COAST DAIRIES LONG-TERM RESOURCE PROTECTION AND ACCESS PLAN

THE TRUST FOR PUBLIC LAND

February 2004

ESA Environmental Science Associates

COAST DAIRIES LONG-TERM RESOURCE PROTECTION AND ACCESS PLAN

THE TRUST FOR PUBLIC LAND

February 2004

Prepared by

The Trust for Public Land
for the Future Stewards
of the Coast Dairies Property

225 Bush Street
Suite 1700
San Francisco, CA 94104
(415) 896-5900

436 14th Street
Suite 600
Oakland, CA 94612
(510) 839-5066

8950 Cal Center Drive
Building 3, Suite 300
Sacramento, CA 95826
(916) 564-4500

4221 Wilshire Boulevard
Suite 480
Los Angeles, CA 90010
(323) 933-6111

710 Second Avenue
Suite 730
Seattle, WA 98104
(206) 442-0900

1751 Old Pecos Trail
Suite O
Santa Fe, NM 87505
(505) 992-8860

2685 Ulmerton Road
Suite 102
Clearwater, FL 33762
(727) 572-5226

5850 T.G. Lee Boulevard
Suite 440
Orlando, FL 32822
(407) 851-1155

200071

ESA Environmental Science Associates

A READER'S GUIDE TO THE COAST DAIRIES PLAN

A Reader's Guide to the Coast Dairies Plan

The document in your hands is the result of a comprehensive planning effort for the Coast Dairies Property (Property), including many years of citizen interest and involvement, interactions between public agencies and land stewards, intense resource inventory, professional land management planning, and unforeseen changes in the economy of the state and the region.

The Coast Dairies Property is located along California's central coast in northern Santa Cruz County and surrounds the town of Davenport. The approximately 7,000-acre Property consists of 6 distinct watersheds, more than 7 miles of stunning coastal resources (including 7 beaches), hundreds of acres of agricultural lands, 700 acres of redwood forest, critical habitat for endangered species (coho salmon, steelhead, California red-legged frog, and snowy plover), and other unique natural and cultural resources.

In 1974, the publication of *In the Ocean Wind: The Santa Cruz North Coast*, described the threatened natural beauty of this region and became a call to action for long-term protection. Now with the 2004 publication of this *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or Plan), three decades have passed and the land we all know as Coast Dairies is poised to become public land, protected in perpetuity.

The first chapters of the Coast Dairies Plan, especially *Land Use History*, tell the story of the Property's near brush with becoming the site of a nuclear power plant or residential development. In keeping with the Property's complex history, the past five years, during which the Property was held by the Trust for Public Land (TPL), have not been a simple, straight-line trajectory from Swiss-owned dairy and farmland to public park. The Coast Dairies Plan is complete and stands by itself as land management guidance, but its future use and the multiplicity of appendices spawned by the process require some explanation.

The Trust for Public Land, in its role as first steward, had responsibilities that stretched backward to the funding entities and forward to the ultimate managers of the land. During the process of purchasing the Coast Dairies & Land Co. (CDLC), TPL issued a request for proposals to locate an entity to accept and care for the Property. Based on proposals received, two agencies, the California Department of Parks and Recreation (Department) and the U.S. Department of the Interior, Bureau of Land Management (BLM), were chosen in 1999 for ultimate ownership and joint long-term stewardship of the Property.

In the spring of 2000, a consulting firm, Environmental Science Associates (ESA) of San Francisco, was selected to prepare a plan. This firm, with the assistance of a Steering Committee (the prospective stewards, TPL, Coastal Conservancy, Save-the-Redwoods League, and Land Trust of Santa Cruz County) and a Community Advisory Group (CAG), were tasked to develop a Plan that would serve as the blueprint, a kind of constitution that would establish the basic principles and make manifest the Vision Statement for Coast Dairies. This process has guided the ownership transition to BLM and the Department with the kind of transparency demanded by a concerned and very attentive public.

Preparation of the Coast Dairies Plan began with an extensive examination of the Property's attributes to assist in planning and land use guidance. The Coast Dairies *Existing Conditions Report* (ECR) was published in June 2001. Much more detailed than the Plan itself, the Existing Conditions Report has been revised several times to stay current. It formed the most comprehensive reference when the actual planning process began. Paper copies of the Coast Dairies Plan include the ECR as a compact disk in a pocket in the back cover.

