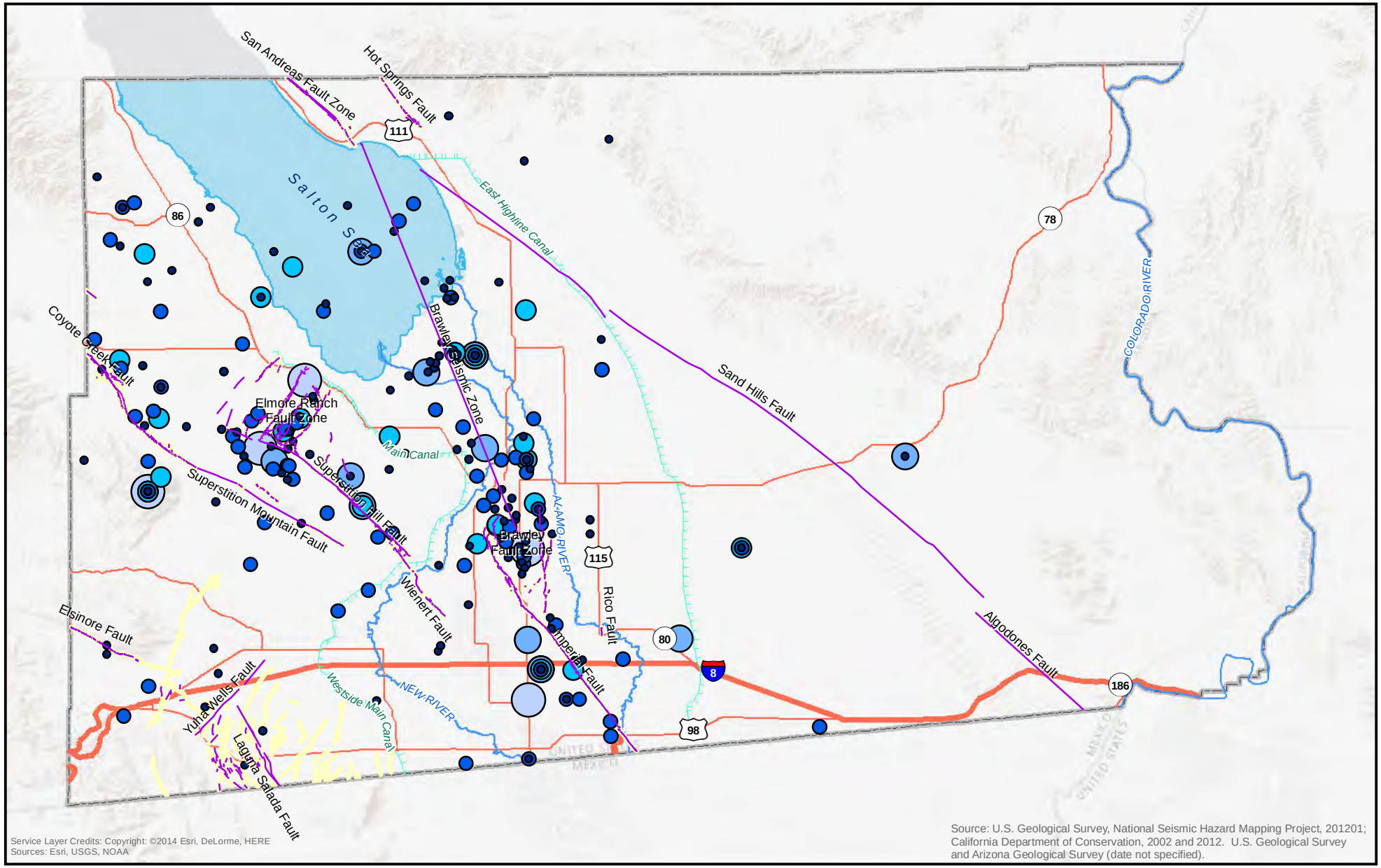

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- USGS Quaternary Faluts
- Alquist-Priolo Earthquake Fault Zoning

Earthquake Epicenter (from year 1900 to 2000)

- 4.0 - 4.2
- 4.2 - 4.7
- 4.7 - 5.2
- 5.2 - 6.0
- 6.0 - 7.0

N

0 5 10 20
Miles

Figure 2.6-3
Imperial County Renewable Energy and Transmission Element Update
Regional Faults and Seismicity

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Surface Rupture

Surface rupture occurs when movement along a fault results in actual cracking or breaking of the ground along a fault during an earthquake; however, it is important to note that not all earthquakes result in surface rupture. Surface rupture almost always follows preexisting fault traces, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Fault creep is the slow rupture of the earth's crust. Sudden displacements are more damaging to structures because they are accompanied by shaking.

Landslides

A landslide refers to a slow to very rapid descent of rock or debris caused by natural factors such as the pull of gravity, fractured or weak bedrock, heavy rainfall, erosion, and earthquakes. The majority of lands within the County are located on relatively flat topography and are not prone to seismically-induced landslides. Areas of moderate landslide activity are located in the western portions of Imperial County and include the Jacumba, Coyote, Fish Creek, and Santa Rosa mountains.

Subsidence

Subsidence is the gradual, local settling or sinking of the earth's surface with little or no horizontal motion. Subsidence is usually the result of gas, oil, or water extraction, hydro-compaction, or peat oxidation and not the result of a landslide or slope failure. Subsidence due to groundwater withdrawal can occur in unconsolidated to semiconsolidated sediments containing confined or semiconfined sand and gravel aquifers inter-bedded with clay sediments. The potential for subsidence is dependent on the depths of and amount of water likely to be extracted from the aquifer. On the valley floor where these conditions exist, the potential for subsidence is considered to be moderate to low, based on the current hydrological conditions.

Liquefaction

Liquefaction of soils can be caused by strong vibratory motion in response to earthquakes. Both research and historical data indicate that loose, granular soils are susceptible to liquefaction, while cohesive clays are not adversely affected by vibratory motion. Liquefaction is generally known to occur only in saturated or near-saturated granular soils at depths shallower than approximately 50 feet.

The unconsolidated sediments of the Salton Trough, especially in saturated areas such as irrigated lands, are subject to failure during earthquakes, thus, causing the potential for liquefaction. The majority of soil types within Imperial Valley are generally considered liquefiable due to their physical characteristics and saturated conditions. The Glenbar clay loam and the Torriorthents-Rock outcrop soil complexes, usually found in the eastern and western portions of the County, are not subject to liquefaction primarily due to the density of underlying sediments and volcanic base.

Soils

The soils of Imperial County are variable and complex and are formed by stratified alluvial deposits. The upper soil layers have been worked through the hydrologic action from periodic flooding of the New and Alamo rivers and other various washes from the East and West mesas. Wind erosion has also helped work the surface soils.

Approximately 48 soil mapping units are located within Imperial County (Table 2.6-1). These map units cover areas as small as 462 acres to as large as 203,659 acres. Each detailed soil map unit consists of one or more general soil series that occur in association with each other. These include Aco, Antho, Carrizo, Carsitas, Chuckawalla, Cibola, Coachella, Fluvaquents, Gadsden, Gilman, Glenbar, Holtville, Imperial, Indio, Kofa, Lagunita, Laposa, Laveen, Mecca, Meloland, Niland, Orita, Ripley, Rositas, Salorthids, Superstition, Torriorthents, and Vint. For a detailed description of the characteristics of each soil type, refer to the Soil Survey of Imperial County (SCS 1981).

Parent material includes Glenbar, Holtville, and Imperial soils. Indio, Vint, Meloland, and Rositas are derived from windblown and channel silts. Rositas and Carsitas were formed in beach deposits. A desert plain which forms the west terrace of the Colorado River delta known as the Imperial East Mesa is nearly flat with an almost 1-percent elevation change. Sand and gravelly fan materials are the parent materials of Carsitas and Rositas soils.

The clay material deposited in riverine environments during the formation of the Colorado River delta terrace is the source of the Holtville and Imperial soils. Niland soils occur in clayey lakebed. Several large gullies have formed from runoff water leading into the Salton Sea. The Antho, Laveen, Niland, and Superstition soils were formed from fan sediment. Fine-textured basin deposits provide the source material for Glenbar, Holtville, and Imperial soils.

Table 2.6-1: Soil Mapping Units in Imperial County

Soil Map Unit Name	Acres	Percent
Antfao loamy fine sand	4,134	0.4
Antho-Superstition Complex	8,416	0.9
Bad Land	4,390	0.4
Carsitas gravelly sand, 0 to 5 percent slopes	7,011	0.7
Fluvaquents, saline	12,262	1.2
Glenbar clay loam	2,951	0.3
Glenbar day loam, wet	4,239	0.4
Glenbar complex	12,894	1.3
Holtville loam	2,804	0.3
Holtville silty clay	3,628	0.4
Holtville silty day, wet	70,547	7.1
Holtville-Imperial silty clay loams	2,242	0.2
Imperial silty clay	1,405	0.1
Imperial silty day, saline	5,679	0.6
Imperial silty clay, wet	123,401	12.5
Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes	203,659	20.6
Imperial-Glenbar silty clay loams, 2 to 5 percent slopes	2,162	0.2
Indio loam	9,169	0.9

Table 2.6-1: Soil Mapping Units in Imperial County

Soil Map Unit Name	Acres	Percent
Indio loam, wet	13,625	1.4
Indio-Vint complex	29,643	3.0
Laveen loam	2,322	0.2
Meloland fine sand	10,748	1.1
Meloland very fine sandy loam, wet	41,734	4.2
Meloland and Holtville loams, wet	11,483	1.2
Niland gravelly sand	7,884	0.8
Niland gravelly sand, wet	9,820	1.0
Niland fine sand	2,846	0.3
Niland loamy fine sand	2,088	0.2
Niland-Imperial complex, wet	6,974	0.7
Pits	1,400	0.1
Rositas sand, 0 to 2 percent slopes	22,608	2.3
Rositas sand, 2 to 5 percent slopes	1,590	0.2
Rositas fine sand, 0 to 2 percent slopes	77,301	7.8
Rositas fine sand, 2 to 9 percent slopes	40,748	4.1
Rositas fine sand, 9 to 30 percent slopes	19,401	2.0
Rositas fine sand, wet, 0 to 2 percent slopes	22,626	2.3
Rositas loamy fine sand, 0 to 2 percent slopes	90,896	9.2
Rositas silt loam, 0 to 2 percent slopes	3,737	0.4
Rositas-Superstition loamy fine sands	11,373	1.2
Superstition loamy fine sand	12,887	1.3
Tomorthents-Rock outcrop complex, 5 to 6 percent slopes	462	*
Torriorthents and Orthids, 5 to 30 percent slopes	900	0.1
Vint loamy very fine sand, wet	31,545	3.2
Vint fine sandy sand, wet	13,066	1.3
Vint and Indio very fine sandy loams, wet	15,462	1.6
Vint and Indio very fine sandy loams, water	3,288	0.3

* Less than 0.1%
Source: Soil Survey of Imperial County, California, Imperial Valley Area (SCS 1981).

A large portion of Imperial County includes fine-textured lakebed sediments. On the surface, the Salton Trough province exhibits at least three geomorphic areas: ancient lakebed sediments, alluvial channels,

and dune sands. The central portion of this province, consisting of the Imperial and Coachella valleys (or the Salton Sink), is covered by clay and silt deposits from prehistoric lakestands. Shoreline deposits circumscribe the central lakebed deposits and consist predominantly of unconsolidated sand and gravel, grading into the previously mentioned silts and clays. Lake Cahuilla beds are generally believed to be less than 100 feet thick and may have received their heaviest rate of deposition during the Wisconsin or early postglacial age.

Dissected, flat-lying alluvium is present on both mesa-like areas east and west of the central portion of the Salton Trough province. Consisting of poorly consolidated silts, sands, and gravels, these more recent alluviums typically form thin veneers of desert pavement between dry washes. Also, no topsoils or well-defined horizons are present in these areas.

Expansive Soils

Expansive soils are primarily composed of clay particles. Clay increases in volume when water is absorbed and shrinks when dry. Expansive soils can damage building foundations, concrete flatwork, and asphaltic concrete pavements as a result of swelling forces that reduce soil strength. In general, much of the near surface soils in the agricultural area of the Salton Trough consist of silty clays and clays which are moderately to highly expansive.

Soil Corrosivity

Soils in the Project Area have characteristics which make them corrosive to metals. A major factor in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (direct current [DC]) from the metal into the soil. Lower electrical resistivities result from higher moisture and soluble salt contents and indicate corrosive soil.

Other soil characteristics that may influence corrosivity towards metals are pH, soluble salt content, soil types, aeration, anaerobic conditions, and site drainage. Soil pH values ranged from 7.6 to 8, which are considered mildly to moderately alkaline. The soluble salt content of the samples ranges from low to very high. Chloride and sulfate salts are the predominant constituents.

Mineral Resources

Imperial County contains diverse mineral resources. Those with the highest economic value include gold, gypsum, sand, gravel, lime, clay, and stone. Geologic factors restrict mining operations to the relatively few locations where mineral deposits are feasible for extraction. The majority of the mining areas are located in the eastern portion of Imperial County.

2.6.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

AB 2205 (Chapter 253, Statutes of 2012) is a bill that identifies geothermal waste as a hazardous waste product and is meant to provide clarification on the existing regulatory framework for geothermal activities in the State of California.

Constraints Due to Existing Conditions

Areas within Imperial County prone to lateral spreading, liquefaction, and subsidence should be avoided as suitable renewable energy sites. Areas within the seismic hazard mapping zone that are prone to seismic hazards such as subsidence should also be avoided for siting renewable energy facilities.

Opportunities

The Imperial Valley contains active geothermal areas. The All American Canal from the Colorado River provides hydroelectric power. In previous years, steam wells have been drilled to provide output of steam generation. The geothermal energy provided by these steam wells can produce electric power and mineral development.

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2.7 GREENHOUSE GASES

2.7.1 Introduction

This section of the Baseline analysis assesses greenhouse gas (GHG) emissions in Imperial County. GHG emissions have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. Global climate change also has the potential to result in sea level rise (resulting in flooding of low-lying areas), to affect rainfall and snowfall (leading to changes in water supply and runoff), to affect temperatures and habitats (affecting biological and agricultural resources), and to result in many other adverse environmental consequences. The environmental setting includes a summary of applicable regulations and a discussion of the existing sources of GHG emissions.

2.7.2 Terminology

The following is a summary of greenhouse gas emissions and climate change terminology discussed in this section.

- **Greenhouse Gas (GHG)** – GHGs are any of the atmospheric gases that contribute to the greenhouse effect. The principal GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

- **Greenhouse effect** – A process by which infrared radiation (i.e., thermal heat) from the earth's surface is absorbed by GHGs. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon is responsible for maintaining a habitable climate on the earth.

- **Carbon Dioxide (CO_2)** – CO_2 is an odorless, colorless natural GHG. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; and evaporation from oceans. Anthropogenic (human caused) sources include burning coal, oil, natural gas, and wood.

- **Methane (CH_4)** – CH_4 is the main component of natural gas and is associated with agricultural practices and landfills.

- **Nitrous Oxide (N_2O)** – N_2O is a colorless GHG that results from industrial processes, vehicle emissions, and agricultural practices.

- **Hydrofluorocarbons (HFCs)** – HFCs are synthetic, man-made chemicals that are used as a substitute for chlorofluorocarbons in automobile air conditioners and refrigerants.

- **Perfluorocarbons (PFCs)** – PFCs are produced as a by-product of various industrial processes associated with aluminum production and the manufacturing of semiconductors.

- **Sulfur Hexafluoride (SF_6)** – SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable GHG used for insulation in electric power transmission and distribution equipment and in semiconductor manufacturing.

- **Global Warming Potential (GWP)** – GWP is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO_2. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 21, and N_2O, which has a GWP of 310 (UNFCC 2012).

- **CO_2-equivalents (CO_2e)** – CO_2e is used to account for the different GWP potentials of GHGs to absorb infrared radiation.

2.7.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to greenhouse gas (GHG) emissions and climate change.

Federal Regulations

The Environmental Protection Agency (USEPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA). On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act (CAA) and that the USEPA has the authority to regulate GHGs. The Court held that the USEPA Administrator must determine (1) whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare; or (2) whether the science is too uncertain to make a reasoned decision.

Mandatory GHG Reporting Rule

On October 30, 2009, USEPA published the final version of the Mandatory GHG Reporting Rule in the Federal Register. In general, this national reporting requirement provides USEPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. Subsequent rulings have expanded the emissions sources required to report emissions data, which now include oil and natural gas industries, industrial wastewater treatment, and industrial landfills. Certain categories, such as general stationary fuel combustion sources and electricity generation, began reporting their yearly emissions with the 2010 reporting year. A total of 41 source categories now report emissions as a result of the Mandatory GHG Reporting Rule (USEPA 2013).

GHG Findings under the Federal CAA

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- Endangerment Finding: The USEPA Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The USEPA Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industries or other entities, this action was a prerequisite to finalizing the USEPA's Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles. On May 7, 2010, the final Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards were published in the Federal Register. The emissions standards will require model year 2016 vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, which is equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely by improving fuel economy.

On August 28, 2012, the U.S. Department of Transportation and USEPA issued a joint Final Rulemaking requiring additional federal GHG and fuel economy standards for passenger cars and light-duty trucks produced in model years 2017 through 2025. These vehicles would be required to meet an estimated combined average emissions level of 163 grams of CO_2 per mile in model year 2025, which is equivalent to mileage of 54.5 miles per gallon if the improvements were made solely through improvements in fuel efficiency.

In addition to the standards for light-duty vehicles, on August 9, 2011, the U.S. Department of Transportation and USEPA announced standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses.

State Regulations

With the passage of legislation including Senate Bills (SB), Assembly Bills (AB), and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the State level.

Assembly Bill 1493 (Pavley)

AB 1493 requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with model year 2009. In June 2009, the USEPA Administrator granted a CAA waiver of preemption to California. This waiver allowed California to implement its own GHG emissions standards for motor vehicles beginning with model year 2009. California agencies worked with federal agencies to conduct joint rulemaking to reduce GHG emissions for passenger car model years 2017 to 2025.

Executive Order S-3-05

The goal of this Executive Order S-3-05 (EO S-3-05), signed on June 1, 2005, by Governor Arnold Schwarzenegger, is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by 2020, and 3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of AB 32.

Assembly Bill 32

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, was signed in September 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020.

In December 2008, CARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which contains the main strategies California will implement to achieve the required GHG reductions required by AB 32. The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory. CARB further acknowledges that decisions about how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors.

CARB is required to update the Scoping Plan at least once every five years to evaluate progress and develop future inventories that may guide this process. CARB is currently in the process of updating the Scoping Plan, and a draft update was issued for initial review and comment on October 1, 2013.

Executive Order S-01-07

Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this Executive Order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2

SB 1078 requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017 (CEC 2002). SB 107 changed the target date to 2010. Executive Order S-14-08 expands the State's Renewable Portfolio Standard to 33 percent renewable power by 2020. This new goal was codified in 2011 with the passage of SB X1-2. To meet the goals set out in SB X1-2, a significant effort will be needed to reduce overall energy used in the State through energy efficiency efforts and a large effort to increase the amount of renewable energy generated and purchased by utility companies.

Senate Bill 97 (Chapter 185, 2007)

SB 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 required the Governor's Office of Planning and Research to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The Amendments became effective on March 18, 2010.

Senate Bill 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or an Alternative Planning Strategy (APS) which will prescribe land use allocation in that MPO's regional transportation plan (RTP). On September 23, 2010, CARB adopted regional GHG targets for passenger vehicles and light trucks for 2020 and 2035 for the 18 MPOs in California. If MPOs do not meet the GHG reduction targets,

transportation projects would not be eligible for funding programs after January 1, 2012. The regional GHG targets are established for passenger vehicles and light trucks and do not include emissions from heavy-duty vehicles, such as on-road tanker trucks.

Regional and Local Regulations

CARB's Scoping Plan states that local governments are "essential partners" in the effort to reduce GHG emissions (CARB 2008). The Scoping Plan also acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions.

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the applicable MPO for Imperial County. SCAG's jurisdiction covers six counties—Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial—and approximately 18 million residents. One of the main responsibilities of SCAG is to maintain and develop comprehensive transportation planning for the region through RTPs. In addition to transportation planning, SCAG is also responsible for planning the region's growth management, hazardous waste management, and air quality. The most recent EIR for the SCAG 2012 RTP/SCS indicated that the region would meet the SB 375 emissions targets from light-duty trucks and passenger vehicles, would meet the 2020 target, and would achieve even greater emission reductions in 2035 as compared to the 2035 target (SCAG 2012).

Imperial County Air Pollution Control District

The Imperial County Air Pollution Control District (ICAPCD) has no regulations or additional guidelines relative to GHG emissions for residential, commercial, or industrial projects; however, ICAPCD Rule 903 applies to any stationary source that would have the potential to emit air contaminants equal to or in excess of the threshold for a major source of regulated air pollutants. In 2011, ICAPCD amended Rule 903 to add GHGs to the list of regulated pollutants. As part of the revised rule, stationary sources that exceed the *de minimis* emissions level of 20,000 tons of carbon dioxide equivalent (CO_2e) per year in a 12-month period would need to meet recordkeeping and reporting requirements.

Imperial County

The existing Imperial County General Plan does not include any policies that directly address GHG emissions; however, the *Conservation and Open Space Element* of the General Plan contains goals, policies, and programs that would contribute to the reduction of GHG emissions:

- Protection of Air Quality

  Goal 9. The County shall actively seek to improve and maintain the quality of air in the region.

  Objective 9.1. Ensure that all facilities shall comply with current federal and State requirements for attainment of air quality objectives.

Objective 9.2. Cooperate with all federal and State agencies in the effort to attain air quality objectives.

- Conservation of Energy Sources

Goal 6. The County shall seek to achieve maximum conservation practices and maximum development of renewable alternative sources of energy.

Objective 6.2. Encourage the utilization of alternative passive and renewable energy resources.

Objective 6.3. Maximize energy conservation and efficiency of utilization.

Objective 6.4. Minimize environmental impact of energy sources.

Objective 6.6. Encourage compatibility with national and State energy goals and city and community general plans.

Objective 6.7. Support local utility companies' energy conservation programs.

Policy: The County shall establish programs and procedures to encourage the conservation of energy by the general public.

Program: Promote the demonstration of new energy-saving or supply technologies such as solar energy technologies on County facilities and the dissemination of information on their relative effectiveness and operating costs.

Program: Amend County Building Codes in accordance with local conditions and California Energy Commission standards for both residential and nonresidential buildings to include insulation requirements against heat infiltration in new construction.

Program: Encourage State legislation which would remove tax disincentives on capital investments in solar space cooling equipment.

Program: Amend County Building Codes to remove unnecessary obstacles to implementing energy conservation technology.

2.7.4 Existing Environmental Setting

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic sources, and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include the respiration of humans, animals, and plants; decomposition of organic matter; and evaporation from the oceans. Anthropogenic sources include the combustion of fossil fuels, waste treatment, and agricultural processes.

GHG emissions related to human activities have been determined to be highly likely responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2007). Similarly, impacts of GHGs are borne globally, as opposed to the more localized air quality effects

of criteria air pollutants and toxic air contaminants. The quantity of GHGs that ultimately results in climate change is not precisely known; however, no single project alone is expected to measurably contribute to a noticeable incremental change in the global average temperature or to a global, local, or micro climate. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis.

Trends of Climate Change

Warming of the climate system is now considered to be unequivocal (IPCC 2007), with global surface temperature increasing approximately 1.33°F over the last 100 years. The rate of increase in global average surface temperature over the last 100 years has not been consistent; the last three decades have warmed at a much faster rate—on average, 0.32°F per decade. Continued warming is projected to increase the global average temperature by 2°F to 11°F over the next 100 years.

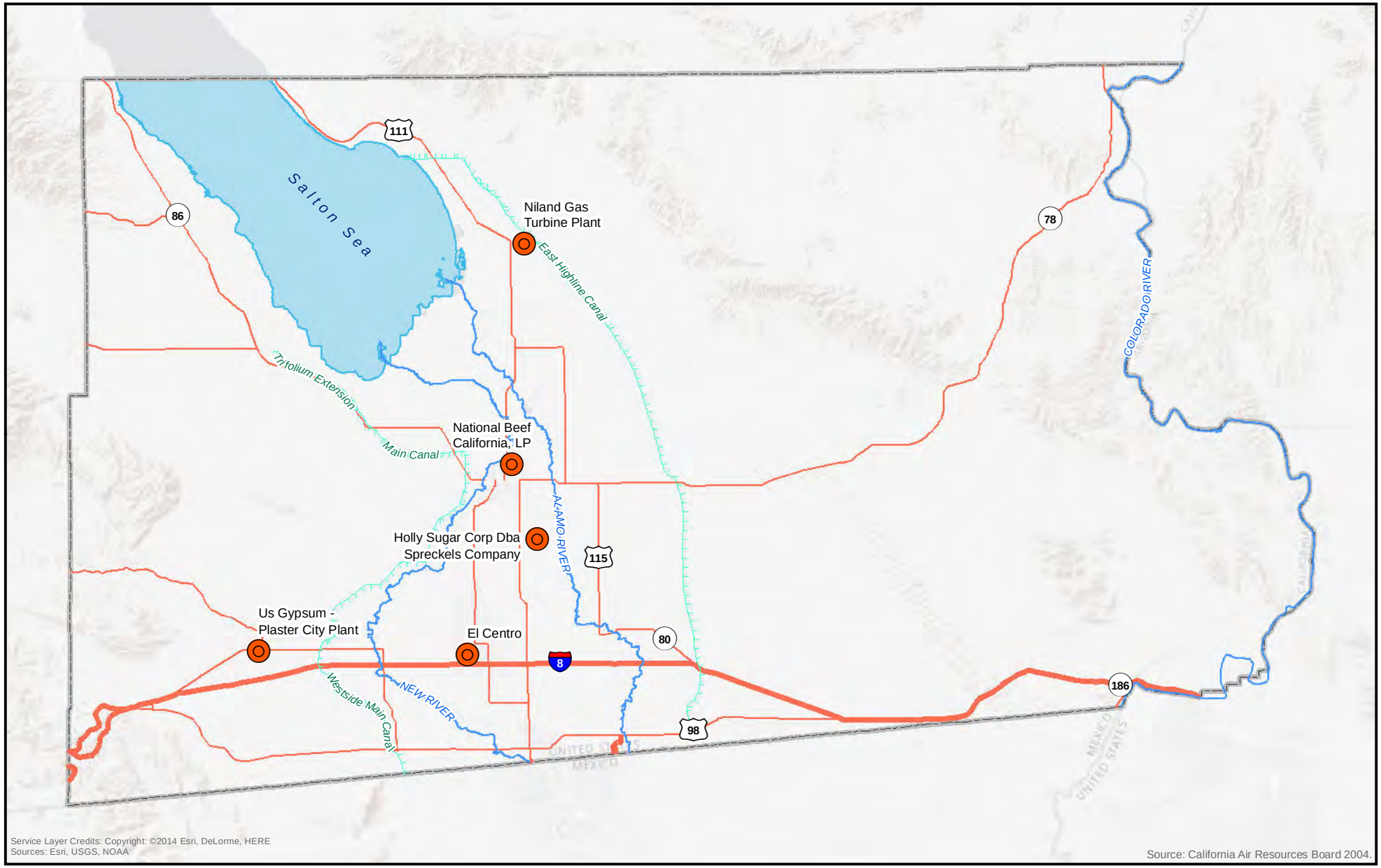
The causes of this warming have been identified as both natural processes and as the result of human actions. The Intergovernmental Panel on Climate Change (IPCC) concluded that variations in natural phenomena, such as solar radiation and volcanoes, produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, however, increasing GHG concentrations resulting from human activity, such as fossil fuel burning and deforestation, have been responsible for most of the observed temperature increase.

Impacts of Climate Change

Over the same period that increased global warming has occurred, many other changes have occurred or are predicted to occur in other natural systems. Sea levels have risen; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; wildfires are predicted to increase in number and intensity; extreme weather events such as heat waves have increased; and numerous other conditions have been observed. Although it is difficult to prove a definitive cause-and-effect relationship between global warming and other observed changes to natural systems, the scientific community has a high level of confidence that these changes are a direct result of increased global temperatures caused by increased presence of GHGs in the atmosphere (IPCC 2007).

Greenhouse Gas Emission Sources

GHG emissions contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, electric utility, residential, commercial, and agricultural sectors. Emissions of CO_2 are byproducts of fossil fuel combustion; and methane (CH_4), a highly potent GHG, is the primary component in natural gas and is associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. Figure 2.7-1 shows the GHG sources in Imperial County.



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Green House Gas Source

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Figure 2.7-1

Imperial County Renewable Energy and Transmission Element Update

Sources of Green House Gas Emissions

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For purposes of accounting for and regulating GHG emissions, sources of GHG emissions are grouped into emissions sectors. CARB identifies the following main GHG emissions sectors that account for most anthropogenic GHG emissions generated within California:

- Transportation: On-road motor vehicles, recreational vehicles, aviation, ships, and rail
- Electricity: Use and production of electrical energy
- Industry: Mainly stationary sources (e.g., boilers and engines) associated with process emissions
- Commercial and Residential: Area sources, such as landscape maintenance equipment, fireplaces, and consumption of natural gas for space and water heating
- Agriculture: Agricultural sources that include off-road farm equipment; irrigation pumps; crop residue burning (CO_2); and emissions from flooded soils, livestock waste, crop residue decomposition, and fertilizer volatilization (CH_4 and N_2O)
- High GWP Gases: Refrigerants for stationary and mobile source air conditioning and refrigeration, electrical insulation (e.g., SF_6), and various consumer products that use pressurized containers
- Recycling and Waste: Waste management facilities and landfills; primary emissions are CO_2 from combustion and CH_4 from landfills and wastewater treatment

State GHG Emissions Inventory

CARB performs an annual GHG inventory for emissions and sinks of the six major GHGs. As shown in Figure 2.7-2, California produced 451.6 million metric tons (MMT) of CO_2e in 2010 (IPCC 2007). Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2010, accounting for 38 percent of total GHG emissions in the state. The transportation sector was followed by the electric power sector, which accounts for 23 percent of total GHG emissions in the State (including in- and out-of-state sources), and the industrial sector, which accounts for 21 percent of total GHG emissions in the State (CARB 2013b).

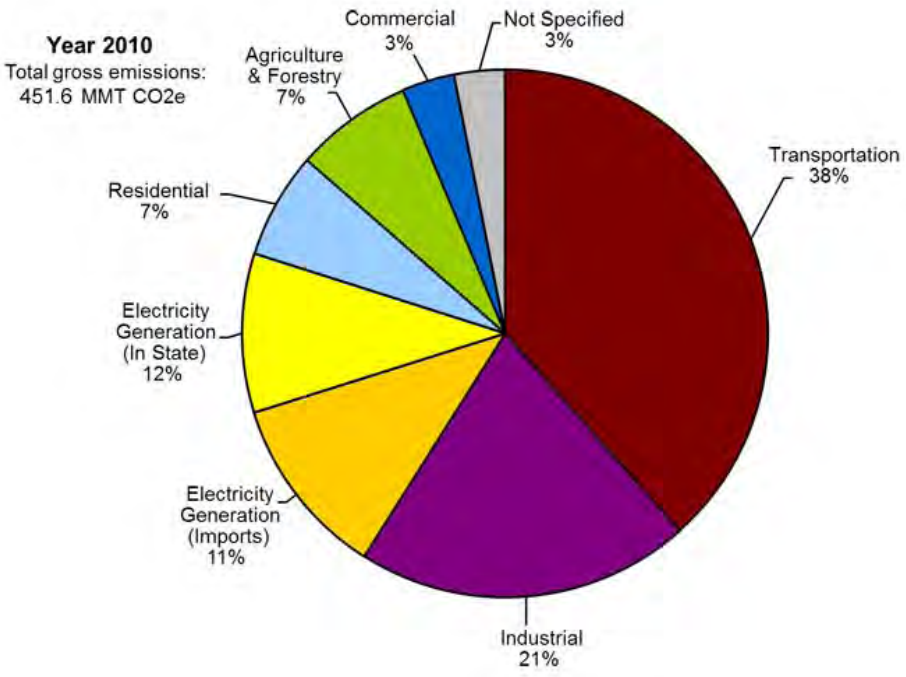

Figure 2.7-2: 2010 California GHG Emissions by Sector

2.7.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Development of renewable energy facilities associated with General Plan update would result in GHG emissions both from construction and long-term operational activities. The introduction of new land uses or changes in land use may conflict with existing or future plans, such as the AB 32 Scoping Plan, SCS, or Climate Action Plans, that are adopted for the purpose of reducing GHG emissions. The level and types of GHG emissions for renewable energy projects would have to be analyzed according to CEQA and NEPA emission thresholds that are applicable to Imperial County.

Constraints Due to Existing Conditions

Since climate change is a cumulative impact, local conditions do not typically constrain development of individual renewable energy facilities, such as wind or solar sources; however, since renewable energy facilities can require large amounts of land, projects might be built in more remote areas. Remote locations would require additional miles traveled by light-duty and heavy-duty vehicles, resulting in increased GHG emissions. The level of GHG emissions generated by the project could constrain the amount or type of development or require mitigation to offset GHG emissions. Renewables do present

substantially lesser GHG emissions compared to traditional fossil fuel sources of electricity, which is the driver behind the push for increasing renewables at the State and national level.

Opportunities

Construction and operation of the renewable energy facilities would result in the generation of GHG emissions; however, those projects are also consistent with the goals of the Renewable Portfolio Standard to obtain 33 percent of all electricity from renewable sources by 2020. The CARB Scoping Plan states that the GHG reduction goals will be achieved through development of new (nonfossil-fuel based) technologies and a "shift into a landscape of new ideas, clean energy, and green technology." The General Plan update can include policies to allow projects to demonstrate that they are consistent with the goals of the General Plan as well as AB 32. Imperial County could also develop a Climate Action Plan to provide policy direction and identify actions that can reduce GHG emissions. For the development of renewable energy projects, siting to reduce vehicle miles traveled (VMT) and minimize distances of transmission line construction should be prioritized to reduce the potential for GHG emissions associated with their development.

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2.8 HAZARDS AND HAZARDOUS MATERIALS

2.8.1 Introduction

This section discusses the existing hazards and hazardous materials in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.8.2 Terminology

The following is a summary of hazards and hazardous materials terminology discussed in this section.

- **Defensible Space** – An area around residences or other structures, which is either man-made or natural, where the vegetation is modified and maintained to slow the rate and intensity of an advancing wildland fire. It also provides room for firefighters to work and helps protect the forest from becoming involved should a structure fire occur.

- **Hazards** – Dangers to human health, safety, and welfare.

- **Hazardous Materials** – A substance or combination of substances which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed (C.C.R., Title 22, Section 66260.10).

- **Sensitive Receptors** – Individuals such as children, the elderly, and people with preexisting health conditions who are more susceptible to hazardous conditions. Examples of sensitive receptor sites are schools, day care facilities, nursing homes, and residences.

2.8.3 Regulatory Setting

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) gives the Environmental Protection Agency (EPA) the authority to control the generation, transportation, treatment, storage, and disposal of hazardous wastes. The RCRA framework was set in 1976, with 1986 amendments added to govern the environmental hazards that could result from underground storage tanks. The Office of Resource Conservation and Recovery (ORCR) implements RCRA (USEPA 2014b).

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, defines which hazardous substances or materials are designated for special consideration by the federal Environmental Protection Agency (USEPA). The substances are designated by USEPA for special consideration under the Clean Air Act, Clean Water Act, Toxic Substances Control Act, or the Resource Conservation and Recovery Act. USEPA may also designate other substances as hazardous

based on at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) that can pose a hazard to human health (DRECP 2014).

Superfund Amendments and Reauthorization Act

The Superfund Amendments and Reauthorization Act established the Emergency Planning and Community Right-to-Know Act as the national legislation on community safety. This law helps local communities protect public health, safety, and the environment from releases of hazardous substances. In implementing provisions of the Emergency Planning and Community Right-to-Know Act, Congress requires each state to appoint a State Emergency Response Commission. Each state commission then must divide its state into Emergency Planning Districts and appoint a Local Emergency Planning Committee for each of those districts (DRECP 2014).

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act of 1985 require local agencies to develop area plans in order to respond to releases of hazardous wastes and materials. An area plan includes pre-emergency planning procedures for emergency response, coordination of affected government agencies and responsible parties, follow-up, and training. The California Hazardous Materials Incident Reporting System collects data involving the accidental release of hazardous materials. This information is reported to and maintained by the California Office of Emergency Services and California Emergency Management Agency (OES/Cal EMA).

The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) enforce federal and State regulations and respond to hazardous materials transportation emergencies. The California Highway Patrol enforces labeling and packing regulations to prevent leaks and spills of material in transit. It also provides information to cleanup crews in the event of an incident. Caltrans has emergency teams throughout California (DRECP 2014).

California Health and Safety Code

The California Health and Safety Code establishes regulations for health care services, health research, local health and safety, health care facilities, health care service plans, local administration, community facilities, and state-county partnerships, among many other categories (California Health and Safety Code 2014).

California Fire Code and Guidelines

The California Fire Code was established by the California Building Standards Commission, including collaboration with the Department of Housing and Community Development, the Division of State Architect, the Office of the State Fire Marshal, the Office of Statewide Health Planning and Development, the California Energy Commission, the California Department of Public Health, the California State Lands Commission, the Board of State and Community Corrections, and the California Building Standards Commission (CBSC). The California Fire Code and Guidelines provides guidance regarding general requirements, emergency planning and preparedness, building equipment and design features, instructions for special occupancies and operations, and hazardous materials (CBSC 2013).

California Occupational Safety and Health Administration

The California Occupational Safety and Health Administration (Cal/OSHA) is a state agency that strives to protect workers from job-related health and safety hazards. Cal/OSHA establishes standards as well as enforcement and consultation programs (Cal/OSHA 2014). OSHA operates under the U.S. Department of Labor as part of the Occupational Safety and Health Act of 1970.

Imperial County-Mexicali Emergency Response Plan

The Binational Prevention and Emergency Response Plan between Imperial County, California, and the city of Mexicali, Baja California, was established as part of a joint contingency plan (JCP) between the United States of America (U.S.) and Mexico. The JCP was signed in 1999 and provided a foundation for collaboration for the border area and the basis for preparedness, mitigation, response, and prevention of hazardous substances along the inland international boundary. A memorandum of understanding (MOU) was developed to reinforce the jurisdictional cooperation between the two nations. The MOU with the corresponding emergency preparedness and response plan was developed with the support of USEPA (County 2005).

Imperial County Multi-Jurisdictional Hazard Mitigation Plan Update

The Imperial County Multi-Jurisdictional Hazard Mitigation Plan (MHMP) Update was developed in partnership with the County of Imperial, the City of Brawley, the City of Calexico, the City of Calipatria, the City of El Centro, the City of Holtville, the City of Imperial, the City of Westmorland, the Imperial County Irrigation District, and the Imperial County Office of Education. This document is a comprehensive update of the original MHMP. The purpose of the MHMP is to reduce death, injury, and disaster losses from both natural and human-caused disasters in Imperial County through outlining goals, strategies, and actions regarding hazard mitigation (County 2013c).

Imperial County Hazardous Materials Area Plan

The Imperial County Hazardous Materials Area Plan addresses the use, storage, and transportation of hazardous materials, as well as the generation and transportation of hazardous wastes. The Hazardous Materials Area Plan identified the federal, State, and local agencies responsible for incidents involving the release or threatened release of hazardous materials. The primary responsibility and authority lie with the Incident Commander, who activates the responses consistent with the plan. The Hazardous Materials Area Plan also identifies the existing mutual aid agreements with Yuma County and Cal Fire. Existing plans and documents that have also been taken into account include the Imperial County Emergency Operations Plan, the Multi-Jurisdictional Hazard Mitigation Plan, the Imperial Valley Hazardous Emergency Assistance Team Joint Powers Agreement, and the U.S. – Mexico Environmental Program (County 2009).

2.8.4 Existing Environmental Setting

Hazardous Materials

A hazardous material accident has the potential to occur in Imperial County due to the agricultural economy, abundance of fuel tanks, complex canal system, and the confluence of major surface arteries and rail systems. Although a hazardous material accident can occur almost anywhere, specific regions are more vulnerable. The potential for an accident is increased in regions near roadways that are

frequently used for transporting hazardous material and in regions with agricultural or industrial facilities that use, store, handle, or dispose of hazardous material. Hazardous material incidents are one of the most common technological threats to public health and the environment. Incidents may occur as the result of natural disasters, human error, and/or accident.

Locations of hazardous materials are shown on Figure 2.8-1. The largest concentrations of hazardous materials and the sources of huge leaks or spills in Imperial County include the following:

- **The Santa Fe Pacific Pipeline Tank Farm:** Located in Imperial City and a component of the Santa Fe Pacific Pipeline network that delivers gasoline, diesel, and jet fuel to southern California and Arizona. The tank farm contains 16 storage tanks with a total storage capacity of approximately 10 million gallons.

- **Naval Air Facility (El Centro):** Serviced by a 4-inch fuel line directly from the Santa Fe Pacific Pipeline Tank Farm. The facility also stores one million gallons of fuel, predominantly jet fuel, in underground tanks. Munitions storage is limited to aircraft and small arms training ammunition.

- **ST Services:** Located south of the Santa Fe Pacific Pipeline Tank Farm with the capacity to store 70,000 gallons of fuel.

- **Crop Production Services:** Located in the City of Heber and serves as a chemical and fertilizer storage facility.

- **United Agriculture Products:** Handles hazardous wastes, chemicals, insecticides, and pesticides in the City of Imperial.

- **Puregro Company:** Handles chemicals and fertilizers in Brawley.

- **Rockwood Chemical Company:** Handles chemicals and fertilizers in Brawley.

- **Helena Chemical Products:** Handles chemicals, fertilizers, insecticides, and pesticides in Brawley.

- **Wilbur Ellis Company:** Handles chemicals, fertilizers, insecticides, and pesticides in Heber.

- **Pipelines:** Imperial County has 89.92 miles of pipeline that transport hazardous materials. Pipe sizes vary in size from 12 to 20 inches, and the average size is 12 inches. Pipelines are located adjacent to the Southern Pacific Railroad tracks from the Arizona border at Yuma to the Niland tank farm, north to the Riverside County Line, and south to the Imperial tank farm. The pipeline system has section fuel control valves (OES 2013).

The Clean Harbors hazardous waste facility is located west of Westmorland. Although the facility poses a potential hazard, it has strict design standards and monitoring is imposed on it to prevent failure. Other facilities that pose a risk are chemical handling and storage facilities that include distributors, transporters, and crop-dusting firms; however, these firms are not permitted to store the various chemicals in open areas or in buildings not adequately protected from flood conditions. During severe flooding, the potential for these chemicals to be mixed with the flood water can pose a potentially serious health concern.

Wildfires

Even though wildfires can start from natural sources, humans are the cause of four out of every five wildfires. Wildfires started by humans are usually the result of debris burns, arson, or carelessness. Lightning is often the natural cause for wildfires that can destroy personal property and public lands such as State and national forest lands. Wildfires cause the destruction of property, timber, and wildlife and injury or loss of life to people using a recreation area or living in the area. The MHMP states that the potential for wildfire or a major fire in the unincorporated areas of Imperial County is generally low. Fire hazards exist, however, at two different sites in the County: east of Niland and at the fuel storage farms located south of the City of Imperial. In the event of a fire, assistance from various fire departments within the County would be necessary. The MHMP states that the threat of fire spreading and causing major problems to other areas of the County is minimal, however, due to the isolated locations of the fuel storage farms.

Extreme Weather

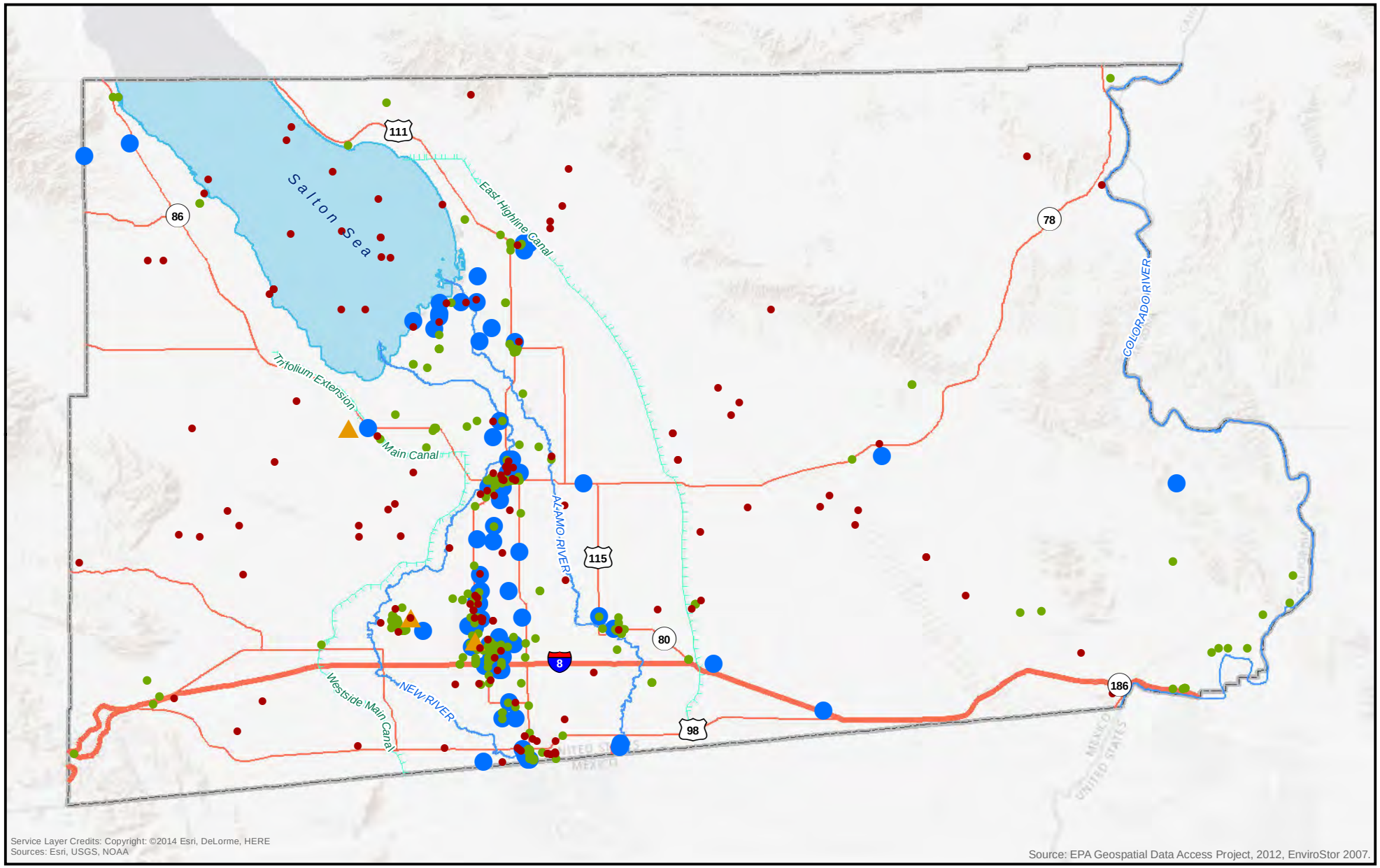
According to the MHMP, Imperial County has had a history of extreme weather hazards such as temperature extremes (freezes/heat waves), thunderstorms/windstorms, heavy rain/hailstorms, and tornadoes. Imperial County has had two State and federal declared freeze disasters from 1950 to 2009. Heat waves have claimed many lives compared to other disasters in Imperial County; the worst in southern California was an eight-day heat wave in 1955 that was estimated to result in 946 deaths. The Spatial Hazard Events and Loss Data for the United States (SHELDUS) estimated that approximately 47 heat events occurred in California from 1960 to 2008, causing 325 injuries and 121 deaths and causing about $531.7 million in crop damage.

Pest Infestation

Pest infestation occurs when an undesirable type of insect or other pest populates an area such that it causes serious harm to agriculture crops, livestock, or poultry; wildland trees, plants, waterways, or animals; or humans. Numerous insects live on, in, and around plants, animals, and humans in all environments. Many are harmless, while others can cause fatal destruction. Under some conditions, harmless insects already present can become hazardous. For example, severe drought conditions weaken trees and make them more susceptible to damage from insect attacks. The climate in Imperial County makes it possible for insects to reproduce with little natural interference to their propagation. Since much of Imperial County is agricultural, the probability of infestation is very high. An insect hazardous to crops, livestock, forest, or property can cost the County millions of dollars in lost revenue. Other pest infestations such as Hydrilla and Quagga mussels can affect waterways and water infrastructure, causing disruption to water supply flow and negatively affecting water quality.

Naturally Occurring Biological Threats

Public health-related hazards may be the result of a naturally occurring events or terrorism. Key hazards of concern to Imperial County today include risks from several infectious diseases and viruses. As discussed in the current Imperial County Multi-Jurisdiction Hazard Mitigation Update (2013), in 2003 the first evidence of West Nile virus in California was identified in mosquitoes collected in Imperial County near the Salton Sea. Several flocks of sentinel chickens from the same region were also positive for having West Nile virus. One case of West Nile virus was identified in 2006 in Imperial County. Since 2003, two human cases of infection with the West Nile virus have occurred in Imperial County. The two



Legend

- EPA Regulated Facilities
- Hazardous Waste Sites
- Cleanup Sites
- Hazardous Cleanup Sites

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0 5 10 20

Miles

Figure 2.8-1

Imperial County Renewable Energy and Transmission Element Update
Hazardous Materials

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mosquito species most likely to spread West Nile virus in the County are *Culex tarsalis* and *Culex pipiens*. Tuberculosis (TB) incidences in the states bordering Mexico, which include Imperial County, have been increasing due to Mexico's higher tuberculosis rate and frequent border crossings and travel in the U.S. for employment, commerce, health services, and leisure. Imperial County has also had at least one case each of Hantavirus and Lyme disease. Additionally, at least two confirmed deaths were due to the flu in Imperial County during the 2013-2014 flu season (County 2014).

Terrorism

Terrorists frequently use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism, and to get instant publicity for their causes. Terrorist acts or acts of war usually cause casualties, widespread property damage, fires, flooding, and other subsequent hazards. Terrorism can take many forms, including: chemical, biological, radiological, nuclear and explosive, and cyber-terrorism.

California has many favorable targets for terrorists; its diverse population and many amenities and venues make it an easy place to hide. California's Emergency Preparedness Planning effort has included responses to terrorism. Many terrorist events have occurred in California, but most involved bombings; however, there is also a concern for the potential of weapons of mass destruction (WMD) to be used in the future. The use of WMDs increases the potential for mass fatalities and destruction. Luckily, Imperial County has no history of incidents of chemical, biological, radiological, nuclear, or explosive terrorism; although, the County has been impacted by computer viruses and worms.

2.8.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

The MHMP is implemented by the County of Imperial, City of Brawley, City of Calexico, City of Calipatria, City of El Centro, City of Holtville, City of Imperial, City of Westmorland, the IID, and the Imperial County Office of Education (representing all of Imperial County's school districts) to reduce the impacts of natural and human-caused hazards. It contains goals, strategies, and actions for reducing future disaster losses. Potential renewable energy development projects would be required to align with the goals in that plan.

Any renewable energy project would be subject to all relevant federal, State, and local regulations regarding hazards and hazardous materials. Geothermal development would need to avoid geologic, soil, and hydrology hazards through seismic and subsidence monitoring, protection of surface and groundwater quality, and proper disposal of wastes and proper operating procedures including: appropriate routing of pipelines and electrical transmission lines; safe use of public roads for equipment transport; and maintaining an Emergency Response Plan covering incidents such as blow-outs, major fluid spills, earthquakes, fires, and other emergencies (ICPDS 2006).

As discussed in Section 2.6, AB 2205 (Chapter 253, Statutes of 2012) is a bill that identifies geothermal waste as a hazardous waste product and provides clarification on the existing regulatory framework for geothermal activities in California. Waste from geothermal facilities would be regulated by the Imperial County Health Department/Environmental Health Services (EHS) Division through the issuance of a Solid Waste Facilities Permit for any handling, processing, and disposal of wastes generated by geothermal power plants. Hazardous waste disposal is also reviewed by the Certified Unified Program Agency (CUPA), as applicable.

Constraints Due to Existing Conditions

Areas within Imperial County prone to lateral spreading, liquefaction, and subsidence should be avoided as suitable renewable energy sites. Areas within the seismic hazard mapping zone that are prone to seismic hazards such as subsidence should also be avoided for siting renewable energy facilities.

Opportunities

Areas with potential hazard risks other than geologic hazards would not hinder the siting and development of renewable energy sources.

2.9 HYDROLOGY AND WATER QUALITY

2.9.1 Introduction

This section of the Baseline analysis addresses potential impacts to water resources, water quality, and drainage in the County of Imperial. The environmental setting includes discussions of existing surface and groundwater resources, water quality issues, and drainage and flooding. Analysis of potential impacts that could result from implementing the proposed plan update and identification of feasible mitigation (general plan policies) to avoid or lessen potential environmental impacts conclude this section.

2.9.2 Terminology

The following is a summary of hydrology and water quality terminology discussed in this section.

- **Basin Plan** – water quality control plan
- **BFE** – Base Flood Elevation
- **BMP** – best management practice
- **Caltrans** – California Department of Transportation
- **CDFW** – California Department of Fish and Wildlife
- **C.F.R.** – Code of Federal Regulations
- **CLOMR** – conditional letter of map revision
- **Construction General Permit** – General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities
- **CWA** – Clean Water Act
- **DWQ** – drinking water quality
- **EO** – Executive Order
- **FEMA** – Federal Emergency Management Agency
- **FIRM** – Federal Insurance Rate Map
- **HA** – hydrologic area
- **HR** – hydrologic region
- **HSA** – hydrologic subarea
- **HU** – hydrologic unit
- **LID** – low-impact development
- **LUP** – Linear Utility Project
- **MS4** – municipal separate stormwater sewer system
- **NFIP** – National Flood Insurance Program
- **NPDES** – National Pollutant Discharge Elimination System
- **Porter-Cologne** – Porter-Cologne Water Quality Control Act
- **RWQCB** – Regional Water Quality Control Board
- **SFHA** – Special Flood Hazard Area
- **SWMP** – Storm Water Management Program
- **SWPPP** – Storm Water Pollution Prevention Plan
- **SWRCB** – (California) State Water Resources Control Board
- **TMDL** – total maximum daily load
- **USACE** – U.S. Army Corps of Engineers
- **USEPA** – U.S. Environmental Protection Agency

- **WDR** – waste discharge requirement

2.9.3 Regulatory Setting

This section describes federal, State, and local regulations applicable to hydrology and water quality. It also describes the existing environmental setting of the County of Imperial with regard to the surface water, groundwater, and water quality. A discussion of hydrology and water quality impacts is also provided, and mitigation measures are identified to address potential impacts.

Federal Laws and Requirements

Federal Clean Water Act of 1972

The Federal Clean Water Act of 1972 (CWA) is the basic federal law that addresses surface water quality control and protection of beneficial uses of water. The purpose of the CWA is to provide guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters through prevention and elimination of pollution. The CWA applies to discharges of pollutants into waters of the United States. The CWA establishes a framework for regulating stormwater discharges from municipal, industrial, and construction activities under National Pollutant Discharge Elimination System (NPDES) regulations. In California, the State Water Resources Control Board (SWRCB) administers the NPDES program. The following CWA sections are most relevant to the regulation of surface water in the County of Imperial.

CWA Section 303(d)

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two primary elements: 1) designated beneficial uses of waterbodies; and 2) criteria that protect the designated uses.

Under CWA Section 303(d), states, territories, and authorized tribes are required to develop a list of waterbodies that are considered to be "impaired" from a water quality standpoint. Waterbodies that appear on this list do not meet, or are not expected to meet, water quality standards even after the minimum required levels of pollution-control technologies have been implemented to reduce point sources of pollution. The law requires that respective jurisdictions establish priority rankings for surface waterbodies on the list and develop action plans, referred to as total maximum daily loads (TMDLs), to improve water quality. TMDL refers to the amount of a specific pollutant a river, stream, or lake can assimilate and still meet federal water quality standards as provided in the CWA. TMDL accounts for all sources of pollution, including point sources, nonpoint sources, and natural background sources.

The Section 303(d) list of impaired water bodies provides a prioritization and schedule for development of TMDLs for the State. SWRCB, in compliance with the Section 303(d) of the CWA (33 U.S. Code, Section 1313[d]), publishes the list of segments having limited water quality in California, which includes a priority schedule for the development of TMDLs for each contaminant or "stressor" impacting the water body (SWRCB 2011).

CWA Section 401

Every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain a CWA Section 401 Water Quality Certification for the proposed activity and comply

with State water quality standards prescribed in the certification. In California, these certifications are issued by SWRCB under the auspices of the Regional Water Quality Control Board (RWQCB). Most certifications are issued in connection with CWA Section 404 U.S. Army Corps of Engineers (USACE) permits for dredge and fill discharges.

CWA Section 402

CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the United States from any point source without obtaining an NPDES permit. SWRCB implements the NPDES and the State's water quality programs by regulating point-source discharges of wastewater and agricultural runoff to land and surface waters to protect their beneficial uses. To comply with the CWA water quality regulations, the various RWQCBs in California (nine regions) require permits for discharging or proposing to discharge materials that could affect water quality. SWRCB and its RWQCBs administer the NPDES permit program.

Although the NPDES permit program initially focused on point-source discharges of municipal and industrial wastewater that were assigned individual permits for specific outfalls, results of the Nationwide Urban Runoff Program identified contaminated stormwater as one of the primary causes of water quality impairment. To regulate runoff-related (nonpoint-source) discharges, the U.S. Environmental Protection Agency (USEPA) developed a variety of general NPDES permits for controlling industrial, construction, and municipal stormwater discharges.

SWRCB/RWQCB also regulates discharges to, and the quality of, groundwater resources through the issuance of Waste Discharge Requirements (WDRs). WDRs are issued to discharges that specify limitations relative to the Water Quality Control Plan for the Colorado River Region (SWQCB 2014).

CWA Section 404

Section 404 of the CWA establishes a permit program, administered by USACE, regulating discharge of dredged or fill materials into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. CWA Section 404 permits are issued by USACE.

Federal Antidegradation Policy

The federal antidegradation policy has been in existence since 1968. The policy protects existing uses, water quality, and national water resources. It directs states to adopt a statewide policy that includes the following primary provisions:

- maintain and protect existing instream uses and the water quality necessary to protect those uses

- where existing water quality is better than necessary to support fishing and swimming conditions, maintain and protect water quality unless the State finds that allowing lower water quality is necessary for important local economic or social development

- where high-quality waters constitute an outstanding national resource, such as waters of national and State parks, wildlife refuges, and waters of exceptional recreational or ecological significance, maintain and protect that water quality

Executive Order 11988 — Floodplain Management

Executive Order (EO) 11988 directs federal agencies to avoid, to the extent practicable and feasible, short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever a practicable alternative can be found. Further, EO 11988 requires the prevention of uneconomic, hazardous, or incompatible use of floodplains; protection and preservation of the natural and beneficial floodplain values; and consistency with the standards and criteria of the National Flood Insurance Program (NFIP).

The basic tools for regulating construction in potentially hazardous floodplain areas are local zoning techniques and Federal Emergency Management Agency (FEMA) floodplain mapping. The Federal Insurance Rate Map (FIRM) is the official map created and distributed by FEMA and NFIP that delineates Special Flood Hazard Areas (SFHAs) — areas that are subject to inundation by a base flood — for every county and community that participates in the NFIP. FIRMs contain flood risk information based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development.

For projects that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and, thus, result in the modification of the existing regulatory floodway, effective Base Flood Elevations (BFEs), SFHA, or conditional letter of map revision (CLOMR) would need to be prepared and approved by the California Department of Transportation (Caltrans), the County, and FEMA prior to any work occurring.

State Regulations and Policies

Porter-Cologne Water Quality Control Act of 1969

Division 7 of the California Water Code is the basic water-quality control law for California. This law is titled the Porter-Cologne Water Quality Control Act (Porter-Cologne). Porter-Cologne establishes a regulatory program to protect water quality and the beneficial uses of State waters.

Porter-Cologne is California's comprehensive water-quality control law. It requires the adoption of water quality control plans (basin plans) by the RWQCBs for watersheds within their regions. The basin plans are reviewed triennially and amended as necessary by the RWQCB, subject to the approval of the California Office of Administrative Law, SWRCB, and ultimately USEPA. Moreover, pursuant to Porter-Cologne, these basin plans become part of the California Water Plan when such plans have been reported to the legislature (California Water Code, Section 13141). Porter-Cologne also regulates river or stream crossings during road, pipeline, or transmission line construction that may result in a discharge into a State waterbody that is not considered to be under the jurisdiction of USACE.

In some cases, the RWQCB may issue WDRs under Porter-Cologne that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Statewide Construction General Permit

Dischargers whose projects disturb one or more acres of soil, or less than 1.0 acre but are part of a larger common plan of development that in total disturbs 1.0 or more acres, are required to obtain coverage under SWRCB Order 2012-0006-DWQ (amending Order 2009-0009-DWQ as amended by 2010-0014-DWQ), the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit). Construction activity subject to this permit also includes linear underground/overhead projects disturbing at least 1.0 acre. Construction and demolition activities subject to this permit include clearing, grading, grubbing, and excavation, or any other activity that results in a land disturbance equal to or greater than 1.0 acre.

Linear Utility Project (LUP) construction includes those activities necessary for installation of underground and overhead linear facilities (e.g., conduits; substructures; pipelines; towers and poles; cables and wires; connectors; switching, regulating, and transforming equipment; and associated ancillary facilities). LUP construction also includes those activities necessary for underground utility mark-out; potholing; concrete and asphalt cutting and removal; trenching, excavating, boring, and drilling; access road and pole/tower pad and cable/wire pull station construction; substation construction; substructure installation; tower footings and/or foundations construction; pole and tower installations; pipeline installations; welding; concrete and/or pavement repair or replacement; and stockpile/borrow locations. As Order 2003-0007-DWQ previously regulated LUP construction activities, these projects are now regulated by Attachment A of Order 2012-0006-DWQ.

Permit applicants are required to submit a Notice of Intent (NOI) to the SWRCB and to prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP identifies best management practices (BMPs) that must be implemented to reduce construction effects on receiving water quality based on potential pollutants. The BMPs identified are directed at implementing sediment- and erosion-control measures and other measures to control potential chemical contaminants. The SWPPP also includes descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases are completed at the site (postconstruction BMPs).

The Construction General Permit requires a risk-level assessment for construction sites, an active stormwater effluent monitoring and reporting program, rain event action plans, and numeric effluent limitations and numeric action levels for pH and turbidity.

Statewide Industrial General Permit

The SWRCB issued Water Quality Order 97-03-DWQ, NPDES General Permit No. CAS000001 WDRs for discharges of stormwater associated with industrial activities. This General Permit is intended to cover all new or existing stormwater discharges and authorized nonstormwater discharges from facilities required by federal regulations to obtain a permit, including those designated by the RWQCBs, facilities whose operators seek coverage under this General Permit, and facilities required by future USEPA stormwater regulations. Attachment 1 of the permit describes the types of facilities that are covered, summarized as follows:

- facilities that are subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 C.F.R. Subchapter N)

- manufacturing facilities

- mining/oil and gas facilities
- hazardous waste treatment, storage, or disposal facilities
- landfills, land application sites, and open dumps that receive industrial waste
- recycling facilities such as metal scrap yards, battery reclaimers, salvage yards, and automobile yards
- steam electric-generating facilities
- transportation facilities that conduct any type of vehicle maintenance such as fueling, cleaning, repairing, etc.
- sewage treatment plants
- certain facilities (often referred to as "light industry") where industrial materials, equipment, or activities are exposed to stormwater

Requirements of this permit include effluent limitations, receiving water limitations, SWPPP preparation, and stormwater monitoring programs. Facility operators must control pollutant discharges using the best available technology economically achievable and best conventional pollutant control technology. Discharges from facilities must not cause or contribute to a violation of an applicable water quality standard.

California Fish and Wildlife Code, Section 1602

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation pursuant to Section 1602 of the California Department of Fish and Game Code. Section 1602 makes it unlawful for an entity (i.e., any person, state, or local governmental agency or public utility) to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake without first notifying the California Department of Fish and Wildlife (CDFW) of such activity. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW Streambed Alteration Agreement (SAA) must be obtained for any project that would result in an impact to a river, lake, or stream that would adversely affect any fish or wildlife resource.

California Toxics Rule

Under the California Toxics Rule (CTR), USEPA has proposed water quality criteria for priority toxic pollutants for inland surface waters, enclosed bays, and estuaries. These federally promulgated criteria create water quality standards for California waters. The CTR satisfies CWA requirements and protects public health and the environment. USEPA and the SWRCB have the authority to enforce these standards, which are incorporated into the NPDES permits that regulate the current discharges of a particular project.

Regional and Local Requirements

Water Quality Control Plan for the Colorado River Basin

The Water Quality Control Plan for the Colorado River Basin (Basin Plan) sets forth water quality standards and control measures for surface and groundwaters of the Colorado River Basin. The County of Imperial is entirely within the Colorado River Basin. The Basin Plan designates beneficial uses for waterbodies and establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. State water quality standards also include a Nondegradation Policy. Water quality control measures include TMDLs, which are often, but not always, adopted as Basin Plan amendments. The Colorado River Basin RWQCB administers the Basin Plan for the region. Specifically, the Basin Plan is designed to accomplish the following:

- designate beneficial uses for surface and ground waters
- set the narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to California's antidegradation policy
- describe implementation programs to protect the beneficial uses of all water in the region
- describe surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan

The Basin Plan incorporates by reference all applicable SWRCB and RWQCB plans and policies. In addition to the Basin Plan, federal water quality standards for certain toxic pollutants apply to surface waters within California, including the Colorado River Basin. These standards are contained in the National Toxics Rule (40 C.F.R. 131.36) and the CTR. The SWRCB adopted a statewide implementation policy for the federal toxics standards. The federal standards have not yet been incorporated into the Basin Plan.

Phase II Small Municipal Separate Storm Sewer Systems General Permit

On April 30, 2003, the SWRCB issued a General Permit for the Discharge of Storm Water from Small Municipal Separate Stormwater Sewer System (MS4s) (Water Quality [WQ] Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities (population less than 100,000), including nontraditional Small MS4s, which are facilities such as military bases, public campuses, and prison and hospital complexes. The Phase II Small MS4 General Permit covers Phase II Permittees statewide. On February 5, 2013, the Phase II Small MS4 General Permit 2013-0001 DWQ was adopted; it became effective on July 1, 2013.

The Cities of Imperial, El Centro, Calexico, and Brawley and the County of Imperial are enrolled under the State Water Board General Order for Phase II MS4s. Permittees are required to comply with all provisions of the permit, including the following:

- Discharge prohibitions
- Effluent limitations
- Receiving-water limitations
- Program management element in Storm Water Management Program (SWMP)
- Education and outreach program

- Public involvement and participation program
- Illicit discharge detection and elimination
- Construction site stormwater runoff control program
- Pollution prevention/good housekeeping for permittee operations program
- Postconstruction stormwater management program
- Water quality monitoring
- Program effectiveness assessment and improvement
- TMDL compliance requirements
- Annual reporting program

The County of Imperial SWMP is designed to reduce the discharge of pollutants through its MS4s through the use of BMPs to the maximum extent practicable. The Small MS4 Permit requires postconstruction stormwater management programs, including the following measures:

- Site design measures
- Source control measures
- Low-impact development (LID) design standards
- Hydromodification measures
- Enforceable mechanisms
- Operation and maintenance of stormwater control measures
- Postconstruction BMP condition assessment
- Planning and development review process
- Postconstruction stormwater management requirements based on assessment and maintenance of watershed processes
- Alternative postconstruction stormwater management program

Hydromodification measures within the Colorado River Hydrologic Region (HR) would apply to projects that create and/or replace 1.0 acre or more of impervious surface. Those projects with no net increase in impervious surface are not required to comply. Applicable projects would be required to ensure that post-project runoff does not exceed estimated pre-project flow rate for the 10-year, 24-hour storm.

County of Imperial Flood Management Plan

The County of Imperial Department of Public Works (DPW) and the engineering departments of the incorporated areas are responsible for designing, constructing, and maintaining flood control facilities in their respective jurisdictions. These responsibilities include evaluation of proposed construction projects with regard to their potential to increase flood hazard. The County of Imperial Office of Emergency Services (OES) developed the Flood Management Plan (FMP) (County 2007a) to identify known flood problems, reduce flooding and flood hazards, and protect the beneficial functions of floodplains. The County of Imperial recognizes that flood management is a comprehensive process that requires constant planning and implementation of flood protection and mitigation measures, strict land use regulations and enforcement, and community-wide awareness and vigilance. Included in this FMP are the County of Imperial and Cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland, with participation and input from the Imperial Irrigation District, Imperial County School District, and the Salton Community Services District.

Imperial Irrigation District

The Imperial Irrigation District (IID) is an irrigation district organized under the California Irrigation District Law, codified in Section 20500 *et seq*. of the California Water Code. Critical functions of IID include diversion and delivery of Colorado River water to the Imperial Valley, operation and maintenance of the drainage canals and facilities including those in the study area, and generation and distribution of electricity. Several policy documents govern IID operations and are summarized below:

- The Law of the River and historical Colorado River decisions, agreements and contracts
- The Quantification Settlement Agreement (QSA) and Transfer Agreements (TAs)
- The Definite Plan, now referred to as the Systems Conservation Plan, which defines the rigorous agricultural water conservation practices being implemented by growers and IID to meet the QSA commitments
- The Equitable Distribution Plan, which defines how IID will prevent overruns and stay within the cap on the Colorado River water rights
- Existing IID standards and guidelines for evaluation of new development and define IID's role as a responsible agency and wholesaler of water
- Integrated Water Resources Management Plan (IWRMP), September 2009

In relation to the projects, IID maintains regulation over the drainage of water into their drains, including the design requirements of stormwater retention basins. IID requires that retention basins be sized to handle an entire rainfall event in case the IID system is at capacity. Additionally, IID requires that outlets to IID facilities be no larger than 12 inches in diameter and must contain a backflow prevention device (IID 2009).

2.9.4 Existing Environmental Setting

Surface Water

The major surface water features within the County of Imperial are the Colorado River and Salton Sea. Several small rivers and creeks occur within the County of Imperial; but only the San Felipe River, New River, and Alamo River are perennial. The County of Imperial is entirely within the Colorado River HR. Each HR is further divided into hydrologic units (HUs) that are defined as an entire watershed of one or more streams. The County of Imperial is composed of portions of the Imperial Reservoir HU, Salton Sea HU, Lower Colorado HU, San Felipe Creek HU, Carrizo Creek HU, and Southern Mojave HU (Figure 2.9-1). Each HU is divided into hydrologic areas (HAs), which are the major tributaries and/or major groundwater basins within the HU, and further subdivided into hydrologic subareas (HSAs), which are major subdivisions of HAs, including both water-bearing and nonwater-bearing formations.

Average annual precipitation for the Colorado River HR ranges from less than 3 inches along the eastern boundary near Imperial Valley to 25 inches in the mountain divide between the Salton Sea and Pacific Ocean drainages. Runoff occurs from winter precipitation, especially in the higher elevations, and from summer thunderstorms. The surface water that intermittently exists flows toward the Salton Sea and Colorado River.

The Colorado River Basin RWQCB divides the Colorado River HR into seven major planning areas based on economic and hydrologic characteristics. Only four of these planning areas lie within the County of Imperial: Anza-Borrego, Imperial Valley, East Colorado River, and Salton Sea (Figure 2.9-2). The Lucerne Valley planning area is entirely outside the County of Imperial. A very small portion of both Coachella Valley and Hayfield planning areas occur within the County boundaries, but they are not significant enough to warrant further discussion. Characteristics of each of the four Colorado River HR planning areas in the County of Imperial are described below.

Anza-Borrego Planning Area

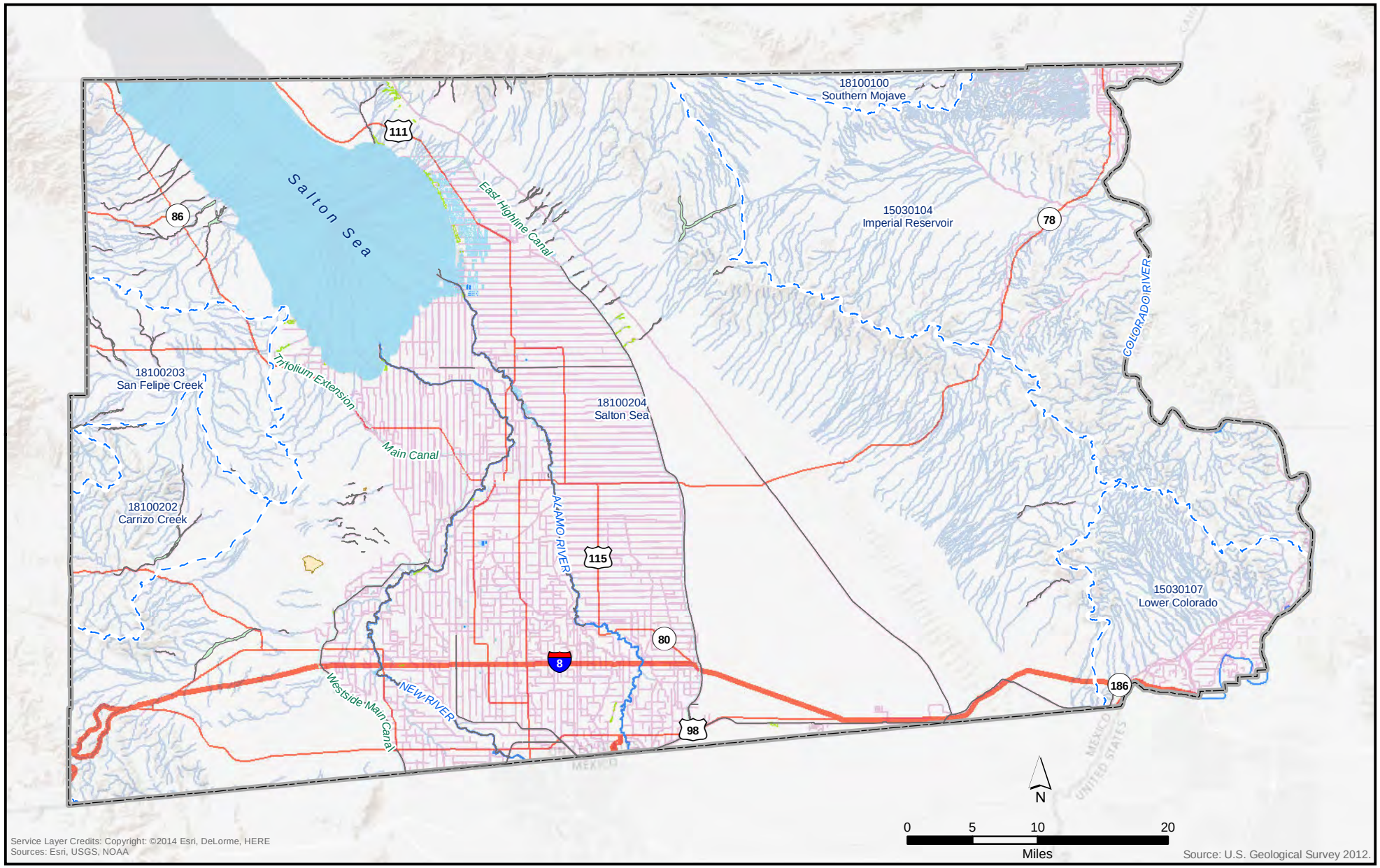
The Anza-Borrego Planning Area includes the Clark, West Salton Sea, and Anza-Borrego HUs. It comprises 1,000 square miles, mostly within San Diego and Imperial counties, with a small segment in Riverside County. Elevations in Imperial County range from 235 feet below sea level at the surface of the Salton Sea to 4,548 feet amsl at Blue Angel Peak. The principal communities in the planning area are Salton City and Borrego Springs. Drainage flows to the Salton Sea except for two small areas of internal drainage in Clark and Borrego valleys in the northwest corner of the planning area. Average annual precipitation ranges from less than 3 inches along the eastern boundary near Imperial Valley to 25 inches in the mountain divide between the Salton Sea and Pacific Ocean drainages. Runoff occurs from winter precipitation, especially in the higher elevations, and from summer thunderstorms. Perennial flow includes reaches of Coyote and San Felipe creeks (SWQCB 2014).

Imperial Valley Planning Area

The Imperial Valley Planning Area comprises 2,500 square miles in the southern portion of the Colorado River HU, almost all of it in Imperial County. A small portion in the southwestern part of the planning area lies within San Diego County. The easterly and westerly boundaries are contiguous with the westerly and easterly boundaries of the East Colorado River Basin and the Anza-Borrego Planning Area, respectively. Its northern boundary is along Salton Sea and the Coachella Valley Planning Area, and its southern boundary follows the international border with Mexico. The planning area's central feature is the flat, fertile Imperial Valley. The principal communities are El Centro, Brawley, and Calexico. Surface waters mostly drain toward the Salton Sea. The New and Alamo rivers convey agricultural irrigation drainage water from farmlands in the Imperial Valley, surface runoff, and lesser amounts of treated municipal and industrial waste waters from the Imperial Valley. The New River also contains agricultural drainage, treated and untreated sewage, and industrial waste discharges from Mexicali, Mexico. Average annual precipitation ranges from less than 3 inches over most of the planning area to approximately 8 inches in the Coyote Mountains on the western border. Colorado River water, imported via the All-American Canal, is the predominant water supply and is used for irrigation and industrial and domestic purposes (SWQCB 2014).

East Colorado River Basin Planning Area

The East Colorado River Basin Planning Area covers the eastern portion of San Bernardino, Riverside, and Imperial counties along the western bank of the Colorado River. The planning area is 200 miles long and 40 miles wide at its widest point. The area is characterized by desert valleys and low mountains that are generally less than 4,000 feet above sea level. The climate is arid, with average annual precipitation of 3 to 4 inches. Precipitation amounts are generally split, with half occurring during the summer and half occurring during the winter. All drainage flows to the Colorado River except for a minor amount that



Legend

- Hydrologic Unit
- Lake-Pond
- Playa
- Reservoir
- Swamp-Marsh
- Other Flowline Types (Pipeline, Connector, Canal Ditch, Artificial Path)
- Stream/River: Intermittent
- Stream/River: Perennial

Hydrologic Area

- Canal/Ditch
- Inundation Area
- Stream/River: Intermittent
- Stream/River: Perennial
- Wash

Figure 2.9-1

Imperial County Renewable Energy and Transmission Element Update
Surface Waters

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Date Saved: 1/6/2015, Author: msimmons

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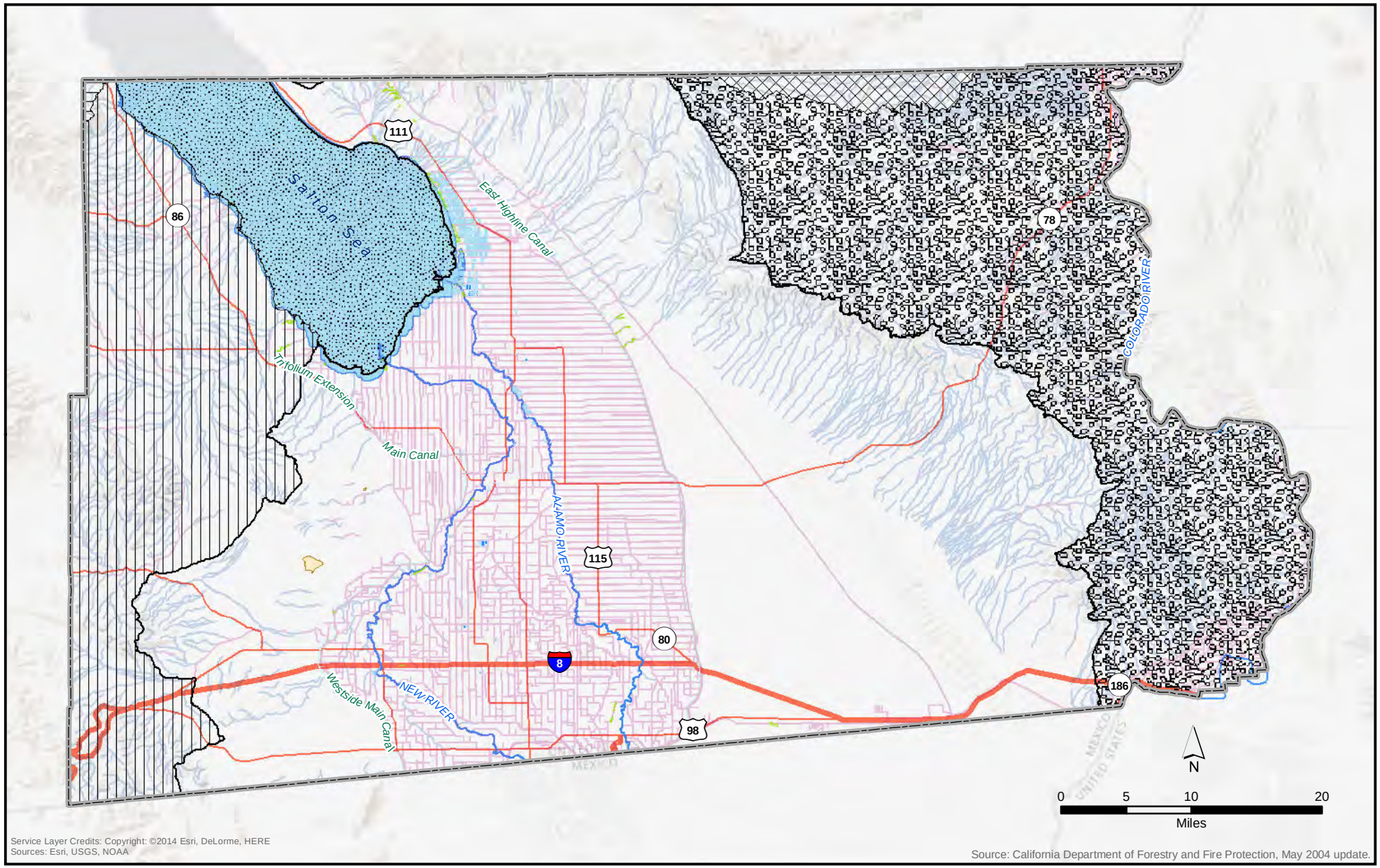

Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: California Department of Forestry and Fire Protection, May 2004 update.

Legend

- Lake-Pond
- Playa
- Reservoir
- Swamp-Marsh
- Other Flowline Types (Pipeline, Connector, Canal Ditch, Artificial Path)
- Stream/River: Intermittent
- Stream/River: Perennial

Hydrologic Planning Area

- Anza-Borrego
- Coachella Valley
- East Colorado Unit
- Hayfield
- Imperial Valley
- Salton Sea

Figure 2.9-2

Imperial County Renewable Energy and Transmission Element Update
Hydrologic Planning Areas

Name: 20674 Background Fig 2.9-2 Hydro Plan Areas.Mxd
Date Saved: 1/6/2015, Author: msimmons

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flows into the Colorado River aqueduct via Gene Wash and Copper Basin reservoirs. Perennial surface flow is limited to the Colorado River and Piute Creek; however, Piute Creek infiltrates into the ground after approximately 1 mile of perennial flow (SWQCB 2014).

The major beneficial uses for the region are presently agricultural uses, municipal and industrial uses, and recreational uses. For specific beneficial uses of the various HAs, refer to the Water Quality Control Plan for the Colorado River Basin (SWQCB 2014).

Salton Sea Planning Area

The Salton Sea Planning Area consists entirely of the Salton Sea. The Salton Sea is a saline body of water in a natural sink that is being replenished predominantly by farm drainage and seepage, with occasional inputs from stormwater runoff. The Salton Sea fluctuates in size and capacity but is currently about 35 miles long and 15 miles wide, occupies 376 square miles, and contains about 7.5 million acre-feet of water (DRECP 2014). The surface elevation is 235 feet below mean sea level. The climate is arid, and the average annual precipitation is 2.6 inches. During larger storm events, runoff from adjacent planning areas, Coachella Valley, Anza-Borrego, and Imperial Valley drain into the Salton Sea (SWQCB 2014).

Groundwater

The Colorado River HR is underlain by some 64 groundwater basins/subbasins covering approximately 8.68 million acres, or 26 percent of the HR. Within the HR, 8 percent of domestic and agricultural supply is drawn from groundwater resources. In some larger basins, particularly near dry lakes, aquifers may be separated by aquitards that create confined groundwater resources. Groundwater in most of the smaller basins is found in unconfined alluvial aquifers (DWR 2003)(Figure 2.9-3). Groundwater conditions of the four Colorado River HR planning areas are described below.

Anza Borrego Planning Area

The Anza-Borrego Planning Area groundwater is pumped principally from the unconsolidated Pleistocene sediments, but some is pumped from low-yield wells that extend to weathered and fractured bedrock. Groundwater flows in the same general direction as surface water to Clark Lake, Borrego Sink, and the Salton Sea; however, this subsurface flow is affected by pumping and may be impeded by faults. Approximately 10,000 acre-feet of subsurface flow reaches the Salton Sea annually. A safe yield of 22,000 acre-feet/year is estimated for the planning area. Storage capacity of the groundwater basin is estimated at 7 million acre-feet (SWQCB 2014).

Imperial Valley Planning Area

The Imperial Valley Planning Area groundwater is stored in the Pleistocene sediments of the valley floor, the mesas on the west, and the East Mesa and sand hills on the east; however, the fine-grained lake sediments in the central portion of Imperial Valley inhibit groundwater movement, and tile-drain systems are used to dewater the sediments to a depth below the root zone of crops and to prevent the accumulation of saline water on the surface. Few wells have been drilled in these lake sediments because the yield is poor and the water is generally saline. The few wells in the Imperial Valley are for domestic use only. In the Coyote Wells Hydrologic Subunit and Davies HU, which are at higher elevations, the water yield from wells is higher; and the waters are of lower salt concentration. Groundwater is the main water supply in those areas. Factors that diminish groundwater reserves are

consumptive use, evapotranspiration, evaporation from soils where groundwater is near the surface, and losses through outflow and export (SWQCB 2014).

East Colorado River Basin Planning Area

Groundwater from the East Colorado River Basin Planning Area is generally unconfined in all four HUs of the planning area; however, some confined zones probably exist in the more than 700 feet of alluvial sediments that form the aquifers in three of the units. Some subsurface water probably enters the planning area from other than the Colorado River; however, no data is available upon which to base an estimate. The subsurface inflow from Nevada into the Piute Hydrologic Subunit and from the Chuckwalla and Rice HUs into the Palo Verde and Vidal Hydrologic Subunits, respectively, may be significant in terms of the limited capacity of these subunits. Approximately 10,000 acre-feet of precipitation deep-percolates annually. The combined total storage capacity of all HUs is approximately 35 million acre-feet within a selected 200-foot zone that lies above the base of the deepest well in each HU. In three HUs, wells are 300 feet or more deep (SWQCB 2014).

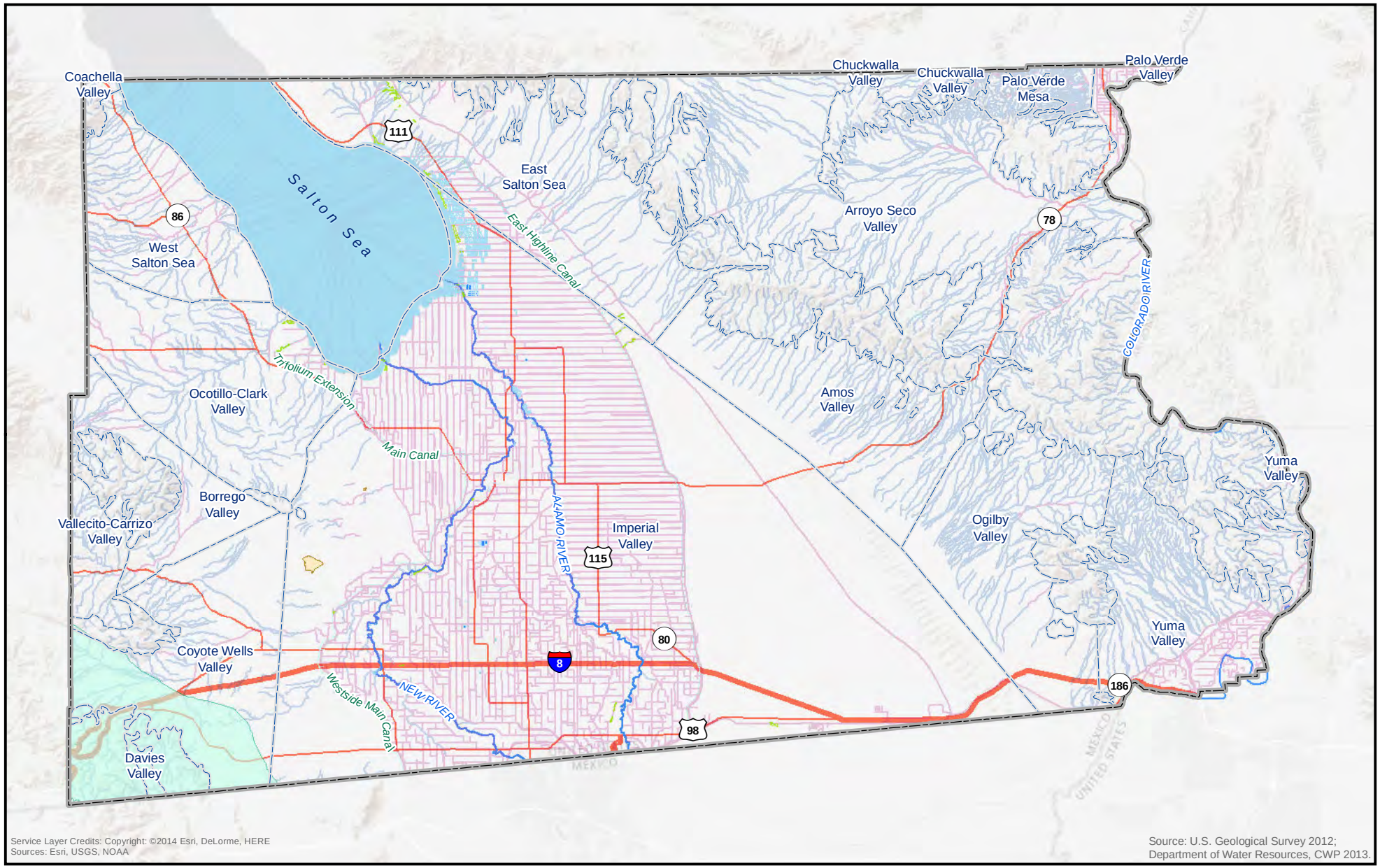
Salton Sea Planning Area

The Salton Sea Planning Area does not have a delineated groundwater basin.

Water Quality

Surface Water Quality

Untreated or inadequately treated stormwater runoff can contain a number of pollutants that may eventually flow to receiving waters. Rapid growth and urbanization have placed increased pressure on water resources and resulted in local impacts to water quality, especially in the urbanized portions of the County of Imperial. In general, urbanization increases the amount of pollutants generated by human activities within a watershed and increases the amount of impervious surfaces, thus reducing the amount of water that would normally infiltrate into the soil and be filtered naturally. Pollutants such as motor oil, antifreeze, sediment, heavy metals, fertilizers and pesticides, and bacteria and viruses can be transported to surface waters in stormwater runoff. The stormwater conveyance system is not connected with the sanitary sewer system; therefore, unless adequate BMPs are incorporated, urban runoff can affect surface water and groundwater quality. Intense agriculture within the County results in runoff with varying levels of agricultural chemicals, fertilizers, and pesticides. Agricultural practices must be tailored to reduce the amount of these chemical residues in runoff.



Legend

- Groundwater Basin
- Lake-Pond
- Playa
- Reservoir
- Swamp-Marsh
- Other Flowline Types (Pipeline, Connector, Canal Ditch, Artificial Path)
- Stream/River: Intermittent
- Stream/River: Perennial
- Ocotillo-Coyote Wells Aquifer

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Figure 2.9-3

Imperial County Renewable Energy and Transmission Element Update
Groundwater Basins

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The Colorado River HR contains waterbodies that do not meet the water quality objectives and do not support the beneficial uses as defined in the Basin Plan. These waterbodies are designated as impaired under CWA Section 303(d). Table 2.9-1 shows the CWA Section 303(d) listed waterbodies within the County of Imperial.

Table 2.9-1: Impaired Waters within Imperial County

COLORADO RIVER BASIN HYDROLOGIC REGION		
Water Body	**Pollutant/Stressor**	**Hydrologic Unit**
Alamo River	chlordane, chlorpyrifos, DDT, diazinon, dieldrin, endosulfan, Enterococcus, E. coli, mercury, PCBs, selenium, toxaphene	Imperial
Coachella Valley Storm Water Channel	DDT, dieldrin, PCBs, pathogens, toxaphene	Whitewater
Colorado River (Imperial Reservoir to California/Mexico Border)	selenium	Yuma
Imperial Valley Drains	chlordane, DDT, dieldrin, endosulfan, PCBs, sedimentation/siltation, selenium, toxaphene	Imperial
New River	chlordane, chloroform, chlorpyrifos, copper, DDT, diazinon, dieldrin, hexachlorobenzene, mercury, nutrients, organic enrichment, PCBs, pathogens, selenium, toxaphene, toxicity, trash, zinc	Salton Sea
Palo Verde Outfall Drain and Lagoon	DDT, pathogens, toxaphene	Colorado
Salton Sea	arsenic, chlorpyrifos, DDT, Enterococcus, nutrients, salinity, selenium	Salton Sea
Wiest Lake	DDT	Imperial

Waterbodies listed as impaired under the CWA Section 303(d) require the development of TMDLs to establish priority rankings and control plans. TMDLs provide the method to attain and maintain the established water quality objectives and beneficial uses. The SWRCB and USEPA-approved TMDLs in the Colorado River HR are as follows:

- Alamo River Sedimentation/Siltation TMDL (approved on June 28, 2002)
- New River Pathogen TMDL (approved on August 14, 2002)
- New River Sedimentation/Siltation TMDL (approved on March 31, 2003)
- New River Trash TMDL (approved on September 24, 2007)
- Imperial Valley Drains Sedimentation/Siltation TMDL (approved on September 30, 2005)
- Coachella Valley Stormwater Channel Bacterial Indicators TMDL (approved on April 27, 2012
- New River Dissolved Oxygen TMDL (approved on November 16, 2012)

The following are TMDL projects in development:

- Alamo and New River Chlorpyrifos and Diazinon TMDL
- Palo Verde Outfall Drain and Lagoon DDT and Toxaphene TMDL
- Salton Sea Nutrient TMDL
- Imperial Valley Chlordane, DDT, Dieldrin, PCB, and Toxaphene TMDL

Groundwater Quality

The chemical character of groundwater in the Colorado River HR is variable. Cation concentration is dominated by sodium, with calcium common and magnesium appearing less often. Bicarbonate is usually the dominant anion, although sulfate and chloride waters are also common. In basins with closed drainages, water character often changes from calcium-sodium bicarbonate near the margins to sodium chloride or chloride-sulfate beneath a dry lake. It is not uncommon for concentrations of dissolved constituents to rise dramatically toward a dry lake where saturation of mineral salts is reached. The total dissolved solids content of groundwater is high in many of the basins in this region. High fluoride content is common; sulfate content occasionally exceeds drinking water standards; and high nitrate content is common, especially in agricultural areas (DWR 2003).

Two of the primary challenges in the Colorado River HR are overdraft in the Coachella Valley and leaking underground storage tanks. USEPA has not yet placed any contamination sites in this HR on the Superfund National Priorities List; however, one site is under consideration because of high pesticide levels (DWR 2003).

From 1994 to 2000, 314 public supply wells were sampled throughout the Colorado River HR; 14 percent of all wells had constituents that exceeded one or more State-defined mean concentration limits for drinking water. The exceedances were caused by constituents that were characterized as radiological (47 percent), inorganic (39 percent), or nitrates (14 percent) (DWR 2003).

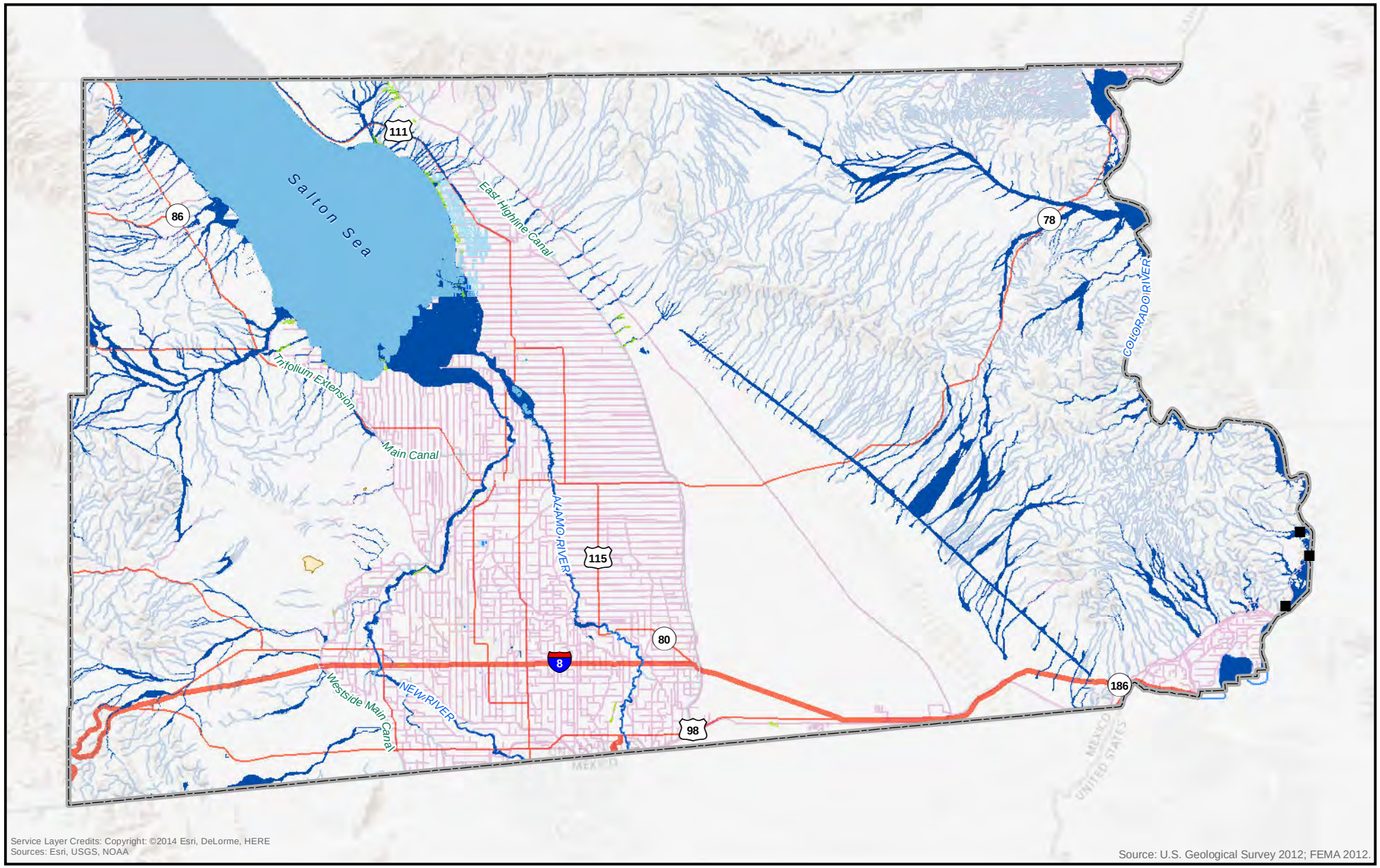
Flood Hazards and Flood Control

The County of Imperial developed the Flood Management Plan (County 2007a) to identify known flood problems, reduce flooding and flood hazards, and protect the beneficial functions of floodplains. Due to arid climate and low permeability of the dry desert soils within the County, the interspersed heavy rains result in a medium to high hazard rating for flooding within the floodplains. Both flash flood and slow-rise flood events occur in the County of Imperial. The desert areas are subject to frequent flash flood events with little or no warning. These flood flows roughly follow dry stream beds and mountain washes, inundating floodplains or floodways. Floodplains are generally located adjacent to rivers or other bodies of water and, in low-lying areas, near a water source. Floodways are defined as discernible drainage channels.