How the Coast Dairies Plan Evolved

Between June 2001 and the date of this Plan (February 2004) planning passed through the normal stages of a document of its type: Community Advisory Group and more general public meetings, regular meetings of the Steering Committee, a "Constraints Analysis" (planning jargon for organizing and focusing the Plan), and finally multiple drafts of the Plan itself. On the whole, the Plan follows the logical sequence of extracting the most relevant information from the ECR and presenting it in abbreviated form in the Plan, stating property-wide goals and standards, and specific direction (prescriptions) for different watersheds (management zones).

How BLM and the Department came to Adopt the Plan – Chapter VII and Appendix D

The planning process remained on track and close to schedule through the end of 2001, with extended Steering Committee and CAG meetings through the fall and the public presentation of the *Opportunities and Constraints Analysis* in early 2002. Most of the Planning Team's assumptions remained intact until spring 2002, but at that time two of them changed substantially.

First, it had been assumed by TPL and its consultant, ESA, that the planning process would include analysis of the Plan under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). This would have meant that the Plan would be officially accepted by the Department and BLM at the time the Property was transferred. In March 2002, the Planning Team announced to the CAG that, as a non-profit agency, TPL could not prepare the NEPA/CEQA documents because, under law, it could not be the "lead agency." Further, BLM and the Department could not accept NEPA/CEQA documents on land they didn't yet own and manage. As a result, it is now envisioned that the long-term Plan will stand alone until it can be legally integrated into the internal planning frameworks of the new land stewards.

Second, spring 2002 brought with it new realities of state and federal funding for public land management. In March, both agencies reasserted their intent to steward Coast Dairies as envisioned in the Plan, but acknowledged that it might take some time to secure the budgets necessary to do so. At the April 2002 Steering Committee meeting, the harsh truths were confronted head-on by the Planning Team. The consultants were instructed to draft a new chapter that would resolve both problems at the same time: describe a sequence of management intensities, from the basic custodial to full Plan implementation. This Plan would describe the need to apply CEQA and NEPA and incorporate Coast Dairies into the state and federal budget mechanisms. This sequence is described in Chapter VII and as might be expected, went through several drafts before inclusion in the Plan.

The "Draft Final" Coast Dairies Plan was released at the end of June 2003. The public was invited to comment on the draft plan at the July 31, 2003 community meeting and to submit comments through August 31, 2003. These comments, as well as notes from the July 31 meeting, are contained in Appendix D. Beyond some updates and a few small errors of fact and lapses of clarity, which have been corrected, this Plan has not been substantially changed from the June 2003 Draft. Most of the public comments received express support for certain specific policies. For the most part these actions would be allowed under the Plan, but public comments have called for policy decisions that are more specific than the general level of policy represented by the Plan. So that the public input can guide the agencies as specific policy decisions are made in the future, the Planning Team decided that it was preferable to retain all these comments as literally as possible. As an appendix, maintained in the project record, the land stewards can exercise their own judgment on these comments when they consider the Plan afresh, as part of their CEQA and NEPA deliberations.

Coastal Agriculture, Water Rights, and Anadramous Fish – Appendices E and F

Coast Dairies continued to be a vibrant working landscape during the planning years. Part of Coast Dairies' authenticity is its ability to combine human uses successfully with unique natural resources. Cattle were grazed, crops raised, beaches were visited. The extraction of limestone for cement continued to be a thriving business. Wild pigs and noxious weeds were problems to be managed; leases had to be renewed and fees collected.

But the most challenging land management issue, as well as a tough planning issue, concerned sustaining coastal agriculture while protecting anadramous fish habitat.

Coast Dairies row crops had been irrigated for years from spring and summer stream diversions. Habitat protection now required that in-stream withdrawal be restricted to the winter, and that off-stream storage ponds be used. Further, water rights for this historic use of water had not been perfected.

The Planning Team had wrestled with the issue of water withdrawals since preparation of the ECR. Early drafts of the Coast Dairies Plan specified a review of fish/farm conflicts and a gradual process for resolving them. However, circumstances changed due to the absence of water rights and the quantitative fisheries data collected by the Planning Team.

The National Oceanic and Atmospheric Administration (NOAA) Fisheries made it clear to TPL in April 2002 that the water withdrawals were potential violations of the federal Endangered Species Act. Later that month, TPL sent a letter to all farmers irrigating with stream water advising them not to plant any additional acreage and to halt all stream diversions.