Since 1950, eight federal declarations of a state of emergency due to flooding have been made. More than $760,000 in flood insurance claims have been made by County of Imperial residents, not including damage to County of Imperial infrastructure such as roads, culverts, and utilities (County 2007a). To reduce the flood risk, communities that have joined the NFIP are required to implement minimum floodplain management standards. New development in areas designated as SFHAs cannot increase the flood risk and must protect existing and new buildings from floods. Figure 2.9-4 shows the FEMA FIRM floodzones for the 100-year flood and existing dams within the County of Imperial.

Stormwater Drainage and Management

A vast amount of the County of Imperial is rural land that does not support or require stormwater drainage facilities. In contrast, most urban areas within the incorporated areas of the County have a range of stormwater drainage facilities that convey surface water runoff to the area's waterbodies, the Salton Sea, or the Colorado River.



Legend

- FEMA 100-year Floodzone
- Lake-Pond
- Playa
- Reservoir
- Swamp-Marsh
- Other Flowline Types (Pipeline, Connector, Canal Ditch, Artificial Path)
- Stream/River: Intermittent
- Stream/River: Perennial
- Dam

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Figure 2.9-4
Imperial County Renewable Energy and Transmission Element Update
FEMA 100-Year Floodzones

Name: 20674 Background Fig 2.9-4 FEMA Floodzones.Mxd
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Each jurisdiction within the County requires implementation of stormwater pollution prevention efforts such that conveyance systems are designed to protect the surface water and groundwater quality as mandated by State and federal regulations. These regulations require a multifaceted approach that involves infrastructure improvements and maintenance; water quality monitoring; source identification of pollutants; land use planning policies and regulations; and pollution prevention activities such as education, code enforcement, outreach, public advocacy, and training.

2.9.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Hydrology- and water-quality-related regulatory requirements define the method by which a project can be implemented without negative impacts to sensitive resources. The basic premise for all of the regulatory constraints is the protection of water resources. Proposed development is required to implement measures to the maximum extent practicable to prevent potential impacts. The primary beneficiaries of water quality protection are the communities that use the resources.

Constraints Due to Existing Conditions

The prominent issues in the County's existing conditions as they relate to hydrology and water quality are the various impairments of the waterbodies, as shown in Table 2.9-1; the increasing salinity and impairments of the Salton Sea; and the limited water supply of the Colorado River. Proposed projects would be required to imbed the protection of water quality and hydrology and the conservation of water supplies into their plans.

Opportunities

Hydrology and water quality constraints vary depending on individual project design; but numerous opportunities exist to integrate natural, vegetated LID features and postconstruction BMPs into project plans and landscape designs that will achieve compliance with hydrology and water quality regulations while enhancing the beneficial uses of receiving waterbodies. Examples are as follows:

- Projects with increases of impervious surfaces can result in increases to runoff volumes and rates that can impact water quality and hydrology. Runoff can be reduced or eliminated through resourceful and creative project design. Incorporating landscaping and using pervious surfaces for recreational areas and paths can reduce hardscape and the need for large flood management BMPs. Proposed projects could provide an opportunity to incorporate aesthetically pleasing vegetated systems into landscape areas that accept and treat runoff while blending with the local environment.

- Adequate depth to groundwater and well-drained soils are needed for the proper functioning of stormwater treatment devices that employ infiltration as a design element. Alternative noninfiltration-type BMPs or engineered soils and underdrains may be needed. Space that may be needed for large-footprint BMPs (such as detention basins) to address flood management and hydromodification impacts could be divided among multiple smaller scale and/or linear BMPs to achieve hydromodification impact mitigation objectives. Smaller scale systems such as bioretention cells and vegetated or cobble swales can integrate with landscape and recreational designs while providing for flood control and hydromodification management. Incorporating

permeable pavement and other pervious areas that accept stormwater runoff can also reduce runoff volumes while creating a more aesthetically pleasing design.

- Achieving water quality objectives for runoff pollutants expected from proposed project areas could be met through creative site design for pollutant treatment management to meet current State and local regulatory standards. The same would be true for strategically managing runon flow contributions and associated pollutants. By integrating natural, aesthetically pleasing systems that treat runoff, regulatory compliance could be achieved while providing educational and recreational opportunities.

- Cost of maintaining hydromodification management and LID systems is a principal concern because maintenance is required in perpetuity to ensure proper functioning throughout the life of a project. Ongoing BMP maintenance needs and associated costs should be evaluated prior to project design and BMP selection. BMPs effective at removing pollutants of concern that offer lower anticipated maintenance should be targeted. Ongoing maintenance costs should be projected and planned for accordingly.

- Drainage and LID features would need to be designed and located to avoid sensitive areas to alleviate soil/sand loss and structural degradation. Where opportunities exist, LIDs can mitigate existing erosion or stability problems while providing environmental benefit.

2.10 LAND USE AND PLANNING

2.10.1 Introduction

This section discusses the existing and planned land uses in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for the purpose of siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.10.2 Terminology

The following is a summary of land use terminology discussed in this section:

- **Area of Critical Environmental Concern (ACEC)** – Certain lands managed by the U.S. Bureau of Land Management (BLM) have been designated ACECs. ACECs are areas that contain significant natural, archeological, or historical resources.

- **Environmental Impact Report (EIR)** – A document required under CEQA that assesses the impacts a proposed project would have on the environment and proposes mitigation measures. An EIR is used to inform decision makers and the public of the potential environmental impacts and mitigation measures associated with a proposed project.

- **Environmental Impact Statement (EIS)** – A document required by the federal National Environmental Policy Act (NEPA) for proposed actions including major projects or legislative proposals using federal money that significantly affect the environment. An EIS describes the environmental implications of the proposed action and lists alternative actions. An EIS is used to inform decision makers and the public of the alternatives that would avoid or minimize adverse impacts or enhance the quality of the environment associated with the action.

- **Known Geothermal Resource Area (KGRA)** – Pursuant to 30 U.S.C. 1001, a KGRA is defined as an area in which the geology, nearby discoveries, competitive interests, or other indicia would, in the opinion of the Secretary of the Department of the Interior, engender a belief in men who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose.

2.10.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to land use.

National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) is a federal law under the jurisdiction of the Environmental Protection Agency (USEPA) that requires federal agencies to consider environmental values in the decision-making process. The federal agencies must consider environmental impacts and consequences of proposed actions and reasonable alternatives that could potentially reduce impacts (USEPA 2014a).

California Environmental Quality Act

CEQA is a State document that is part of the California Code of Regulations. CEQA requires projects to undergo environmental review; depending on the potential effects, a more substantial review may need to be conducted in the form of an Environmental Impact Report (EIR). In an EIR, mitigation measures are proposed for any potentially significant impacts in order to reduce the level of impact, and feasible alternatives are considered (CNRA 2014). The County and consultant team will prepare a Programmatic EIR pursuant to CEQA Guidelines, Section 15168. Completion of the Programmatic EIR would allow future individual renewable energy projects to "tier" off this environmental document. Future renewable energy projects would be implemented on a "project-by-project" basis based on County approval of individual renewable energy projects. Future renewable energy projects would need to be reviewed in the context of this Programmatic EIR to determine if additional environmental documentation would be required.

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) provides decision makers with data regarding important farmland, including maps that identify important farmland. These *Important Farmland Maps* identify land based on the quality of soils and land use information. The FMMP website provides the most up-to-date information on farmland in California. The FMMP was established in 1982 and established categories of important farmland including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, and Other Land (FMMP 2004).

Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act (SMARA) of 1975 provides policies and regulations regarding surface mining operations, as well as encouraging the preservation of the State's mineral resources. The SMARA general provisions are set forth in Public Resources Code, Division 2, Chapter 9, Section 2710 *et seq*. The regulations include providing a reclamation plan for surface mining operations as well as outlining practices to comply with during surface mining operations (SMARA 2012).

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is a joint powers authority that was established in 1965. Federally, SCAG is a Metropolitan Planning Organization; under State law, it is a Regional Transportation Planning Agency and a Council of Governments. SCAG includes Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. SCAG's responsibilities include developing long-range regional transportation plans, including the consideration of sustainable growth, growth forecasting, housing needs, and transportation improvement (SCAG 2014).

Imperial County Local Agency Formation Commission

The Imperial County Local Agency Formation Commission (LAFCO) is an independent organization that is responsible for reviewing and either approving or denying any plans regarding boundary changes, city annexations, consolidations, special district formations, incorporation for cities and special districts, and sphere of influence boundaries. The Imperial County LAFCO is responsible for the implementation of the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (ICLAFCO 2014).

Imperial County General Plan

The purpose of the County of Imperial General Plan is to guide growth throughout the County. Under the General Plan, urban development is directed to areas where infrastructure exists or can be provided and where public health and safety hazards are limited. Development should avoid natural, cultural, and economic resources.

The County of Imperial General Plan includes 10 elements: *Land Use; Housing; Circulation and Scenic Highways; Noise; Seismic and Public Safety; Conservation and Open Space; Agricultural; Geothermal/Alternative Energy and Transmission; Water; and Parks and Recreation*. Together, these elements satisfy the California Government Code requirements for general plan elements. Each element includes goals, objectives, and implementing policies and action programs.

The revised *Land Use Element* was approved by the County Board of Supervisors on January 29, 2008. The revised *Land Use Element* provides information on the existing land uses in the County as well as goals and objectives for future growth within the County. Specific goals in the *Land Use Element* include the following:

> *Goal 1:* Preserve commercial agriculture as a prime economic force.
>
> *Goal 2:* Diversify employment and economic opportunities in the County while preserving agricultural activity.
>
> *Goal 3:* Achieve balanced economic and residential growth while preserving the unique, natural, scenic, and agricultural resources of Imperial County.
>
> *Goal 4:* Preserve and enhance distinctive historic desert towns and newer communities.
>
> *Goal 5:* Encourage the compatible development of a variety of housing types and densities to accommodate regional population projections and special housing needs.
>
> *Goal 6:* Promote orderly industrial development with suitable and adequately distributed industrial land.
>
> *Goal 7:* Identify and protect areas of regionally-significant mineral resources which are in locations suitable for extractive uses.
>
> *Goal 8:* Coordinate local land use planning activities among all local jurisdictions and State and federal agencies.
>
> *Goal 9:* Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality (ICPDS 2008b).

Bureau of Land Management

The Bureau of Land Management (BLM) operates under the Department of the Interior to manage 15.2 million acres of public land in California. BLM's Strategic Framework is centered on sustainability, heritage, and community, which guide BLM in its long-term management of public lands. Under its commitment to sustainability, BLM is working to facilitate the development of solar, wind, and

geothermal energy projects on BLM land, including the implementation of the Desert Renewable Energy Conservation Plan (DRECP). Imperial County is located within the BLM California Desert District with a field office in El Centro (BLM 2014).

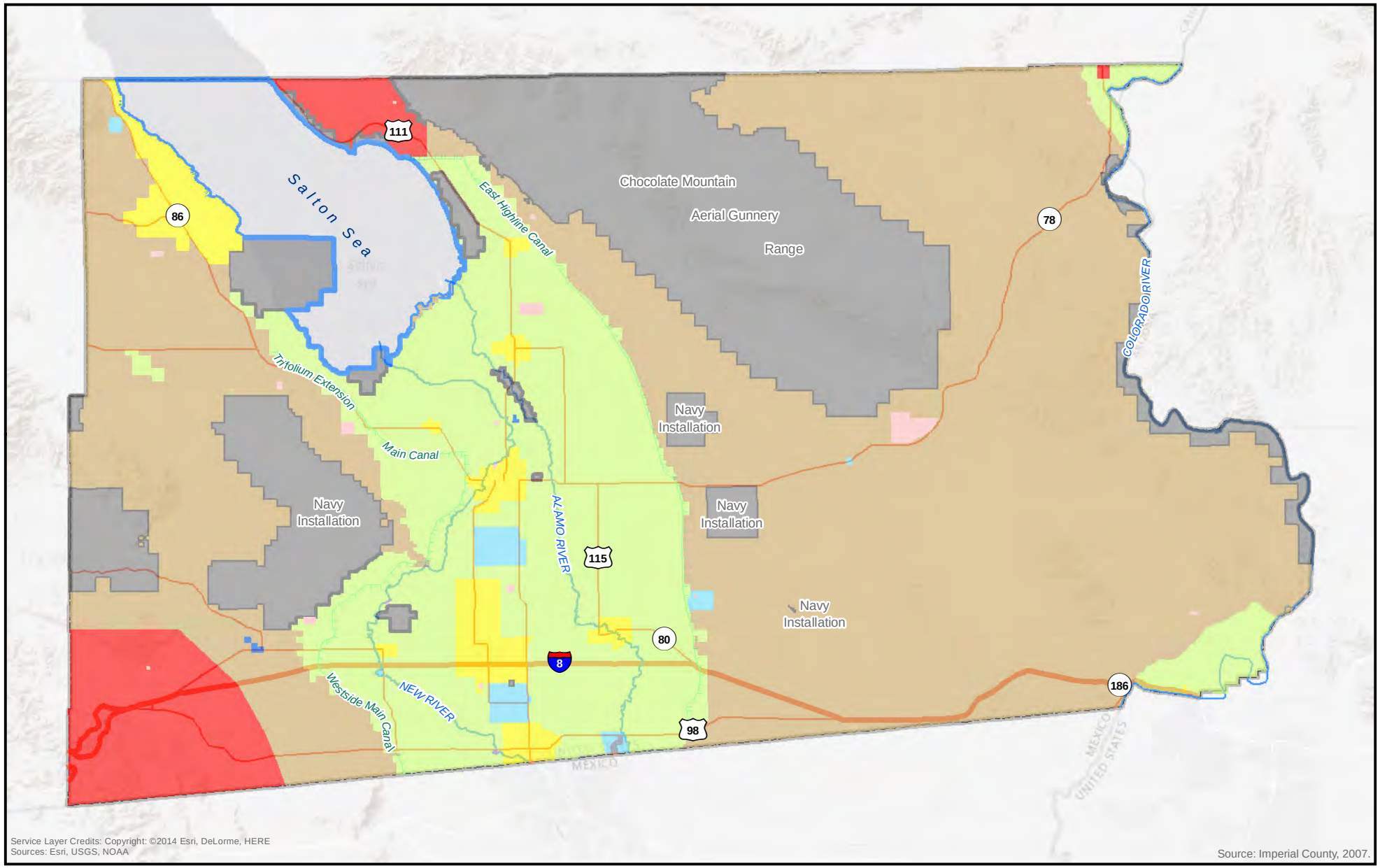
Naval Air Facility El Centro Joint Land Use Study

The Naval Air Facility El Centro (NAFEC) Joint Land Use Study was developed by the NAFEC in coordination with the City of El Centro, the City of Imperial, and Imperial County. The Joint Land Use Study identifies noise contours where military training operations could affect noise levels in the surrounding vicinity. In addition, NAFEC range compatibility zones (RCZs) are identified to define areas that could be impacted by NAFEC operations and may have restricted uses in order to protect public safety and welfare. Military Training Routes (MTRs) are identified to outline areas where low-level and high-speed flight operations may occur. The Air Installations Compatible Land Use Zones Program is identified in the Joint Land Use Study as a federal program that involves the coordination efforts between base commanders, local community leaders, and local government agencies to determine compatible land use developments that protect public safety (NAFEC 2014).

2.10.4 Existing Environmental Setting

Imperial County is located within the southeastern corner of California. The County is surrounded by Riverside County to the north, the Colorado River and the State of Arizona to the east, the International Boundary with the Republic of Mexico to the south, and San Diego County to the west. The County covers an area of approximately 2,942,080 acres (ICPDS 2009).

Eight land use designations within the County are currently discussed in the General Plan *Land Use Element* (Figure 2.10-1). Table 2.10-1 provides a list of the land uses and their associated acreage and percentages in relation to the total acreage of the County.



Legend

Land Use

- Agriculture
- Community Area
- Government/Special Public
- Industry
- Recreation/Open Space
- Salton Sea
- Special Purpose Facility
- Specific Plan Area
- Urban Area

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Figure 2.10-1

Imperial County Renewable Energy and Transmission Element Update
Existing General Plan/Land Use

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Date Saved: 1/6/2015, Author: msimmons

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Table 2.10-1: Imperial County Land Use Distribution (Acres*)

Land Use	Area (acres)	Percentage
Agricultural	551,280.30	19.23%
Community Areas	138,594.44	4.84%
Government/Special Public	554,026.44	19.33%
Industry	686.40	0.02%
Recreation/Open Space/Preservation	1,343,931.03	46.89%
Salton Sea*	171,682.08	5.99%
Special Purpose Facility	7,620.75	0.27%
Specific Plan Area	17,696.85	0.62%
Urban Area	80,899.36	2.82%
Imperial County Total	2,866,418.00	100.00%
*All acreages have been rounded to the nearest hundredth. Source: Imperial County, 2007		

Agricultural

Agricultural production has been a major economic industry in Imperial County over the years. Agricultural land use designation is reserved for areas where the County would like to preserve lands for agricultural production and related industries. This designation includes most of the central irrigated area of the County known as the Imperial Valley, the Bard/Winterhaven Valley, and the southern end of the Palo Verde Valley.

No land shall be removed from the Agricultural designation except for annexation to a city, where needed for use by a public agency, for geothermal purposes, where a mapping error may have occurred, or where a clear long-term economic benefit to the County can be demonstrated through the planning and environmental review process (ICPDS 2008b).

Community Area

Land use within the Community Area designation is associated with the unincorporated communities of Bombay Beach/Hot Mineral Spa, Ocotillo/Nomirage, and Palo Verde. Land uses in this designation consist of low density, second home and retirement dwellings, and recreational services. These areas tend to have a rural orientation and include small local- and tourist-serving central business districts.

<u>Bombay Beach/Hot Mineral Spa</u>

Bombay Beach has two distinct areas known as Bombay Beach “South” and Bombay Beach “North.” Bombay Beach “South” consists of all of the lots south of First Street to Fifth Street. The land uses of Bombay Beach “South” consist primarily of single-family homes, including a significant number of mobile homes, and commercial uses. Bombay Beach “North” consists of approximately 99.1 developable acres north of First Street and south of SR-111. The land within Bombay Beach “North” was approved for 280 residential units and commercial and recreational uses under the Bombay Beach Specific Plan. Land uses in Hot Mineral Spa consist of mobile home and recreational vehicle parks, aquaculture businesses, and sand and gravel operations (ICPDS 1999). The Bombay Beach/Hot Mineral Spa Community Area Plan defines eight land use designations including: Low Density Residential - Bombay Beach, Medium Density

Residential - Bombay Beach, Low Density Residential - Hot Mineral Spa, Neighborhood Commercial, General Commercial, Heavy Industry, Government/Special Public, and Recreation/Open Space.

Ocotillo/Nomirage

The Ocotillo/Nomirage Community Area Plan comprises approximately 108,000 acres of land under the jurisdiction of BLM, State land, and private land. Approximately 15,000 acres are privately owned. The townsite of Ocotillo contains approximately 575 acres; Nomirage contains approximately 225 acres. Eleven land use designations are defined in the Ocotillo/Nomirage Community Area Plan including: Desert Residential, Low Density Residential, Residential, Commercial, Recreation, Light Industry, Special Purpose Facility, Government/Special Public, Open Space, Floodway, and Earthquake Fault (ICPDS 1994a).

Palo Verde

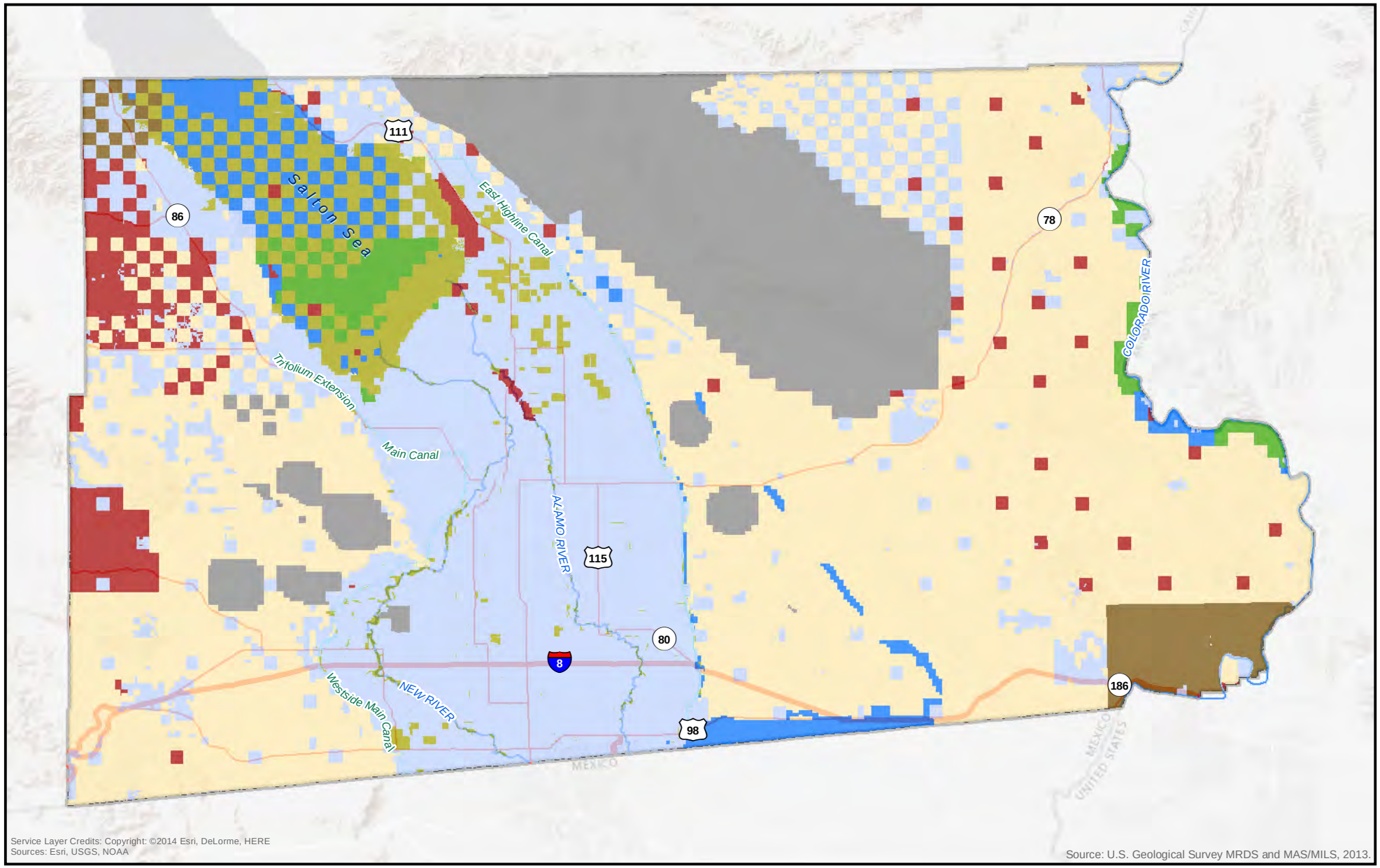
The largest use of land within the Palo Verde Community Area is agricultural. Most of the residential development in the planning area is concentrated in the Palo Verde townsite. The Palo Verde Community Area Plan defines eight land use designations including: Low Density Residential, Medium Density, High-Density Residential, Neighborhood Commercial, General Commercial, Recreation, Medium Agriculture, and Government/Special Public. Outside the Palo Verde Community Area Plan, the County General Plan designation is Agriculture, generally following the Palo Verde Irrigation District service area. According to the Palo Verde Community Area Plan, this area should also remain in agricultural uses, with a 40-acre minimum lot size (ICPDS 1998).

Government/Special Public

Lands with the Government/Special Public designation are generally owned by public agencies and used for a specific governmental purpose. Included in this designation are military bases, schools or school-related facilities, and public parkland. The designation may also be applied to airports, sewers and water facilities, cemeteries, and other public utilities and facilities. The County has no jurisdiction over federally owned lands except for permitting SMARA projects and groundwater wells (exploration and production/extraction). The use and intensity on such lands will be determined in conjunction with the appropriate federal agency. Table 2.10-2 and Figure 2.10-2 provide a depiction of land ownership in the County.

Table 2.10-2: Land Ownership in Imperial County

Agency	Area (acres)	Percentage of Imperial County
Bureau of Indian Affairs	59,977.59	2.09%
Local Government	89,932.29	3.14%
State	108,681.64	3.79%
U.S. Bureau of Land Management	1,244,544.67	43.40%
U.S. Bureau of Reclamation	97,030.64	3.38%
U.S. Department of Defense	349,443.74	12.19%
U.S. Fish and Wildlife Service	45,761.24	1.60%
U.S. Navy	58,317.40	2.03%
Private Lands	813,695.30	28.38%
Source: U.S. Geological Survey MRDS and MAS/MILS, 2013		



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Sources: Esri, USGS, NOAA

Source: U.S. Geological Survey MRDS and MAS/MILS, 2013.

Legend

- Bureau of Indian Affairs
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Fish & Wildlife Service
- Local Government
- Department of Defense
- U.S. Navy
- State
- Private Lands

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Figure 2.10-2
Imperial County Renewable Energy and Transmission Element Update
Land Surface Management/Ownership

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Four California State parks are partially located within Imperial County: Anza-Borrego Desert State Park, Ocotillo Wells State Vehicle Recreation Area, Salton Sea State Recreation Area, and Picacho State Recreation Area. Uses of these lands, which are designated Government/Special Public, are under the jurisdiction of the State Department of Parks and Recreation.

Industry

Lands within the Industry designation are not suitable for agricultural use and consist of heavy manufacturing land uses located in areas with supporting infrastructure, including major transportation systems. This designation is intended to identify areas outside existing cities where heavy industrial uses exist or can be accommodated without impacting residential or agricultural land uses.

Recreation/Open Space/Preservation

Areas designated Open Space/Recreation/Preservation are primarily characterized by a low intensity of human utilization and include mountain areas, sand dunes, desert lands, and other open lands that are essentially unimproved and not predominantly used for agriculture. This designation recognizes the unique recreational character of Imperial County and includes desert, mountain, and waterfront areas with the potential for development as public or private parks and recreation facilities in appropriate areas. The majority of the land under this designation is public land administered by BLM and owned by either BLM or the U.S. Bureau of Reclamation.

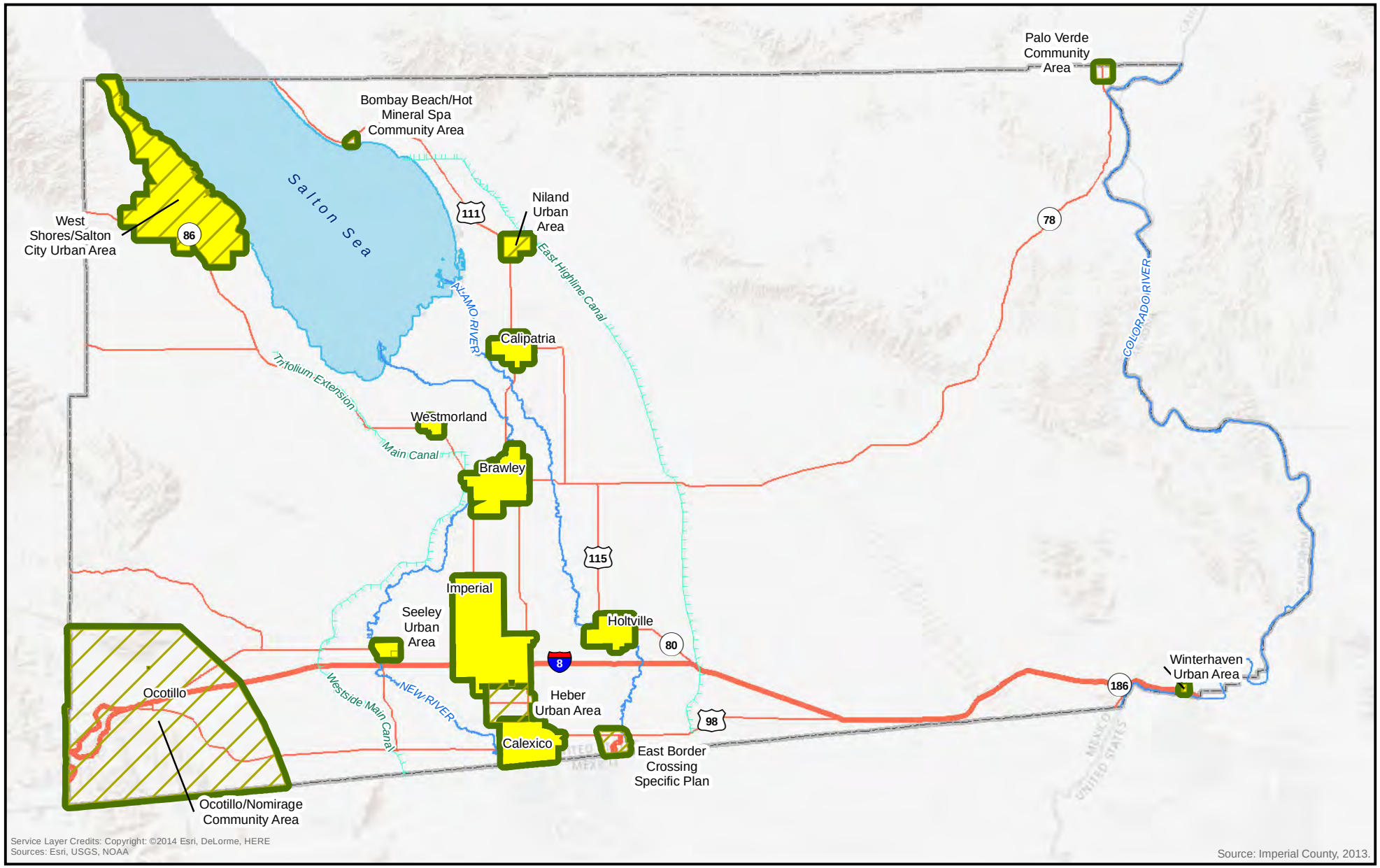
The Open Space/Recreation/Preservation designation reserves lands for the preservation of natural resources; areas for the recharge of groundwater basins; rivers and lakes which are important as wildlife habitat and for the enjoyment of recreational sport fishing; areas for the conservation and managed production of mineral resources; and areas for the preservation of outstanding scenic, historic, and cultural value. It is intended that this category also be used to protect public health and safety, including areas that require special management or regulation because of hazardous or special conditions such as earthquake fault zones, unstable soils, flood plains, watersheds, and other areas required for the protection of water quality.

Special Purpose Facility

The Special Purpose Facility designation is applied to lands that are necessary for basic governmental services which have physical or operational characteristics that are incompatible with the majority of other land use designations, such as aesthetics, noise, odors, air and water quality impacts, and traffic which may create dangerous or objectionable conditions.

Specific Plan Area

The Specific Plan Area land use designation may be used where a Specific Plan has been approved or must be approved prior to development. Land within this designation usually has environmental constraints or unique land use concerns or opportunities which require special land use and/or design control. Imperial County currently has seven Specific Plan Areas, including Gateway of the Americas Specific Plan, Imperial Lake Specific Plan, McCabe Ranch Specific Plan, Mesquite Lake Specific Plan, Rio Bend Specific Plan, Riverfront Specific Plan, and Travertine Point Specific Plan.



Legend

- Specific Development Community Areas
- Imperial County Urban Area Land Use
- 1/2-mile Buffer of Urban and Specific Development Areas

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Figure 2.10-3

Imperial County Renewable Energy and Transmission Element Update
Urban and Community Areas

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Urban Areas

The Urban Area land use designation includes areas adjacent to the seven incorporated cities within Imperial County and the unincorporated communities of Heber, Niland, Seeley, West Shores/Salton City, and Winterhaven. The seven incorporated cities include Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland. These areas include a full level of urban services, including public water and sewer systems. Additionally, these areas also contain or propose a broad range of residential, commercial, and industrial uses.

Heber

The Heber Urban Area Plan comprises approximately 960 acres, of which the majority is under private ownership. The planning area includes the townsite of Heber and the surrounding rural agricultural area. Seven land use designations are defined in Heber Urban Plan including: Low Density Residential, Medium Density Residential, High Density Residential, General Commercial, Light Industrial, Government/Special Public, and Medium Industrial (ICPDS 2003).

Niland

Niland is located in the northern half of the Imperial Valley east of the Salton Sea on SR-111 at approximately 146 feet below sea level. The area is surrounded by land zoned/used for agriculture with a Geothermal Overlay Zone on lands 0.5 mile to the southwest and north of the townsite. The Niland Urban Area Plan defines 10 land use designations within the plan area including: Low Density Residential, Medium Density Residential, High Density Residential, General Commercial, Neighborhood Commercial, Government/Special Public, Light/Medium Industrial, Recreational, Light Agricultural, and Medium Agricultural (ICPDS 1996b).

Seeley

The Seeley Urban Area is an unincorporated area encompassing approximately 1,520 acres and located within Imperial County approximately 6 miles west of El Centro. Nine land use designations are defined in the Seeley Urban Area Plan including: Low Density Residential, Medium Density Residential, High Density Residential, General Commercial, Neighborhood Commercial, Government/Special Public, Light/Medium Industrial, Recreational/Open Space, and Light Agricultural (ICPDS 1994b).

West Shores/Salton Sea

West Shores/Salton City Urban Area encompasses approximately 31,840 acres and includes the developing community of Salton City; the beach resorts of Vista Del Mar, Salton Sea Beach, and Desert Shores; and the proposed Habitat 2000 Specific Plan Area. Portions of the Torres-Martinez Indian Reservation are located in the northern portion of the Urban Area. The West Shores Urban Area Plan defines nine land use designations including: Low Density Residential, Medium Density Residential, High Density Residential, General Commercial, Neighborhood Commercial, Government/Special Public, Light/Medium Industrial, Recreational/Open Space, and Specific Plan Area (ICPDS 2000).

Winterhaven

The Winterhaven Urban Area consists of the townsite of Winterhaven and surrounding areas and is situated in the most southeastern section of Imperial County. The Winterhaven Urban Area Plan

identifies nine land use designations including: Low Density Residential, Medium Density Residential, High Density Residential, Neighborhood Commercial, General Commercial, Government/Special Public, Light Industry, Medium Agricultural, and Floodway (ICPDS 1996c).

2.10.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

California State Lands Commission

The California State Lands Commission (CSLC) has jurisdiction over the development of mineral resources beneath State lands including those lands owned by other State agencies. The County of Imperial has approximately 108,680 acres of State-owned lands, making up about 3.8 percent of all lands in the County. It is estimated that at least 5,000 acres may have commercially valuable amounts of geothermal resources (ICPDS 2006). CSLC does not preempt the County in permitting geothermal activities on State lands. A proposed developer on State lands must obtain permits from and comply with all regulations of the County of Imperial in addition to obtaining the required authorization from CSLC for using State land for geothermal activities.

U.S. Department of Interior, Bureau of Land Management

Federal law preempts any County regulation over geothermal activity on federal lands. Federal lands comprise approximately 50 percent of all lands in Imperial County. The California Desert Conservation Area Plan has the potential to constrain geothermal and renewable energy activities. The California Desert Conservation Area Plan discusses land use classes available for electrical generation facilities. Electrical generation facilities are not allowed on multiple-use class C (controlled use, wilderness management) land. Electrical generation facilities may be allowed after certain requirements are met in multiple-use class L, class M, and class I land. Additionally, Areas of Critical Environmental Concern, National Wilderness Preservation System, and off-road vehicle "closures" or "limited" areas would present constraints for geothermal and renewable energy activities.

Renewable energy development would be limited within the Chocolate Mountains Aerial Gunnery Range and NAF El Centro target ranges. Development would not be allowed in areas where it could possibly interfere with military aircraft. Issues include interference with radar from wind turbines and glare from solar installations.

Urban Areas

Development in the incorporated Cities of Brawley, El Centro, Westmorland, Holtville, Imperial, Calipatria, and Calexico shall be consistent with city standards as determined by each city. Additionally, any proposed renewable energy activities should be located outside a 0.5-mile buffer of all urban area boundaries.

Land Use Ordinance

The Land Use Ordinance provides comprehensive land use regulations for all unincorporated areas of the County of Imperial. These regulations are adopted to promote and protect the public health, safety, and general welfare through the orderly regulation of land uses throughout the unincorporated areas of the County. If land uses are changed and new designations are applied, inconsistencies have the potential to arise. Regulations outlined in the Land Use Ordinance should be followed.

Constraints Due to Existing Conditions

Existing conditions that have the potential to constrain development of renewable energy activities within the County include physical characteristics such as endangered species and habitat, flood hazards, steep slopes, unstable slopes, liquefaction, and active faults.

Agricultural production has been a major economic industry in Imperial County. Development of renewable energy activities in the County could affect agricultural land. Additionally, according to the General Plan, no land shall be removed from the Agriculture designation except for annexation to a city, where needed for use by a public agency, for geothermal purposes, where a mapping error may have occurred, or where a clear long-term economic benefit to the County can be demonstrated through the planning and environmental review process (ICPDS 2008b). Prime Farmland and Farmland of Statewide Importance should be avoided as much as possible.

General and specific standards should be followed, including preservation of farm operations by minimizing surface land usage for geothermal exploration and facilities and avoiding disruption to existing irrigation and drainage patterns; maintaining adequate setbacks from property lines, streets, and, in particular, noise-sensitive land uses such as residences, schools, and hospitals; avoiding nuisance and unsightly conditions with appropriate limits on hours of operations, light control, and adequate fencing and landscaping; and establishing proper procedures for system shutdown and site abandonment.

Opportunities

Known Geothermal Resource Areas

The United States Geological Survey (USGS) has designated nine Known Geothermal Resource Areas (KGRA) in Imperial County. The nine KGRAs located within Imperial County are shown in Figure 2.10-4, and the size of the nine KGRAs is listed in Table 2.10-3. They vary in temperature, pressure, and chemical composition of brine solutions found in each area (ICPDS 2006). Four of the nine KGRAs are located within Imperial County designated Geothermal Overlay Zones that have been identified in approved EIRs. These areas would provide opportunities for geothermal activities.

Table 2.10-3: Known Geothermal Resource Area Acreages in Imperial County

KGRA*	Area (acres)	Percentage of Imperial County
Salton Sea	103,221.51	3.51%
East Brawley	70,548.85	2.40%
Glamis	25,985.76	0.88%
East Mesa	37,802.91	1.28%
Dunes	7,723.11	0.26%
South Brawley	12,782.22	0.43%
Heber	59,319.26	2.02%
Westmorland	2,534.01	0.09%
North Brawley	7,020.26	0.24%
Total	**319,917.63**	**11.11%**

Source: Geo-Heat Center, Oregon Institute of Technology

High Wind Resource Areas

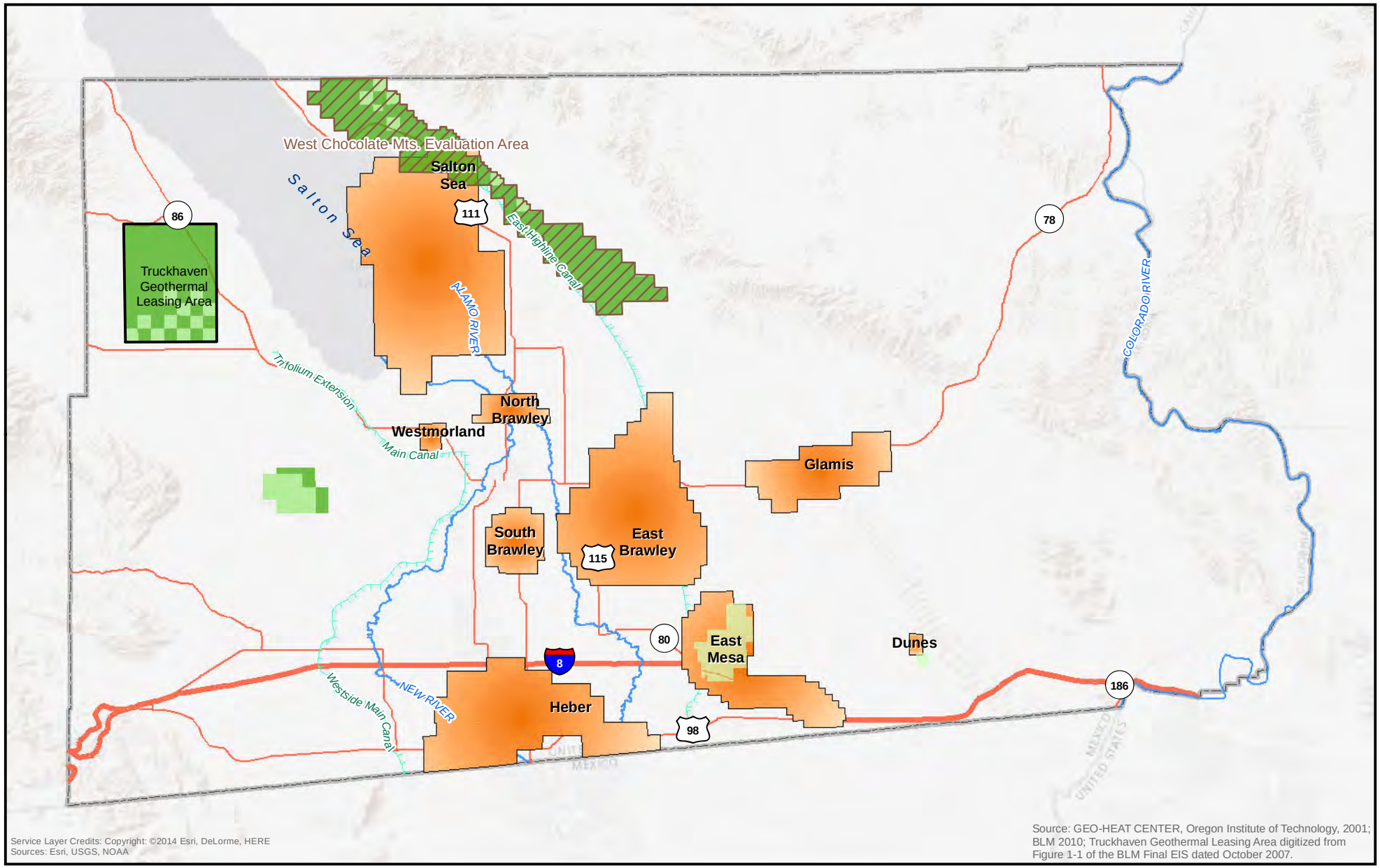
The U.S. Department of Energy's National Renewable Energy Laboratory has developed maps which call out areas with potential for wind power resources.

Figure 2.10-5 shows areas within Imperial County with potential for wind power ranging from poor to superb. These areas would provide a range of opportunities for wind power activities.

Solar Power Resource Areas

The U.S. Department of Energy's National Renewable Energy Laboratory has developed maps which call out areas with potential for solar power resources. Figure 2.10-6 provides annual average daily total solar resources averaged over surface cells of 0.1 degree in both latitude and longitude, or about 10 kilometers (km) in size.[1] Annual clear sky direct normal irradiance (DNI) data is beneficial in determining solar resources opportunity areas.

[11] Data accuracy is approximately 15% of a true measured value within the grid cell. Due to terrain effects and other microclimate influences, the local cloud cover can vary significantly even within a single grid cell.



Legend

- Known Geothermal Resource Area
- Truckhaven Geothermal Leasing Area
- West Chocolate Mountain Renewable Energy Evaluation Area
- BLM Geothermal Leasing Areas
- BLM Verified Geothermal Leases

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Figure 2.10-4
Imperial County Renewable Energy and Transmission Element Update
Known Geothermal Resource Areas

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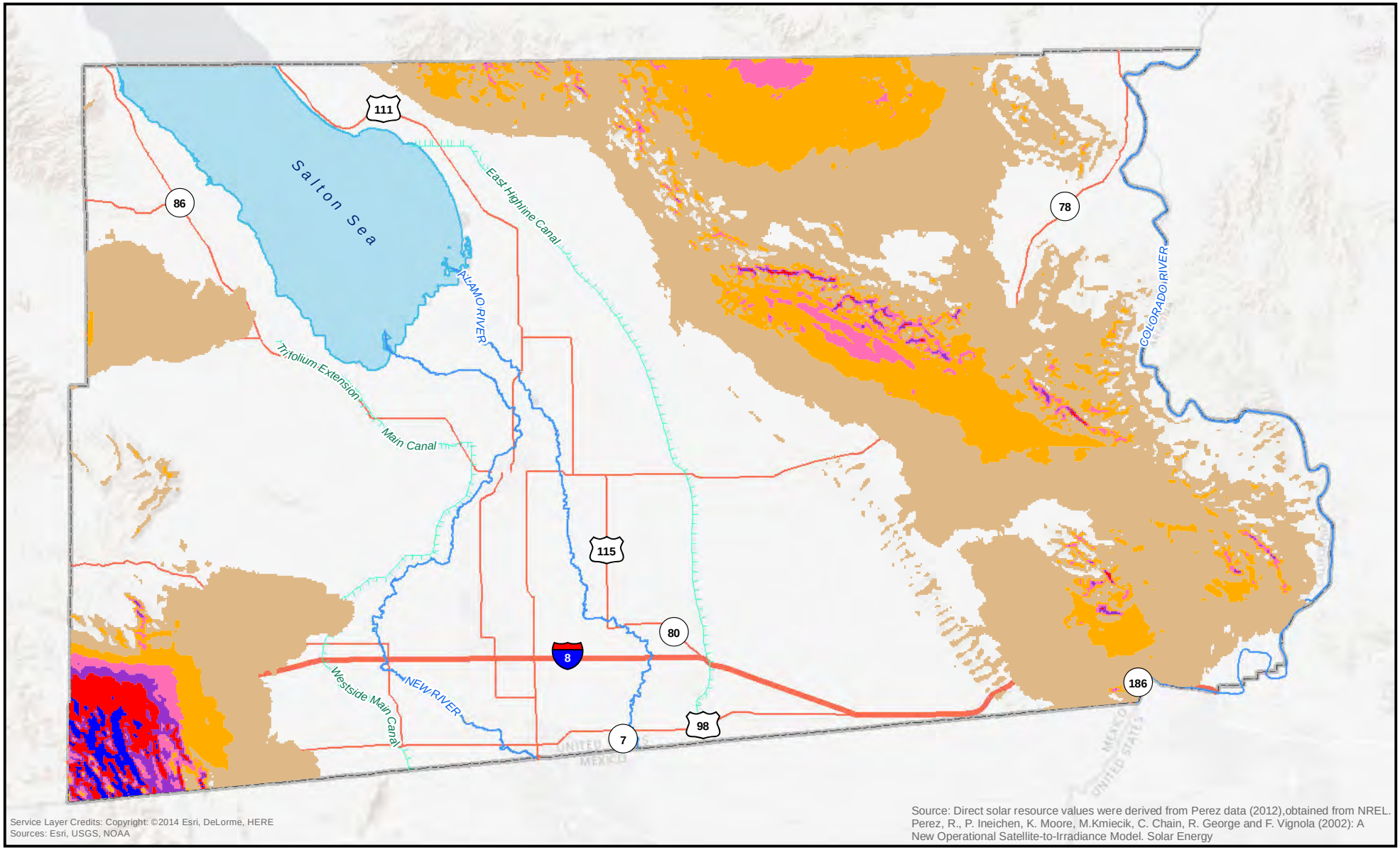

Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: Direct solar resource values were derived from Perez data (2012),obtained from NREL. Perez, R., P. Ineichen, K. Moore, M.Kmiecik, C. Chain, R. George and F. Vignola (2002): A New Operational Satellite-to-Irradiance Model. Solar Energy

Legend

Wind Power Class

1
2
3
4
5
6
7

WPC	Resource_Potential	WindPwrDensity_50m
1	Poor	0 - 200
2	Marginal	200 - 300
3	Fair	300 - 400
4	Good	400 - 500
5	Excellent	500 - 600
6	Outstanding	600 - 800
7	Superb	> 800

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Figure 2.10-5

Imperial County Renewable Energy and Transmission Element Update
Wind Resource Potential

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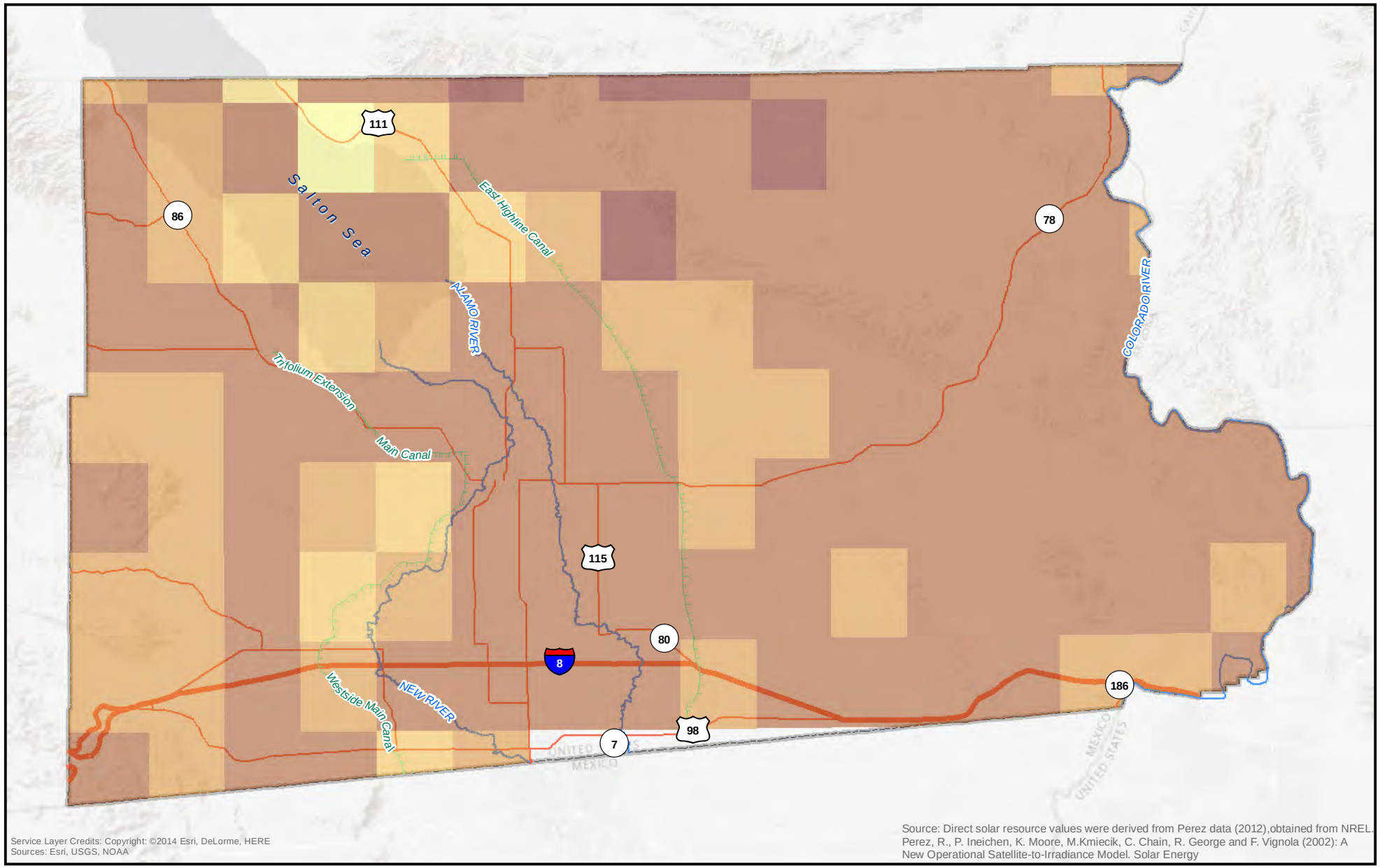

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Sources: Esri, USGS, NOAA

Source: Direct solar resource values were derived from Perez data (2012),obtained from NREL. Perez, R., P. Ineichen, K. Moore, M.Kmiecik, C. Chain, R. George and F. Vignola (2002): A New Operational Satellite-to-Irradiance Model. Solar Energy

Legend

Annual DNI (kWh/sq.m/day)

- 5.9 - 6.0
- 6.1 - 6.5
- 6.6 - 7.0
- 7.1 - 7.5
- 7.6 - 8.0
- 8.1 - 8.5

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Figure 2.10-6

Imperial County Renewable Energy and Transmission Element Update
Solar - Clear Sky Direct Normal (DNI)

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2.11 MINERAL RESOURCES

2.11.1 Introduction

This section discusses the existing mineral resources in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.11.2 Terminology

The following is a summary of mineral resources terminology discussed in this section.

- **Locatable Minerals** – The General Mining Law of 1872, as amended, opened the public lands of the United States to mineral acquisition by the location and maintenance of mining claims. Mineral deposits subject to acquisition in this manner are generally referred to as "locatable minerals." Locatable minerals include metallic minerals (gold, silver, lead, copper, zinc, nickel, etc.), nonmetallic minerals (fluorspar, mica, limestone and gypsum, tantalum, heavy minerals in placer form, and gemstones), and certain uncommon variety minerals. A complete list of locatable minerals is difficult to prepare because the history of the law has resulted in a definition of minerals that includes economics.

- **Leasable Minerals** – BLM leases certain solid minerals, like coal, oil shale, phosphate, sodium, and potassium, on public and other federal lands. These lands include areas managed by BLM and USFS. BLM can also lease these minerals on certain private lands, provided that the mineral rights are owned by the federal government.

- **Saleable Minerals** – BLM sells mineral materials to the public at fair market value and uses both competitive and noncompetitive sales. These include mineral materials such as sand, gravel, dirt, and rock used in everyday building and for other construction uses. Mineral materials are used to support and maintain both national infrastructure and local community needs for energy, mineral, and other developments (e.g., roads, bridges, dams, buildings, and foundations).

- **Area of Regional Significance** – An area of regional significance is an area that is designated by the California State Mining and Geology Board and is known to contain deposits of minerals, the extraction of which is judged to be of prime importance in meeting future needs for mineral s in a particular region of the State within which the minerals are located and which, if prematurely developed for alternate incompatible uses, could result in the permanent loss of minerals that are of more than local or regional significance.

- **Area of Statewide Significance** – An area designated by the California State Mining and Geology Board which is known to contain a deposit of minerals, the extraction of which is judged to be of prime importance in meeting future needs for minerals in the State and which, if prematurely developed for alternate incompatible land uses, could result in the permanent loss of minerals that are of more than local or regional significance.

- **Borrow Pits** – Excavations created by the surface mining of rock, unconsolidated geologic deposits, or soil to provide material (borrow) for fill elsewhere.

- **Compatible Land Uses** – Land uses inherently compatible with mining and/or that require a minimum of public or private investment in structures and land improvements which may allow for mining due to the relative economic value of the land and its improvements.

- **Haul Road** – A transportation road for transporting mined material.

- **Idle** – Surface mining operations curtailed for a period of one year or more, by more than 90 percent of the operation's previous maximum annual mineral production, with the intent to resume those surface mining operations at a future date.

- **Incompatible Land Uses** – Land uses inherently incompatible with mining and or that require public or private investment in structures, land improvements, and landscaping and that may prevent mining because of the greater economic value of the land and its improvements. Examples of such uses may include, but are not limited to, high-density residential, low-density residential with high unit value, public facilities, geographically limited but impact intensive industrial, and commercial.

- **Mined Lands** – The surface, subsurface, and groundwater of an area in which surface mining operations will be, are being, or have been conducted, including private ways and roads appurtenant to any such area; land excavations, workings, and mining waste; and areas in which structure, facilities, equipment, machines, tools, or other materials or property which result from or are used in surface mining operations are located.

2.11.3 Regulatory Setting

Surface Mining and Reclamation Act of 1975

In 1975, the Surface Mining and Reclamation Act (SMARA) was passed by the California Legislature to both address the need for continued mineral supplies as well as mitigate or prevent negative impacts to public health, property, and the environment that could result from mining activities. Regulations within SMARA are jointly administered by the Department of Conservation's Office of Mine Reclamation (OMR) and the State Mining and Geology Board (SMGB). Along with acting as the appeals board, the SMGB serves to distribute and clarify information regarding provisions within the Act. To complement these services, the OMR provides technical assistance for lead agencies and operators, maintains a database of mine locations and operational information statewide, and is responsible for matters related to compliance.

To better enforce provisions in the Act, SMARA directs the State Geologist to classify (identify and map) the nonfuel mineral resources of the State to show where economically significant mineral deposits occur and where they are likely to occur based upon the best available scientific data. Mineral land classification is the principal responsibility of the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP). Although no SMARA maps are currently available for the County of Imperial, study of the region by the State Geologist could result in findings that classify potentially significant mineral deposits and identification of restrictions aimed at curbing development of those areas.

The County Planning/Building Department as lead agency has the responsibility under SMARA, as amended, and State Policy for Surface Mining and Reclamation Practice, to regulate surface mining and reclamation within its jurisdiction including the reclamation of federal lands to assure that:

1. Adverse environmental effects are prevented or minimized and mined lands are reclaimed to a usable condition which is readily adopted for alternative land use.

2. The production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.

3. Residual hazards to the public health and safety are eliminated (Public Resources Code, Section 2712).

Under the Surface Mining and Reclamation Act of 1975, with specified exceptions, a person is prohibited from conducting surface mining operations without obtaining a permit from, and submitting a reclamation plan to and receiving approval by, the lead agency for the surface mining operation. A person who obtained a vested right to conduct surface mining operations prior to January 1, 1976, is not required to obtain a permit but is required to submit a reclamation plan to the lead agency. The State Mining and Geology Board is required to review lead agency ordinances which establish permit and reclamation procedures.

In order to comply with SMARA, the County enacted Chapter 4.5, Surface Mining Operations into the Imperial County Ordinance (Sections 83450-83463). In addition, "Policies and Standards for Development and Reclamation of Natural Resource Areas" were adopted by the Board of Supervisors on September 25, 1979.

Assembly Bill (AB) 747 also clarified the definition of "lead agency" by specifying that cities and counties, and certain State agencies with land use regulatory authority, are lead agencies under SMARA. Pursuant to this, the County Board of Supervisors and the Bureau of Land Management (BLM), El Centro Resource Area have prepared and signed a Memorandum of Understanding (MOU) effective August 12, 1988. The MOU is an agreement to have the County process reclamation plans for mining operations located on federal lands for the BLM in order to avoid duplication efforts. The County and BLM have developed an effective and efficient permit system that meets the regulatory requirements without seriously disrupting development and operation of such projects.

In November 1989, the State Office of Mines and Geology conducted a statewide survey to ascertain compliance with the requirements of SMARA. At that time it was found that lead agencies were substantially in noncompliance. Of 116 mines analyzed only 11 percent were verified as being in compliance; and of the total reclaimed, 30 percent of the sites were determined to be unreclaimed or not reclaimed to SMARA standards. Additionally, the Bureau of Mines and Geology also determined that only a few agencies carried out site inspections and less than 50 percent of the lead agencies had notified the mining operations that were out of compliance.

As a result of the above survey, the Division of Mines and Geology informed the lead agencies that unless substantial compliance is immediate, it is their intent to preempt the SMARA program to the State Mines and Geology Board. A piece of legislation, AB 3551, imposes substantially new and much more complex regulations on surface mining operations.

From the onset, Imperial County has pursued implementation and compliance with SMARA. Imperial was one of the few counties found to be substantially in compliance with state requirements. Should SMARA be taken away from the local jurisdiction's control, compliance will become much more time-consuming, with review and approvals required at the State level. Additionally, the process would become more costly with substantially higher review fees and severe penalties for tardiness or

noncompliance. In addition, local concerns and issues become unclear; and statewide mandates become a burden to the local operations.

California Desert Conservation Area Plan

In 1976, the Federal Land Management and Policy Act (FLPMA) was passed to evaluate management strategies for the approximately 300 million acres of public lands that existed at the time. Under Section 601 of the FLMPA, Congress determined that the California Desert Conservation Area (CDCA) was of unique importance, stating "…[t]he Congress finds that the California Desert contains historical, scenic, archeological, environmental, biological, cultural, scientific, educational, recreational, and economic resources that are uniquely located adjacent to an area of large population…" (BLM 2006). As such, Congress instructed BLM to prepare and implement a long-range plan for the management, use, development, and protection of public lands contained within the CDCA.

Of the 2,942,080 acres of land that constitute the County of Imperial, approximately 1.3 million acres are public lands administered by BLM. According to information distributed by BLM, all of the public lands within the County are included in the CDCA (BLM 2006). Consequently, the CDCA Plan has far-reaching implications with regard to the regulation of mineral resources throughout the County. Under the plan, BLM has drafted multiple-use class provisions to serve as guidelines for mineral exploration and development. The regulations include three levels of operations:

- Causal Use – No Notice or Plan Required: Designed for part-time miners or weekend prospectors who cause only negligible disturbance

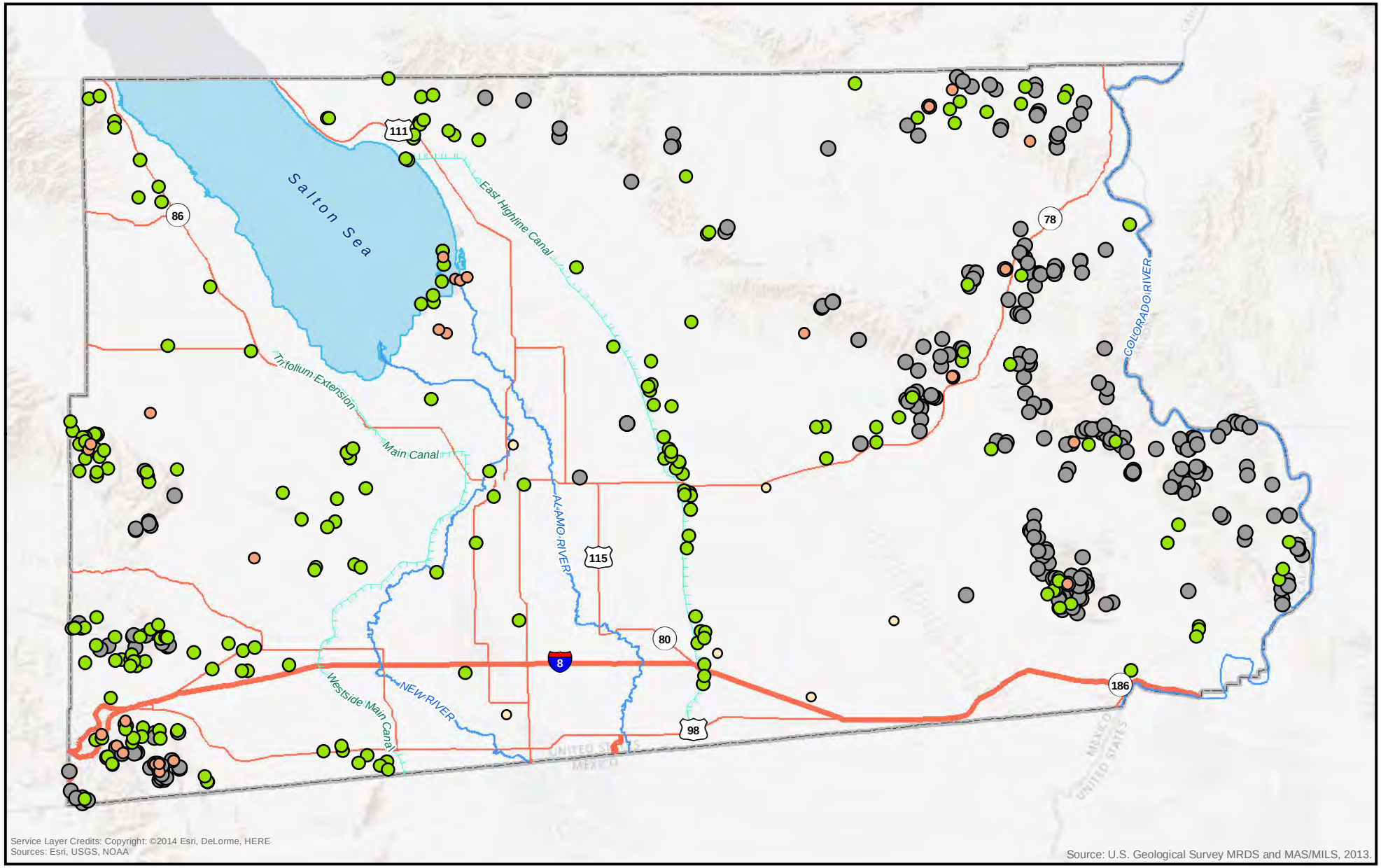
- Surface Disturbance of Less than 5 Acres – Notice Required: Designed for operators who propose to conduct exploration or mining activities which cause surface disturbance of 5 acres or less per year (except on special-category lands)

- Disturbance of More than 5 Acres Due to Mining in Special Areas – Plan of Operations Required: Designed for large-scale operations or if the operations will be conducted on lands with special category designations such as CDCA areas multiple-use class C (controlled use) or multiple-use class L (limited use)

At each of the three levels, unnecessary or undue degradation resulting from mineral exploration must be prevented, and mineral reclamation must be completed. While the CDCA Plan outlines goals for energy production and utility corridors, its overarching policies regulating Leasable Minerals, including oil, gas, and geothermal resources, has the potential to inhibit or prevent the development of certain renewable energy facilities.

2.11.4 Existing Environmental Setting

Imperial County has a number of mineral resources that are currently being extracted for economic gain. These mineral resources include gold, gypsum, sand, gravel, lime, clay, and stone. Industrial materials are also readily available, including kyanite, limestone, sericite, mica, tuff, salt, potash, calcium chloride, and manganese. Several issues influence the extraction of mineral deposits in Imperial County and include the areas of geologic deposition, impacts to the environment, and land use conflicts. As a result, the extraction of mineral resources is limited to a relatively small number of sites throughout the County. Figure 2.11-1 depicts the distribution and location of mineral resources and mining sites in



Legend

Commodity Type

- Unknown
- Both Metallic and Non-metallic
- Non-metallic
- Metallic

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Figure 2.11-1

Imperial County Renewable Energy and Transmission Element Update

Existing Mineral Resources

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Imperial County. As demonstrated in Figure 2.11-1, extraction activities for metallic minerals are concentrated along the eastern perimeter of the County. Mining activities for nonmetallic minerals are more evenly distributed across the County, with specific concentrations found near the center of the County following East Highline Canal as well as along the western County line.

Past mining activities have introduced such factors as degraded air quality, noise pollution, accentuated geologic hazards, surface and groundwater pollution; jeopardized public safety; undermined cultural resources; and impacted wildlife and plant species. Given these potential environmental impacts and conflicts with adjacent land uses, mineral resource extraction activities continue to draw scrutiny from both the public and private sectors. Balancing the need for mineral resources alongside the public interest and well-being is an important aim of the current regional land use strategy. Table 2.11-1 provides the amount of these mineral resources located within the County of Imperial.

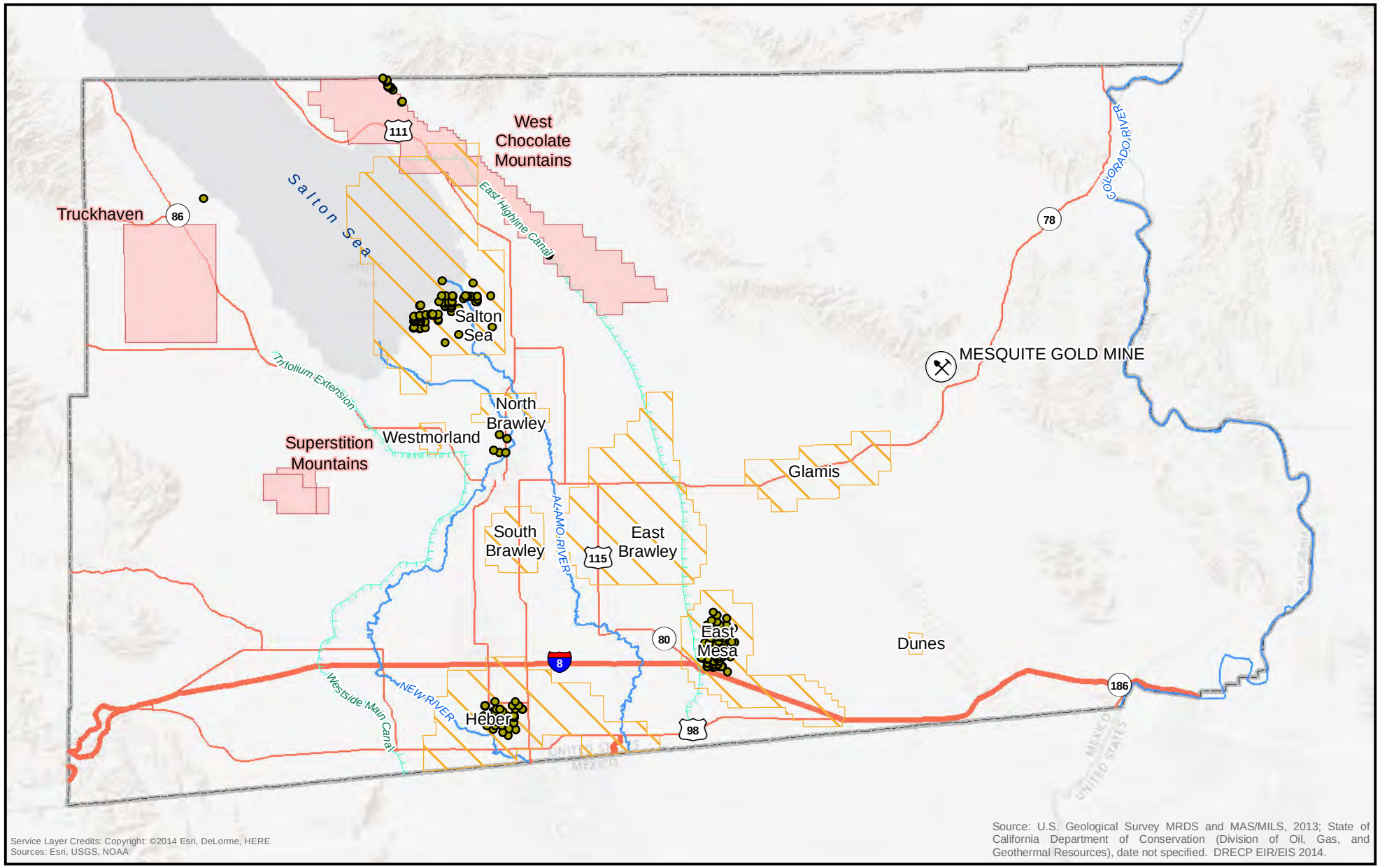
Table 2.11-1: Mineral Resources in Imperial County

Mineral Resource	Number of past producing sites	Number of current producing sites	Number of prospecting sites	Number of Processing Plants	Unknown Status	Number of Documented Occurrences
Metallic	53	17	46	7	52	141
Metallic and Nonmetallic	14	None	None	1	2	10
Nonmetallic	57	66	10	None	15	82
Source: USGS 2013.						

The United States Geological Survey (USGS) has identified nine Known Geothermal Resource Areas (KGRAs) in Imperial County. A KGRA is defined as:

> "…An area in which the geology, nearby discoveries, competitive interests, or other indicia would, in the opinion of the Secretary of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose…" (30 U.S.C. 1001)

The nine KGRAs are located throughout the County and vary in temperature, pressure, and chemical composition of brine solutions found in each area (ICPDS 2006) and constitute approximately 326,938 acres (11 percent) of total land area of the County of Imperial (Table 2.11-2). Four of the nine KGRAs are located within Imperial County designated Geothermal Overlay Zones that have been identified in approved Master Environmental Impact Reports (MEIRs). These areas would provide opportunities for geothermal energy generation. Figure 2.11-2 shows the locations of the existing KGRAs, the Truckhaven Geothermal Leasing Area, and West Chocolate Mountains Renewable Energy Evaluation Area. Figure 2.11-2 also shows the locations of active geothermal wells and the New Gold Mine.



Legend

- High Priority Operations
- Active Geothermal Wells
- Prospectively Valuable KGRA
- Geothermal Lease

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Figure 2.11-2

Imperial County Renewable Energy and Transmission Element Update
Geothermal Resources and High Priority Operations

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Table 2.11-2: Geothermal Resource Area Acreages in Imperial County

Known Geothermal Resource Area*	Area (acres)	Percentage of Imperial County
Salton Sea	103,221.51	3.51%
East Brawley	70,548.85	2.40%
Glamis	25,985.76	0.88%
East Mesa	37,802.91	1.28%
Dunes	7,723.11	0.26%
South Brawley	12,782.22	0.43%
Heber	59,319.26	2.02%
Westmorland	2,534.01	0.09%
North Brawley	7,020.26	0.24%
Total	**319,917.63**	**11.11%**
Source: Geo-Heat Center, Oregon Institute of Technology		

2.11.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Surface Mining and Reclamation Act

In 1975, the Surface Mining and Reclamation Act (SMARA) was passed by the California Legislature to both address the need for continued mineral supplies as well as mitigate or prevent negative impacts to public health, property, and the environment that could result from mining activities. Regulations within SMARA are jointly administered by the Department of Conservation's Office of Mine Reclamation (OMR) and the State Mining and Geology Board (SMGB). Along with acting as the appeals board, the SMGB serves to distribute and clarify information regarding provisions within the Act. To complement these services, the OMR provides technical assistance for lead agencies and operators, maintains a database of mine locations and operational information statewide, and is responsible for matters related to compliance.

To better enforce provisions in the Act, SMARA directs the State Geologist to classify (identify and map) the nonfuel mineral resources of the State to show where economically significant mineral deposits occur and where they are likely to occur based upon the best available scientific data. Mineral land classification is the principal responsibility of the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP). Although no SMARA maps are currently available for the County of Imperial, study of the region by the State Geologist could result in findings that classify potentially significant mineral deposits and identification of restrictions aimed at curbing development of those areas.

California Desert Conservation Area Plan

In 1976, the Federal Land Management and Policy Act (FLPMA) was passed to evaluate management strategies for the approximately 300 million acres of public lands that existed at the time. Under Section 601 of the FLMPA, Congress determined that the CDCA was of unique importance, stating "…[t]he Congress finds that the California Desert contains historical, scenic, archeological, environmental, biological, cultural, scientific, educational, recreational, and economic resources that are uniquely located adjacent to an area of large population…" (BLM 2006). As such, Congress instructed BLM to prepare and implement a long-range plan for the management, use, development, and protection of public lands contained within the CDCA.

Of the 2,942,080 acres of land that constitute the County of Imperial, approximately 1.3 million acres are public lands administered by BLM. According to information distributed by BLM, all of the public lands within the County are included in the approximately 25 million total acres of the CDCA (BLM 2006). Consequently, the CDCA Plan has far-reaching implications with regard to the regulation of mineral resources throughout the County. Under the plan, BLM has drafted multiple-use class provisions to serve as guidelines for mineral exploration and development. The regulations include three levels of operations:

- Causal Use – No Notice or Plan Required: Designed for part-time miners or weekend prospectors who cause only negligible disturbance

- Surface Disturbance of Less than 5 Acres – Notice Required: Designed for operators who propose to conduct exploration or mining activities which cause surface disturbance of 5 acres or less per year (except on special-category lands)

- Disturbance of More than 5 Acres Due to Mining in Special Areas – Plan of Operations Required: Designed for large-scale operations or if the operations will be conducted on lands with special category designations such as CDCA areas multiple-use class C (controlled use) or multiple-use class L (limited use)

At each of the three levels, unnecessary or undue degradation resulting from mineral exploration must be prevented; and mineral reclamation must be completed. While the CDCA Plan outlines goals for energy production and utility corridors, its overarching policies regulating Leasable Minerals, including oil, gas, and geothermal resources, has the potential to inhibit or prevent the development of certain renewable energy facilities.

Constraints Due to Existing Conditions

As demonstrated in the Mineral Resources Data System provided by USGS, mining operations and the extraction of mineral resources are important economic activities in the County. Along with other mineral resources, economically viable deposits of clay, sand, gravel, stone/rock, and decomposed granite are currently being mined throughout the area. Given the prevalence and economic importance of mining activities, the County may choose to protect its mining operations and promote extraction policies. Ultimately, this could constrain future patterns of land use for the development of renewable energy sources.

Opportunities

As described above, the County of Imperial contains areas with such economically viable mineral resource deposits as clay, sand, gravel, stone/rock, and decomposed granite. Currently, mining activities have focused on their extraction, creating a substantial market base established around the mineral resources present in the County. Under revisions to the General Plan, the County of Imperial is provided an opportunity to craft policies to balance mining activities with the development of renewable energy facilities. Here, the County can determine appropriate measures to regulate mining operations while concurrently promoting the industry as an economic engine under the guidance of specified conditions.

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2.12 NOISE

2.12.1 Introduction

This section describes noise conditions in Imperial County, including the noise regulatory environment and existing ambient conditions, which will be assessed and analyzed to determine associated constraints and opportunities for the development of renewable energy and transmission projects. The analysis presented in this section will be used to prepare the *Renewable Energy and Transmission Element* update.

Legal Basis and Requirements

Government Code, Section 65302(d), states the General Plan shall include a noise element "…which shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources (1) Highways and freeways, (2) Primary arterials and major local streets, (3) Passenger and freight on-line railroad operations and ground rapid transit systems, (4) Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation, (5) Local industrial plants, including, but not limited to, railroad classification yards, and (6) Other ground stationary noise sources, including, but not limited to, military installations, identified by local agencies as contributing to the community noise environment..."

2.12.2 Terminology

The following is a summary of noise terminology discussed in this section.

- **Ambient noise level** – The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal of existing level of environmental noise at a given location.

- **dB (Decibel)** – A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the ratio of the sound measured to the reference pressure, which is 20 micropascals. A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.

- **dBA (A-Weighted Decibel)** – The sound level in decibels as measured on a sound level meter using the A-weighting network. An overall frequency weighted sound level in decibels that approximates the frequency response of the human ear.

- **CNEL (Community Noise Equivalent Level)** – The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

- **Ldn (Day-Night Level)** – The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. Ldn and CNEL values rarely differ by more than 1 dB.1[2]

- **Leq (Equivalent Sound Level)** – The equivalent steady-state sound level that, in a stated period of time, would contain the same acoustical energy.

- **Noise contours** – Lines drawn around a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics used in this document to describe annoyance due to noise and to establish land use planning criteria for noise.

- **Noise sensitive land uses** – These land uses include but are not necessarily limited to: schools, hospitals, rest homes, long-term care facilities, mental care facilities, residential uses, places of worship, libraries, and passive recreation areas.

2.12.3 Regulatory Setting

Federal Regulations

No federal regulations govern offsite (community) noise. The Occupational Safety and Health Act of 1970 specifies measures designed to protect workers against the effects of noise exposure and lists permissible noise level exposure as a function of the amount of time to which a worker is exposed. Occupational Safety and Health Administration (OSHA) regulations also dictate hearing conservation program requirements and workspace noise monitoring requirements. OSHA requirements limit worker noise exposure to 90 A-weighted decibels (dBA) over an 8-hour work shift. Furthermore, if 8-hour worker noise exposure at a work site exceeds 85 dBA, the area must be posted as a noise hazard zone; and a hearing conservation program would be required.

United States Fish and Wildlife Service (USFWS) has established a level of 60 dBA equivalent continuous noise level (Leq) as the maximum permissible noise level to which certain riparian bird species may be subjected during the mating and nesting seasons (see Section 2.4).

State Regulations

State Government Code requires counties to draft a Noise Element for their General Plans to establish acceptable noise limits for various land uses. The Imperial County General Plan contains a *Noise Element* which provides land use compatibility criteria as Community Noise Equivalent Level (CNEL) for acceptable land use noise levels. CEQA Guidelines defining a significant noise effect require that the impacts of a project be considered cumulatively in conjunction with those of other projects planned for the area.

[2] As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this study. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level.

Imperial County Regulations

The County is the agency responsible for regulating and controlling noise through the *Noise Element* of the County General Plan and the *Noise Ordinance* of the County's Codified Ordinances. The *Noise Element* of the Imperial County General Plan provides a program for incorporating noise issues into the land use planning process with a goal of minimizing adverse noise impacts to noise-sensitive receptors. The *Noise Element* specifies construction hours and noise limits and the acceptable property line operational noise levels at various land uses for day, evening, and night periods for the County *Noise Ordinance*.

Noise Element

The *Noise Element* of the Imperial County General Plan examines noise sources and provides information to be used in setting land use policies to protect noise-sensitive land uses and for developing and enforcing a local noise ordinance. The *Noise Element* provides a program for incorporating noise issues into the land use planning process with a goal of minimizing adverse noise impacts to receptors such as residences, schools, and hospitals, which are sensitive to noise.

The County identifies Noise Impact Zones for sensitive receptors likely to be exposed to significant noise (greater than 60 dB CNEL or 75 dB Leq) from roadways, railroads, airports, and agricultural activities. The purpose of the Noise Impact Zone is to define areas and properties where an acoustical analysis of a proposed project is required to demonstrate project compliance with land use compatibility requirements and other applicable environmental noise standards. Any property within 1,500 feet of an interstate highway or 1,100 feet of a State highway is within a Noise Impact Zone, as is any property within 0.25 mile (1,320 feet) of existing farmland that is in an agricultural zone.

An acoustical analysis is required for any action that would be located, all or in part, in a Noise Impact Zone. According to the *Noise Element*, if the future noise levels from the action are within the normally acceptable noise level guideline but result in an increase of 5 dBA CNEL or greater, the action would have a potentially significant noise impact; and mitigation measures must be considered. If the future noise level after the action is completed is greater than the normally acceptable noise level, a noise increase of 3 dBA CNEL or greater should be considered a potentially significant noise impact; and mitigation measures must be considered.

Land use compatibility defines the acceptability of a land use in a specified noise environment. Noise/Land Use Compatibility Guidelines are provided in the *Noise Element* to evaluate potential noise impacts and provide criteria for environmental impact findings and conditions for project approval. An acoustical analysis is required to demonstrate conformance of a proposed project with Noise/Land Use Compatibility Guidelines. These guidelines categorize noise levels at residential land uses as "normally acceptable" up to 60 dBA day-night average sound level (Ldn) or CNEL and as "conditionally acceptable" up to 70 dBA Ldn or CNEL.

Noise Ordinance

The County enforces construction and operation noise standards specified in the *Noise Element* through the *Noise Ordinance*. Noise-generating sources in Imperial County are regulated under the County of Imperial Codified Ordinances, Title 9, Division 7 (Noise Abatement and Control) (County 2012). The noise standards of the Ordinance limit the hours of construction and the level of noise emitted by the

construction, as well as the operational noise levels at various land uses for day, evening, and night. Noise limits are established in Chapter 2 of this ordinance and shown in Table 2.12-1.

Table 2.12-1: Imperial County Property Line Noise Limits

Zone	Time	Average Hourly Sound (Leq)
Residential Zones	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
	7 a.m. to 10 p.m.	55
Multi-residential Zones	10 p.m. to 7 a.m.	50
	7 a.m. to 10 p.m.	60
Commercial Zones	10 p.m. to 7 a.m.	55
Light Industrial/Industrial Park Zones	Anytime	70
General Industrial Zones	Anytime	75
Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB Leq.		

Property line noise limits apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise. These standards are enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. The County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area. Noise received at the property line of a residence is limited to 50 dBA Leq in the daytime and 45 dBA Leq at night.

Under Section 90702.00 of the County's Codified Ordinances, sound level limits for industrial noise are set at 75 dBA Leq on or beyond the boundary of the property line at any time. Average hourly noise in residential areas is limited to 50 to 55 dB(A) from 7:00 a.m. to 10:00 p.m. and to 45 to 50 dB(A) from 10:00 p.m. to 7:00 a.m.

2.12.4 Existing Environmental Setting

Noise-Sensitive Land Uses

Noise-sensitive land uses in Imperial County include varying densities of clustered residential developments and noncontiguous residences, different densities and types of businesses and commercial developments, open space, and recreation. The locations and densities of these land uses, in conjunction with major transportation routes and other significant activities within the County such as construction, contribute to create the ambient noise conditions, or setting, of the area.

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of noise could adversely affect the use of the land. These land uses include uses such as schools, hospitals, residences, libraries, and recreation areas. Excessive exposure to noise can result in adverse physical and psychological responses in addition to interfering with sleep, speech, and concentration or diminishing the quality of life.

In addition to human noise-sensitive receptors, some protected animal species and their habitat may be considered sensitive noise receptors if present near construction and operational noise sources, especially during the species' breeding seasons. Many riparian bird species are sensitive to excessive noise. Imperial County is within a region that has potential for protected species. Undeveloped land in proximity of a project site (e.g., the Sonny Bono Salton Sea National Wildlife Refuge) may provide habitat for protected species which may or may not be noise sensitive. For example, the Yuma clapper rail is a protected bird species in the area of the refuge that is known to be sensitive to noise, i.e., noise levels above the USFWS limit of 60 dBA Leq during mating or nesting seasons.

Existing Ambient Noise Conditions

Topography and Climate

Imperial County is located regionally in a remote area of undeveloped land and land developed for agriculture and industrial uses including geothermal power plants and manufacturing. Noise amplitude and attenuation characteristics are key factors in the establishment of noise conditions and vary considerably according to natural climate and topographical features. Meteorological factors affecting noise characteristics within the County include major temperature changes, Santa Ana winds, and varying amounts and durations of rainfall. Imperial County is a desert community with a warm, dry climate. Summers are extremely hot and dry, while winters are temperate. Topographical features in the County include steep mountains, a central valley with elevation below sea level, and vast open space areas. Man-made features within the County, such as buildings and structures, agricultural fields, and roadways, also affect noise amplitude and attenuation.

Noise Sources

Many activities which create objectionable noise levels in Imperial County, such as industrial operations and rail switching yards, are located within cities which are not a part of the County General Plan. The highest traffic volumes, which are major noise sources, are within the Cities of El Centro and Calexico. This noise section addresses only noise sources which affect unincorporated areas of the County.

The principal noise sources in Imperial County are the transportation sources, aircraft, rail lines, motor vehicles and agricultural operations. In rural areas of the County, mining and off-road vehicle activity also create substantial noise, but these occur generally in areas without noise-sensitive receptors.

Aircraft Noise

Aircraft traffic is another of the more prevalent sources of noise within the County, especially in proximity to airports and airstrips. Aircraft traffic noise varies in how it affects land uses depending upon the type of aircraft, distance of the land use from airports and flight paths, and topographical settings and other physical land features such as landscaping, walls, buildings, and other structures. Some variables that affect the amount of noise emitted from aircraft are the type, speed, and altitude. Another variable affecting the overall measure of noise is a perceived increase in sensitivity to aircraft noise at night.

Aircraft noise which may affect sensitive land uses occurs in the vicinities of seven airports in the County: Imperial County, Brawley Municipal, Calexico International, Calipatria Municipal, Holtville Airstrip, Salton Sea, and the Naval Air Facility (NAF) El Centro, which is located north of the townsite of Seeley. The noise levels and associated areas of noise impact are quantified in noise contour maps,

contained in the *Noise Element*, which usually are products of FAA-mandated noise surveys, and the 1996 Airport Land Use Compatibility Plan.

Railroad Noise

The Union Pacific Railway is the primary source of railroad transportation noise in the County. The main line right-of-way runs from the Riverside County border, just east of the Salton Sea, southeast to Niland. From Niland, the main line continues southeast to Yuma, Arizona; a branch runs south to Calipatria, Brawley, Imperial, El Centro, and Calexico.

Two other railways, located west of Seeley, are the U.S. Gypsum rail line to their mining site in the Fish Creek Mountains and the San Diego and Arizona Eastern Railroad (SD&AE) from San Diego through the Jacumba Mountains. The U.S. Gypsum line passes through uninhabited areas, including a military bombing range, and does not impact sensitive receivers.

Traffic Noise

Roadway traffic is one of the more prevalent sources of noise within the County along highly utilized transportation corridors such as I-8, SR-86, and SR-111. Traffic noise varies in how it affects land uses depending upon the type of roadway, distance of the land use from that roadway, topographical setting, and other physical land features such as landscaping, walls, buildings, and other structures. Some variables that affect the amount of noise emitted from a road are speed of traffic, flow of traffic, and type of traffic (e.g., tractor trailers versus cars). Another variable affecting the overall measure of noise is a perceived increase in sensitivity to vehicular noise at night.

Vehicle noise level information is obtained from measurements using a sound level meter and is calculated using highway traffic volume, speed, and vehicle mix information. The *Noise Element* lists the interstate and State highways in Imperial County and shows the vehicle volumes, mixes, and calculated noise levels. The traffic volumes are based on data presented in the *Circulation and Scenic Highways Element*, while the vehicle mixes are based on Caltrans 1990 data (ICPDS 2001). Due to the relatively low volumes on most of the roadways in the unincorporated area of the County, noise contours would not be distinguishable at a scale which could be included with the *Noise Element*. A large-scale map (1 inch = 2 miles) with noise contours has been provided and is on file at the County Planning and Development Services Department. More detailed descriptions of the State highways and local roadways may be found in the *Circulation and Scenic Highways Element* of the General Plan.

The major east-west roadway in the County is I-8, which runs from Yuma, Arizona, to San Diego County, through the City of El Centro. SR-98 parallels I-8 on the south to serve the City of Calexico and the community of Ocotillo. SR-78 parallels I-8 to the north, serving the Cities of Westmorland and Brawley, and continues northeast to the community of Palo Verde. The Evan Hewes Highway is Old Highway 80, which parallels I-8 on the north from Ocotillo to Seeley, El Centro, and Holtville, then turns back southeast to again join I-8.

SR-86 and SR-111 are the main north-south roadways. SR-86 runs from SR-111 north of Calexico, through Heber and the Cities of El Centro, Imperial, Brawley, and Westmorland and northward to eventually connect with Interstate 10 (I-10) at Indio. It is a principal “farm-to-market” route for Imperial County agricultural products and carries a high percentage of heavy trucks. SR-86 also carries heavy recreational traffic on weekends. SR-111 is originates east of El Centro connecting Calexico to the Cities

of Brawley and Calipatria and continuing north along the east side of the Salton Sea past Niland and Bombay Beach to also connect with I-10 at Indio.

Other state roads include SR-115, which runs northwest from I-8 to Holtville, then north to Brawley and Calipatria, and SR-186, a short spur running south from the eastern end of I-8 to the international border.

Industry Noise

Industrial and manufacturing facilities are also stationary noise producers that may affect sensitive land uses. Industrial land uses have the potential to exert a relatively high level of noise impact within their immediate operating environments. The scope and degree of noise impacts generated by industrial uses is dependent upon various critical factors, including the type of industrial activity, hours of operation, and the site's location relative to other land uses.

Manufacturing and utility operations often emit noise which may impact sensitive receptors in the area of the plant. Existing major manufacturing sites within Imperial County are generally located away from concentrations of sensitive receptors. These include a gypsum plant in Plaster City; Spreckles Sugar; and geothermal power plants in the southeast Salton Sea, Heber, and East Mesa areas. Additional geothermal plants are planned.

Agricultural Noise

The predominant land use in Imperial County is agriculture. Noise sources associated with agricultural operations include the field machinery, especially when it is diesel-engine driven; heavy trucks used for delivering supplies and distributing products; and aircraft used for spraying crops.

Schools

Schools can be a source of nuisance noise for neighboring residential uses. Noise-generating activities include children at play, bells, and public address systems. Noise sources from high schools may include stadiums used for day and evening athletic events and the use of public address/loudspeaker systems, which can also generate substantial noise levels during the day and/or evening.

Other Sources

Noise sources not included above which are likely to be included in planning analyses include: construction noise; noise from commercial activities such as automotive and truck repair, kennels, and entertainment facilities; noise from building heating, ventilating, and air conditioning (HVAC) systems; and noise from recreational areas, including off-road vehicles. Other noise complaints can result from new housing tracts under construction.

Vibration

In addition to noise, vibration can be described by both its amplitude and frequency. Amplitude may be characterized by displacement, velocity, and/or acceleration. Typically, particle velocity (measured in inches or millimeters per second) and/or acceleration (measured in gravities) are used to describe vibration. Vibration can be felt outdoors, but the perceived intensity of vibration impacts are much greater indoors due to the shaking of the structure.

The most common sources of vibration are transit vehicles, construction equipment, and large vehicles. Several land uses are especially sensitive to vibration. These uses include, but are not limited to, hospitals, libraries, residential areas, schools, and offices.

2.12.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Existing applicable noise regulations, such as land use compatibility standards, property line noise limits, and construction noise regulations, have the potential to constrain the development of industrial facilities, specifically renewable energy generation and transmission facilities associated with the *Renewable Energy and Transmission Element* update.

USEPA, HUD, and the State of California General Plan Guidelines establish residential indoor and outdoor noise limits to protect public health and welfare. Constraints to developing new renewable energy generation and transmission facilities will be siting these facilities in proximity to noise sensitive receptors such as residences and schools in areas where facility noise levels will not exceed recommended limits at property lines. In addition, new land uses that produce noise are limited to areas where they will not affect sensitive users.

Constraints Due to Existing Conditions

Existing noise conditions within the County have the potential to constrain the implementation of new renewable energy generation and transmission facilities within the County. Renewable energy facilities, such as generated by wind, solar, geothermal, biofuel, biomass, and algae production sources, typically require large, contiguous, open space due to the substantial surface area needed (e.g., solar) or sufficient buffer needed between other land uses (e.g., geothermal). Therefore, available land for these new facilities tends to be located in remote areas, typically with the proposed site and surrounding areas currently used for agricultural.

Development of these facilities generates noise from construction and operation that is unique to their varying technologies, time of day operation, and conditions of operation. For example, geothermal facilities generate continuous similar noise levels 24 hours per day, 7 days per week. The primary noise sources are the turbine/generator and the cooling towers, with various secondary noise sources including associated pumps and equipment. Solar facilities typically generate noise primarily during the daylight hours but have components such as inverters that generate noise at night. Wind facilities operate based on local wind patterns and speeds. Wind turbines generate noise and vibration levels that are more problematic to nearby receptors at slower winds, when turbines spin but wind noise is low.

Energy generated by these facilities requires the development of transmission lines to transport electricity generated to the existing electrical grid. Transmission lines are typically above ground and require right-of-way easements from remote areas to more developed areas, encountering noise sensitive receptors along the route. Transmission lines generate electromagnetic radiation and, therefore, require a wide, undeveloped corridor for health and safety purposes, which can be a constraint in developed areas.

Ambient noise levels can also be a constraint to development. Remote rural areas, where these facilities are typically sited, have low ambient noise levels, especially at night. The addition of these facilities typically results in a substantial increase in ambient noise levels in proximity to the facilities.

Opportunities

Updating this element of the General Plan offers an opportunity to address noise issues from the development of new renewable energy facilities. Noise constraints vary depending on individual project design and technology. Opportunities exist to integrate noise construction BMPs and project design into project plans that will achieve compliance with noise regulations. Facilities should be sited appropriately based on the noise generated by the type of technologies implemented. Typically, facilities should be located in areas with sufficient setback distances from noise sensitive receptors to account for noise regulations at the property line for day and night periods. Where setbacks are limited, noise reduction measures at the sources and receptor can be considered including noise enclosures for loud equipment and noise barriers at noise sensitive areas. Site development should consider an appropriate undeveloped buffer around the site perimeter to the adjacent property line to meet property line noise limits. Noise generated from facility operation and maintenance should considered time of day and property line constraints. The siting of transmissions lines should maximize use of existing transmission corridors or consider undeveloped corridors of sufficient width and setback from residents to achieve noise compliance.

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2.13 POPULATION AND HOUSING

2.13.1 Introduction

This section discusses the existing population and housing in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.13.2 Terminology

The following is a summary of population and housing terminology discussed in this section.

- **Family** – A group of two or more people who reside together and who are related by birth, marriage, or adoption.

- **Forecast** – The projection selected as the one most likely to provide an accurate prediction of the future value of a variable such as population or housing. This is based on the analyst's opinion in regards to the most likely future value of a variable.

- **Hispanic Origin** – People of Hispanic origin were identified by a question that asked for self-identification of the person's origin or descent. Respondents were asked to select their origin (and the origin of other household members) from a list of ethnic origins. People of Hispanic origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. People of Hispanic origin may be of any race.

- **Household** – A household is made up of all persons living in a dwelling unit whether or not they are related by blood, birth, or marriage.

- **Population Estimate** – The Census Bureau's Population Estimates Program (PEP) produces July 1 estimates for years after the last published decennial census (2000), as well as for past decades. Existing data series such as births, deaths, federal tax returns, Medicare enrollment, and immigration are used to update the decennial census base counts.

- **Population Projection** – Calculation of future changes in population numbers, with assumptions about future trends in the rates of fertility, mortality, and migration. Demographers often issue low, medium, and high projections of the same population, based on different assumptions of how these rates will change in the future.

- **Race** – The race of individuals was identified by a question that asked for self-identification of the person's race. Respondents were asked to select their race from a list of racial groups.

- **Regional Housing Needs Assessment (RHNA)** – Quantifies the existing and projected housing need, by household income group, within each jurisdiction during specified planning periods.

- **Tenure** – Refers to the distinction between owner-occupied and renter-occupied housing units. A housing unit is "owned" if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. A cooperative or condominium unit is "owned" only if the owner or co-owner

lives in it. All other occupied units are classified as "rented," including units rented for cash rent and those occupied without payment of cash rent.

- **Vacancy Rate** – The housing vacancy rate is the proportion of the housing inventory that is available ''for sale'' or ''for rent.'' It is computed by dividing the number of available units by the sum of occupied units and available units and then multiplying by 100.

- **Zoning** – Zoning is an activity undertaken by local jurisdictions to direct and shape land development activities. The intent of zoning is to protect the public health, safety, and welfare by ensuring that incompatible land uses (e.g., residential vs. heavy industrial) are not located next to each other. Zoning also impacts land values, creating and taking away "capital" for and from property owners.