In early September 2002, TPL and ESA biologists conducted fish sampling in San Vicente Creek. They found many steelhead in the stream, and over 150 coho salmon as well as more steelhead in the adjacent off-channel impoundment. NOAA Fisheries estimated that there could be as many as a thousand young fish, or "fry," in the off-stream pond. (TPL later contracted with ESA to monitor habitat conditions in San Vicente Pond through the winter and to measure and release the coho and steelhead as they migrated out to sea.)

Sustaining coastal agriculture is one of the primary reasons the Coast Dairies property was preserved, and the community rallied to help:

The County Supervisor convened a Coast Dairies Water Rights Working Group to oversee permitting for water rights and off-stream ponds. The Coastal Conservancy is considering granting $300,000 for this effort.

Agri-Culture, a non-profit agency closely affiliated with the Santa Cruz Farm Bureau, will acquire and manage the agricultural land inland of Highway 1. (TPL selected Agri-Culture after BLM announced in the summer of 2003 that it could not acquire the inland agricultural land because managing row crop agriculture was not consistent with its agency mission.)

Agri-Culture provides agricultural education in Santa Cruz County, which it proposes to expand onto Coast Dairies. It has also created farm working housing by providing loans for site improvements. Agri-Culture will be responsible for maintaining and restoring agriculture at Coast Dairies, and will work with BLM, and State Parks to protect the 7,000-acre Property's agricultural and natural resources, while allowing appropriate public access.

During the planning process, TPL contracted with ESA to develop several reports that will assist in sustaining agriculture while protecting habitat. The following reports are included in the appendices of the Plan:

Appendix E provides information for determining whether streamflow downstream of diversion points is sufficient to support salmonids; and to determine the amount of water that would be available for agricultural use if permits to appropriate water were obtained.

Appendix F is specific to San Vicente Pond. The report compares relative population sizes and physical conditions of fish from both the pond and the main channel and attempts to answer questions about the effect that the pond has on the overall salmonid population of San Vicente Creek.

From these documents, it appears that water can be withdrawn from four of the streams and stored in ponds, subject to seasonal restrictions and maximum amounts. It appears as well that the pond at San Vicente Creek has had a positive impact on the fish using San Vicente Creek.

Using best management practices, ponds can be either screened to avoid entrapping fish, or alternatively shown to do the fish no harm, making off-stream storage of water a good solution to maintaining irrigated agriculture at Coast Dairies, one of the Plan's main goals. There are currently many off-stream storage ponds on the Property in addition to the pond studied at San Vicente.

A Last Word from the Planning Team

All of the individuals involved in the details of this complicated and sometimes frustrating planning process never doubted the worthiness and importance of their enterprise. They also appreciate the patience of the community, the resource agencies, and the tireless efforts of all the members of the Steering Committee. Along with the readers of the Plan, we hope someday to visit the "Coast Dairies Park" and find it meets all of our collective expectations.

TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

Attachment

Existing Condition Report on Compact Disk

EXECUTIVE SUMMARY

Executive Summary

Introduction

This *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan) is being developed under the auspices of the Coast Dairies Steering Committee (Steering Committee) and a Memorandum of Understanding (August 8, 2000) and conducted in consultation with federal, state, and local governments and the interested public. The Steering Committee includes representatives of the Bureau of Land Management (BLM), California Department of Parks and Recreation (Department), Trust for Public Land, Coast Dairies & Land Co. (CDLC), Save-the-Redwoods League, Land Trust of Santa Cruz County, and California Coastal Conservancy.

Purpose of the Coast Dairies Plan

The Purpose is derived from three sources – the Vision Statement developed by the Coast Dairies Steering Committee; the *Assignment of Stock Options, Escrow Account and Stock Option Deposit,* developed as part of the real estate transaction between the Save-the-Redwoods League and the Trust for Public Land in March 1998; and discussions between the funders and the Trust for Public Land.

The purpose of the Coast Dairies Plan is to assess the value of natural, cultural, and social resource attributes and develop sustainable management strategies that can be implemented by the Department and BLM to balance uses and protect those values.