2.13.3 Regulatory Setting

Southern California Association of Governments

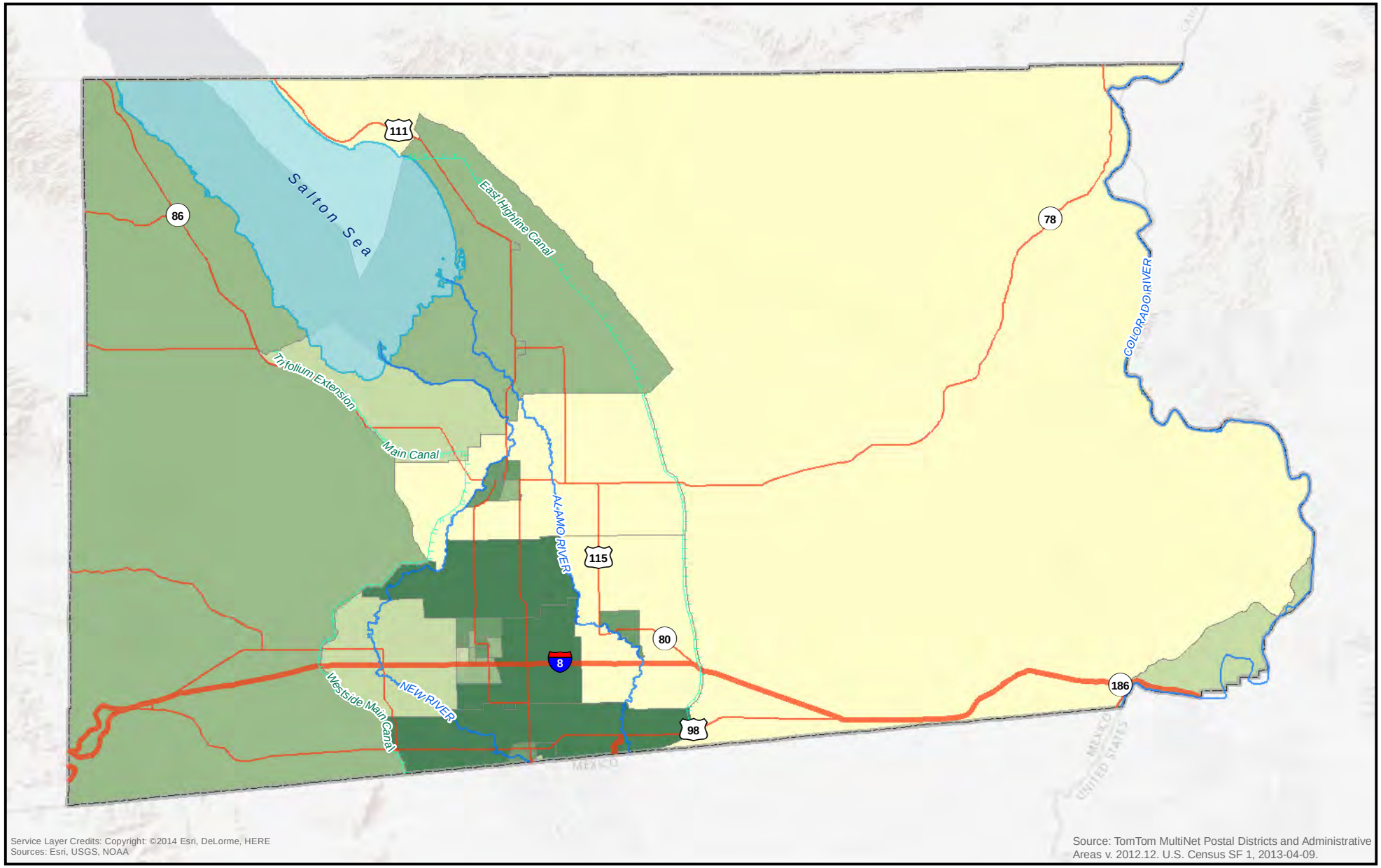
Imperial County is included within the regional planning area of the Southern California Association of Governments (SCAG), which is a Joint Powers Authority under California state law. SCAG was established as an association of local governments and agencies that voluntarily convene as a forum to address regional issues and represents 6 counties, 191 cities, and more than 18 million residents within an area covering more than 38,000 square miles. SCAG has prepared regional population projections for Imperial County which are described in Section 2.13.2.

County of Imperial General Plan Housing Element

The *Housing Element* of the County of Imperial General Plan is one of the seven County of Imperial General Plan elements mandated by the State of California, as articulated in Sections 65580 and 65589.8 of the Government Code. Each city and county is required to discuss how it will meet its fair share of the housing need in the state. The purpose of the *Housing Element* is to ensure that local governments adequately plan to meet the housing needs of all people within the community (ICPDS 2008a). The County of Imperial *Housing Element* for 2008–2014 includes policies that address housing, employment, and growth management, as well as the adequate provision of resources, facilities, and services (ICPDS 2008a). The *Housing Element* contains a number of goals and policies to encourage continuous analysis and evaluation of population trends and housing needs to allow for the development of sites and facilities that sustain population growth in the County and development in existing communities. The *Housing Element* also acknowledges the governmental, environmental, infrastructure, and land use constraints on residential development in the County.

2.13.4 Existing Environmental Setting

Imperial County is the least populated county in the region, with approximately 177,000 residents. The two largest cities within the County are El Centro and Calexico, each with over 35,000 persons. Figure 2.13-1 shows existing population levels by census tract within Imperial County.



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: TomTom MultiNet Postal Districts and Administrative Areas v. 2012.12. U.S. Census SF 1, 2013-04-09.

Legend

Population by Census Tract (2010)

- 933 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- 8,001 - 13,000

N

0 5 10 20

Miles

Figure 2.13-1

Imperial County Renewable Energy and Transmission Element Update
Existing Population

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Population by Race and Ethnicity

The U.S. Census Bureau reports that in the year 2010, 58 percent of the population in Imperial County identified as White, representing the largest race category within the County. Six percent of the County's population identified as Black, American Indian & Alaskan Native, Asian, and Native Hawaiian & Other Pacific Islander. Native Hawaiian & Other Pacific Islanders make up less than 1 percent of the population within the County, representing the smallest group. Thirty percent of the population identified as "Other," and 4 percent reported two or more races. Eighty percent of the population identified as persons of Hispanic origin. See Table 2.13-1 for racial and ethnic composition.

Table 2.13-1: Racial and Ethnic Composition, 2010

Race	Imperial County
White	102,553
Black or African American	5,773
American Indian & Alaskan Native	3,059
Asian	2,843
Native Hawaiian & Other Pacific Islander	165
Other	52,413
Two or More Races	7,722
Total	**174,528**
Persons of Hispanic Origin	140,271
Source: U.S. Census Bureau 2010	

Population by Age

The age characteristics of a population are an important factor in evaluating current and future housing needs. Each age group consists of distinct lifestyles, income ranges, family types and sizes, and housing preferences. Evaluating the age breakdown of a community is important in determining future housing development.

Residents aged 25 to 54 are considered to be in their prime working years and represent approximately 40 percent of the population within the County. School-age and young adults represent 32 percent of the population. Persons aged 65 and older account for 10 percent of the population in the County. The retirement age group consists of a significantly smaller portion of the population than the population in their prime working years. This could suggest that Imperial County has more appeal to the working-age population than to persons of retirement age. Imperial County attracts many seasonal migratory workers and retired people, especially from November through February (ICPDS 2008a).

Table 2.13-2: Population by Age, 2010

Age (years)	Imperial County
Under 5	13,526
5-14	28,377
15-19	15,047
20-24	13,188
25-34	24,197

Table 2.13-2: Population by Age, 2010

Age (years)	Imperial County
35-44	22,941
45-54	22,497
55-64	16,603
65 and over	18,152
Total	**174,528**
Source: U.S. Census Bureau 2010	

Trends

Within the Southern California region, six neighboring counties cover over 38,000 square miles: Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The urban center of the region is Los Angeles County, which contains 54 percent of the region's population.

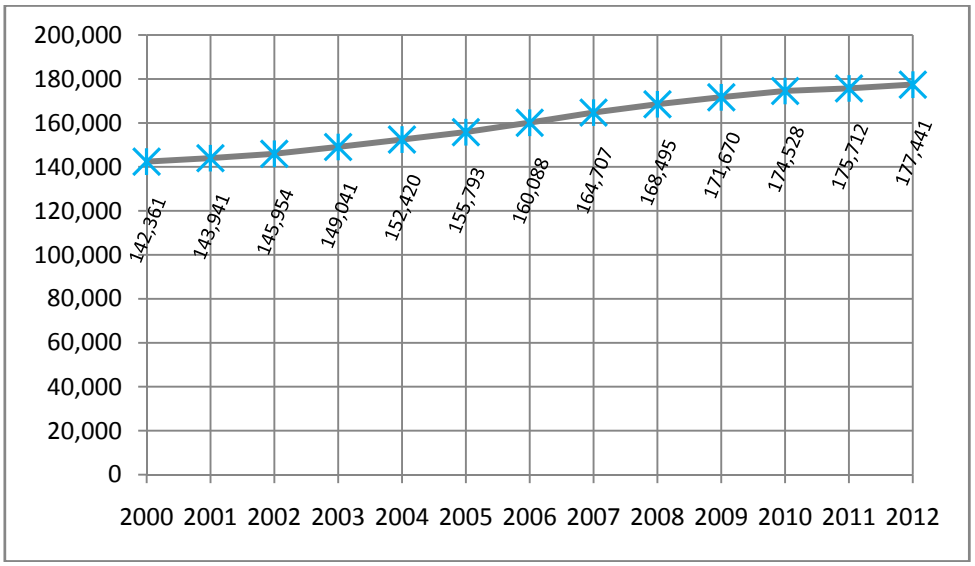
Table 2.13-3: Population Trends – Imperial County and Neighboring Counties

County	Year		Change	
	2000	2010	Number	Percent
Imperial	**142,361**	**174,528**	**32,167**	**18.43%**
Los Angeles	9,519,338	9,818,605	299,267	3.05%
Orange	2,846,289	3,010,232	163,943	5.45%
Riverside	1,545,387	2,189,641	644,254	29.42%
San Bernardino	1,709,434	2,035,210	325,776	16.01%
Ventura	753,197	823,318	70,121	8.52%
Total	16,516,006	18,051,534	1,535,528	8.51%
Source: U.S. Census Bureau 2000, 2010				

Between the years 2000 and 2010, the six counties in the Southern California region grew by approximately 1,500,000 people, representing an 8.5 percent growth in regional population. The majority of the growth occurred in Riverside County, where 42 percent of the total increase occurred.

As shown in Figure 2.13-2 and Table 2.13-4, the total population in Imperial County increased by 35,080 between 2000 and 2012. According to the Southern California Association of Governments (SCAG), during this 12-year period, the County's population rate of 24.6 percent was higher than the SCAG region rate of 10.4 percent. Imperial County has 0.97 percent of the total population within the Southern California region (SCAG 2013a).

Figure 2.13-2: Imperial County Population Change from 2000 to 2012



Source: Southern California Association of Governments 2013

Table 2.13-4: Population Change in Imperial County Cities from 2000 - 2012

City	Year		Change	
	2000	2012	Number	Percent
Brawley	22,052	25,465	3,413	13.40%
Calexico	27,109	39,533	12,424	31.43%
Calipatria	7,289	7,980	691	8.66%
El Centro	38,025	43,396	5,371	12.38%
Holtville	5,612	6,049	437	7.22%
Imperial	7,560	15,353	7,793	50.76%
Westmorland	2,131	2,270	139	6.12%
Unincorporated County Area	32,583	37,395	4,812	12.87%
Total	142,361	177,441	35,080	19.77%
Source: Southern California Association of Governments, California Department of Finance				

Population Projections

The Housing Needs Assessment prepared for the Imperial County General Plan *Housing Element* provides information on the expected population growth for the County from 2000 to 2050 (Table 2.13-5). The County is expected to experience a strong growth rate, growing by 26 percent from 2010 to 2020 and growing another 19 percent from 2020 to 2030.

Table 2.13-5: Population Projections

	2000	2010	2020	2030	2040	2050
Imperial County	143,763	189,675	239,149	283,693	334,951	387,763
Source: Imperial County General Plan *Housing Element* 2008, California Department of Finance P-3 Report January 2007						

Housing

The County of Imperial adopted its current *Housing Element* of the General Plan in 2008, including the County's housing goals, objectives, policies, and programs. The County is currently in compliance with State regulations, and no changes to the existing *Housing Element* are being made.

Household Characteristics

Prior to determining existing housing problems and anticipating future housing needs, current housing occupancy characteristics should be identified. A household consists of any group of people living together in a residence, regardless of relation. For example, two people living in an apartment as roommates is considered a household, just as a couple with two children living in the same dwelling unit is considered a household. A survey of household characteristics is useful to determine household size trends, income, overcrowding or under-utilization of housing, and the number of special needs households.

Housing Inventory and Market Conditions

Persons per Household

An important indicator of the relationship between population growth and household formation is "persons per household." If persons per household were increasing, then population would be growing faster than households. Conversely, if the number of persons per household is decreasing, then households would be forming at a faster rate than population growth. In Imperial County, persons per household increased by 0.30 percent from 2000 to 2010 (Table 2.13-6).

Table 2.13-6: Persons per Household

Area	2000	2010	Percent Change
Imperial County	3.33	3.34	0.30%
Source: U.S. Census Bureau 2000, 2010			

Number of Households

According to the General Plan *Housing Element*, 9,148 households occupied the unincorporated portions of Imperial County in 2000. Approximately 30 percent of the households were renter-occupied, while the remaining 70 percent were owner-occupied. Between 2000 and 2010, the number of households in

California and Imperial County increased by approximately 9 percent and 20 percent, respectively (Table 2.13-7).

Table 2.13-7: Total Households

Area	2000	2010	Percent Change
California	11,502,870	12,577,498	8.54%
Imperial County	39,384	49,126	19.83%
Source: U.S. Census Bureau 2000, 2010			

Vacancy Rates

The vacancy rate is a measure of the general availability of housing and an indicator of the relationship between housing supply and demand in the County of Imperial. If the demand for housing is greater than the available supply, then the vacancy rate is probably low; and the price of housing will most likely increase or remain stable. A high vacancy rate may indicate either the existence of a high number of units undesirable for occupancy or an oversupply of housing units. The availability of vacant housing units provides households with choices of different unit types to accommodate changing needs. The 2010 U.S. Census reports a homeowner vacancy rate of 3.5 percent and a rental vacancy rate of 7.5 percent. These rates represent a 2.1 percent and 4.7 percent increase, respectively, from 2000.

Income

Table 2.13-8 provides a list of the income distributions of households in Imperial County between 2007 and 2011. The table also shows that the overall median income for the County was $39,402. The households listed in the "less than $10,000" category are considered "extremely low-income." According to the *Housing Element*, the projected extremely low-income housing need over the 2008 to 2014 planning period is 1,658 units (or 50 percent of the very low-income RHNA allocation).

Table 2.13-8: Imperial County Household Income

Income	Number	Percent*
Less than $10,000	4,392	9.1%
$10,000 to $14,999	4,706	9.8%
$15,000 to $24,999	7,315	15.2%
$25,000 to $34,999	5,846	12.1%
$35,000 to $49,999	5,882	12.2%
$50,000 to $74,999	7,852	16.3%
$75,000 to $99,999	4,929	10.2%
$100,000 to $149,999	4,849	10.1%
$150,000 to $199,999	1,446	3.0%
$200,000 or more	900	1.9%
Total	**48,117**	
Imperial County Median Income	39,402	
*Percentages may not add up to 100% due to rounding Source: U.S. Census Bureau, 2007-2011 American Community Survey		

Poverty

The State of California issues annual income limits for each county that are used in determining eligibility for assisted housing programs within each county. The California Health and Safety Code requires that the limits established by the State for the low, very low, and extremely low income categories are the same as those in the equivalent levels established by the U.S. Department of Housing and Urban Development (HUD) for its Housing Choice Voucher (Section 8 program). Table 2.13-9 provides the income limits by household size.

Table 2.13-9: State Income Limits for 2013, Imperial County

Income Category	Number of Persons in Household							
	1	2	3	4	5	6	7	8
Extremely Low-	12,150	13,900	15,650	17,350	18,750	20,150	21,550	22,950
Very Low-	20,300	23,200	26,100	28,950	31,300	33,600	35,900	38,250
Low -	32,450	37,050	41,700	46,300	50,050	53,750	57,450	61,150
Median -	40,550	46,300	52,100	57,900	62,550	67,150	71,800	76,450
Moderate -	48,650	55,600	62,550	69,500	75,050	80,600	86,200	91,750
Source: California Department of Housing and Community Development, February 2013								

Table 2.13-10 shows the poverty rates for each age group in the County as well as for single-parent households. In Imperial County, 23.3 percent of the population is below the poverty level.

Table 2.13-10: Population below Poverty Level, 2007-2011

	Percent Below
Children < 18 years	30.5%
Adults (18-64) years	20.8%
Elderly (65+) years	16.1%
Female Headed Single Family	39.6%
Total Population Below Poverty Level	23.3%
Source: U.S. Census Bureau, 2007-2011 American Community Survey	

2.13.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

No regulatory constraints related to population and housing would restrict renewable energy projects.

Constraints Due to Existing Conditions

Population and housing rates and projections would not provide constraints on renewable energy projects. Population growth and the associated need for new residential development increases the necessity for services, including energy needs.

Opportunities

The County is expected to experience a strong growth rate, growing by 26 percent from 2010 to 2020 and growing another 19 percent from 2020 to 2030. Renewable energy development in the County would provide an opportunity to create more local jobs and tax revenues. The benefits include increased direct and indirect job growth and associated improvement to the standard of living of many local residents.

2.14 PUBLIC SERVICES

2.14.1 Introduction

This section discusses the existing public services in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.14.2 Terminology

No specific public services terminology is used in this section.

2.14.3 Regulatory Setting

California Office of Emergency Services (OES)

The California Governor's Office of Emergency Services provides services and oversight in order to increase safety and preparedness throughout California. The agency provides strong guidance and encourages collaboration and meaningful partnerships between agencies. The mission of OES is founded in public service under the California Emergency Services Act. The goal is to protect lives and property by effectively preparing for, preventing, responding to, and recovering from all threats, crimes, hazards, and emergencies (OES 2014).

California Fire Code and Guidelines

The California Fire Code was established by the California Building Standards Commission, including collaboration with the Department of Housing and Community Development, the Division of State Architect, the Office of the State Fire Marshal, the Office of Statewide Health Planning and Development, the California Energy Commission, the California Department of Public Health, the California State Lands Commission, the Board of State and Community Corrections, and the California Building Standards Commission. The California Fire Code and Guidelines provide guidance regarding general requirements, emergency planning and preparedness, building equipment and design features, instructions for special occupancies and operations, and hazardous materials (CBSC 2013).

California Health and Safety Code

The California Health and Safety Code establishes regulations for health care services, health research, local health and safety, health care facilities, health care service plans, local administration, community facilities, and state-county partnerships, among many other categories (California Health and Safety Code 2014).

California Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (Cal Fire) is a state agency that provides fire protection and stewardship to the privately owned wildlands within the state. Cal Fire also provides emergency services in coordination with local governments. According to their website, Cal Fire responds to approximately 5,600 wildland fires each year and responds to over 350,000 emergency calls

each year (Cal Fire 2014). Cal Fire also assists other fire departments when resources are available, as part of the California Master Mutual Aid Agreement (DCREP 2014).

The Board of Forestry and Fire Protection adopted the Strategic Fire Plan for California in 2010, which provided guidelines for reducing the risk of wildfire, including fire suppression. The plan divides California into operational units to deal with fire suppression in specific areas. Imperial County is located in the San Diego Unit (DCREP 2014).

California Occupational Safety and Health Administration

The California Occupational Safety and Health Administration (Cal/OSHA) is a state agency that strives to protect workers from job-related health and safety hazards. Cal/OSHA establishes standards as well as enforcement and consultation programs (Cal/OSHA 2014). OSHA operates under the U.S. Department of Labor as part of the Occupational Safety and Health Act of 1970.

Imperial County General Plan

The *Seismic and Public Safety Element* of the Imperial County General Plan addresses the goals and policies related the public services and public safety within the County. Policies related to public services include the following:

> *Goal 1*: Include public health and safety considerations in land use planning.
>
> > *Objective 1.8*: Reduce fire hazards by the design of new developments.
>
> *Goal 2:* Minimize potential hazards to public health, safety, and welfare and prevent the loss of life and damage to health and property resulting from both natural and human-related phenomena.
>
> > *Objective 2.1*: Ensure the adequacy of existing emergency preparedness and evacuation plans to deal with identified hazards and potential emergencies.

The *Parks and Recreation Element* of the Imperial County General Plan provides a framework for the provision and stewardship of County parks and recreational facilities for the enjoyment of County residents and visitors. *The Parks and Recreation Element* applies to all the unincorporated land within the County.

Imperial County Year 2006 Development Impact Fees Ordinance

The 2006 Development Impact Fees Ordinance was approved by the Imperial County Board of Supervisors in November 2006 and requires "…new development both in the countywide and unincorporated areas to supplement the fair share costs of public facilities, equipment and services necessitated by such new development…" (County 2006, pg. 1).

Imperial County Fire/ Office of Emergency Services – Emergency Operations Plan

The Imperial County Operational Area Emergency Operations Plan provides the procedures for Imperial County in order to prepare for and respond to emergencies or natural disasters. In addition, the Emergency Operations Plan outlines the organizational structures, relationships, and responsibilities

related to coordinating responses for various emergency situations. The Emergency Operations Plan provides guidance for the cities, special districts, and private organizations that play a role in emergency response situations throughout the County operational area (County 2007b).

Imperial County-Mexicali Emergency Response Plan

The Binational Prevention and Emergency Response Plan between Imperial County, California, and the city of Mexicali, Baja California, was established as part of a joint contingency plan (JCP) between the United States of America (U.S.) and Mexico. The JCP was signed in 1999 and provided a foundation for collaboration for the border area and the basis for preparedness, mitigation, response, and prevention of hazardous substances along the inland international boundary. A memorandum of understanding (MOU) was developed to reinforce the jurisdictional cooperation between the two nations. The MOU with the corresponding emergency preparedness and response plan was developed with the support of the U.S. Environmental Protection Agency (County 2005).

2.14.4 Existing Environmental Setting

Fire Protection

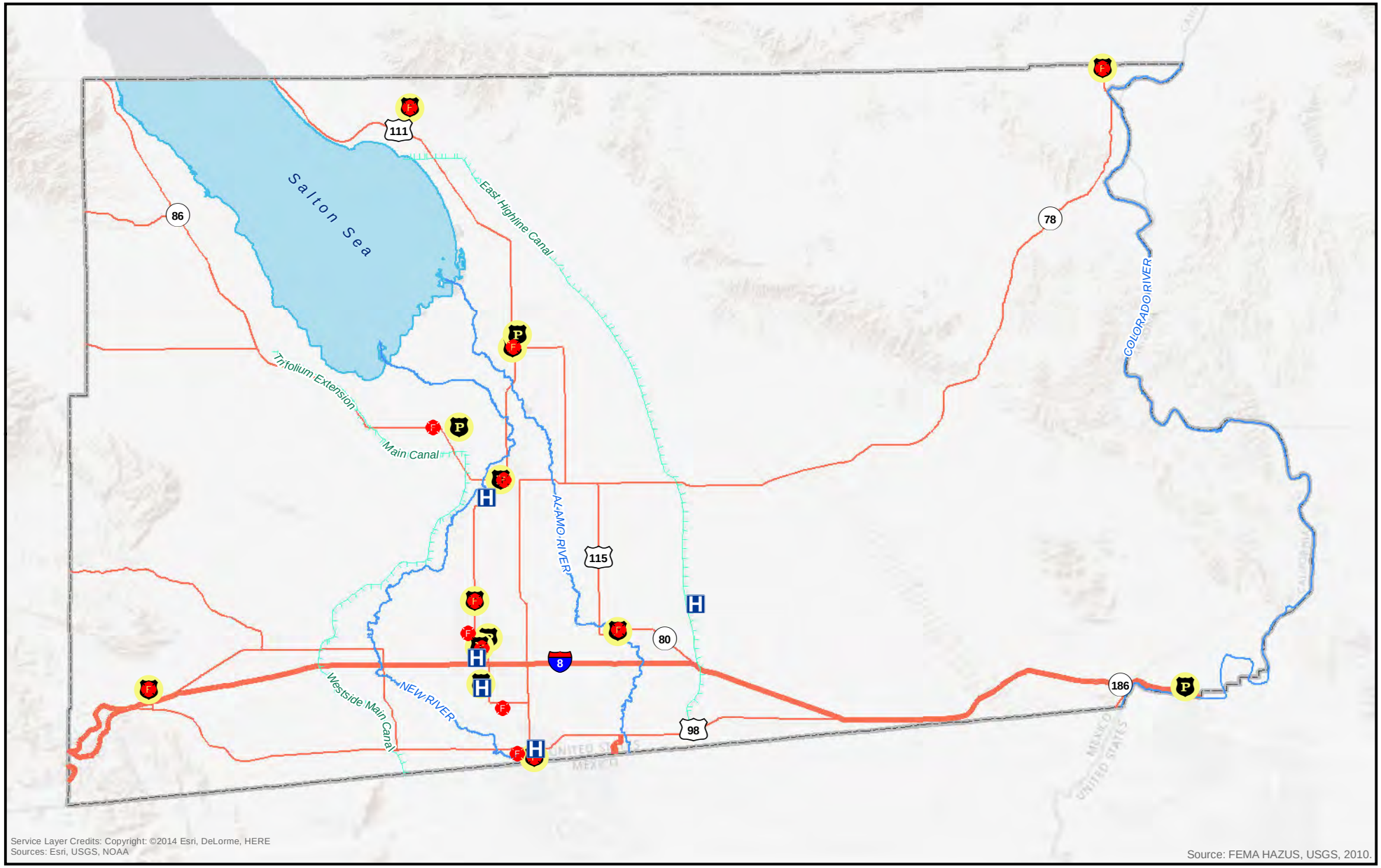
Fire protection in Imperial County is currently provided by the Imperial County Fire Department/OES. The headquarters is located in the City of Imperial at 2514 La Brucherie Road; and substations are located in Heber, Seeley, Imperial, and Palo Verde. Staff includes 8 staff personnel, 31 full-time fire suppression personnel, and 20 reserve personnel (ICPDS 2012). The Imperial County Fire Department provides services including responses to fire, medical, rescue, hazardous materials, prevention, and hazardous device incidents. The average response time is approximately five minutes, but the response time varies based on the location of the incident. In the remaining unincorporated areas of the County, fire protection services are provided based on a mutual aid agreement with other agencies throughout the County (ICPDS 2011). Table 2.14-1 presents the locations of the fire stations throughout the County, while Figure 2.14-1 displays the locations of the fire stations throughout the County.

Table 2.14-1: Fire Stations in Imperial County

Fire Station	Address
Imperial County Fire Department Headquarters	2514 La Brucherie Road, Imperial, CA
Imperial County Fire Department Substation – Heber	1078 Dogwood Road, Heber, CA
Imperial County Fire Department Substation – Seeley	1828 Park Street, Seeley, CA
Imperial County Fire Department Substation – City of Imperial	2514 La Brucherie Road, Imperial, CA
Imperial County Fire Department Substation – Palo Verde	112 US Highway 78, Palo Verde, CA

Law Enforcement

The Imperial County Sheriff's Office provides police protection within the County. The Imperial County Sheriff's Office is headquartered in El Centro at 328 Applestill Road (Imperial County Sheriff's Office 2013). Imperial County Sheriff's Office substations are located in Brawley, Salton City, and Winterhaven, with resident deputies located in the unincorporated communities of Ocotillo, Bombay Beach, Niland, and Palo Verde. The Imperial County Sheriff's office has a staff of approximately 300 sworn, non-sworn,



Legend

- Police Station
- Fire Station
- Hospital

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Figure 2.14-1

Imperial County Renewable Energy and Transmission Element Update

Police, Fire, and Emergency Services

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and civilian employees (County 2011). The average response time would be difficult to estimate due to the size of the County and multiple other factors that could affect the response time such as available personnel, workload, and distance (County 2011). Each of the cities within Imperial County also has a police department to serve its incorporated area. Similar to fire protection, the County has a Mutual Aid Agreement for police protection emergencies. In addition, the California Highway Patrol provides some police protection services within the County, including traffic regulation enforcement, emergency accident management, and service and assistance on State roadways or highways (Imperial County Sheriff's Office 2013). Table 2.14-2 displays the locations of the police stations throughout the County.

Table 2.14-2: Law Enforcement Stations in Imperial County

Police Station	Address
Imperial County Sheriff's Office Headquarters	328 Applestill Road, El Centro, CA
Imperial County Sheriff's Office Substation – Brawley	220 Main Street, Brawley, CA
Imperial County Sheriff's Office Substation – Salton City	251 S. Marina Drive, Salton City, CA
Imperial County Sheriff's Office Substation – Winterhaven	513 2nd Avenue, Winterhaven, CA
Imperial County Sheriff's Office – Niland Station	218 1st Street, Niland, CA
Imperial County Sheriff's Office – Palo Verde Station	112 Highway 78, Palo Verde, CA

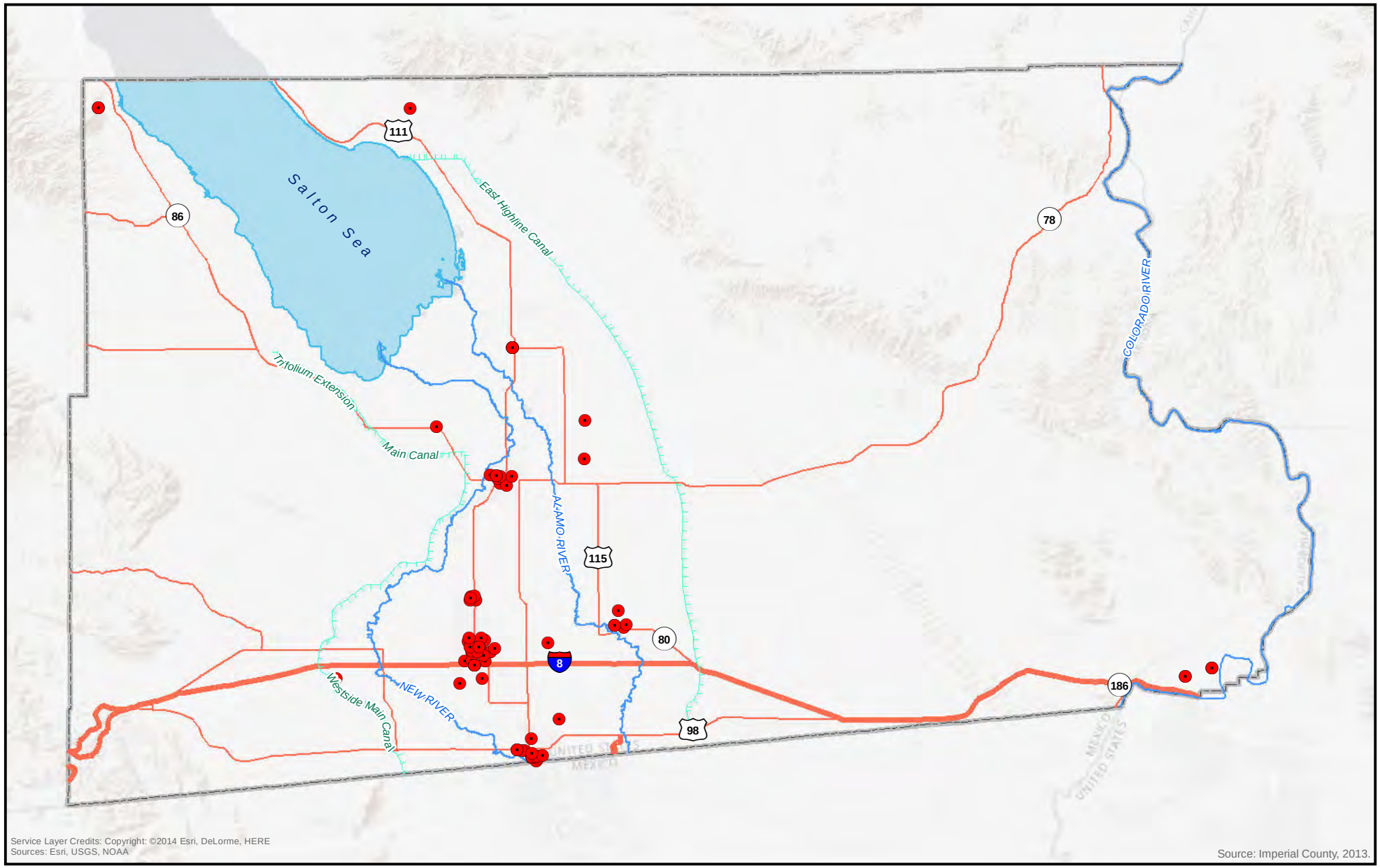
Schools

Imperial County includes the following 16 school districts:

- Brawley Elementary School District
- Brawley Union High School District
- Magnolia Elementary School District
- Mulberry Elementary School District
- Calexico Unified School District
- Calipatria Unified School District
- Central Union High School District
- El Centro Elementary School District
- McCabe Union School District
- Meadows Union School District
- Heber Elementary School District
- Holtville Unified School District
- Imperial Unified School District
- Seeley Union School District
- Westmorland Elementary School District
- San Pasqual Valley Unified School District

In addition, San Diego State University has campuses located in Calexico and Brawley. Furthermore, Imperial Valley College, a community college, is located within the County (Imperial County Office of Education 2013). Figure 2.14-2 shows the locations of schools within the County.

The Brawley Elementary School District is located in the City of Brawley with five schools – four elementary schools and one middle school – serving grades Kindergarten through 8th grade.



Legend

- School Location

N

0 5 10 20

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Figure 2.14-2

Imperial County Renewable Energy and Transmission Element Update
School Locations

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Approximately 3,700 students attend schools within the Brawley Elementary School District (Brawley Elementary School District 2013).

Magnolia Union Elementary School District consists of a small, rural elementary school that has approximately 130 students in Kindergarten through 8th grades. The district is located in the City of Brawley but serves students from the surrounding agricultural areas including Calipatria and Holtville. A modernization project was completed in 2006-2007, where all facilities were either renovated or replaced; and in the summer of 2011 roof repairs were completed (Magnolia Union Elementary 2012, 2013).

Mulberry Elementary School District is located 10 miles from the City of Brawley in northeastern Imperial County. The district consists of one school, which serves students in Kindergarten through 8th grades. The number of students ranges from approximately 70 to 90, depending on the school year. In the spring of 2004, the school underwent modernization and new construction projects, including a new Cafeteria/Multipurpose Room, a new kitchen, and new classroom and restroom facilities (Mulberry Elementary School 2013).

Calexico Unified School District is located in the City of Calexico and includes seven elementary schools, two junior high schools, one 9th grade campus, one comprehensive high school, one continuation high school, and an adult education program. The number of students within the district is approximately 9,200 (Calexico Unified School District 2013).

Calipatria Unified School District is located in the Cities of Calipatria and Niland. The district includes two elementary schools with Kindergarten through 4th grades, one middle school with 5th through 8th grades, and one high school. The district includes approximately 1,200 students (Calipatria Unified School District 2013).

Central Union High School District includes two comprehensive high schools, one continuation high school, and one adult school and is located in the City of El Centro. Enrollment at the Central Union High School District is approximately 4,200 students (Central Union High School District 2012).

El Centro Elementary School District is located in the City of El Centro and includes approximately 5,000 students. Schools within the district include eight elementary schools, one magnet school for 4th through 6th grades, one middle school, one junior high school, and one home school academy (El Centro Elementary School District 2013).

McCabe Union Elementary School District is located in the City of El Centro and serves Kindergarten through 8th grades. The district includes two school sites, the McCabe site for Kindergarten through 3rd grades and the Corfman site for 4th through 8th grades. Enrollment in the McCabe Union Elementary School District is approximately 1,200 students. Recent upgrades to the campuses include relining the district's sewer plant in 2009, upgrading the district's water plant, and concrete repairs after a 7.2-magnitude earthquake in 2010 (McCabe Union Elementary School District 2012).

Meadows Union Elementary School District serves the southern region of Imperial County, including rural areas outside the City of El Centro. Meadows Union Elementary School District is a one-school district with Kindergarten through 8th grades, serving approximately 500 students (Meadows Union Elementary School District 2012).

Heber Elementary School District consists of two elementary schools in the community of Heber, serving Kindergarten through 8th grades. The district has an enrollment of approximately 1,140 students (Heber Elementary School District 2012).

Holtville Unified School District includes two elementary schools, one middle school, one comprehensive high school, one continuation high school, and one homeschooling academy with 7th through 12th grades. The district is located in the City of Holtville and has approximately 1,600 students within (Holtville Unified School District 2012).

The Imperial Unified School District is located in the City of Imperial and serves approximately 3,700 students within the district. The district includes two elementary schools, one intermediate school, one continuation school, and one high school (Imperial Unified School District 2013).

Seeley Union School District is a single-school district serving Kindergarten through 8th grades. The district includes approximately 390 students and is located in the community of Seeley (Seeley Union School District 2013).

Westmorland Union Elementary School District is located in the community of Westmorland and serves students from Kindergarten through 8th grades. Approximately 390 students are enrolled in the district, which is a one-school district. The most recent maintenance projects completed at the school included exterior painting, removing wallpaper and painting the front office, and installing new computers in the computer lab room (Westmorland Union Elementary School District 2012).

San Pasqual Valley Unified School District includes the communities of Winterhaven, Bard, and the Quechan Indian Nation, as well as other incorporated areas. The district includes one elementary school, one middle school, a comprehensive high school, and an alternative high school and has an enrollment of approximately 780 students (San Pasqual Valley Unified School District 2012).

Table 2.14-3: School Districts and Schools within Imperial County

District	School	Address
Brawley Elementary School District		261 "D" Street, Brawley CA
	J.W. Oakley Elementary School	1401 "B" Street, Brawley, CA
	Myron D. Witter Elementary School	150 "K" Street, Brawley, CA
	Miguel Hidalgo Elementary School	615 S. Cesar Chavez Street, Brawley, CA
	Phil D. Swing Elementary School	245 West "A" Street, Brawley, CA
	Barbara Worth Junior High School	385 "D" Street, Brawley, CA
Magnolia Union Elementary School District	Magnolia Elementary School	4502 Casey Road, Brawley, CA
Mulberry Elementary School District	Mulberry Elementary School	1391 East Rutherford Road, Brawley, CA
Calexico Unified School District		901 Andrade Avenue, PO Box 792 Calexico, CA
	Calexico High School	1030 Encinitas Avenue, Calexico, CA
	Aurora High School	641 Rockwood Avenue, Calexico, CA
	Robert F. Morales – Adult Center	901 Andrade Avenue, Calexico,

Table 2.14-3: School Districts and Schools within Imperial County

District	School	Address
		CA
	De Anza 9th Grade Academy	824 Blair Avenue, Calexico, CA
	Enrique Camarena Junior High School	800 E. Rivera Street, Calexico, CA
	William Moreno Junior High School	1201 Kloke Road, Calexico, CA
	Blanche Charles Elementary	1201 Kloke Road, Calexico, CA
	Cesar Chavez Elementary	1251 E. Zapata Street, Calexico, CA
	Dool Elementary	800 Encinitas Avenue, Calexico, CA
	Jefferson Elementary	1120 E. 7th Street, Calexico, CA
	Kennedy Gardens Elementary	23000 Rockwood Avenue, Calexico, CA
	Mains Elementary	655 W. Sheridan Avenue, Calexico, CA
	Rockwood Elementary	1000 Rockwood Avenue, Calexico, CA
Calipatria Unified School District		501 W. Main Street, Calipatria, CA
	Bill E. Young Middle School	601 W. Main Street, Calipatria, CA
	Calipatria High School	601 W. Main Street, Calipatria, CA
	Fremont Primary School	401 W. Main Street, Calipatria, CA
	Grace Smith School	501 W. Main Street, Calipatria, CA
Central Union High School District		351 Ross Avenue, El Centro, CA
	Central Union High School	1001 Brighton Avenue, El Centro, CA
	Desert Oasis High School	1302 South 3rd Street, El Centro, CA
	Southwest High School	2001 Ocotillo Drive, El Centro, CA
	Central Union Adult School	1302 South 3rd Street, El Centro, CA
El Centro Elementary School District		1256 Broadway, El Centro, CA
	De Anza Magnet School	1530 S. Waterman, El Centro, CA
	Desert Garden Elementary	1900 S. 6th Street, El Centro, CA
	Harding Elementary	950 S. 7th Street, El Centro, CA
	Hedrick Elementary	550 S. Waterman, El Centro, CA
	IV Home School Academy	2370 W. Main Street, El Centro, CA
	Kennedy Middle School	900 N. 6th Street, El Centro, CA
	Lincoln Elementary School	200 N. 12th Street, El Centro, CA
	Martin Luther King Elementary School	1950 Villa, El Centro, CA
	McKinley Elementary School	1177 N. 8th Street, El Centro, CA
	Sunflower Elementary School	2450 W. Main Street, El Centro, CA

Table 2.14-3: School Districts and Schools within Imperial County

District	School	Address
	Washington Elementary School	223 S. 1st Street, El Centro, CA
	Wilson Junior High School	600 S. Wilson, El Centro, CA
McCabe Union Elementary School District	Corfman Site/McCabe Site	701 W. McCabe Road, El Centro, CA
Meadows Union Elementary School District	Meadows School	2059 Bowker Road, El Centro, CA
Heber Elementary School District	Heber Elementary School	1052 Heber Avenue, Heber, CA
	Dogwood Elementary School	44 E. Correll Road, Heber, CA
Holtville Unified School District	Freedom Academy	621 E. 6th Street, Holtville, CA
	Holtville High School	755 Olive Avenue, Holtville, CA
	Holtville Middle School	800 Beale Avenue, Holtville, CA
	Finley Elementary	627 E. 6th Street, Holtville, CA
	Pine Elementary	3295 Holt Road, Holtville, CA
	Webb Continuation High School	522 W. 8th Street, Holtville, CA
Imperial Unified School District		219 North "E" Street, Imperial, CA
	Ben Hulse Elementary	303 South "D" Street, Imperial, CA
	T.L. Waggoner Elementary	627 Joshua Tree Street, Imperial, CA
	Frank Wright Middle School	885 N. Imperial Ave, Imperial, CA
	Imperial High School	517 W. Barioni Blvd, Imperial, CA
	Imperial Avenue Holbrook School	322 N. Imperial Ave, Imperial, CA
Seeley Union School District	Seeley Elementary School	1812 W. Rio Vista, Seeley, CA
Westmorland Union Elementary School District	Westmorland Elementary School	200 S. "C" Street, PO Box 88, Westmorland, CA
San Pasqual Valley Unified School District	San Pasqual Valley Elementary School, Middle School, High School	676 Baseline Road, Winterhaven, CA

Parks

Five parks are operated by the Imperial County Planning & Development Services Department (ICPDS). These include Sunbeam Lake Park, Wiest Lake, Red Hill Park, Ocotillo Community Park, and Palo Verde Park. These County parks offer a variety of passive and active recreation opportunities, including playground equipment, basketball courts, picnic tables, barbeque grills, campsites, walking trails, boating and fishing opportunities, and open space for passive recreation (ICPDS 2013a).

Other park facilities not operated by the County include:

- Heber Dunes Park, which is currently being leased to the California Department of Parks and Recreation
- Pioneer's County Park, which is managed by the Imperial County Historical Society
- Heber Community Park, which is maintained by the Heber Public Utility District

- Salton City Park, which is managed by the Salton Community Services District
- Osbourne Park, which is operated by the Bureau of Land Management
- two privately managed neighborhood parks in Heber
- a neighborhood park in Salton City managed by the Salton Community Services District
- Salton Sea State Recreation Area
- Picacho State Recreation Area
- Anza-Borrego Desert State Park
- Imperial Sand Dunes Recreation and Wilderness Area, overseen by the Bureau of Land Management (ICPDS 2013b)

Libraries

The Imperial County Free Library (ICFL) offers library and information services to the residents of Imperial County who are located outside the city limits of Brawley, Calexico, El Centro, and Imperial. The ICFL includes four libraries located in the communities of Calipatria, Heber, Holtville, and Salton City (ICFL 2013).

Recreational Facilities

In addition to the parks, recreational programs and activities include Little League and BMX races at Sunbeam Lake Park and hunting activities during the allowed hunting season (in allowable game fields) (ICPDS 2013c).

2.14.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

No constraints are anticipated due to regulatory requirements.

Constraints Due to Existing Conditions

In terms of geothermal and renewable energy facilities, any constraints would be due to ensuring the provision of public safety at these facilities in case of explosion or fire. Since the Imperial County Sheriff's Office and the Imperial County Fire Department/EOS already provide police and fire protection services throughout the County, no major constraints are anticipated.

Opportunities

No major opportunities are anticipated in terms of public services.

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2.15 RECREATION

2.15.1 Introduction

This section discusses the existing recreational resources in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.15.2 Terminology

The following is a summary of recreation terminology discussed in this section:

- **Environmental Impact Statement (EIS)** – A document required by the federal National Environmental Policy Act (NEPA) for major projects or legislative proposals using federal money and that significantly affects the environment. An EIS describes the environmental implications of a project and lists alternative actions. The report informs decision makers and the public of the alternatives that would avoid or minimize adverse impacts or enhance the quality of the environment.

- **Environmental Impact Report (EIR)** – A document required under the California Environmental Quality Act (CEQA) that assesses the impacts a proposed project will have on the environment and proposes mitigation measures.

2.15.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to recreation.

Imperial County Parks and Recreation Element

The *Parks and Recreation Element* of the Imperial County General Plan provides a framework for the provision and stewardship of County parks and recreational facilities for the enjoyment of County residents and visitors. The *Parks and Recreation Element* applies to all the unincorporated land within the County.

The *Parks and Recreation Element* policy section addresses: (1) the condition and location of existing parks; (2) the classification of parks and other recreational amenities; (3) anticipated park and recreational needs by County residents and visitors; (4) the establishment, duties, and authority of a Parks and Recreation Commission; (5) the maintenance and enhancement of existing parks and recreational amenities; (6) the acquisition and development of regional, community, and neighborhood parks and recreational amenities; (7) the promotion of greater cooperation and coordination between incorporated cities, the State, and the federal government to establish joint-use parks and recreational amenities; (8) the conservation and promotion of waterbodies and adjoining areas for recreation; (9) the procurement of funding; and (10) the encouragement of park tourism and related businesses.

The *Parks and Recreation Element* provides a description of the condition and location of the existing parks within the County, anticipated park needs for the future, responsibilities of the Parks and Recreation Commission, park design and maintenance standards, park acquisition and development policies, funding mechanisms, and government cooperation.

Parks within unincorporated areas in the County are divided into the following categories:

- **Limited Park Facility**: Amenities at this type of park are minimal, with one primary function and possibly some accessory uses. This type of park may be any size and is usually located in the open desert area of the County. Examples of this type of parks include marinas, boat launching areas, and trail heads.

- **Neighborhood Park**: These parks are small (usually less than 3.0 acres) and are located within the confines of an unincorporated community and within walking distance of a residential district for ease of access by pedestrians. Typically these parks have two or three amenities, such as playgrounds or other active uses, and landscaped areas for passive, leisurely uses such as light walking or sitting. As these parks are pedestrian-oriented, they usually have only curbside parking. Often, Neighborhood Parks are referred to as Pocket Parks when they are embedded within a residential block. These parks may be maintained by the County or an Assessment District, as is typical for newer subdivisions.

- **Community Park**: Larger than a Neighborhood Park (from 30 to 80 acres), these parks are shared by the entire local community. This type of park is usually entirely within an unincorporated community and typically has a major, active, recreational use such as athletic fields or courts which the entire community uses. Numerous onsite amenities, not usually available at a neighborhood park, such as baseball fields, basketball courts, and larger picnic areas, are located within a Community Park. These parks are easily accessible by pedestrians, bikes, or by vehicles and typically include small onsite parking facilities.

- **Regional Park**: Outside or inside a community but with ease of access from a major road, these parks are shared by the entire populace of the County. These parks are much like community parks except they are typically larger and are meant to serve the entire County. In addition to sports fields and grassy leisure areas with picnic tables, a regional park is usually distinguished by a water feature such as a pond or lake. Excepting pedestrians from nearby residential areas, Regional Parks usually are accessed by vehicle; hence, they include onsite parking facilities. Regional Parks are typically maintained by the County but may also be maintained by a city or special district.

- **State and Federal Parks**: These parks are maintained by the State or federal government. These parks are typically large pieces of land and may include hundreds of acres under wildlife preserve with designated areas for human use. These parks usually attract visitors from outside the County and typically have outdoor recreational opportunities, with trails for hiking, designated areas for camping and off-highway driving, and wildlife preserves where access is limited or prohibited. These parks are located outside the County farmland area and must be driven to, in order to access. Onsite parking is found at these parks, but usually the parking is unimproved (i.e., without pavement or designated parking stalls).

The following are goals and policies of the *Parks and Recreation Element*:

> *Goal*: The County will strive to provide its populace with usable and functional landscaped parks with recreational amenities such as playgrounds and athletic fields, and facilities such as restrooms and ramadas.

Policy: In calculating park acreage, the County shall have a gross figure and a net figure. The gross figure shall include all developed and undeveloped parkland. The net figure shall only include improved and developed parkland and shall exclude bodies of water and undeveloped parkland.

Goal: The County shall provide 5.0 net acres of parkland for every 1,000 residents.

Goal: To achieve the target of 5.0 acres per 1,000 people, the County will actively work to reopen closed parks, improve and/or expand existing parks, and establish new parks.

Goal: The County will work to establish a new regional park along McCabe Road.

Policy: New development shall include the dedication of 1.0 acre of improved parkland for every 50 housing units (provided directly or as an in-lieu fee).

Goal: The County will seek greater cooperation between cities and special districts to ensure adequate funding of joint-use parkland areas.

Policy: If the park includes native natural habitat and plant species, those shall be maintained and incorporated within the park to the extent feasible.

Policy: To promote water conservation, all vegetation installed shall follow xeriscape principles for reduced total water consumption.

Goal: The County shall try to reopen all its parks and acquire new parkland.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is a federal law under the jurisdiction of the Environmental Protection Agency (USEPA) that requires federal agencies to consider environmental values in the decision-making process. The federal agencies must consider environmental impacts and consequences of proposed actions and reasonable alternatives that could potentially reduce impacts (USEPA 2014a).

California Environmental Quality Act

CEQA is a State document that is part of the California Code of Regulations. CEQA requires projects to undergo environmental review; depending on the potential effects, a more substantial review may need to be conducted in the form of an Environmental Impact Report (EIR). In an EIR, mitigation measures are proposed for any potentially significant impacts in order to reduce the level of impact, and feasible alternatives are considered (CNRA 2014). The County and consultant team will prepare a Programmatic EIR pursuant to CEQA Guidelines, Section 15168. Completion of the Programmatic EIR would allow future individual renewable energy projects to "tier" off this environmental document. Future renewable energy projects would be implemented on a "project-by-project" basis based on County approval of individual renewable energy projects. Future renewable energy projects would need to be reviewed in the context of this Programmatic EIR to determine if additional environmental documentation would be required.

Quimby Act

The 1975 Quimby Act was passed in order to require the provision of parkland and open space for recreational use. The act requires developers to set aside land, donate conservation easements, or pay fees for park improvements. The Quimby Act allows for the constant provision of parks for California communities. The Quimby Act standards adopted in jurisdictions typically require the provision of 3 to 5 acres of parkland per 1,000 residents (CDPR 2002). The Quimby Act is the County's primary means of acquiring park area and open space. The Act is designed to ensure "adequate" provision of parkland and open space through the Quimby Act Standards. Through these standards, the County can require developers to provide land for parks, donate for conservation easements, or pay in-lieu fees for the creation or rehabilitation of recreational facilities.

Imperial County General Plan

The *Land Use Element* of the Imperial County General Plan provides guidance regarding the distribution, general location, and extent of uses for land involving housing, agriculture, business, open space, industry, and public facilities. The *Land Use Element* contains overviews of the County's specific plan areas including Gateway of the Americas Specific Plan Area, Glamis Specific Plan Area, Holtville Air Strip Specific Plan Area, Mesquite Lake Specific Plan Area, Heber Specific Plan Area, and Wonderstone Aggregate Specific Plan Area. Specific Plans noted in the *Land Use Element* include Rio Bend Specific Plan, Imperial Lakes Specific Plan, McCabe Ranch 2 Specific Plan, Brookfield/101 Ranch Specific Plan, Rancho Los Lagos Specific Plan, and River Front Specific Plan.

The *Land Use Element* goals and objectives related to recreation include the following:

> *Goal 3*: Achieve balanced economic and residential growth while preserving the unique natural, scenic, and agricultural resources of Imperial County.
>
> > *Objective 3.1*: Maintain and improve the quality of life, the protection of property and the public health, safety, and welfare in Imperial County.
> >
> > *Objective 3.2*: Preserve agriculture and natural resources while promoting diverse economic growth through sound land use planning.
> >
> > *Objective 3.6*: Recognize and coordinate planning activities as applicable with the Bureau of Land Management (BLM), and the California Desert Conservation Plan.
> >
> > *Objective 3.7*: Establish a continuing comprehensive long-range planning process for the physical, social, and economic development of the County.
> >
> > *Objective 3.12*: Plan the County urban areas to have physical features, such as urban green belts, parks, or geographic/topographic features that distinguish one community/city from another to avoid the future bland mega-city such as the Los Angeles basin.
>
> *Goal 4*: Preserve and enhance distinctive historic desert towns and newer communities.
>
> > *Objective 4.1*: Preserve and enhance existing urban and rural communities.
> >
> > *Objective 4.2*: Encourage distinctive community identities.

Objective 4.3: Maintain and require compatible land uses within the existing communities.

Objective 4.4: Limit the establishment of nonresidential uses in predominantly residential neighborhoods and require effective buffers when appropriate nonresidential uses are proposed.

Goal 8: Coordinate local land use planning activities among all local jurisdictions and State and federal agencies.

Objective 8.1: Coordinate with federal, State, and municipal agencies when planning for the acquisition and improvement of public parks and assure compatibility with adjacent communities and private property.

Objective 8.2: New developments shall provide improvements to meet the added demands for parks and recreational facilities.

Objective 8.4: Ensure that all future proposed private and public facilities are adequate to meet expected population growth and the needed additional services around local cities.

Goal 9: Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality.

Objective 9.1: Preserve as open space those lands containing watersheds, aquifer recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes.

California Desert Conservation Area Plan

The California Desert Conservation Area (CDCA) Plan was originally created by BLM in 1980 to serve as a guide regarding land use management for the desert area. The CDCA covers over 15.2 million acres of desert, including public lands. The goal of the CDCA Plan "…is to provide for the use of public lands, and resources of the California Desert Conservation Area, including economic, educational, scientific, and recreational uses, in a manner which enhances wherever possible—and which does not diminish, on balance—the environmental, cultural, and aesthetic values of the Desert and its productivity…" (BLM 1999).

The CDCA Plan includes a Recreation Element that recognizes the broad range of recreational opportunities that can be found in the desert. Goals found in the Recreation Element include the following:

1. Provide for a wide range of quality recreation opportunities and experiences emphasizing dispersed undeveloped use.

2. Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety.

3. Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources.

4. Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources.

5. Adjust management approach to accommodate changing visitor use patterns and preferences.

6. Encourage the use and enjoyment of desert recreation opportunities by special populations and provide facilities to meet the needs of those groups (BLM 1999).

California Parklands Act of 1980

The California Parklands Act of 1980 is included in the California Public Resources Code, Section 5096.141-5096-145. The California Parklands Act recognizes the responsibility of the state to provide recreational opportunities and facilities for the residents of California. According to the California Parklands Act of 1980, "…when there is proper planning and development, parks, beaches, recreation areas and recreational facilities, and historical resources preservation projects contribute not only to a healthy physical and moral environment, but also contribute to the economic betterment of the state, and, therefore, it is in the public interest for the state to acquire, develop, and restore areas for recreation, conservation, and preservation and to aid local governments of the state in acquiring, developing, and restoring such areas as will contribute to the realization of the policy declared in this chapter..."

Overall, the California Parklands Act of 1980 identifies the importance of available parkland and recreational areas throughout the State for use by residents and visitors. The California Parklands Act also recognizes the importance of funding in order to provide new and to improve existing recreational facilities and parkland areas.

2.15.4 Existing Environmental Setting

Parks and recreation in Imperial County are enhanced by the natural resources of the Sonoran Desert, including the mountains, sandy hills, the Colorado River, and the Salton Sea. Due to the varied terrain throughout the County, abundant opportunities for recreation exist, such as hiking, boating, and off-highway activities. In addition, multiple parks are located within the urban areas of the County.

Parks

Five parks are operated by the Imperial County Planning and Development Services Department (ICPDS). These include Sunbeam Lake Park, Wiest Lake Park, Red Hill Marina Park, Ocotillo Community Park, and Palo Verde Park. These County parks offer a variety of passive and active recreation opportunities, including playground equipment, basketball courts, picnic tables, barbeque grills, campsites, walking trails, boating and fishing opportunities, and open space for passive recreation (ICPDS 2013a). Table 2.15-1 describes the specific amenities at these parks.

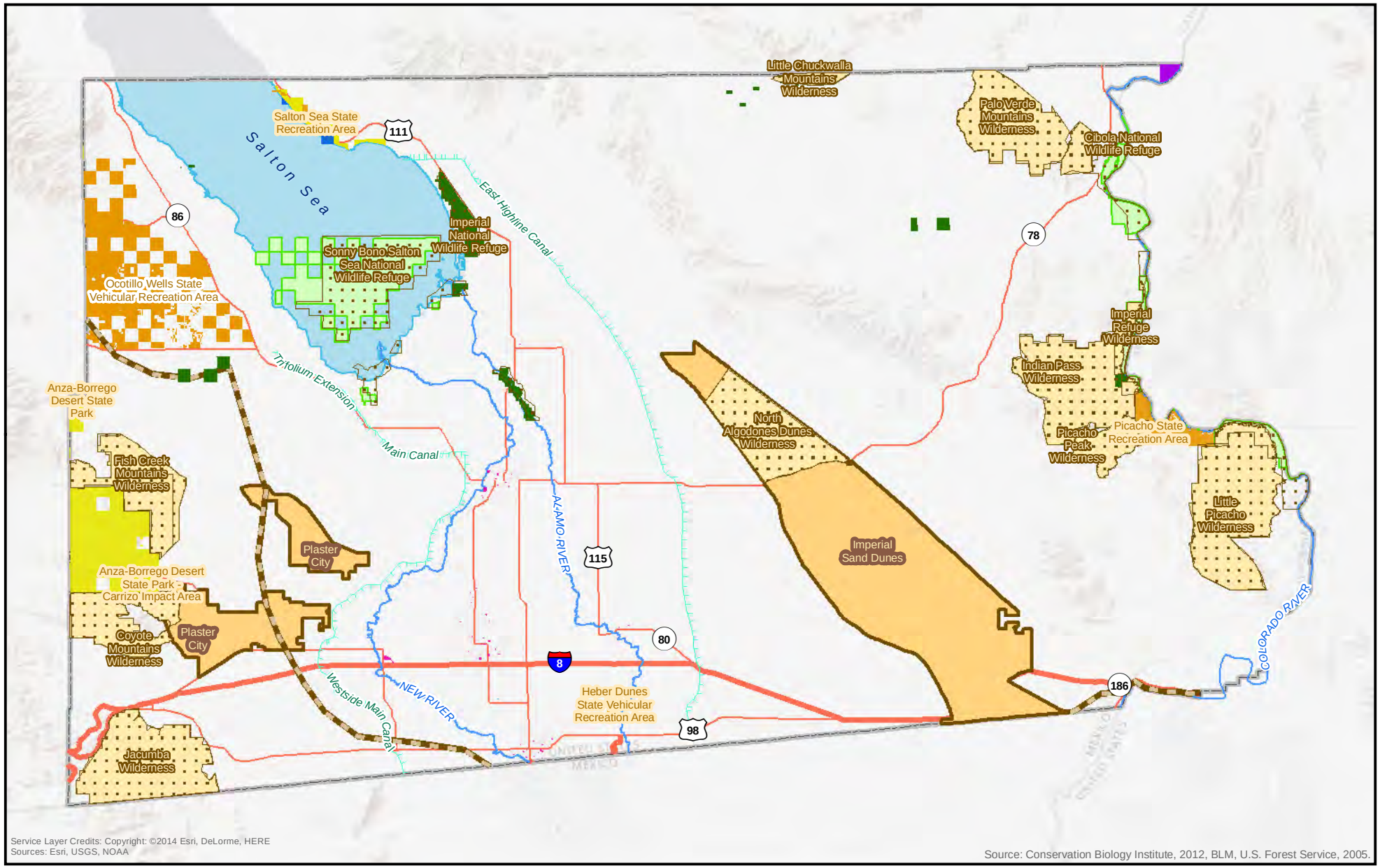
Other park facilities not operated by the County include Heber Dunes Park, Pioneer's County Park, Heber Community Park, Salton City Park, Osbourne Park, Seeley Park, two privately managed neighborhood parks in Heber, a neighborhood park in Salton City, the Salton Sea State Recreation Area, Picacho State Recreation Area, Anza-Borrego Desert State Park, Imperial Sand Dunes Recreation and Wilderness Area, North Algodones Dunes Wilderness, and Ocotillo Wells State Vehicular Recreation Area (Table 2.15-2)(ICPDS 2013b; BLM 2013b, 2013c; California State Parks 2013). Figure 2.15-1 displays the locations of the parks and recreation areas throughout the County.

Table 2.15-1: Imperial County Parks and Recreation

Park/Recreation Area	Acres	Amenities/Activities
Sunbeam Lake Park	117.0	Small lake and lagoon, picnic tables, barbeque stands, shaded areas, restrooms, fishing, walking trails/paths, jet skiing, and boating (ICPDS 2013b).
Wiest Lake Park	63.0	Lake for fishing, campsites, swimming, boating, jet skiing, barbeque pits, recreation hall, picnic tables, and restrooms with showers (ICPDS 2013b).
Red Hill Marina Park	10.0	RV hookups, camping area, boat launch, picnic tables, and restrooms (ICPDS 2013b).
Ocotillo Community Park		Basketball court, baseball field, walking path, and community center (ICPDS 2013d).
Palo Verde Park	13.6	Boat ramp, restrooms, storage/shade structure (ICPDS 2008c).

Table 2.15-2: Other Parks and Recreation in Imperial County

Park/Recreation Area	Area	Amenities/Activities
Heber Dunes Park (California Department of Parks and Recreation)	323 acres	Off-highway vehicle recreation on the sand dunes within the park, picnic tables, barbeque stands, and restrooms (ICPDS 2013b).
Pioneer's County Park (Imperial County Historical Society)	22 acres	The Pioneers Museum and Cultural Center, outdoor exhibits, a train station building, and restrooms (ICPDS 2013b).
Heber Community Park (Heber Public Utility District)	< 1 acre	Baseball field on the edge of a residential development (ICPDS 2013d).
Salton City Park (Salton Community Services District)	11 acres	Picnic tables, barbeque areas, a basketball court, a swimming pool, restrooms, and a covered playground area (ICPDS 2013d).
Osbourne Park (Bureau of Land Management)		Acts as an access point to the Imperial Sand Dunes area for off-highway vehicles; the park has a small shade structure with a picnic table and a storage room (ICPDS 2008c).
Heber Neighborhood Parks (privately maintained within residential developments)	< 1 acre each	Landscaped areas and playground equipment (ICPDS 2008c).
Salton City Neighborhood Park	1 acre	Picnic tables and restrooms (ICPDS 2008c)
Salton Sea State Recreation Area	14 miles of shoreline	Camping, boating, fishing, water skiing, kayaking, birdwatching, photography, and hiking (CDPR 2013a).
Picacho State Recreation Area	Along 8 miles of the Colorado River	Boating, hiking, fishing, camping along the Colorado River (CDPR 2013b).
Anza-Borrego Desert State Park	Approximately 600,000 acres	Visitor Center, wildflower season, hiking, camping, and interactive programs and events (CDPR 2013c).
Imperial Sand Dunes Recreation and Wilderness Area (Glamis), Bureau of Land Management	Approximately 214,700 acres	Off-roading, hiking, camping, photography, passive recreation, Approximately 1.1 million visitors in 2012; and an average of 1.3 million visitors per year over the last 10 years (BLM 2013b).
North Algodones Dunes Wilderness, Bureau of Land Management	25,895 acres	Primary and secondary dunes in one of the largest dune complexes in the continent, plants and wildlife (BLM 2013c).
Ocotillo Wells State Vehicular Recreation Area	85,000 acres	Desert area open for off-highway vehicle recreation, includes a visitor center, self-guided tours, and multiple geologic points of interest (California State Parks 2013).



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: Conservation Biology Institute, 2012, BLM, U.S. Forest Service, 2005.

Legend

- City Park
- County Park
- National Recreation Area
- Park
- Regional Park
- State Park
- State Recreation Area
- Federal Off-highway Vehicle Area
- Documented Recreational Trails
- U.S. Fish & Wildlife Service National Wildlife Refuge
- BLM NLCS Wilderness Areas
- CDFW Wildlife Areas & Ecologcial Reserves
- USGS Wilderness & Wildlife Areas

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Figure 2.15-1

Imperial County Renewable Energy and Transmission Element Update
Parks and Recreation Areas

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Trails

Multiple trails are present within Imperial County; some traverse long distances while others are smaller scenic loops. Table 2.15-3 lists some of the major trails within the County. Figure 2.15-1 displays the locations of the documented trails within the County but includes only some of the trails listed below.

Table 2.15-3: Imperial County Designated Trails

Trail	Length	Amenities/Recreational Opportunities
Juan Bautista de Anza National Historic Trail	1,200 miles total (from Nogales, Arizona, to the San Francisco Bay Area)	De Anza Historical Marker, Historical Expedition Campsites, marked trail sections, and hiking or biking along the trail (NPS 2013)
Bradshaw Trail	70-mile-long graded trail (mostly in southern Riverside County, with small portion in Imperial County)	Views of Chuckwalla Bench and Orocopia, Chuckwalla, and Mule mountains; used as a historic overland stage route, currently used for hiking or off-road vehicle usage (BLM 2013d)
Ironwood Nature Trail	4.5 miles roundtrip	Visitor Center, views of the Salton Sea, nearby swimming area, 30-stop nature trail (CDPR 2013e)
Rock Hill Trail	2 miles roundtrip	Walking trail through multiple habitats, nearby picnic area (USFWS 2013a)
Michael Hardenberger Trail	½-mile trail	Walking loop around a freshwater pond that provides nesting habitat for the endangered Yuma clapper rail (USFWS 2013a)

2.15.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

The Quimby Act

The Quimby Act is the County's primary means of acquiring park area and open space. The Act is designed to ensure "adequate" provision of parkland and open space through the Quimby Act Standards. Through these standards, the County can require developers to provide land for parks, donate for conservation easements, or pay in-lieu fees for the creation or rehabilitation of recreational facilities. Therefore, renewable energy facilities should avoid placement in close proximity to existing or planned residential developments in case parkland or open space setbacks are required.

Imperial Irrigation District NCCP/HCP

The Imperial Irrigation District is currently in the process of coordinating the preparation of a Natural Community Conservation Plan (NCCP) and Habitat Conservation Plan (HCP) with CDFW and USFWS. The NCCP/HCP may reduce the amount of land that is available for development. The open space areas required to be preserved for habitat would not be available for active recreational uses.

Constraints Due to Existing Conditions

Renewable energy projects should conform to local setbacks near recreational areas that are frequented by visitors. This will allow the proper protection necessary to ensure the safety of park or open space visitors.

Proper buffers should be provided in areas where views are part of the recreational value of the park or open space area. This includes recreational facilities mentioned above, including the Imperial Sand Dunes Recreation and Wilderness Area (Glamis), Anza-Borrego Desert State Park, and the North Algodones Dunes Wilderness, among others.

Opportunities

As renewable energy and transmission projects increase across the County, the County has an opportunity to ensure that the new projects are consistent with the existing land uses and do not diminish the recreational quality of the area.

For the Salton Sea, opportunities exist in the Salton Sea Authority plan for a multipurpose project in which a large portion of the Salton Sea will be restored through filtration; and the remaining portion could be used for renewable energy use. Due to the Salton Sea being fed by agricultural runoff, the waterbody is experiencing water quality problems including increasing salinity and issues associated with the nutrients in the agricultural runoff. Habitat enhancement and the reestablishment of Salton Sea as a major recreational area and tourist destination are the driving features of the plan. Nevertheless, the existing geothermal resource and the potential for solar energy at the south end of the Salton Sea make the area ideal for renewable energy development.

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2.16 TRANSPORTATION/TRAFFIC

2.16.1 Introduction

This section discusses the existing transportation and circulation in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.16.2 Terminology

The following is a summary of transportation and circulation terminology discussed in this section.

- **Major Highway** – Major highways, many of multi-lane or freeway design, are used primarily for through traffic. High-volume traffic corridor movements that connect major generators of travel, such as an urban arterial, characterize major highways. Major highways are high-speed facilities that incorporate restrictions on access primarily through at-grade intersections to provide an increased level of safety.

- **Major/Secondary** – Major arterials are streets carrying the traffic of local and collector streets to and from freeways and other major streets, with controlled intersections and generally direct access to properties. Secondary arterials interconnect with and augment the major arterial system. They connect major arterials to collectors and distribute traffic to small geographic areas and communities.

- **Secondary Highway** – A secondary highway is any road, street, parkway, or freeway/expressway that includes rights-of-way, bridges, railroad-highway crossings, tunnels, drainage structures, signs, guardrail, and protective structures in connection with highways.

- **Transit** – Describes passenger transportation services, local, metropolitan, or regional in scope. Transit incorporates the usage of bus, rail, or other conveyance which is configured to provide scheduled service on fixed routes.

2.16.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to transportation and traffic.

California Department of Transportation

The State of California Department of Transportation (Caltrans) has responsibility over the design, construction, maintenance, and operation of the California State Highway System. Caltrans has jurisdiction over State highway right-of-way and sets maximum load limits for trucks and safety requirements for oversized vehicles that operate on highways. The *Renewable Energy and Transmission Element* update does not include any components which would encroach into Caltrans jurisdiction.

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is a joint powers authority that was established in 1965. Federally, SCAG is a Metropolitan Planning Organization; under State law it is a

Regional Transportation Planning Agency and a Council of Governments. SCAG includes Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. SCAG's responsibilities include developing long-range regional transportation plans, including the consideration of sustainable growth, growth forecasting, housing needs, and transportation improvement (SCAG 2014).

Imperial County Transportation Commission

The Imperial County Transportation Commission (ICTC) was established under Senate Bill 607 (SB 607 - Ducheny) which was approved by the California Legislature and Governor Arnold Schwarzenegger in 2009. ICTC member agencies, as a part of a county transportation commission, are enabled to exercise basic initiative and leadership in the transportation planning and programming process. The ICTC will act in accordance with all applicable laws and statutes for County transportation commissions. ICTC body will guide the development of the Regional Transportation Plan for the Imperial region and its regional, State, and federal transportation improvement programs (TIPs) and their updates, including, but not limited to: the distribution and oversight of Local Transportation Fund monies; the preparation and submittal of applications for transportation-related funds; approval of the allocation of and claims for Transportation Development Act funds; the planning, programming, and administration of regional transit services; and encourage active citizen participation in the development and implementation of various transportation-related plans and programs.

County of Imperial General Plan

The *Circulation and Scenic Highways Element* of the County of Imperial General Plan provides information about the transportation needs of Imperial County and provides guidance to meet these needs and to facilitate regional transportation coordination. While future projects would need to be analyzed for consistency with the General Plan pursuant to CEQA Guidelines, Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

Objectives noted in the *Circulation and Scenic Highways Element* include:

> *Objective 1.2*: Require a traffic analysis for any new development which may have a significant impact on County roads. A traffic analysis may not be necessary in every situation, such as when the size or location of the project will not have a significant impact upon and generate only a small amount of traffic. Also, certain types of projects, due to the trip generation characteristics, may add virtually no traffic during peak periods. These types of projects may be exempt from the traffic analysis requirements. Whether a particular project qualifies for any exemption will be determined by the Department of Public Works Road Commissioner.
>
> *Objective 1.12*: Review new development proposals to ensure that the proposed development provides adequate parking and would not increase traffic on existing roadways and intersection to a level of service (LOS) worse than "C" without providing appropriate mitigations to existing infrastructure. This can include fair share contributions on the part of developers to mitigate traffic impacts caused by such proposed developments.

2.16.4 Existing Environmental Setting

Roads

As described in the Imperial County *Circulation and Scenic Highways Element* (ICPDS 2008d) and the Imperial County 2013 Transportation Plan (ICTC 2013), the regional roadway network consists of one interstate route (I-8), seven State routes (SR-7, SR-78, SR-86, SR-98, SR-111, SR-115, and SR-186), and several regionally significant arterials. Additionally, three international Ports of Entry (POEs) between the United States and Mexico are within the Imperial County limits: Calexico, Calexico East, and Andrade (ICTC 2013). Figure 2.16-1 shows the major roadways in Imperial County. Table 2.16-1 presents the existing road conditions.

State Routes

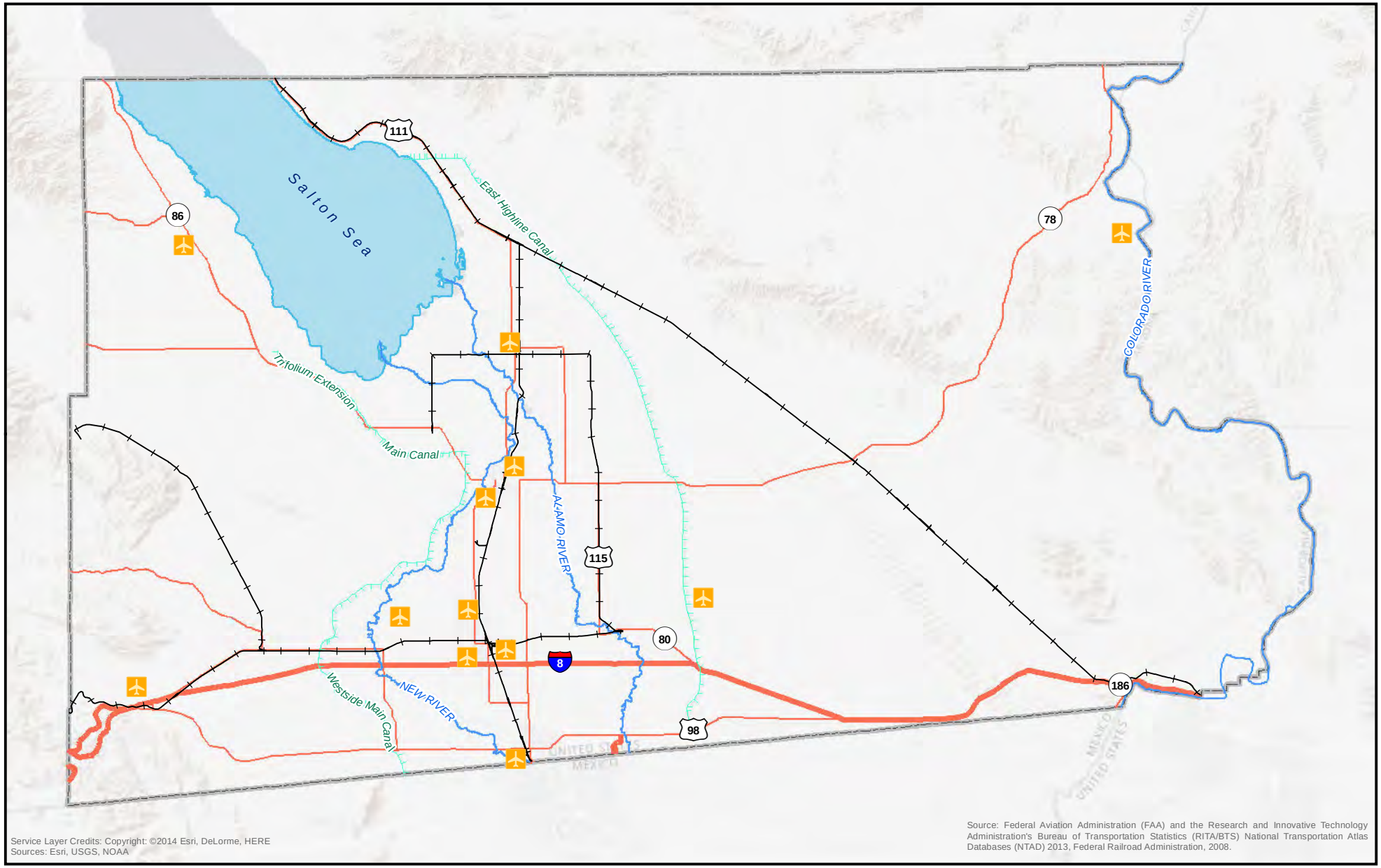
Interstate 8 (I-8) is the primary east-west route through Imperial County and runs for 172 miles from San Diego, California, to Yuma, Arizona. With two travel lanes, it spans 79 miles within Imperial County. From the west it connects to the western end of SR-98. In Imperial County, it intersects with SR-86, SR-111 (access to the international POE at Calexico), SR-7, and SR-115 and then reconnects to SR-98 at its eastern end. It also accesses the SR-186 connection to the Andrade POE. It serves regional, cross-border, and interstate traffic and provides access to desert recreational areas. The Average Daily Traffic (ADT) volumes on I-8 are approximately 19,600 ADT west of Imperial Avenue and 16,600 ADT east of SR-111. In the area of El Centro between Imperial Avenue and SR-111, the volumes reach a maximum of approximately 37,500 ADT (ICTC 2013).

State Highway 98 (SR-98) is a 56.9-mile east-west route that is entirely contained within Imperial County. It traverses the southern portion of Imperial Valley parallel to I-8 and the U.S./Mexico International Border. It begins at I-8 near Ocotillo, intersects SR-111 and SR-7, and terminates at I-8 near Midway Well. It is mostly two lanes with the exception of having four lanes through portions of the City of Calexico. It serves as an alternate route to I-8, providing access to many agricultural areas in the eastern part of the region, and is used for cross-border traffic.

State Highway 78 (SR-78) is an 81.8-mile east-west route that crosses Imperial County from the San Diego County line to the north junction of SR-86, where it then merges and becomes SR-86 for 24 miles, and then becomes SR-78 again to the Riverside County line. It is typically a two-lane conventional highway except for where it is co-designated SR-86, where it was upgraded to a four-lane expressway or four-lane conventional highway.

State Highway 86 (SR-86) is a 90.8-mile north-south route serving Imperial and Riverside counties. It begins at SR-111 near the U.S./Mexico International Border and extends northward (roughly parallel to SR-111) along the western shore of the Salton Sea, where it ends at Avenue 46 in the City of Indio. It is a two-lane road in Imperial County and ends at the Riverside County line as a four-lane expressway. It intersects several State routes, including I-8 and SR-78 (where it shares the 24-mile alignment) and continues north to cross the Imperial County/Riverside County line, intersecting SR-195 and SR-111.

State Highway 111 (SR-111) runs north from the downtown Calexico POE for 64 miles except for a 1.2-mile break within Brawley, where it shares an alignment with SR-78. From the Calexico POE to SR-98, it functions primarily as a city street and provides access to many local businesses.



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: Federal Aviation Administration (FAA) and the Research and Innovative Technology Administration's Bureau of Transportation Statistics (RITA/BTS) National Transportation Atlas Databases (NTAD) 2013, Federal Railroad Administration, 2008.

Legend

Major Roadways

- Primary Roads
- Secondary Roads
- Railroads
- Airport

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Miles

Figure 2.16-1

Imperial County Renewable Energy and Transmission Element Update

Major Roadways, Railroads, and Airports

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Table 2.16-1: Existing Road Conditions

Segment	Direction	Limits	Capacity at LOS C	Existing	
				ADT	LOS
State Routes					
SR-111	N-S	From Northern Calexico City Limits to International Border	29,600	28,500	B
SR-111	N-S	From I-8 to SR-98	40,000	33,500	B
SR-111	N-S	From SR-78 to I-8	40,000	17,300	A
SR-111	N-S	North of Brawley City Limits	7,100	8,800	D
SR-111	N-S	From Riverside County Line to Wilkinson Road	7,100	1,600	A
SR-115	N-S	From Evan Hewes Highway to I-8	7,100	6,100	C
SR-115	N-S	From SR-78 to Evan Hewes Highway	7,100	5,100	C
SR-115	N-S	From SR-111 to SR-78	7,100	4,600	C
SR-7	N-S	From I-8 to King Road	40,000	4,900	A
SR-186	N-S	From I-8 to the International Border	7,100	8,500	D
SR-78	E-W	From the Riverside County Line to SR-115	7,100	3,500	B
SR-78/115	E-W	From SR-78 East to SR-111	7,100	4,600	C
SR-78/86	E-W	From western Brawley City Limits to Lack Road	29,600	17,500	B
I-8	E-W	From SR-111 to Forrester Road	60,000	34,500	B
SR-98*	E-W	From SR-7 to SR-111	7,100	23,000	F+
SR-98	E-W	From SR-111 to Dogwood Road	7,100	8,200	D
Local Roads					
Forrester Road	N-S	From SR-78/86 to McCabe Road	7,100	8,800	D
Austin Road	N-S	From SR-86 to McCabe Road	7,100	3,300	B
Imperial Avenue	N-S	From Adams Avenue to I-8	29,600	27,800	C
Imperial Avenue	N-S	From Aten Road to I-8	29,600	38,400	F
8th Street	N-S	From Ross Avenue to Wake Avenue	7,100	9,500	D
Dogwood Road	N-S	From Southern El Centro City Limits to McCabe Road	7,100	15,000	E
Dogwood Road	N-S	From Mead Road to SR-98	7,100	15,000	E
Bowker Road	N-S	From Evan Hewes Highway to Cole Road	7,100	1,400	A
Keystone Road	E-W	From SR-115 to Forrester Road	7,100	3,000	B
McCabe Road	E-W	From SR-111 to Austin Road	7,100	1,500	A
Jasper Road	E-W	From SR-7 to SR-111	7,100	100	A
Source: ICTC 2013					

State Highway 7 (SR-7) is a 6.7-mile north-south route from the Calexico East POE to I-8. It is a four-lane highway with access control at the Calexico East POE, SR-98, and direct access to I-8 for the movement of international commercial goods.

State Highway 115 (SR-115) is a 33.6-mile north-south route that begins at the junction with I-8 east of Holtville and ends at the junction with SR-111 in Calipatria. It includes a segment that shares alignment with SR-78, and it is typically a two-lane conventional highway with some short four-lane segments. It serves as an alternate route to SR-86 and SR-111 and is important in facilitating the movement of interregional agricultural goods and intraregional travel between various cities within the County.

State Highway 186 (SR-186) is a 2.1-mile north-south route from the Andrade POE in the east and connects to the interchange with I-8. It is constructed as a two-lane conventional highway accommodating international and commercial travel.

Regional Arterials

The regional roadway system also features several important arterials that generally run in either an east-west or north-south orientation. The important north-south arterials (listed from west to east) include: Forrester Road, Austin Road, Imperial Avenue, and Dogwood Road. The important east-west arterials (listed from south to north) include: Jasper Road, Heber Road, McCabe Road, Ross Road, Evan Hewes Highway, Aten Road, Worthington Road, and Keystone Road.

Scenic Highways

No designated state scenic highways occur in Imperial County; however, portions of I-8, SR-78, SR-111, and Borrego-Salton Seaway within Imperial County are considered eligible for State Scenic Highway Designation. Each of these highways is described in greater detail in Section 2.1.2.

Ports of Entry

Three international Ports of Entry (POEs) between Baja California, Mexico, and California are within the Imperial County limits: Calexico, Calexico East, and Andrade international POEs (ICTC 2013).

The downtown Calexico POE provides access to the Municipality of Mexicali, the capital of Baja California Norte, and is the second busiest California border crossing. It is dedicated to passenger vehicles, rail, and pedestrian inspections. It serves nearly 21,000 passenger vehicles and 20,000 pedestrians entering the U.S., comprised of mostly day-trippers including workers, students, and shoppers.

The Calexico East POE is located about 7 miles east of the downtown Calexico POE. This border crossing serves automobile, pedestrian, and bus traffic as well as the being the second busiest crossing for commercial vehicles along the California/Mexico Border.

The Andrade POE, located further east near the Arizona state border, provides a smaller entry to Mexico. This border crossing is largely dedicated to serving U.S. pedestrians who visit Mexico for the numerous medical-related facilities in the adjacent community of Algodones.

Portions of the transportation network in the greater Calexico area and specifically near the Calexico POE are currently operating at a poor level of service, which creates significant negative impacts on the

economy of the local community. The community is negatively impacted by traffic congestion and delay, primarily along Imperial Avenue (SR-111) and SR-98. Furthermore, the projected growth in the El Centro-Calexico urban area and significant increase in border crossings are expected to worsen the situation.

Public Transit Program

In 1989, bus service began with Imperial County Transit operating three vehicles on five weekday-only routes within the Imperial Valley. Since then, service has increased to 19 vehicles (14 operating on fixed routes); and ridership has grown from an average of 3,000 to 52,000 passengers per month.

Public transit service in Imperial County includes the following:

- Fixed route service, including intercity routes connecting most Imperial Valley communities, is operated as Imperial Valley Transit (IVT), by First Transit, Inc.

- Urban circulator services, currently comprising the IVT Blue and Green Lines in El Centro, which have timed connections with the intercity IVT routes. These routes are also operated by First Transit, Inc. as a part of Imperial Valley Transit but are specially branded.

- Fixed route and ADA paratransit service in eastern Imperial County is provided by Yuma County Intergovernmental Public Transportation Authority (YCIPTA) in partnership with Quechan Indian Tribe and is operated by First Transit, Inc. and branded Yuma County Area Transit (YCAT).

- ADA complementary paratransit service, branded IVT Access, is operated throughout the IVT service area covering most of the Imperial Valley and is also operated by First Transit, Inc.

- Limited paratransit service, branded Med-Express, operates between designated locations in Brawley, El Centro, and Calexico and medical facilities in San Diego County. This service is operated by ARC – Imperial Valley.

- Dial-a-Ride service provides curb-to-curb transit service in five defined areas, including El Centro, Calexico, Brawley, Imperial, and the West Shores area (west side of the Salton Sea). Service in Calexico is operated by First Transit, Inc.; service in El Centro, Imperial, and the West Shores area is operated by ARC – Imperial Valley; and service in Brawley is operated by Sunrise Driving Services. Service in Brawley and the West Shores area is available to the general public; in El Centro, Calexico, and Imperial it is limited to seniors and persons with disabilities.

Railroads

All of the rail service in Imperial County is for freight only. The Union Pacific Railroad, formerly called the Southern Pacific Railroad main line, enters the eastern border near Winterhaven and then bears northwest and leaves the County just east of the Salton Sea. This line serves the Los Angeles area and northward in California and the balance of the U.S. eastward. A branch line from this main line at Niland provides rail service to Calipatria, Brawley, Imperial, El Centro, Calexico, and Mexico. Another branch line of the Union Pacific, the Holton Interurban Railroad, provides service to east El Centro. The San Diego and Arizona Eastern Railroad, also a subsidiary of the Union Pacific Railroad, runs between El Centro and San Diego. It presently provides rail service only between El Centro and the U.S. Gypsum plant in Plaster City. Pacific Imperial Railroad, Inc. (PIR) signed a 99-year lease with San Diego and

Arizona Eastern Railway Company (SD&AE) and San Diego Metropolitan Transit System (MTS) in December 2012 to rehabilitate and use the Desert Line to service the Tijuana-Tecate region of Baja California, Mexico, and eastern San Diego County.

Airports

The primary public-use airports in Imperial County include the Imperial County Airport located in the City of Imperial; Brawley Municipal Airport in northeast Brawley; Cliff Hatfield Memorial Airport located in Calipatria; Holtville Airport located 7 miles northeast of Holtville; Salton Sea Airport in Salton City; the Calexico International Airport located west of Calexico; and the U.S. Naval Air Facility located 6 miles west of El Centro. Several other private airstrips are located throughout Imperial County serving principally crop dusting operations (ICPDS 2008d).

2.16.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

New potential renewable energy projects would be required to conduct project/site-specific traffic studies in order to determine impacts to existing traffic levels. Impacts to traffic would be subject to congestion management compliance requirements under California Government Code 65088 and 65089, which complements but does not replace federal congestion planning requirements under 23 C.F.R. 540.320.

Caltrans has responsibility over the design, construction, maintenance and operation of the California State Highway System. Caltrans has jurisdiction over state highway right-of-way and sets maximum load limits for trucks and safety requirements for oversized vehicles that operate on highways. Proposed renewable energy projects would be subject to Caltrans' regulations on highways within their jurisdiction.

Constraints Due to Existing Conditions

Currently, most of the roads in Imperial County have favorable service ratings and slight increases in traffic as a result of renewable energy development; however, according to the *Imperial County 2013 Transportation Plan* (ICTC 2013), the population in Imperial County is expected to grow significantly in the next 25 years. Several of the highways and local roads could have substantial drops in LOS ratings. The development of renewable energy projects would contribute to increased traffic on roads surrounding the facilities, although the level of impact to traffic would vary depending upon the type of facility or energy source developed.

Opportunities

The abundance and placement of existing transportation facilities make siting potential renewable energy projects fairly easy with respect to available access. Renewable energy developers have an opportunity to contribute locally by upgrading existing roadways and facilities or providing financial support to help local communities make improvements and promote renewable and clean energy use.

2.17 UTILITIES AND SERVICE SYSTEMS

2.17.1 Introduction

This section discusses the existing utilities and services in Imperial County. The regulatory environment and existing conditions have been assessed and analyzed to determine associated constraints and opportunities for siting potential renewable energy sources and preparing the *Renewable Energy and Transmission Element* update for the County of Imperial.

2.17.2 Terminology

The following is a summary of utilities and services terminology discussed in this section:.

- **Class I Landfill** - may accept hazardous and nonhazardous wastes.
- **Class II Landfill** - may accept "designated" and nonhazardous wastes.
- **Class III landfill** - may accept nonhazardous wastes.
- **Hazardous Waste** – Waste that poses a risk to human health or the environment and requires special disposal techniques to make it harmless or less dangerous.
- **Recyclables** – Those materials that can be recycled into the same or new products. Examples include glass, metals, paper, cardboard, and some plastics.
- **Renewable Energy** – Generally refers to energy derived from nonfossil fuel resources that are naturally and continually replenished, such as wind, solar power, geothermal, hydropower, and various forms of biomass.
- **Solid Waste** – All solid, semisolid, liquid, and gaseous wastes, including trash, garbage, yard waste, ashes, industrial waste, construction waste, and household discards such as appliances, furniture, and equipment.
- **Wastewater** – The used water and solids from a community that flow to a treatment plant. Stormwater, surface water, and groundwater infiltration also may be included in the wastewater that enters a wastewater treatment plant. The term "sewage" usually refers to household wastes, but this word is being replaced by the term "wastewater."

2.17.3 Regulatory Setting

This section presents a description of the laws, policies, and plans relevant to utilities and service systems.

National Environmental Policy Act

NEPA is a federal law under the jurisdiction of the Environmental Protection Agency (USEPA) that requires federal agencies to consider environmental values in the decision-making process. The federal agencies must consider environmental impacts and consequences of proposed actions and reasonable alternatives that could potentially reduce impacts (USEPA 2014a).

California Environmental Quality Act

CEQA is a State document that is part of the California Code of Regulations. CEQA requires projects to undergo environmental review; depending on the potential effects, a more substantial review may need to be conducted in the form of an Environmental Impact Report (EIR). In an EIR, mitigation measures are proposed for any potentially significant impacts in order to reduce the level of impact, and feasible alternatives are considered (CNRA 2014). The County and consultant team will prepare a Programmatic EIR pursuant to CEQA Guidelines, Section 15168. Completion of the Programmatic EIR would allow future individual renewable energy projects to "tier" off this environmental document. Future renewable energy projects would be implemented on a "project-by-project" basis based on County approval of individual renewable energy projects. Future renewable energy projects would need to be reviewed in the context of this Programmatic EIR to determine if additional environmental documentation would be required.

The Energy Policy Act of 2005

The Energy Policy Act of 2005 was passed by Congress in order to "…ensure jobs for our future with secure, affordable, and reliable energy..." The Energy Policy Act of 2005 outlines policies to be implemented for energy efficiency including energy efficiency in buildings and energy-efficient appliances, renewable energy promotion including geothermal and hydroelectric energy, policies for natural gas production and petroleum reserves, initiatives regarding clean coal production and federal coal leases, policies regarding nuclear energy production, programs for alternative fuel vehicles and automobile efficiency, and research and development programs for the future of energy production, among other items. The Energy Policy Act of 2005 also outlines policies for the Department of Energy Management, training personnel, energy policy tax incentives, and incentives for innovative technologies.

The Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989, also referred to as AB 939, set requirements for waste diversion including 25-percent diversion by 1995 and 50-percent diversion by 2000. Diversion was to be achieved following city and county implementation of a Source Reduction and Recycling Element where each city and county devised programs to reach the diversion goals. AB-341 was adopted in 2012 and requires 75-percent recycling by 2020.

Imperial County's programs to meet the diversion goals include the following: compost operation, procurement policy, Christmas tree diversion, commercial source and recycling, construction and demolition, school recycling, and County Waste Reduction Policy.

Imperial County Hazardous Materials Area Plan

The Imperial County Hazardous Materials Area Plan was prepared through coordination with the Department of Toxic Substances Control, the Imperial County Fire Department, the Imperial County Public Health Department, the Imperial County Office of the Agricultural Commissioner, the Imperial County Department of Public Works, Imperial County Planning and Development Services, and the Brawley Fire Department. The purpose of the Hazardous Materials Area Plan is to identify responsibilities of the local, State and federal agencies for incidents involving the release or potential release of hazardous substances, with revisions and updates occurring every three years.

The Imperial County Hazardous Materials Area Plan includes emergency response procedures; dispatch procedures for hazardous materials incidents; monitoring and decontamination guidelines for emergency response personnel and equipment; pre-emergency planning; procedures to access local, State, and federal funding and assistance; provisions for access to State-approved and permitted hazardous waste disposal facilities and emergency contractors; procedures for notification and coordination; provisions for training; and procedures for public safety and information.

2.17.4 Existing Environmental Setting

Imperial County is served by a variety of governmental organizations and a few private utility companies which play a role in local land use management and development. The seven incorporated cities within the County are Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland. Each jurisdiction has its own General Plan; and each provides facilities for water and sewage treatment, police and fire services, and other governmental functions; however, the Imperial Irrigation District (IID) is the principal regional agency in the County in terms of services provided.

The unincorporated communities which also provide local services through single or multipurpose special districts are Bombay Beach, Heber, Niland, Ocotillo, Palo Verde, Seeley, Winterhaven, and the Salton City area. Services provided are usually limited to water treatment for domestic use but may also include sewage treatment, fire protection, and park maintenance. For example, in Ocotillo only a volunteer fire department is provided by its district; in Palo Verde, only water treatment is provided; sewer and water treatment is provided in Heber and Seeley; and sewer, park maintenance, and management of a local golf course is provided in Salton City.

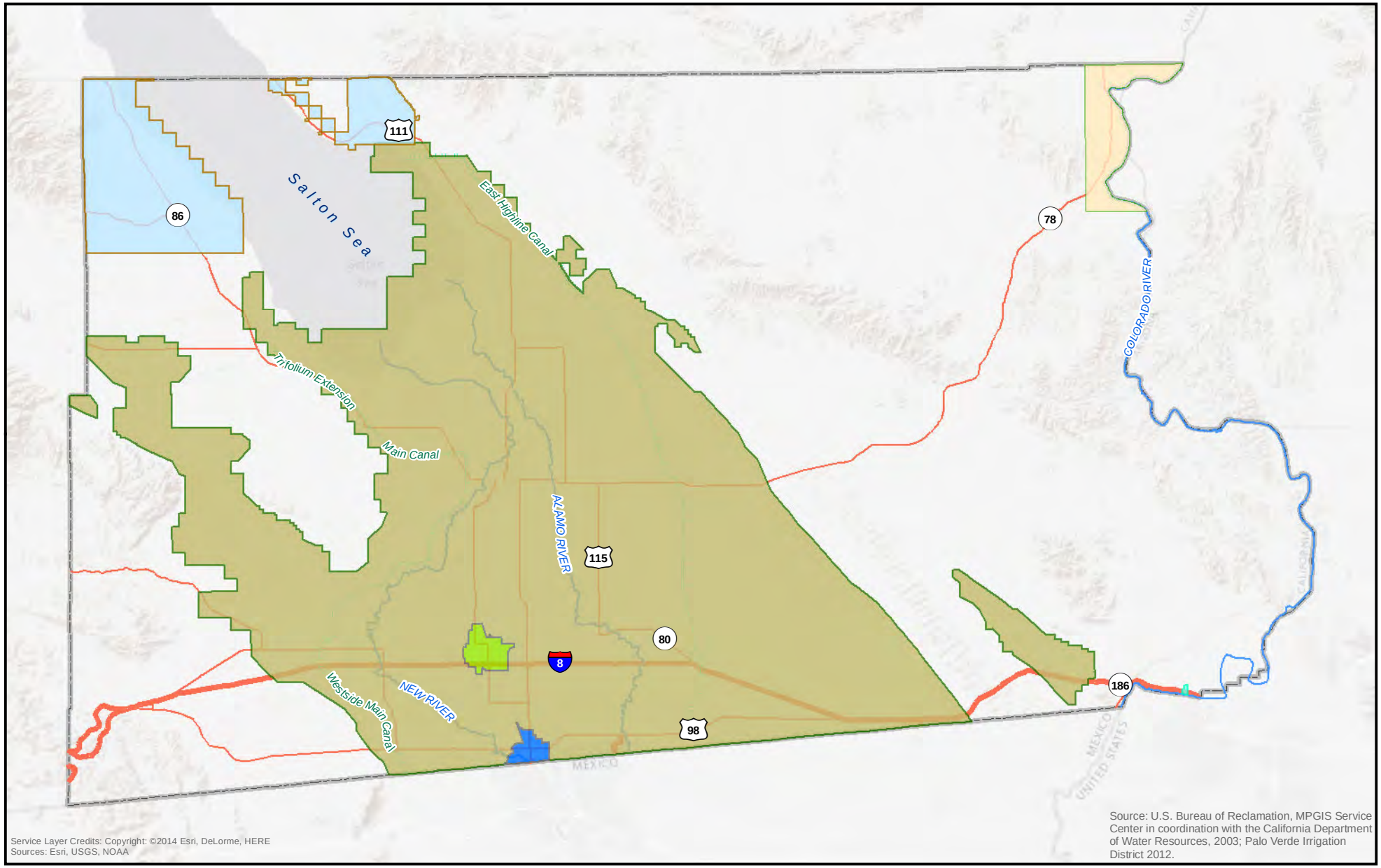
Private utility companies also operate in the County, the largest of which is Southern California Gas Company, which serves Calipatria, Calexico, El Centro, Heber, Holtville, Imperial, Niland, Seeley, Brawley, and Westmorland. Several private water companies provide domestic water in Ocotillo; and in Hot Mineral Spa, sewage treatment is provided by individual mobile home/RV parks.

Utilities

Water and Sewer

Approximately 98 percent of the water supplied by IID is used for agricultural purposes. IID distributes water to over 500,000 acres of farmland. In addition to the water being diverted to the Imperial Valley by the Imperial Irrigation District, five other water districts supply water to other areas in Imperial County outside the IID boundaries. These are the Palo Verde Irrigation District, the Palo Verde County Water District, the Bard Water District, the Winterhaven Water District, and the Coachella Valley Water District.

IID provides water to 10 communities in Imperial County for domestic purposes. These communities include Calexico, Holtville, El Centro, Imperial, Brawley, Westmorland, Calipatria, Niland, Seeley, and Heber. Each of these cities and unincorporated communities has its own water treatment facilities for treating and distributing water within its jurisdiction. Ocotillo/Nomirage is provided water service by private water companies and individual wells; Palo Verde is supplied by the Palo Verde County Water District; and Hot Mineral Spa/Bombay Beach are supplied by the Coachella Valley Water District. The Winterhaven Water District supplies water to approximately 1,000 customers in Winterhaven. The water district boundaries are shown on Figure 2.17-1.



Legend

- Coachella Valley Water District
- Imperial Irrigation District
- City of Calexico Water Service Area
- City of El Centro Water Service Area
- Winterhaven County Water District
- Palo Verde Irrigation District

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Miles

Figure 2.17-1

Imperial County Renewable Energy and Transmission Element Update
Water District Boundaries

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Water service in rural areas for nondrinking domestic use has also historically been provided from IID canals and laterals. Because this water has not received treatment for human consumption, these rural customers supplement the IID water with drinking water delivered by private companies to 100-gallon water storage tanks at each home.

Sewage treatment is provided by each of the cities and by the unincorporated communities of Heber, Niland, Seeley, and Winterhaven. These sewage treatment plants are licensed by the California RWQCB for the Colorado River Basin and generally provide primary and secondary treatment. Rural residences on existing lots and minor subdivisions utilize septic tanks and leach line systems. Bombay Beach has a public sewage system operated by the Coachella Valley Water District, while Hot Mineral Spa relies on subsurface septic systems or facilities operated by mobile home and recreational vehicle (RV) parks. Ocotillo/Nomirage and Palo Verde have no sewage treatment facilities and also rely on subsurface septic systems.

Electric Power

Electric power is supplied to Imperial County primarily by IID, with the exception of the Palo Verde area in the northeast corner of the County, which is supplied by SCE. The IID service territory covers 6,471 square miles, including all of Imperial County along with parts of Riverside and San Diego counties (Figure 2.17-2). Imperial Irrigation District was formed pursuant to the California Irrigation District Act. IID is a State agency formed and existing for governmental purposes. Its legal boundaries are all situated in the County of Imperial. IID's powers and purposes are set forth in the Irrigation District Law found in the Water Code, Section 20500. After discovering its potential for low-cost hydroelectric energy from its five falling water drops along the All-American Canal, IID entered the power industry in 1936. Today, IID serves electricity to more than 145,000 customers in Imperial County and parts of Riverside and San Diego counties. Furthermore, IID owns, controls, and maintains its transmission network that includes more than 1,400 miles of high-voltage lines (IID 2013). Electric power service areas are shown on Figure 2.17-2.

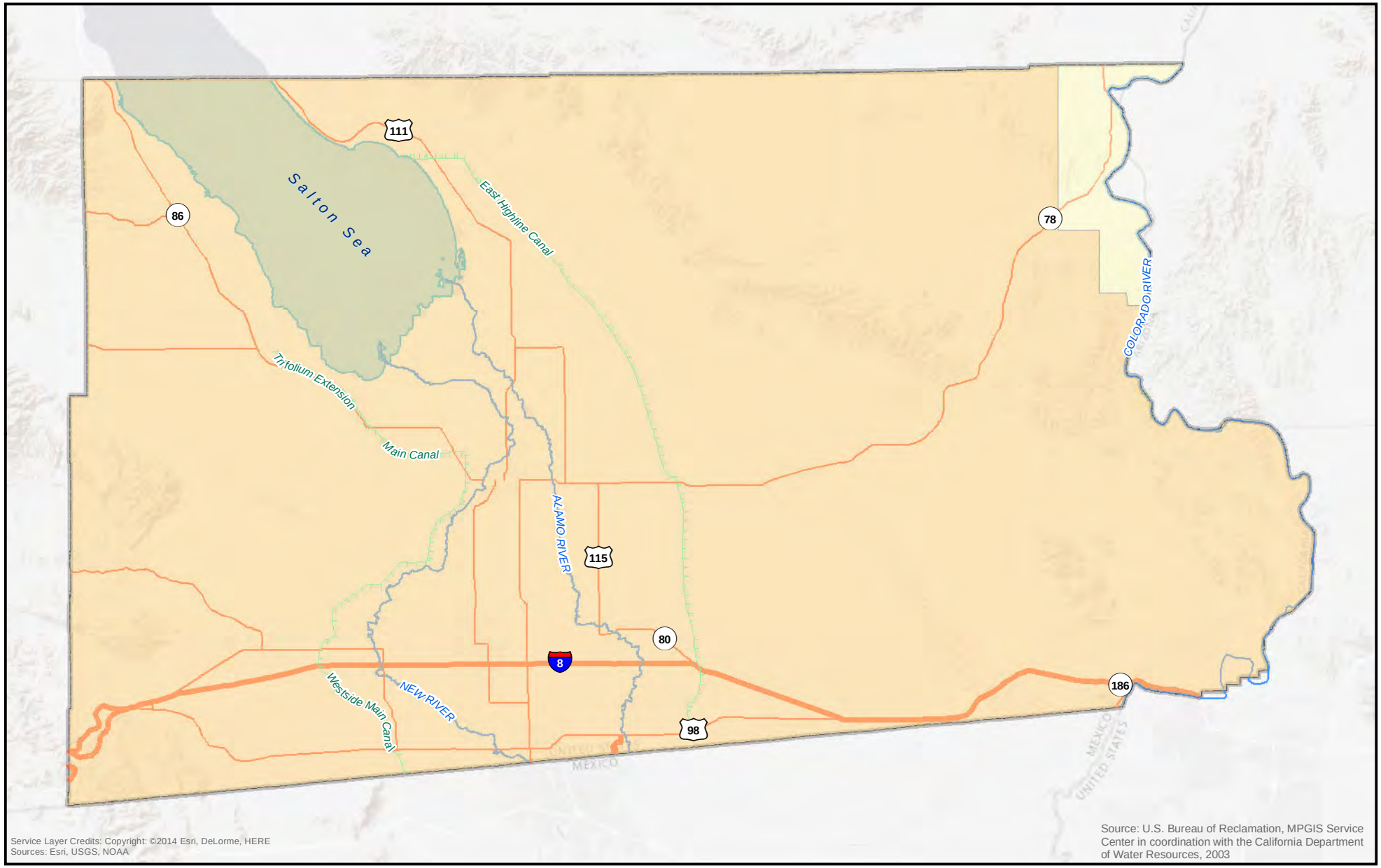
Natural Gas

Southern California Gas Company serves the Imperial County with natural gas and is headquartered in Los Angeles. Southern California Gas Company is a subsidiary of Sempra Energy and is the largest natural gas utility in the nation. Southern California Gas Company delivers natural gas via two 10-inch lines which generally run south through the County in Range 14 East. Liquid petroleum products are delivered to and are transported through the County via the 20-inch Santa Fe Pacific Pipeline (ICPDS 2009).

Solid Waste Disposal

Waste collection, storage, and disposal are provided by the cities and communities in Imperial County via either a city-operated system or a contract with a private firm. Waste collection services are also available in some unincorporated areas through private firms (ICPDS 2009).

Currently, the County owns and operates four Class III disposal sites throughout Imperial County that accept nonhazardous solid waste. The County also owns one landfill, which is operated by a private company, Burrtec Waste Industries, Inc. The County owns and operates three transfer stations that accept nonhazardous solid waste.



Legend

Service Areas

- Imperial Irrigation District
- Southern California Edison

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Figure 2.17-2

Imperial County Renewable Energy and Transmission Element Update
Electric Power Services

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In addition to the public sites described above, the following private waste disposal facilities include: Imperial Landfill (Class III) in the unincorporated area northwest of the City of Imperial, Clean Harbors (Class I) west of the City of Westmorland, and Desert Valley Company (Class II) northwest of the City of Westmorland (ICPDS 2009). Each of these private waste disposal facilities is equipped to handle specific waste based on its designation as a Class I, Class II, or Class III facility.

Specifically, the Clean Harbors Westmorland Facility is a Class I facility that is fully permitted to accept and manage a variety of hazardous wastes including RCRA hazardous waste, naturally occurring radioactive material (NORM) waste from geothermal operations, soils quarantined by the Animal and Plant Health Inspection Service (APHIS), and California-regulated waste materials. The facility is 640 acres in size and provides services such as treatment of heavy metals, microencapsulation of contaminated debris, solidification of liquid and semi-solid wastes, direct landfill of wastes, processing of bulk and/or drummed wastes, and storage prior to final treatment and/or disposal (Clean Harbors 2007).

Since solar panels contain materials such as cadmium, lead, or selenium, solar panels are considered a RCRA-regulated waste. The Clean Harbors Westmorland Facility is one of the facilities that is permitted to handle RCRA hazardous waste. In addition, RCRA hazardous wastes such as solar panels would be disposed of only at facilities permitted to accept such material.

Telecommunications

The AT&T Corporation provides telephone service to Imperial County. A number of companies provide wireless or cell phone services for the area as well. High-speed internet access in Imperial County is offered by both AT&T Corporation and Time Warner Cable.

2.17.5 Constraints and Opportunities

Constraints Due to Regulatory Requirements

Any new renewable energy project and associated transmission lines would be subject to approval and licensing by FERC, CPUC, and CEC. FERC is an independent federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. FERC also reviews and authorizes liquefied natural gas (LNG) terminals, interstate natural gas pipelines, and non-federal hydropower projects. CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. CEC is the State's primary energy policy and planning agency. It is responsible for forecasting future energy needs, promoting energy efficiency through appliance and building standards, and supporting renewable energy technologies. It maintains the California Energy Code and is responsible for licensing thermal power plants 50 megawatts or larger.

New renewable energy and transmission projects would also be subject to CEQA approval, and those with a federal nexus would be subject to the NEPA process as well.

Constraints Due to Existing Conditions

Constraints due to existing utilities and services would include the need to site future projects so as not to conflict or interfere with existing IID and San Diego Gas and Electric (SDG&E) transmission and pipelines. The lack of IID and SDG&E existing power transmission lines in areas of potential renewable

energy development would require additional transmission lines and would be subject to the regulatory requirements as described above.

Opportunities

Developing renewable energy projects near existing IID and SDG&E utilities and transmission lines would reduce the amount of additional lines and connections that would need to be constructed and approved. It would reduce the time required for regulatory processing and reduce costs of needing to construct additional lines and connections to services in the area.

3.0 – POTENTIAL RENEWABLE ENERGY GENERATION SUITABILITY AREAS

The analysis presented in this Chapter represents the initial constraints analysis conducted by the County and consultant team to identify areas suitable for future development of renewable energy projects within Imperial County. The County and consultant team subsequently conducted additional constraints analysis that resulted in the alternatives analyzed in the Draft Programmatic Environmental Impact Report prepared for the *Renewable Energy and Transmission Element* update. The original constraints analysis conducted for the *Renewable Energy and Transmission Element* update has been retained in the Baseline Inventory Report in order to show an important step taken during the initial environmental review to identify locations suitable for future development of renewable energy projects within Imperial County.

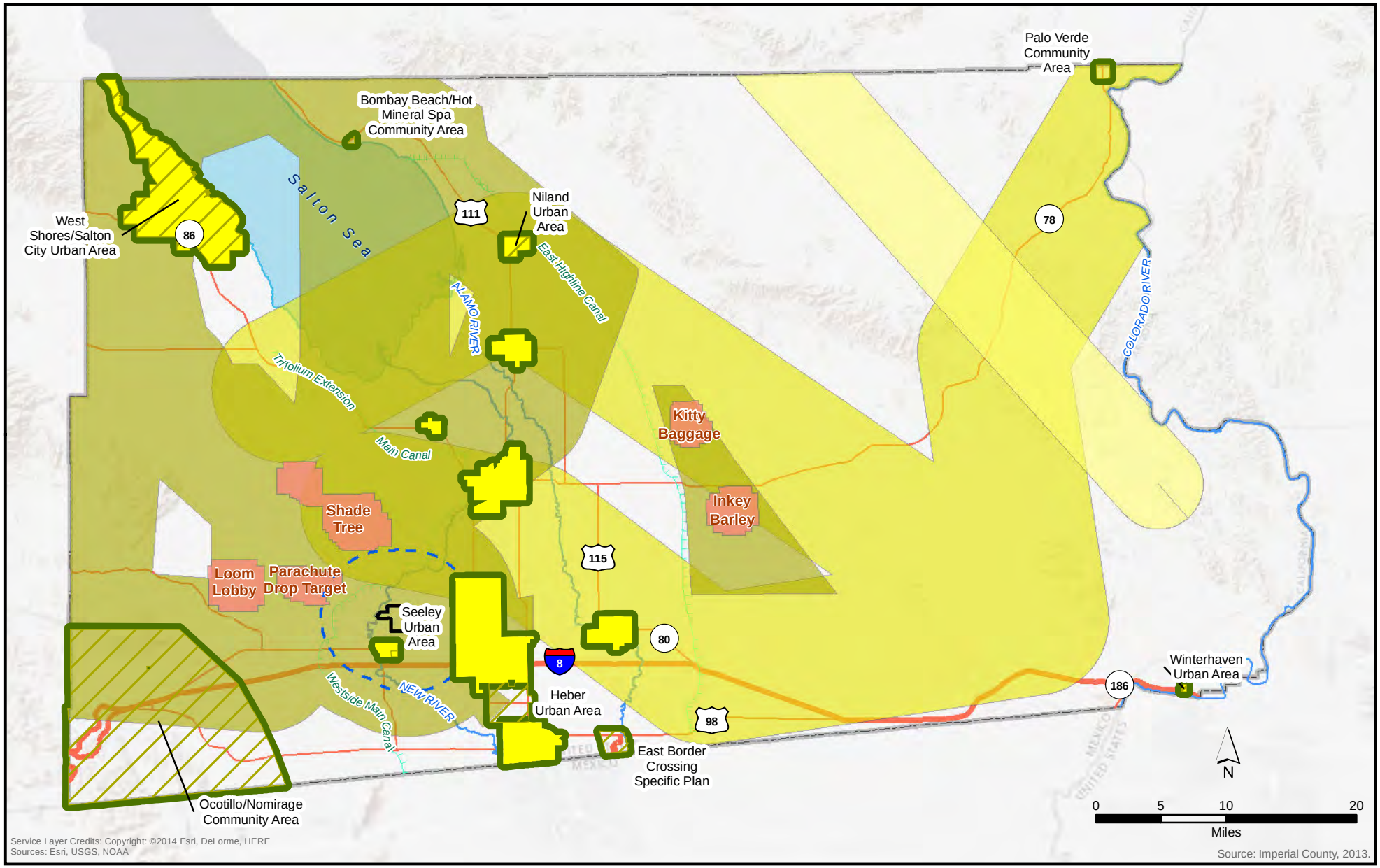
Chambers Group, Inc. conducted an analysis to determine which areas in Imperial County would be most suitable for potential geothermal, wind, solar, deep solar ponds, biofuel, biomass, algae production, concentrated solar-thermal power (CSP), and concentrated photovoltaic (CPV) renewable energy projects. This analysis included three components: (1) evaluating existing environmental conditions, (2) evaluating the production potential for each energy source, and (3) defining the suitability of areas for each energy source to be developed based on existing environmental categories considered. The methodology primarily relied on the evaluation of mapped GIS data generated to document areas within Imperial County that may offer advantages for the development of renewable energy sources, as well as the areas of constraints that could inhibit such development.

3.1 EXISTING ENVIRONMENTAL CONDITIONS

Existing conditions were evaluated based on the characteristics of several environmental categories listed in Table 3.1-1. The characteristics of each category were evaluated in terms of either limiting opportunities or creating advantages for the development of renewable energy facilities. Each of the environmental resources listed in Table 3.1-1 are mapped on Figure 3.1-1, Figure 3.1-2, Figure 3.1-3, Figure 3.1-4, and Figure 3.1-5. Additional issues identified during community meetings were also utilized in defining the suitability areas.

Table 3.1-1: Environmental Categories and Characteristics Evaluated

Category and Characteristic
LAND USE
Community Areas
Urban Areas + 1/2-mile buffer
Military Facilities and Operations
AGRICULTURAL RESOURCES
Important Farmland (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance)
BIOLOGICAL RESOURCES
Agency Designated Sensitive Habitat
AESTHETICS & VISUAL RESOURCES
Maintenance of Visual Quality has High Value (VRI Sensitivity)
RECREATION
Local, State and Federal Parks & Recreation Areas



Legend

- Specific Development Community Areas
- Imperial County Urban Area Land Use
- 1/2-mile Buffer of Urban and Specific Development Areas

Military Influence Areas

- NAF El Centro
- 5-mile BASH Subzone
- Range

- Airspace from 200 ft
- Airspace from Surface
- Airspace from 300 ft

Figure 3.1-1
Imperial County Renewable Energy and Transmission Element Update
Land Use
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.1-1 Concl LandUse.Mxd
Date Saved: 1/6/2015, Author: msimmons
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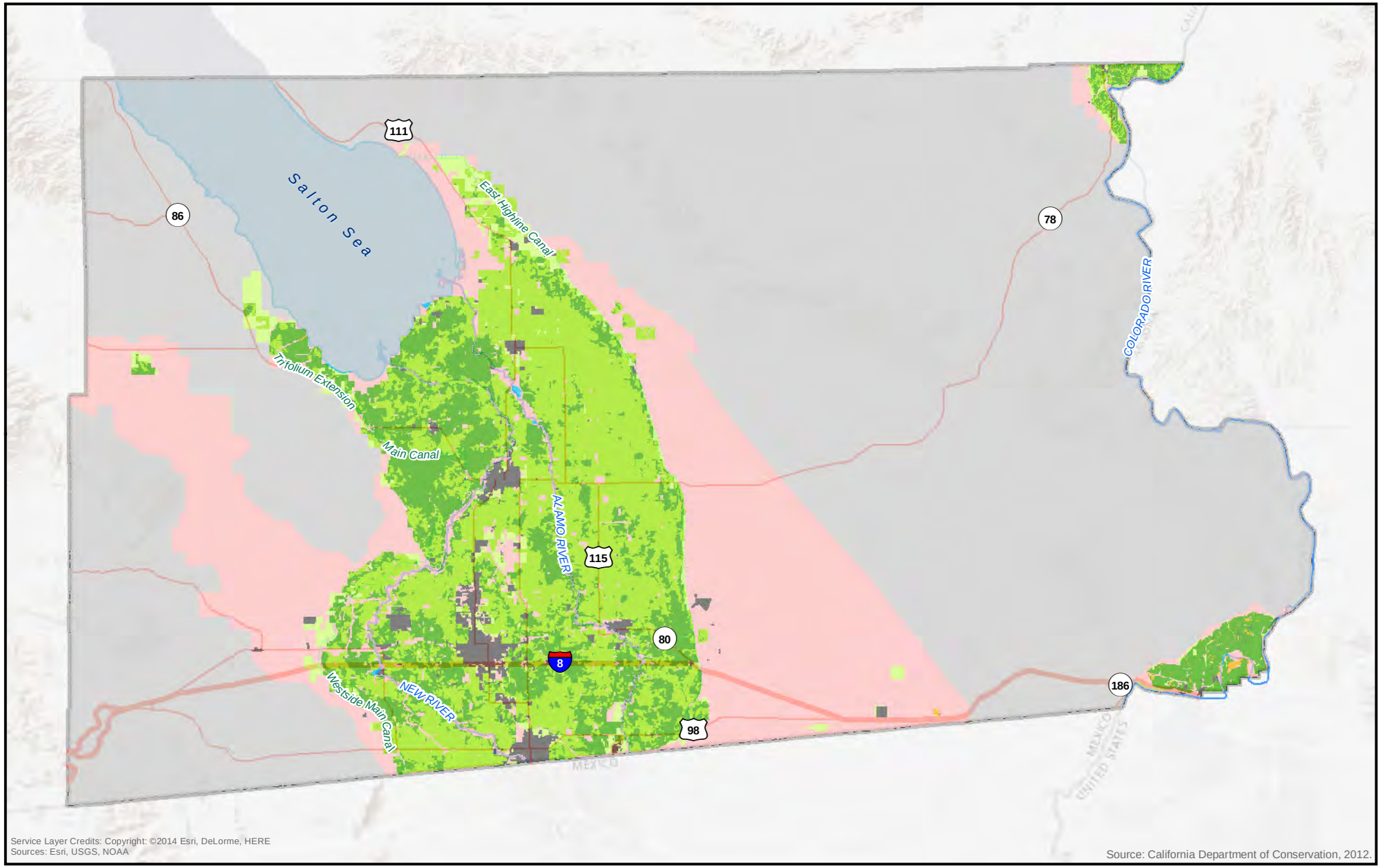

Legend

Farmland Mapping and Monitoring Program

- Prime Farmland (P)
- Farmland of Statewide Importance (S)
- Unique Farmland (U)
- Farmland of Local Importance (L)
- Urban and Built-Up Land (D)
- Other Land (X)
- Water (W)
- Area not mapped (Z)

N

0 5 10 20

Miles

Figure 3.1-2

Imperial County Renewable Energy and Transmission Element Update
State of California Farmlands of Significance
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.1-2 Concl State Farms.Mxd
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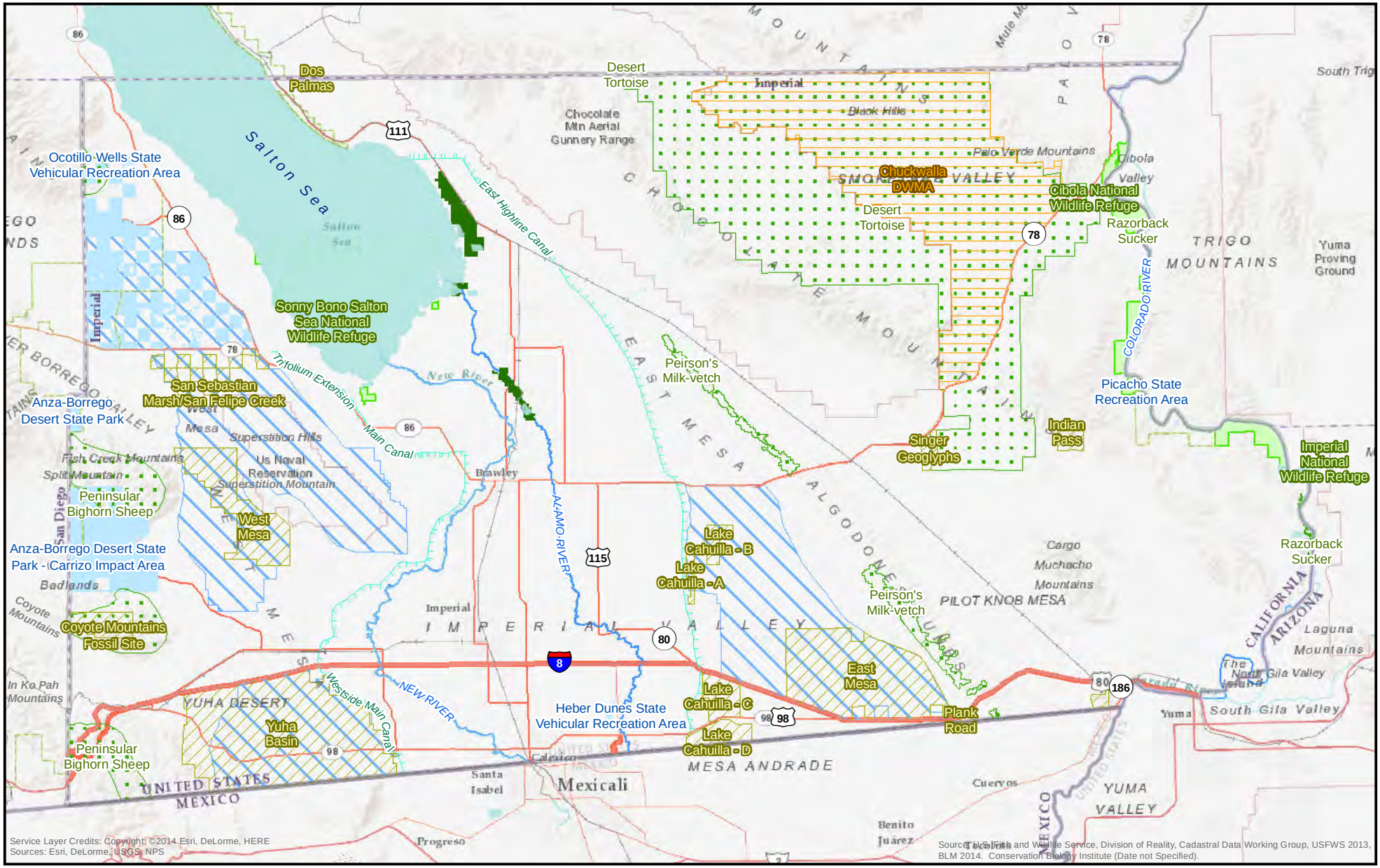

Legend

Agency Designated Habitat

- BLM ACEC Designated Areas
- BLM DWMA Designated Areas
- U.S. Fish & Wildlife Service National Wildlife Refuge
- CDFW Wildlife Management Areas
- California State Parks
- BLM Flat-tailed Horned Lizard Reserve

N

0 5 10 20

Miles

Figure 3.1-3
Imperial County Renewable Energy and Transmission Element Update
Special Management Areas Including Designated Critical Habitat
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.1-3 Concl Mngmnt Areas CH.Mxd
Date Saved: 1/6/2015, Author: msimmons

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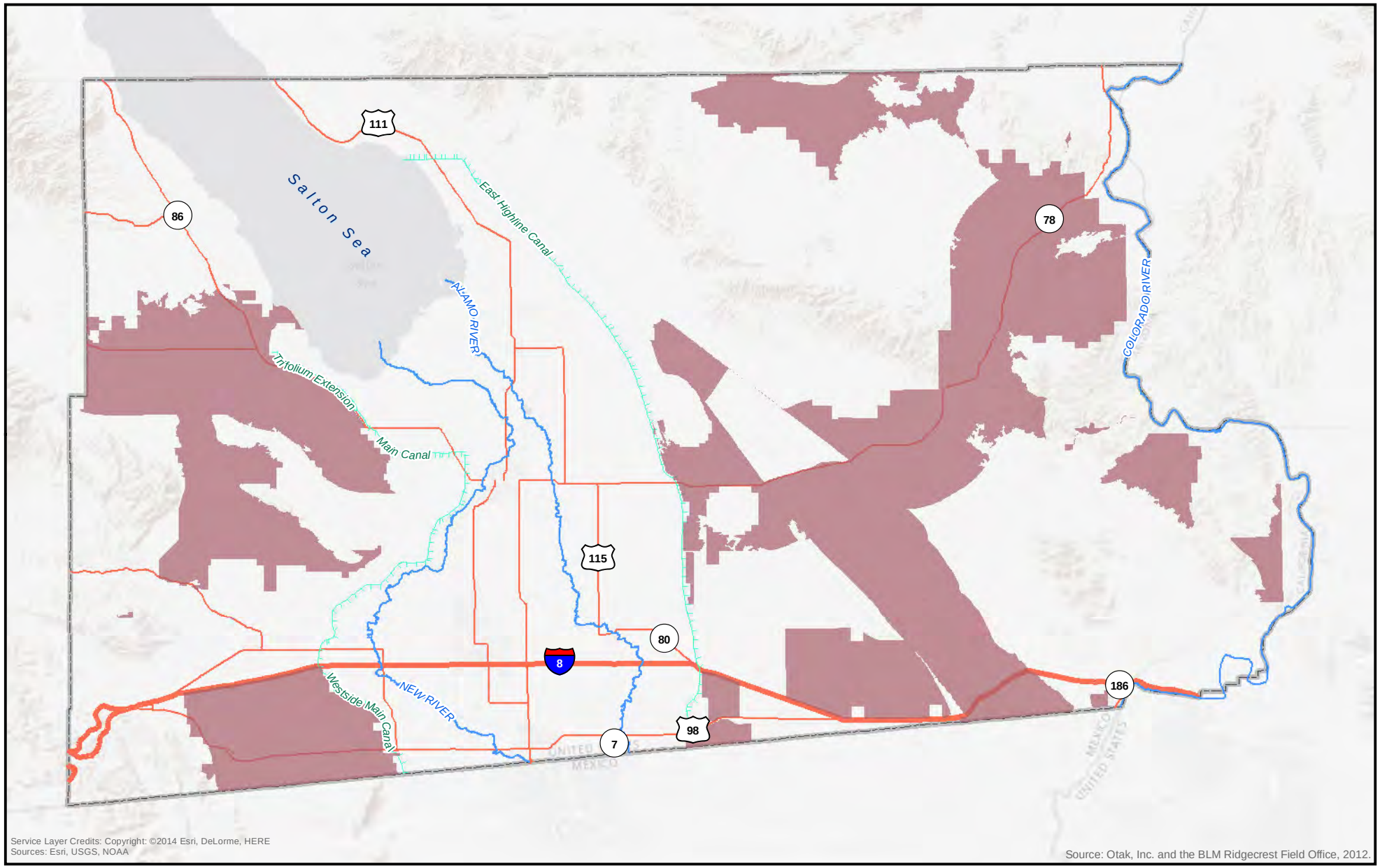

Legend

Overall Rating

Maintenance of Visual Quality has High Value

N

0 5 10 20

Miles

Figure 3.1-4

Imperial County Renewable Energy and Transmission Element Update

VRI Sensitivity Ratings for BLM -Managed Lands For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.1-4 Concl VRI.Mxd
Date Saved: 1/6/2015, Author: msimmons

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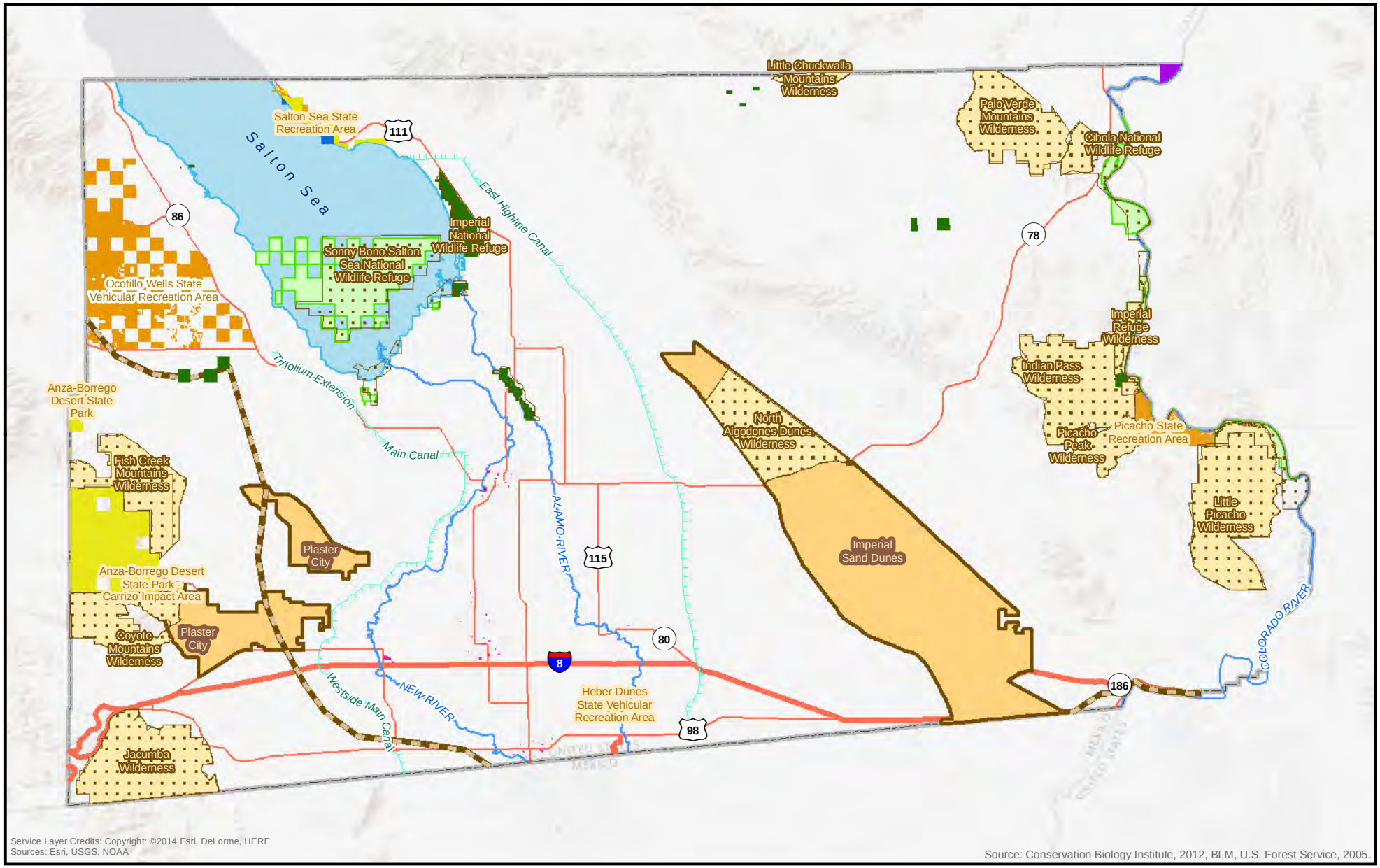

Legend

- City Park
- County Park
- National Recreation Area
- Park
- Regional Park
- State Park
- State Recreation Area
- Federal Off-highway Vehicle Area
- Documented Recreational Trails
- U.S. Fish & Wildlife Service National Wildlife Refuge
- BLM NLCS Wilderness Areas
- CDFW Wildlife Areas & Ecologcial Reserves
- USGS Wilderness & Wildlife Areas

N

0 5 10 20
Miles

Figure 3.1-5

Imperial County Renewable Energy and Transmission Element Update
Parks and Recreation Areas
For Use in Renewable Energy Suitability Analysis

Source: 20674 Background Fig 3.1-5 Concl Parks and Rec.Mxd
Date Saved: 1/6/2015, Author: msimmons

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3.2 RENEWABLE ENERGY DEVELOPMENT POTENTIAL

This section presents a discussion of the potential to develop renewable energy resources within Imperial County. This section evaluates each renewable energy resource based on the environmental opportunities and constraints that exist within Imperial County. The analysis does not identify specific locations that would be suitable for each renewable energy resource but, rather, identifies the environmental characteristics that should be taken into consideration when siting various types of renewable energy facilities.

3.2.1 Geothermal Suitability

Figure 2.10-4, presented in Section 2.10 – Land Use and Planning, shows the known geothermal resource areas within Imperial County which would be highly suitable for development of geothermal energy. Suitability of geothermal development outside the known geothermal resource areas would depend on the presence or absence of a wide variety of environmental resources. Areas currently occupied by local, State, and federal park and recreation areas would not be suitable for development of geothermal energy facilities. Geothermal energy facilities would not be compatible with the undisturbed qualities and recreational characteristics of these sites and could dramatically impact the quality of existing park and recreation areas. Similarly, development of geothermal energy facilities in locations designated as having high visual quality would dramatically impact the visual character and scenic quality of these areas. Geothermal facilities would also be incompatible with a variety of existing land uses within urban and community areas due to public safety issues.

The analysis of potential constraints to development of geothermal energy facilities determined that agricultural resources would not affect site suitability. Although geothermal energy facilities would result in some impacts on designated sensitive biological habitats, these impacts would be minimized by the relatively small amount of land needed to operate a geothermal energy facility. Furthermore, geothermal energy production is not expected to impact designated sensitive habitats surrounding the facility.

Geothermal facilities would have moderate to low conflicts with military airspace restrictions. Steam associated with geothermal facilities could obstruct airspace at low elevations but would be unlikely to disrupt visibility at higher elevations. Geothermal development would also have moderate conflicts with areas designated as 5-mile bird avoidance strike hazard (BASH) subzones due to the potential for birds to strike geothermal facilities.

3.2.2 Wind Suitability

Figure 2.10-5, presented Section 2.10 – Land Use and Planning, shows the areas in Imperial County that would be highly suitable for development of wind energy; however, as shown on Figure 2.10-5, the amount of land suitable for wind energy development is relatively small. Furthermore, wind energy development could be constrained by conflicts with existing environmental resources. Similar to geothermal energy, wind energy facilities would conflict with areas currently occupied by local, State, and federal park and recreation areas, as well as areas designated as having high visual quality.

The analysis of potential constraints to development of wind energy facilities determined that urban and community areas and agricultural resources would not affect site suitability. Therefore, wind energy facilities would not conflict with urban and community areas or agricultural resources. Wind energy facilities would have moderate conflicts with designated sensitive habitats due to the size of the

required project footprints and the potential for windmills to result in bird strikes. Consequently, wind energy facilities would likely be subject to greater mitigation requirements compared to geothermal energy development. Wind energy facilities would be incompatible with areas designated as 5-mile BASH subzones and other military airspace restrictions due to the potential for large wind structures to obstruct airspace.

3.2.3 Solar Suitability

Figure 2.10-6, presented Section 2.10 – Land Use and Planning, shows the areas in Imperial County that would be highly suitable for development of solar energy. Similar to geothermal and wind energy, solar energy facilities would conflict with areas currently occupied by local, State, and federal park and recreation areas, as well as areas designated as having high visual quality. Solar energy facilities would have moderate to high conflicts with agricultural resources due to the large project footprints that could impact sizeable amounts of valuable resources identified for protection within Imperial County. Operation of solar energy facilities would not permanently impact soil quality, however; and the project site could be used for agricultural production once the facility was decommissioned. The analysis of potential constraints to development of solar energy facilities determined that urban and community areas would not affect site suitability.

Solar energy facilities would have conflicts with designated sensitive habitats. These conflicts would be greater than for geothermal and wind energy because solar facilities would require the largest project footprints. Consequently, solar energy facilities would likely be subject to greater mitigation requirements compared to geothermal and wind energy development.

Solar energy facilities would have moderate conflicts with military airspace restrictions. Glare associated with solar facilities could disrupt visibility near the surface but would be unlikely to affect visibility at higher elevations. Solar development would have moderate conflicts with areas designated as 5-mile BASH subzones due to the potential for birds to strike solar facilities.

3.2.4 Deep Solar Ponds and Hyper-Saline Brine Ponds

Research was conducted to evaluate the potential to develop deep solar ponds and hyper-saline brine ponds as a source of renewable energy within Imperial County (Appendix E). This research determined that salty and shallow bodies of water may present a unique opportunity for an on-demand source of renewable energy. In salty and shallow bodies of water, both natural and man-made, high-salinity water may sink to the bottom, with the less saline water rising to the top, virtually stopping convection, decreasing heat loss through evaporation, and creating a high temperature gradient from the surface to the bottom of the body of water with the temperature of the brine at the bottom potentially approaching the boiling point. When this occurs, the high water temperature on the bottom can be used to heat a working fluid that is used to run an organic rankine cycle generator utilizing an expansion turbine as in a conventional steam power plant.

Unfortunately, data has shown[3] that Salton Sea does not possess a permanent layering or stratification of temperature in this body of water. A temporary stratification occurs following periods of no wind in which the temperature on the bottom of the Salton Sea is typically cooler than the surface

[3] "The Salton Sea. Physical and Chemical Characteristics", Lars. H Carpelan, University of Riverside.

temperature[4]; however, this is the opposite heat stratification needed to develop renewable energy within solar ponds. Furthermore, the maximum water temperature in summer approaches but does not exceed 100°F, far from reaching typical solar pond temperatures of around 212°F. The lack of suitability of the Salton Sea to serve as a solar pond is likely due to its large size and depth of approximately 50 feet, as solar ponds are ideally only around 10 feet deep.

Man-made solar ponds are another potential source of renewable energy which require contiguous areas of land and high solar irradiance. The total depth of a solar pond, no matter the scale, whether for research or utility energy production purposes is about 30 to 40 feet. A study performed by Jet Propulsion Laboratories [5] at California Institute of Technology in 1982 found the Salton Sea water to be suitable as a starter feed stock in order to establish utility-scale solar ponds. Brine water from local geothermal power plants is also suitable for solar ponds. Deep solar ponds are typically saltless and covered with double glazing. At night, or when solar energy is not available, insulation is placed on top of the glazing in order to prevent heat loss. The ponds also differ from salty solar ponds in that they require more substantial insulation around the bottom of the pond.

Only two examples of commercial solar ponds, both built and operated at the Dead Sea in Israel, are known to have ever operated in parallel with an electric grid. The overall efficiency of the plant was less than 1 percent in terms of converting solar energy into electricity. The first system measured 75,000 square feet in area, with a depth of 8 feet, and had a rated capacity of 150 kilowatts. The second system utilized a 5-megawatt turbine and was supposed to cover 250 acres, but only one-quarter of that area was built. The project was built at a cost of around $20 million. Freshwater requirements for the pond surface made operating costs high. After a long-term demonstration, the government stopped funding the project in 1991. With no private investors willing to take over, the project was ended.

No significant amount of literature alludes to why this technology has not achieved commercial success; however, energy conversion efficiency based on the Carnot heat engine equation would indicate that such a small temperature gradient between the source and the sink may lead toward an inefficient mechanism for producing electricity. Furthermore, aside from a few small research and development projects, significant investment in the technology by either the private or public sector does not seem to be currently occurring.

Two firms were investigated that are active in the field. Both firms have active solar gradient pond projects in operation; however, neither facility is used to produce electricity. One of the firms' projects is active at the Salton Sea, where the primary activity is to remove salts from the Salton Sea and provide desalinated water back to the sea in order to assist in environmental remediation. In terms of job creation and establishing a stream of revenue, until electricity generation is more commercially viable, the project at the Salton Sea may find salt production for human consumption as a stepping stone. Man-made solar ponds also provide added environmental benefits around the area of the Salton Sea in suppressing airborne dust storms by covering dried lake beds. In terms of siting, access to appropriate brine is important in order to keep costs down by avoiding the import of brine salts to solar ponds. The areas around the Salton Sea thus assist in that respect. Access to utility transmission and road infrastructure are required as for any other utility-scale power plant.

[4] "Chemical and Physical Limnology of the Salton Sea, California – 1999", Holdren and Montano, USDOR.
[5] "Salton Sea Project Phase 1," M.L. Peelgreen, Jet Propulsion Laboratory, Jan 1982.

Based on the information presented above, deep solar ponds and hyper-saline brine ponds are an unproven source of renewable energy. Although research indicates that the Salton Sea may be suitable for development of renewable energy with solar ponds, further research and development of this method of renewable energy must occur. The existing solar pond project currently in operation at the Salton Sea is not used for production of renewable energy, and it is unknown at this time if renewable energy could be generated through this method.

3.2.5 Biofuels

Research was conducted to evaluate the potential to develop biofuels as a source of renewable energy within Imperial County (Appendix E). Biofuels are essentially the same as fossil fuels, except that fossil fuels are ancient and accumulated over millions of years, while biofuels are produced from presently living organisms. Biofuels are generally produced from plants, algae, or animal fats. The most common biofuels today are alcohol fuels, most commonly ethanol, produced by fermentation of sugars in plants such as wheat, corn, sugar beets, sugar cane, molasses, potatoes, or fruit waste and biodiesel produced by transesterification of feedstock such animal fats, vegetable oils, soy, rapeseed, jatropha, mahua, mustard, flax, sunflower, palm oil, and hemp. While these fuels are beneficial for their potential use as transportation fuels, they require arable land and, thus, may compete with food sources. They also have a small net gain in energy output compared to that required for their production and, as a result, are not economically superior to fossil fuel options. Biofuel generation from plants typically requires fresh water.

Despite their fresh water needs, arable land requirements, and small net gain in energy output, alcohol fuels and biodiesels have been very successful commercially, the most notable example of which is Brazil's ethanol production which relies on sugarcane feedstock. Some have cited Brazil as able to sustain a biofuel economy because it is endowed with enormous amounts of arable land. Significant investments in technology and research and development by both the public and private sectors have helped the Brazil ethanol success story as well.

Algae-based biofuels present a unique opportunity in that they may be grown in a controlled environment and make use of nonarable land that may have no other commercial purpose. Some algae-based biofuel technologies do not need fresh water but, rather, can function with salt water or nonpotable water and can successfully produce freshwater as a by-product. Like deep solar ponds described in Section 3.2.4 above, this technology is yet to be proven commercially as cost competitive; however, private and public investment in these technologies has been significant, continues to be invested in, and shows promise. Algae-based biofuels also require high levels of sunshine and large, contiguous areas of land with relatively flat terrain. It is anticipated that in order to provide algae-based oil in the quantities that a fossil fuel based oil field produces, hundreds of thousands of acres of land would be necessary. Algae's high demands for CO_2 require access to some sort of facility with excess CO_2, an industrial site or a geothermal plant. A refinery for algae-based oil would be of the same size as any other chemical refinery. Since algae-to-energy technology is water-intensive, the proximity to water resources should be a consideration in the development of energy-producing facilities. While the Salton Sea may provide the water source, only 75 percent of the water is currently recycled, with the remaining 25 percent going to evaporation ponds. Waste salts resulting from the evaporation would need to be taken to a landfill. It may be possible to co-locate an algae-based oil facility's evaporation pond to a solar pond so that the solar pond may make use of the waste salt products.

Imperial County is seen by algae growers as one of the best places in the world for production due to high levels of sunshine as well as moderate year-round temperatures which rarely drop to freezing and thus do not threaten to kill algae stocks because of a single cold night. The region is also free from pests that may consume algae products; however, potential development of biofuels within Imperial County would be dependent on the financial viability of converting farmland to biofuel cultivation. As described above, development of algae-based biofuels has not been proven to be financially viable and has many siting requirements. Development of alcohol-based biofuels, while not facing challenges as difficult as algae-based biofuels, still remains speculative because it would require conversion of farmland to biofuel production. Given the high sensitivity surrounding agricultural resources within Imperial County, a conclusion regarding the suitability of biofuel development within Imperial County cannot be reached.

3.2.6 Concentrated Solar-Thermal Power (CSP)

Research was conducted to evaluate the potential to develop concentrated CSP as a source of renewable energy within Imperial County (Appendix E). CSP energy facilities use mirrors to reflect sunlight in order to increase the temperature on a specific location. All CSP plants use intensified sunlight in order to heat a working fluid through a heat exchanger to create steam and run a conventional steam turbine. CSP power plants use tracking technology in order to move the mirrors or reflecting surface to align with the sun throughout the day and the year. The working fluid may be water, but it is more often a heat transfer fluid (HTF) such as a synthetic oil; and the thermal energy is transferred to a heat exchanger where it turns water to steam to run a turbine. While most steam turbines use water to run the turbine as steam, they also use water to cool/condense the steam to be reused. Many CSP plants are now using dry cooling to condense the steam to minimize water usage. CSP plants also utilize a tower that extends high into the air to collect heat. At least two CSP plants were commissioned in the southwestern U.S. during the time period spanning from late 2013 to early 2014. The Solar Reserve's Crescent Dunes 110-megawatt plant encompasses 1,500 acres and utilizes a 650-foot-high tower to collect heat. The Bright Source Energy's Ivanpah Project encompasses 3,500 acres and utilizes a 475-foot-high tower to collect heat.

Suitability for development of CSP energy facilities would be very similar to the suitability of solar energy facilities described in Section 3.2.3. Potential opportunities and conflicts associated with land use, agricultural resources, biological resources, aesthetics, and recreation would be similar for CSP because it would require the same type and amount of land and have similar types of impacts on the natural environment. CSP would have greater conflicts with military airspace restrictions than solar energy facilities, however. The height of the towers required for CSP energy facilities would pose safety risks for military aircraft and, therefore, would not be compatible with air space requirements for military facilities in Imperial County. Similarly, CSP would have greater conflicts with areas designated as 5-mile BASH subzones because the height of the tower could impact avian species.

3.2.7 Concentrated Photovoltaic

Research was conducted to evaluate the potential to develop CPV as a source of renewable energy within Imperial County (Appendix E). CPV energy facilities utilize the traditional photovoltaic (PV) silicon wafer cell technology that has recently become widespread, with a few technical enhancements. The common solar photovoltaic modules use silicon technology that is, at a maximum, a little over 20 percent efficient. CPV uses the same silicon-based technology but is much more efficient, up to around 40 percent. CPV achieves this higher efficiency because instead of having one semiconductor junction that focuses on collecting only a part of the visible spectrum of light, it has multiple

semiconductor junctions that collect multiple parts of the visible light spectrum. Because these CPV condensed wafers, also known as "chips," are more expensive to produce per unit area than normal solar PV wafers, the silicon wafers are cut up into small pieces and arranged in a grid pattern in the solar module. A special optical plastic lens is then used to focus the light only where the solar PV chip lies. CPV modules still are more expensive to build than the traditional solar PV modules, and manufacturers must install them on dual axis trackers to follow the sun. CPV trackers are typically around 30 feet in height and about 50 feet in width, and each tracker has an installed capacity of about 25 kilowatts. A CPV array typically produces about 1 megawatt for every 7 acres of land.

Suitability for development of CPV energy facilities would be identical to the suitability of solar energy facilities described in Section 3.2.3. CPV facilities would require the same type and amount of land and would have similar types of impacts on the natural environment as solar energy facilities. Furthermore, CPV energy facilities do not require use of a tower to collect heat as is needed for CSP energy facilities.

3.3 RENEWABLE ENERGY DEVELOPMENT ALTERNATIVES

The Environmental Baseline Study has developed a series of alternatives for locating renewable energy projects based on a detailed analysis of existing environmental resources, land use information, community input, and data from the Desert Renewable Energy Conservation Program. The analysis considered siting characteristics and environmental consequences associated with renewable energy types during development of the alternatives. The analysis also considered existing and approved renewable energy facilities within the County. Figures 3.3-1 through 3.3-3 identify locations suitable for development of renewable energy resources based on two categories. "Focus Areas" indicate locations that are highly suitable for development of renewable energy, while "Constrained" indicate locations that posses environmental resources that may pose some development conflicts. Areas that are not demarcated by either of these categories are considered unsuitable for renewable energy development.

These two categories presented in Figure 3.3-1, Figure 3.3-2, and Figure 3.3-3 present suitability for all types of renewable energy and do not identify suitable locations for specific renewable resources. Suitability for individual renewable energy resources types at specific locations will have to be determined on a project-by-project basis. A description of each alternative and associated map is presented below.

3.3.1 Alternative 1

Alternative 1, presented in Figure 3.3-1, proposes the largest area of potential renewable energy development. Focused areas in Alternative 1 reflect development areas identified in the DRECP that are not located within any identified environmental resources. Alternative 1 identifies approximately 195,437 acres of focused areas within Imperial County. Constrained areas in Alternative 1 reflect areas identified in the DRECP that are located on environmental resources such as agricultural resources, park and recreation areas, visually sensitive areas, and urban areas. Alternative 1 also identifies approximately 550,790 acres of constrained areas within Imperial County, the majority of which consist of agricultural resources.

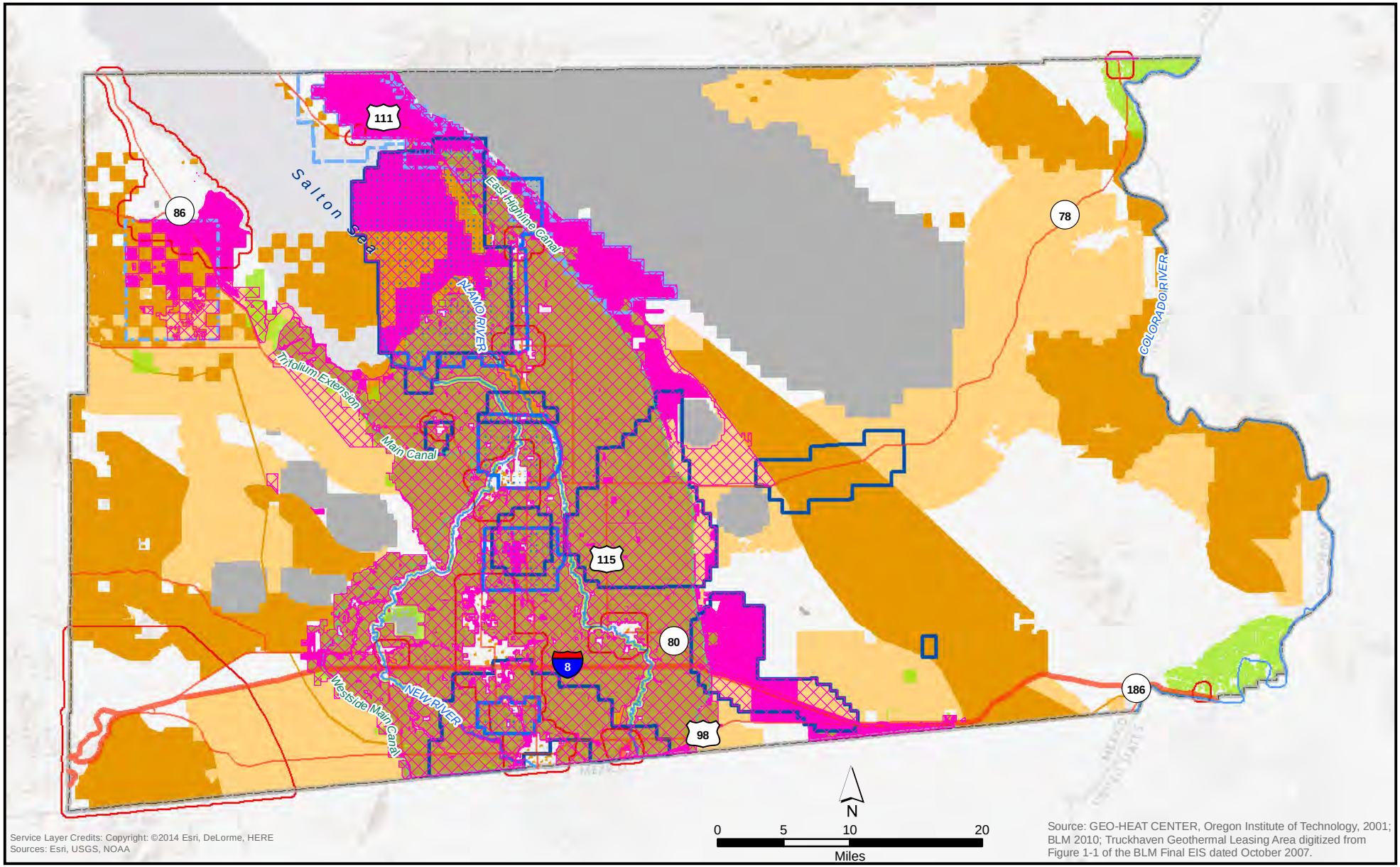
3.3.2 Alternative 2

Alternative 2, presented in Figure 3.3-2, reduces the amount of land available for renewable energy development when compared to Alternative 1. Focused areas in Alternative 1 reflect development areas identified in Alternative 3 of the DRECP that are not located within any identified environmental

resources. Alternative 2 identifies approximately 171,051 acres of focused areas within Imperial County. Constrained areas in Alternative 2 have been reduced compared to Alternative 1 to preserve existing environmental resources. Constrained areas in Alternative 2 reflect areas identified in Alternative 3 of the DRECP that are located on environmental resources such as agricultural resources, park and recreation areas, visually sensitive areas, and urban areas. Alternative 2 identifies approximately 328,849 acres of constrained areas within Imperial County, the majority of which consist of agricultural resources.

3.3.3 Alternative 3

Alternative 3, presented in Figure 3.3-3, was developed to preserve the greatest amount of agricultural resources. Focused areas within Alternative 3 consist of a combination of the focused areas identified in Alternative 1 and some constrained areas within the Chocolate Mountains BLM/NEPA-Designated Zone. Consequently, Alternative 3 would have the largest focused area footprint, consisting of approximately 225,794 acres. The constrained footprint for Alternative 3 was limited to areas consisting of environmental resources within the Truckhaven BLM/NEPA-Designated Zone, the four existing Geothermal Overlay Zones, and existing renewable energy facilities. Alternative 3 identifies approximately 409,759 acres of constrained areas within Imperial County; however, 122,545 acres of this total consists of existing renewable energy facilities, which may be further developed to allow for multiple renewable energy uses. Excluding existing renewable energy facilities, the constrained footprint of Alternative 3 consists of approximately 287,214 acres. This reduced value represents the smallest constrained footprint for all three alternatives and was developed in a manner that would preserve sensitive agricultural lands.



Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: GEO-HEAT CENTER, Oregon Institute of Technology, 2001; BLM 2010; Truckhaven Geothermal Leasing Area digitized from Figure 1-1 of the BLM Final EIS dated October 2007.

Legend

- KGRA
- Geothermal Overlay Zones (2006)
- BLM/NEPA-Designated Zones
- Urban Areas (plus 1/2-mile buffer)
- Important Farmland
- Park Lands & Recreational Areas
- Maintenance of Visual Quality has High Value
- Military Land Ownership
- County of Imperial Renewable Energy Focus Areas, Alternative 1 (to show full extent of DFAs)
- County of Imperial Renewable Energy Focus Areas, Alternative 1

Areas that are depicted as solid pink are areas of opportunity within the DRECP with the least constraints.

Figure 3.3-1
Imperial County Renewable Energy and Transmission Element Update
Alternative 1
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.3-1 Alternative 1.Mxd
Date Saved: 1/6/2015, Author: msimmons

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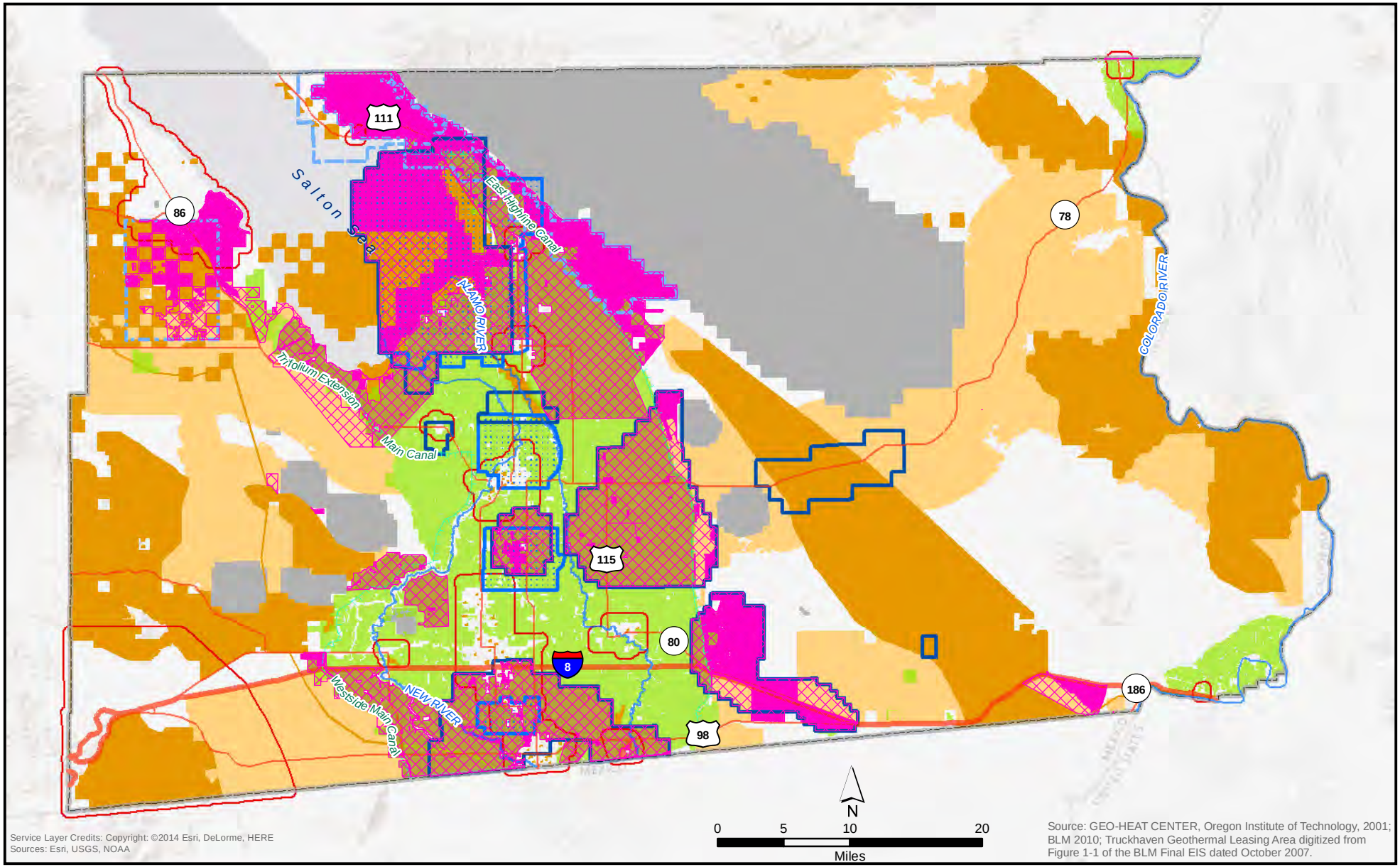

Legend

- KGRA
- Geothermal Overlay Zones (2006)
- BLM/NEPA-Designated Zones
- Urban Areas (plus 1/2-mile buffer)
- Important Farmland
- Park Lands & Recreational Areas
- Maintenance of Visual Quality has High Value
- Military Land Ownership
- County of Imperial Renewable Energy Focus Areas, Alternative 2 (to show full extent of DFAs)
- County of Imperial Renewable Energy Focus Areas, Alternative 2

Areas that are depicted as solid pink are areas of opportunity within the DRECP with the least constraints. Hatched pink indicate areas of opportunity under the DRECP, but may be constrained within the County.

Figure 3.3-2
Imperial County Renewable Energy and Transmission Element Update
Alternative 2
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.3-2 Alternative 2.Mxd
Date Saved: 1/6/2015, Author: msimmons
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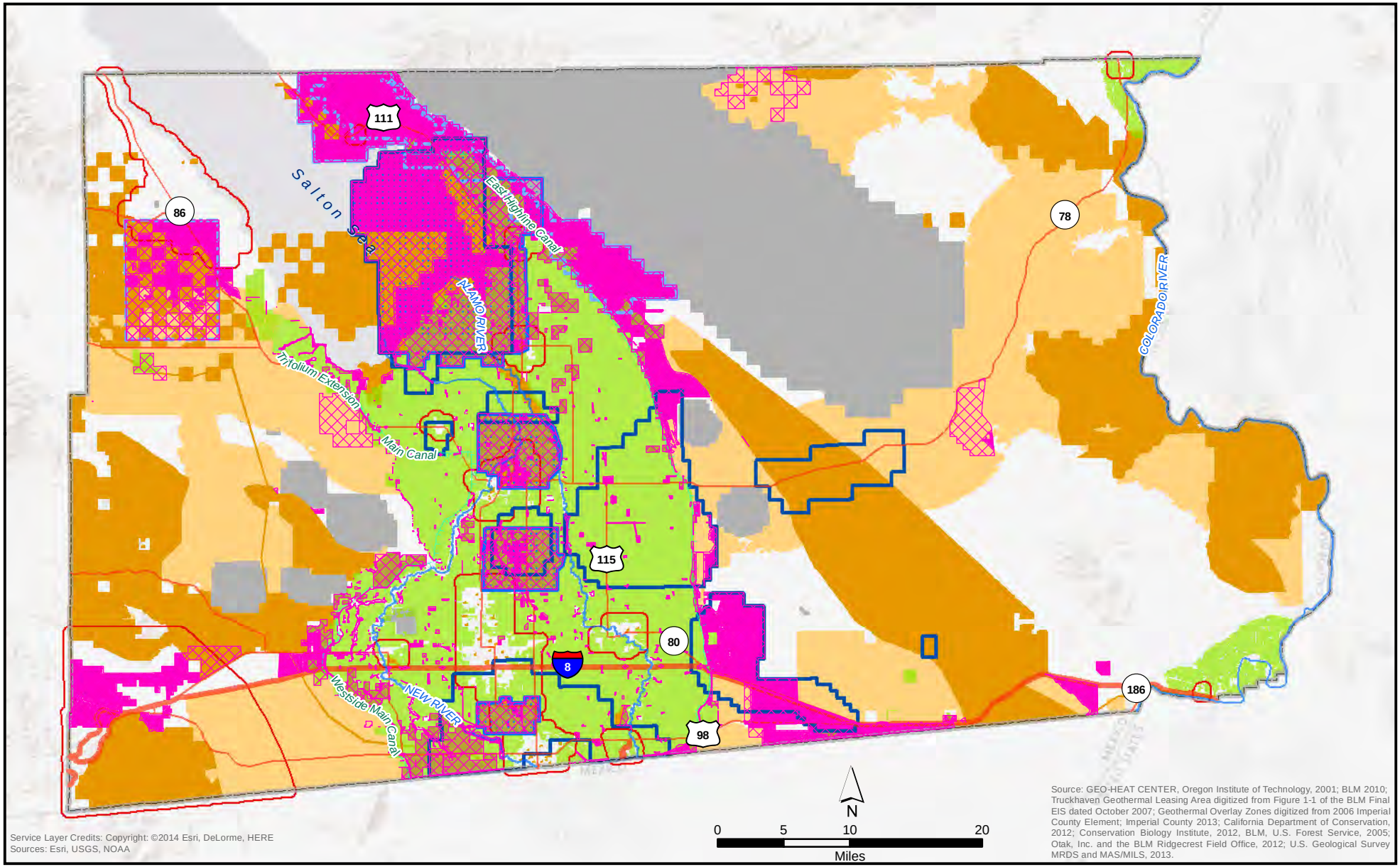

Service Layer Credits: Copyright: ©2014 Esri, DeLorme, HERE
Sources: Esri, USGS, NOAA

Source: GEO-HEAT CENTER, Oregon Institute of Technology, 2001; BLM 2010; Truckhaven Geothermal Leasing Area digitized from Figure 1-1 of the BLM Final EIS dated October 2007; Geothermal Overlay Zones digitized from 2006 Imperial County Element; Imperial County 2013; California Department of Conservation, 2012; Conservation Biology Institute, 2012, BLM, U.S. Forest Service, 2005; Otak, Inc. and the BLM Ridgecrest Field Office, 2012; U.S. Geological Survey MRDS and MAS/MILS, 2013.

Legend

- KGRA
- Geothermal Overlay Zones (2006)
- BLM/NEPA-Designated Zones
- Urban Areas (plus 1/2-mile buffer)
- Important Farmland
- Park Lands & Recreational Areas
- Maintenance of Visual Quality has High Value
- Military Land Ownership
- County of Imperial Renewable Energy Focus Areas, Alternative 3 (to show full extent of DFAs)
- County of Imperial Renewable Energy Focus Areas, Alternative 3

Areas that are depicted as solid pink are areas of opportunity within the DRECP with the least constraints. Hatched pink indicate areas of opportunity under the DRECP, but may be constrained within the County.

Figure 3.3-3
Imperial County Renewable Energy and Transmission Element Update
Alternative 3
For Use in Renewable Energy Suitability Analysis

Name: 20674 Background Fig 3.3-3 Alternative 3.Mxd
Date Saved: 1/6/2015, Author: msimmons

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4.0 – REFERENCES

Airport Land Use Compatibility Plan (ALUCP)
1996 Airport Land Use Compatibility Plan, Imperial County Airports.

Alles, D.L.
2007 Geology of the Salton Trough. Western Washington University. 2007: http://fire.biol.wwu.edu/trent/alles/GeologySaltonTrough.pdf

Anza-Borrego Desert State Park
2012 Anza-Borrego Desert State Park Magazine Historic Trails Edition.

Barfield, B.J., R.C. Warner, and C.T. Haan
1981 *Applied Hydrology and Sedimentology for Disturbed Areas*. Oklahoma Technical Press, Stillwater, Oklahoma, USA.

Bean, Lowell J.
1978 Cahuilla. In *Handbook of North American Indians Vol. 8 California.* Smithsonian Institution: Washington, D.C. 575-587.

Bee, Robert L.
1978 Quechan. In *Handbook of Native American Indians Vol. 10, Southwest.* Smithsonian Institute: Washington, D.C. 86-98.

Beier, P., and B. M. Brost
2010. Use of land facets to plan for climate change: Conserving the arenas, not the actors. *Conservation Biology* 24:701-710.

Berger, J.
2004 The Last Mile: How to Sustain Long-Distance Migration in Mammals. *Conservation Biology* 18(2):320-331.

Bettinger, R. L. and R. E. Taylor
1975 Suggested Revisions in Archaeological Sequences of the Great Basin in Interior Southern California. In *Nevada Archaeological Survey Research Papers* 5:1-26.

Brawley Elementary School District
2013 Brawley Elementary School District website, accessed November 2013 at www.besd.org/about_us.

Brian F. Mooney Associates
1993 *Final Program Environmental Impact Report for the County of Imperial General Plan*. October 1993.

Bunn, D., A. Mummert, M. Hoshovsky, K. Gilardi, and S. Shanks
2007 California Wildlife: Conservation Challenges. 2005 CA SWAP. California Department of Fish and Game. 624 pp.

Bureau of Land Management (BLM)

1979 North Salton Sea: Geothermal – Final Environmental Assessment Record.

1980 The California Desert Conservation Area Plan, 1980 as amended.

1984a BLM Manual 8400–Visual Resource Management.

1984b BLM Manual H-8410-1–Visual Resource Inventory.

1996 *BLM Manual Handbook 6840-1 Special Status Plant Management.* Available online at: http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/pa_pdfs/biology_pdfs.Par.344bd311.File.pdf/SpecialStatusPlantManagement.pdf

1998 (revised) Paleontology Resources Management Manual and Handbook. H-8270-1.

1999 *The California Desert Conservation Area Plan of 1980*. Last Updated March 1999. Accessed on December 4, 2013, at: http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/cdd/cdcaplan.Par.15259.File.dat/CA_Desert_.pdf.

2005 Land Use Planning Handbook. BLM Handbook H-1601-1. BLM Manual.

2006 California Desert Conservation Area: 30th Anniversary – 1976-2006.

2007 Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area. October. Available online: http://www.blm.gov/ca/st/en/fo/elcentro/nepa/truckhaven.html.

2008 *Manual 6840, Special Status Species Management*. Available online at http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf

2012a Final Environmental Impact Statement and Proposed California Desert Conservation Area Plan Amendment for the West Chocolate Mountains Renewable Energy Evaluation Area. November. Available online: http://www.blm.gov/ca/st/en/fo/elcentro/nepa/wcm.html.

2012b Salton Sea. Desert Access Guide – Points of Interest. Available online: http://www.blm.gov/ca/st/en/fo/elcentro/recreation/poi/salton_sea.html Accessed December 2013.

2013a Unpublished Material, Land Use Planning Area Boundaries. 2013. Available at: http://www.blm.gov/ca/gis/index.html.

2013b Imperial Sand Dunes Recreation Area Business Plan 2013.

2013c North Algodones Dunes Wilderness Fact Sheet.

2013d The Bradshaw Trail. Accessed December 2013 at http://www.blm.gov/ca/st/en/fo/palmsprings/bradshaw.html.

2014 About BLM in California. Accessed November 2014 at www.blm.gov/ca/st/en/info/about_blm.html

BLM, United States Department of Interior, "Geothermal"
2013 Accessed on November 24. http://www.icpds.com/CMS/Media/Geothermal-TransmissionElement-(2006).pdf.

Calexico Unified School District
2013 Calexico Unified School District Local Educational Agency Plan (LEAP). Approved May 14, 2013.

California Air Resources Board (CARB)
2005 *Air Quality and Land Use Handbook: A Community Health Perspective*. Available at http://www.arb.ca.gov/ch/landuse.htm. Accessed January 2014.

2008 Climate Change Scoping Plan. Available at www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm. Accessed January 2014.

2013a Ambient Air Quality Standards. Available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed January 2014.

2013b Greenhouse Gas Inventory Data – Graphs. Available at http://www.arb.ca.gov/cc/inventory/data/graph/graph.htm. Accessed July 2013.

2014a Area Designation Maps/State and National. Available at http://www.arb.ca.gov/desig/adm/adm.htm. Accessed January 2014.

2014b Air Monitoring Network. Available at http://www.arb.ca.gov/aaqm/mldaqsb/amn.htm. Accessed January 2014.

2014c. Air Quality Data. Available at http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed January 2014.

California Building Standards Commission (CBSC)
2013 California Fire Code. California Code of Regulations Title 24, Part 9.

California Department of Conservation (CDC)
2004 A Guide to the Farmland Mapping and Monitoring Program.

2010 Imperial County 2008-2010 Land Use Conversion.

2013 Solar-Use Easements – Senate Bill 618.

2010 The California Land Conservation (Williamson) Act Status Report.

California Department of Fish and Wildlife (CDFW)

1984 California Native Plant Protection Act. Accessed on December 9, 2013, at http://www.dfg.ca.gov/habcon/plant/laws.html.

2013a California Natural Diversity Database (CNDDB). RareFind Version 3.1.0. Database query for Imperial County.

2013b California Endangered Species Act. Available at http://www.dfg.ca.gov/habcon/cesa/; accessed on December 2, 2013.

2013c California Fish and Wildlife Code Sections 3503 and 3503.5. Accessed on December 2, 2013 at: http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=03001-04000&file=3500-3516.

2013d Streambed Alteration Agreement. Accessed on December 2, 2013, at http://www.dfg.ca.gov/habcon/1600/.

2013e California Wildlife Relationship System, California Interagency Wildlife Task Group. Accessed on December 10, 2013, at http://www.dfg.ca.gov/biogeodata/cwhr/.

2014 California Natural Diversity Database (CNDDB). Database records search of RareFind5 Animal and Habitat Analysis Branch, California Department of Fish and Wildlife. Sacramento, California.

California Department of Forestry & Fire Protection (Cal Fire)

2014 Cal Fire website. About Cal Fire. Accessed September 2014 at http://calfire.ca.gov/about/about.php

California Department of Housing and Community Development

2013 State Income Limits for 2013, February 2013.

California Department of Parks and Recreation (CDPR)

2013a Salton Sea State Recreation Area. Accessed December 2013 at http://www.parks.ca.gov/?page_id=639.

2013b Picacho State Recreation Area. Accessed December 2013 at http://www.parks.ca.gov/?page_id=641.

2013c Anza-Borrego Desert State Park. Visiting the Park. Accessed December 2013 at http://www.park.ca.gov/?page_id=1016.

2013d Anza-Borrego Desert State Park. Borrego Palm Canyon Trail. Accessed December 2013 at http://www.parks.ca.gov/?page_id=25225.

2013e Salton Sea State Recreation Area. Ironwood Nature Trail. Accessed December 2013 at http://www.parks.ca.gov/?page_id=25087.

California Department of Transportation (Caltrans)

2008 Scenic Highway Guidelines. October. Accessed at http://www.dot.ca.gov/hq/LandArch/scenic/guidelines/scenic_hwy_guidelines_04-12-2012.pdf.

California Department of Water Resources (DWR)

2003 California's Groundwater Bulletin 118 Update 2003. October. Available at http://www.water.ca.gov/groundwater/bulletin118/update2003.cfm.

California Energy Commission (CEC)

2002 Senate Bill No. 1078. Available at http://www.energy.ca.gov/portfolio/documents/documents/SB1078.PDF. Accessed July 2013.

2009 RETI (RETI) General Exclusion Areas BLM NLCS Wilderness Areas, Areas of Critical Environmental Concern, and Desert Wildlife Management Areas, Geographical Information System Data. Accessed at: http://www.energy.ca.gov/reti/documents/.

2010 Renewable Energy Transmission Initiative (RETI) Phase 2B Final Report. Accessed on December 4, 2013, at http://www.energy.ca.gov/reti/index.html.

2013 USGS Wilderness and Wildlife Areas. Personnel communication with Jacque Gilbreath on December 13, 2013.

2014 CEC Core Responsibilities. July 2014.

California Governor's Office of Planning and Research

2003 State of California General Plan Guidelines.

California Health & Safety Code

2014 California Health and Safety Code. Accessed online at http://www.leginfo.ca.gov/cgi-bin/

California Independent Service Operator Corporation (Cal ISO)

2014. Company Information and Facts.

California Native Plant Society Electronic Inventory (CNPSEI)

2013 Inventory of Rare and Endangered Plants (online edition, v7-09a). Rare Plant Scientific Advisory Committee, California Native Plant Society, Sacramento, California. Accessed on November 8, 2013at: http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi for *Imperial County.*

California Natural Resources Agency (CNRA)

1993 California Wetlands Conservation Policy. Accessed on December 2, 2013 at: http://ceres.ca.gov/wetlands/policies/governor.html.

1997 *Summary of Porter-Cologne Water Quality Control Act*. Last modified in 2002. Accessed on December 2, 2013, at: http://ceres.ca.gov/wetlands/permitting/Porter_summary.html.

2014 California Natural Resources Agency website. Frequently Asked Questions about CEQA. Accessed September 2014 at http://resources.ca.gov/ceqa/more/faq.html

California Office of Emergency Services (OES)
2014 Cal OES website. Accessed September 2014 at http://www.calema.ca.gov/pages/default/aspx

California Public Utilities Commission (CPUC)
2014 Regulatory Responsibilities of the California Public Utilities Commission. April 2014.

California State Parks
2013 Ocotillo Wells State Vehicular Recreation Area website. Accessed December 2013 at http://ohv.parks.ca.gov/?page_id=1217.

California (State) Water Resources Control Board (SWRCB)
2003 California's Groundwater Bulletin 118 Update 2003. October. Available at http://www.water.ca.gov/groundwater/bulletin118/update2003.cfm.

2011 Board Approved of 2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report. Available: http://www.waterboards.ca.gov/water_issues/ programs/tmdl/integrated2010.shtml.

2013 *National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements (WDRS) for State of California Department of Transportation*. Order No. 2012-0011-DWQ. NPDES No. CAS000003. Effective July 1.

Calipatria Unified School District
2013 School Facts and Accountability Information 2012-2013. Accessed November 2013 at http://calipatria.schoolwisepress.com/home.

Carrico, R. L., F. Norris, A. Schilz, and R. Minnich
1982 Cultural Resource Overview, San Bernardino National Forest, California, Volume I. Prepared by WESTEC Services, Inc.

Central Union High School District
2012 Central Union High School District Technology Plan. Board Approved February 21, 2012.

Clean Harbors Environmental Services
2007 Transportation & Disposal. Westmorland, California, Facility Facts.

Clevenger, A.P., B. Chruszcz, and K. Gunson.
2001 Drainage culverts as habitat linkages and factors affecting passage by mammals. *Journal of Applied Ecology* 38: 1340-1349.

Convention on Biological Diversity (CBD)
2013 Article 2 – Use of Terms. Accessed at http://www.cbd.int/convention/articles/default.shtml?a=cbd-02 on 12/6/201.

Colorado River Basin Regional Water Quality Control Board

2006 Water Quality Control Plan Colorado River Basin – Region 7, Includes Amendments. Adopted by the Regional Board through June 2006.

2013 Salton Sea Trans-boundary Watershed. Accessed on December 1.

County of Imperial (County)

2002 Noise Ordinance. County Code, Title 9, Division 7 (Noise Abatement and Control), Section 90702.00.

2006 "An Ordinance of the County of Imperial Enacting Development Impact Fees." Ordinance No. 148.

2007a Flood Management Plan. February. Available at http://www.co.imperial.ca.us/emergencyplans/floodmitigationplan.pdf.

2007b Imperial County Operational Area. Emergency Operations Plan (EOP). July 2007.

2009 Imperial County Operational Area. Hazardous Materials Area Plan. Imperial County Office of Emergency Services. September 2009.

2011 Imperial Solar Energy Center West Final EIR/EA. July.

2012a Agricultural Crop & Livestock Report. Accessed at http://www.co.imperial.ca.us/ag/crop_&_livestock_reports/Crop_&_Livestock_Report_2011.pdf.

2012b Ocotillo Wind Energy Facility Final EIR/EIS. February.

2013a Welcome to Imperial County. Accessed on December 2, 2013, at: http://www.co.imperial.ca.us/.

2013b California Ethanol and Power Imperial Valley 1. Sugarcane and Sweet Sorghum to Ethanol, Electricity, and Biomethane Facility Draft EIR. April 2013.

2013c Imperial County Multi-Jurisdiction Hazard Mitigation Plan Update. December. http://www.co.imperial.ca.us/Announcements/ImperialCountyMHMPUpdate2013_121913.pdf.

2014 Imperial County Public Health Department. Personal Communication with Paula Kriner. June 9, 2014.

County of Imperial ORN1 21, LLC Geothermal Project

2013 Draft Environmental Impact Report September 2013.

Desert Renewable Energy Conservation Plan (DRECP)

2012 *2012 Vegetation Map in Support of the Desert Renewable Energy Conservation Plan, Interim Report (1.1)*. Vegetation Classification and Mapping Program California Department of Fish and Wildlife in collaboration with Aerial Information Systems, Inc.

June 2012. Accessed on December 4, 2013, a:t http://databasin.org/datasets/cb8cec98a98348ecb7a20d65c093bfce.

2013 Desert Renewable Energy Conservation Plan. Accessed in December at: http://www.drecp.org/.

2014 DRECP Environmental Impact Report/Environmental Impact Statement. SCH No. 2011071092. September 2014.

Dudek and ICF International (Dudek & ICF)

2012 *Desert Renewable Energy Conservation Plan Baseline Biology Report.* March 2012 Accessed on December 4, 2013, at http://www.drecp.org/documents/docs/baseline_biology_report/index.php.

EGI

2011 Draft Environmental Impact Report for Centinela Solar Project. October 2011.

El Centro Elementary School District

2013 El Centro Elementary School District website accessed November 2013 at http://www.ecesd.com/.

Elsasser, A. B.

1978 Basketry. In *Handbook of North American Indians Vol. 8, California*. Smithsonian Institution: Washington, D.C. 626-641.

Evink, G.L.

2002 *Interaction between roadways and wildlife ecology*. National Academy Press, Washington, D.C.

Farmer, A.M.

1992 The effects of dust on vegetation – a review. *Environmental Pollution* 13:99-107.

Farmland Mapping and Monitoring Program (FMMP)

2004 California Department of Conservation Division of Land Resource Protection. A Guide to the Farmland Mapping and Monitoring Program. 2004 Edition.

Federal Energy Regulatory Commission (FERC)

2014. "What FERC Does." Accessed September 2014 at http://www.ferc.gov/about/ferc-does.asp

Federal Register (FR)

1999 Invasive Species Executive – Executive Order 13112 Accessed on December 2, 2013 at: http://www.gpo.gov/fdsys/pkg/FR-1999-02-08/pdf/99-3184.pdf.

2001 Federal Agencies to Protect Migratory Birds - Executive Order 13186 (2001). Accessed on December 2, 2013 at: https://www.federalregister.gov/articles/2001/01/17/01-1387/responsibilities-of-federal-agencies-to-protect-migratory-birds.

GovTrack.US (GovTrack)

2011 California Desert Protection Act of 2011. Accessed on December 12, 2013, at https://www.govtrack.us/congress/bills/112/s138.

Heber Elementary School District

2012 Heber Elementary School 2011-2012 School Accountability Report Card.

Holtville Unified School District

2012 Holtville Unified School District 2011-2012 School Accountability Report Cards.

Imperial County Air Pollution Control District (ICAPCD)

2007 CEQA Air Quality Handbook. Available at http://www.imperialcounty.net/AirPollution/Web%20Pages/CEQA.htm. Accessed January 2014.

2009 2009 Imperial County State Implementation Plan for Particulate Matter Less Than 10 Microns in Aerodynamic Diameter. Available at http://www.imperialcounty.net/AirPollution. Accessed January 2014.

2010 Final 2009 8-Hour Ozone Modified Air Quality Management Plan. Available at http://www.imperialcounty.net/AirPollution. Accessed January 2014.

Imperial County Free Library (ICFL)

2013 Imperial County Free Library website accessed December 2013 at http://www.co.imperial.ca.us/Library/about/html.

Imperial County Local Agency Formation Commission (ICLAFCO)

2014 ICLAFCO website. About Us. Accessed November 2014 at www.iclafco.com/about-us/

Imperial County Office of Education

2013 Imperial County School Sites. Accessed November 2013 at http://www.icoe.org/icoe/school-districts.

Imperial County Office of Emergency Services (OES)

2013 Multi-Jurisdictional Hazard Mitigation Plan (MHMP) Update. December.

Imperial County Planning and Development Services (ICPDS)

1994a Ocotillo/Nomirage Community Area Plan.

1994b Seeley Urban Area Plan.

1996a Agricultural Element of the Imperial County General Plan. Accessed at http://icpds.com/CMS/Media/Agricultural-Element.pdf.

1996b Niland Urban Area Plan.

1996c Winterhaven Urban Area Plan.

1998 Palo Verde Community Area Plan.

1999 Bombay Beach/Hot Mineral Spa Community Area Plan.

2000 West Shores/Salton City Urban Area Plan.

2001 General Plan. *Noise Element of the General Plan. Geothermal and Transmission Element of the General Plan*.

2003 Heber Urban Area Plan.

2006 Geothermal/Alternative Energy and Transmission Element County of Imperial General Plan. Accessed at http://icpds.com/CMS/Media/Geothermal-TransmissionElement-%282006%29.pdf.

2008a County of Imperial 2008-2014 Housing Element. Accessed at http://www.icpds.com/CMS/Media/Imperial-County-Housing-Element-Final-6-13-08.pdf.

2008b Land Use Element of the Imperial County General Plan. Accessed January 29, 2013, at http://icpds.com/CMS/Media/Land-Use-Element-(2008).pdf.

2008c Parks and Recreation Element of the Imperial County General Plan. Accessed at http://www.icpds.com/CMS/Media/Parks-&-Recreation-Element-(2008).pdf.

2008d Circulation and Scenic Highways Element. January 29. Accessed at http://www.icpds.com/CMS/Media/Circulation-Scenic-Highway-Element-%282008%29.pdf.

2009 General Plan Overview. Accessed at http://icpds.com/CMS/Media/GENERAL-PLAN--(OVERVIEW).pdf.

2011a East Brawley Geothermal Draft Environmental Impact Report. Accessed at http://icpds.com/?pid=2666. March 2011.

2011b Cluster I Solar Power Project Draft Environmental Impact Report. Accessed at http://icpds.com/?pid=2949.

2012 Mount Signal and Calexico Solar Farms Projects Final Environmental Impact Report. Accessed at http://www.icpds.com/?pid=2928.

2013a County Parks. Website accessed December 2013 at http://www.icpds.com/?pid=1058.

2013b Regional Parks website accessed December 2013 at http://www.icpds.com/?pid=1083.

2013c Programs and Activities. Website accessed December 2013 at http://www.icpds.com?pid=1063.

2013d Community Parks. Website accessed December 2013 at http://www.icpds.com?pid=1084.

2013e Imperial County Planning and Development Services, Ordinances. Accessed on December 2, 2013. http://www.icpds.com/?pid=573.

2013f Conservation and Open Space Element. Accessed April 13, 2013, at http://www.icpds.com/CMS/Media/Conservation-and-Open-Space-Element.pdf

2013g Planning and Development Services. Renewable Energy Maps. Imperial County Solar Farm Projects. (Map) Updated October 28, 2013. http://icpds.com/CMS/Media/Solar-Central-County-10-28-13.pdf

Imperial County Sheriff's Office

2013 Imperial County Sheriff's Office website accessed December 2013 at http://www.icso.org/stations/.

Imperial Irrigation District (IID)

2008 Renewable Energy Feasibility Study Final Report.

2009 Annual Water Report. Imperial, California. 36 pp.

2013 Important facts. Website accessed at http://www.iid.com/Modules/ShowDocument.aspx?documentid=5376.

Imperial County Transportation Commission (ICTC)

2013 Imperial County 2013 Transportation Plan. November.

Imperial Unified School District (IUSD)

2013 IUSD website. Accessed September 2013 at imperialusd.org

Intergovernmental Panel on Climate Change (IPCC)

2007 Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Geneva, Switzerland. Available at http://www.ipcc.ch/ipccreports/ar4-wg1.htm. Accessed January 2014.

Inter Tribal Council of Arizona, Inc.

2013 Quechan Tribe. http://itcaonline.com/?page_id=1173. Accessed December 10, 2013.

LANDFIRE

2013 Existing Vegetation Type layer. U.S. Department of Interior, Geological Survey. [Online]. Available: http://landfire.cr.usgs.gov/viewer/ [2013,May 8].

Laylander, Don, ed.

2005 San Dieguito complex. http://www.sandiegoarchaeology.org/Laylander/Issues/Index.htm. Accessed November 11, 2013.

Lech, Steve

2012 Pioneers of Riverside County: The Spanish, Mexican and Early American Periods. The Historic Press. Charleston South Carolina.

Love, Bruce and Mariam Dahdul
2002 Desert Chronologies and the Archaic Period in the Coachella Valley. *Pacific Coast Archaeological Society* 38: 65-86.

Luomala, Katharine
1978 Tipai-Ipai. In *Handbook of North American Indians Vol. 8, California.* Smithsonian Institution: Washington, D.C. 592-609.

Magnolia Union Elementary
2012 Executive Summary School Accountability Report Card, 2011-2012 for Magnolia Elementary.

2013 Magnolia Elementary School website accessed December 2013 at http://www.magnoliatigers.com/.

Mata, C., I. Hervas, J. Herranz, F. Suarez, and J.E. Malo
2005 Complementary use by vertebrates of crossing structures along a fences Spanish motorway. *Biological Conservation* 124: 397-405.

McCabe Union Elementary School District
2012 McCabe Elementary School, School Accountability Report Card Reported Using Data from the 2011-2012 School Year.

McGuire, Randall H. and Michael B. Schiffer
1982 *Hohokam and Patayan: Prehistory of Southwestern Arizona*. Academic Press: New York, NY.

Meadows Union Elementary School District
2012 Meadows Elementary School Accountability Report Card Report for School Year 2011-2012.

Menke, J., E. Reyes, A. Glass, D. Johnson, and J. Reyes
2013 2013 California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan. Final Report. Prepared for the California Department of Fish and Wildlife Renewable Energy Program and the California Energy Commission. Aerial Information Systems, Redlands, CA.

Mithun, M.
2006 *The Languages of Native North America*. Reprinted. Originally published 1999, Cambridge University Press: Cambridge, MA. Third Edition.

Morongo Band of Mission Indians
2013 Our Heritage. http://www.morongonation.org/content/language-culture. Accessed July 29, 2013.

Mulberry Elementary School
2013 About This School accessed December 2013 at http://www.mulberrymustangs.org/.

National Aeronautics and Space Administration
2013 Image of the Day - Salton Trough. Available online: http://earthobservatory.nasa.gov/IOTD/view.php?id=81711 Accessed December 2013.

Naval Air Facility El Centro (NAFEC)
2014 Joint Land Use Study. June 2014.

National Park Service (NPS)
2013 Anza Trail Guide. Accessed online December 2013 at http://www.anzahistorictrail.org/visit/counties/imperial.

Nature Serve
2009 Nature Serve Conservation Status. Version 7.1. Last updated July 2013. Accessed on December 10, 2013, at: http://www.natureserve.org/explorer/ranking.htm.

Office of Energy Efficiency and Renewable Energy (EERE), Department of Energy (DOE); and the Bureau of Land Management (BLM), Department of the Interior (DOI)
2012 Solar Energy Development Programmatic Environmental Impact Study (SDPEIS). Accessed on December 4, 2012, at: http://solareis.anl.gov/documents/index.cfm.

Office of Historic Preservation
2013 Accessed December, 2013, at http://ohp.parks.ca.gov/.

Pacific Imperial Railroad (PIR)
2013 About PIR. http://pacificimperialrailroad.com/about-pir/.

Paleo Services
2011 Paleontological Survey Report Ocotillo Wind Express Project. April.

Penrod, K., R Hunter, and M. Merrifield
2012 *Missing Linkages: Restoring connectivity to the California landscape*. California Wilderness Coalition, The Nature Conservancy, US Geological Survey, Center for Reproduction of Endangered Species, and California State Parks.

PMC
2012 County of Imperial East Brawley Final Impact Report. May 2012.

Pritzker, Barry M.
2000 *A Native American Encyclopedia: History, Culture, and Peoples*. Oxford University Press: Oxford, UK.

Rogers, M. J.
1966 The Ancient Hunters… Who were They? *Ancient Hunters of the Far West.* San Diego, CA: Union-Tribune Publishing.

San Diego Natural History Museum
2012 Ocotillo Express LLC. Department of Paleontological Services. August 2012. http://fire.biol.wwu.edu/trent/alles/GeologySaltonTrough.pdf.

San Pasqual Valley Unified School District
2012 Local Education Agency Plan.

Schaefer, Jerry
1994 The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. In *The Journal of California and Great Basin Archaeology* 16(1): 60-80.

Schaefer, Jerry and Don Laylander
2007 The Colorado Desert: Ancient Adaptations to Wetlands and Wastelands. In *California Prehistory*. Terry L. Jones and Kathryn A Klar, eds. Alta Mira Press: Landham, MD. 247-257.

Schroeder, A. H.
1951 A Brief Survey of the Lower Colorado River, From Davis Dam to the International Border.

1961 The Archaeological Excavations at Willow Beach, Arizona 1950. *University of Utah Anthropological Papers* No. 50.

Seeley Union School District
2013 Seeley Union School District website "About Us" accessed December 2013 at http://seeley.schoolfusion.us/modules/cms/pages.phtml?pageid=278065&sessionid=1f1b7019041ee0b5178a47a18424ca95.

Skinner, M.W. and B.M. Pavlik
1994 California Native Plant Society's inventory of rare and endangered vascular plants of California, special publication, 5th ed., California Native Plant Society.

Society of Vertebrate Paleontology (SVP)
2013 Standard Measures for assessment and mitigation of adverse impacts to nonrenewable paleontological resources. *Society of Vertebrate Paleontology News Bulletin* 152:2-5.

Solar Energy Industries Association (SEIA)
2013 Utility-Scale Solar Projects in the United States Operating, Under Construction, or Under Development. Updated November 2013. http://www.seia.org/research-resources/major-solar-projects-list.

Soil Conservation Service (SCS)
1981 Soil Survey of Imperial County California Imperial Valley Area. U.S. Department of Agriculture Soil Conservation Service. 123 pp.

Southern California Association of Governments (SCAG)
2012 Draft Programmatic EIR. 2012-2035 RTP/SCS. Available at: http://rtpscs.scag.ca.gov/Pages/Draft-2012-PEIR.aspx. Accessed January 2014.

2013a Profile of Imperial County, May 2013.

2013b Profile of the City of Brawley, May 2013.

2013c Profile of the City of Calexico, May 2013.

2013d Profile of the City of Calipatria, May 2013.

2013e Profile of the City of El Centro, May 2013.

2013f Profile of the City of Holtville, May 2013.

2013g Profile of the City of Imperial, May 2013.

2013h Profile of the City of Westmorland, May 2013.

2013i Profile of the unincorporated area of Imperial County, May 2013.

2014 Southern California Association of Governments website. About SCAG. Accessed November 2014 at www.scag.ca.gov/about/pages/Home/aspx

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler
2010 California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Wildlife, and Federal Highway Administration.

Sperry, Robert L.
1975 When the Imperial Valley Fought for Its Life. In *The Journal of San Diego History* 21(1). Online edition https://www.sandiegohistory.org/journal/75winter/imperial.htm. Accessed December 10, 2013.

State Regional Water Quality Control Board (SRWQCB)
2014 Total Maximum Daily Load Program (TMDL). Website: http://www.swrcb.ca.gov/lahontan/water_issues/programs/tmdl/ accessed on 11/5/14.

State of California, State Water Resources Control Board (SWRCB)
2006 Water Quality Control Plan Colorado River Basin – Region 7. Includes adopted amendments through June 2006. http://www.waterboards.ca.gov/coloradoriver/ (accessed 11/2/2014).

Surface Mining and Reclamation Act (SMARA)
2012 Regulations. California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

Taylor, R. E.
1991 Frameworks for Dating the Late Pleistocene Peopling of the Americas. In *The First Americans: Search and Research.* Tom D. Dillehay and David J. Meltzer, eds. CRC Press: Boca Raton, FL. 77-111.

Taylor, R.E. and Louis A. Payen
1979 The Role of Archaeometry in American Archaeology: Approaches to the Evaluation of the Antiquity of *Homo sapiens* in California. In *Advances in Archaeological Method and Theory.* M. Schiffer, ed. Academic Press: New York, NY. 239-238.

Thompson, J.R., P.W. Mueller, W. Fluckiger, and A.J. Rutter

1984 The effect of dust on photosynthesis and its significance for roadside plants. *Environmental Pollution* (Series A) 34:171–190.

United Nations Framework Convention on Climate Change (UNFCCC)

2012 Global Warming Potentials. Available at: http://unfccc.int/ghg_data/items/3825.php. Accessed January 2014.

United States Department of Energy

2012 Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States: Volume 2 – Arizona and California Proposed Solar Energy Zones.

2012 Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States: Volume 2 – Arizona and California Proposed Solar Energy Zones.

United States Environmental Protection Agency (USEPA)

1972 Summary of the Clean Water Act, 33 U.S.C. §1251 et seq. (1972). Accessed on December 2, 2013, at http://www2.epa.gov/laws-regulations/summary-clean-water-act.

1977 Protection of Wetlands, Executive Order 11990 (1977). Accessed on December 2, 2013, at http://water.epa.gov/lawsregs/guidance/wetlands/eo11990.cfm.

2013 Greenhouse Gas Reporting Program. Available at http://www.epa.gov/ghgreporting/index.html. Accessed July 2013.

2014a National Environmental Policy Act (NEPA). Compliance and Enforcement. Accessed September 2014 at www.epa.gov/compliance/nepa

2014b U.S. Environmental Protection Agency. Laws & Regulations. Summary of the Resource Conservation and Recovery Act. 42 U.S.C. Section 6901 et seq. (1976).

United States Fish and Wildlife Service (USFWS)

1918 Migratory Bird Treaty Act (1918). Accessed on December 2, 2013, at http://www.fws.gov/laws/lawsdigest/migtrea.html.

1940 Bald and Golden Eagle Protection Act (1940). Accessed on December 4, 2013, at http://www.fws.gov/laws/lawsdigest/BALDEGL.HTML.

1973 Endangered Species Act (1973) Accessed on December 2, 2013, at http://www.fws.gov/endangered/laws-policies/index.html.

2012 Sonny Bono Salton Sea. Updated on August 23, 2012. Accessed on December 6, 2013, at http://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html.

2013a Imperial National Wildlife Refuge. About the Refuge. Available online: http://www.fws.gov/refuge/Imperial/about.html Accessed: December 2013.

2013b Sonny Bono Salton Sea National Wildlife Refuge. About the Refuge. Available online: http://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html Accessed: December 2013.

2013c Sonny Bono Salton Sea National Wildlife Refuge Complex. Recreational Opportunities. Accessed online December 2013 at http://www.fws.gov/saltonsea/recreation.html.

2013d Critical Habitat Units and National Wetlands Inventory Geographical Information System Data. Accessed at http://www.fws.gov/gis/index.html.

United States Geological Survey (USGS)

1975 USGS, "Geohydrologic Reconnaissance of the Imperial Valley, California." 1975.

2013a Mineral Resources Data System. Available online at http://mrdata.usgs.gov/mineral-resources/mrds-us.html.

2013b National Land Cover Database. Vegetation Communities for Imperial County. Accessed at: http://landcover.usgs.gov/uslandcover.php.

Wallace, W. J.

1962 Prehistoric Cultural Development in the Southern California Deserts. *American Antiquity* 28:172-180.

Warren, Claude N. and D. L. True

1961 *The San Dieguito Complex and Its Place in California Prehistory.* University of California, Los Angeles Archaeological Survey Annual Report, Vol. 3.

Western Region Climatic Center (WRCC)

2014 Monthly Climate Summary, El Centro, California. Available at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2713. Accessed January 2014.

Westmorland Union Elementary School District

2012 Westmorland Elementary School, 2011-2012 School Accountability Report Card.

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