The specific purpose of the Coast Dairies Plan is to provide direction and guidance on how best to manage natural and physical resources, visitor use, development and use of lands and facilities, and resource protection of the Property. This Plan will be the basis for the Proposed Action for subsequent National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) Analysis, and is expected to be adopted as a State Park General Plan and as a BLM Resource Management Plan Amendment. Once completed, the Coast Dairies Plan will be used as a template against which future project implementation plans are reviewed to determine whether such projects will protect and enhance the values of the Property. As a result, the Coast Dairies Plan will provide general direction and guidance for future management decisions; it does not address the specific details of future projects.

Planning Overview

The Coast Dairies Plan provides a vision for the Property. Although broad in scope, the Coast Dairies Plan provides guidance for the long-term management of the Property by BLM and the Department. It is a general planning document that provides guidance rather than definitive proposals, creating an ultimate purpose and vision for management of the Property. Proposals made in this Plan would be codified through the BLM and Department planning processes and the appropriate environmental documentation. This would include a BLM Resource Management Plan Amendment[1] to the Hollister Resource Management Plan in accordance with the Federal Lands Policy Management Act and a State Park General Plan[2] in accordance with

1 Public lands managed by BLM are governed by Land Use Plans. Current land use planning regulations require the development of Resource Management Plans (RMPs). Older BLM management plans, developed under earlier regulations, were called Management Framework Plans (MFPs). The BLM's Hollister Resource Area, which includes the Coast Dairies property, adopted an RMP in 1984. Until the RMP is amended through the Coast Dairies Plan approval process, guidance for management will come from the existing RMP. All BLM actions must be consistent with adopted RMP and Amendments.

2 The general plan is the primary management document for a unit of the State Park System, establishing its purpose and a management direction for the future by providing a defined framework for a unit's development, ongoing management, and public use. Thereafter, this framework assists in guiding daily decision-making and serves as the basis for developing more detailed management and site-specific project plans.

California Public Resources Code Section 5002.2. Implementation plans, which would tier off of general planning documents, focus on how to implement an activity or project needed to achieve a long-term goal. Implementation plans may direct specific projects as well as ongoing management activities or programs, and provide a high level of detail and analysis. Implementation plans affecting the Property should be consistent with the policies set by the Coast Dairies Plan. Once the Coast Dairies Plan is adopted by the BLM as a Resource Management Plan (RMP) Amendment, all future BLM actions must be consistent with the adopted plan and RMP Amendment. Future specific projects or implementation plans would need to comply with the CEQA and/or NEPA as well as all other applicable laws and statues, which could require additional environmental and other site studies to assess the potential impacts of future proposals.

Goals

The Coast Dairies Plan provides seven goals specific to the Property:

- Conserve and enhance the biological open space values;
- Create new and diverse recreational and educational opportunities;
- Maintain and enhance sustainable agriculture;
- Restore key natural resources;
- Protect natural forested areas from commercial harvest;
- Allow for other sustainable economic uses of the land; and
- Use adaptive management as a tool to achieve sound long-term stewardship of the property.

These seven goals lay the foundation for the management of the Property.

Land Transfer and Plan Implementation Stages

Land Transfer

The Department and BLM intend to manage the approximately 7,000-acre Property following the Seamless Management Principle described herein. However, to facilitate the real estate transfer, the Property will be divided and conveyed separately to the agencies. At the agencies' request, the Property coastside of Highway 1 (and the area surrounding the Laguna Inn) will be transferred to the Department, and the portion of the Property inland of Highway 1 will be transferred to BLM. Agri-Culture, a non-profit agency closely affiliated with the Santa Cruz Farm Bureau, will acquire and manage the agricultural land inland of Highway One. BLM will enhance salmonid, red-legged frog, and associated riparian habitats, manage mining leases and right-of-ways, evaluate grazing as a continuing management tool, and provide control of invasive weeds and feral pigs. The BLM will also offer the Department scientific and other support, as funding allows, and will recruit volunteers to conduct tours and assist with research.

Plan Implementation Stages

The Plan (in Chapter VII) describes in general terms how access to the Property will change under the stewardship of BLM and the Department. The term "access" as used here comprises both public access and other uses. The simplest and most benign uses, or those which can be considered identical to existing conditions on the Property, are allowed first. This is called the "Immediate Access Stage," and will be operational shortly after conveyance. As funding becomes available (0-5 years after conveyance) additional access may be provided, but only to the extent that significant impacts to the environment can be avoided. If the agencies offer additional (but limited) access during this period this will be called the "Interim Access Stage." In the longer term (5-10 years after conveyance) a full Plan will emerge that more closely resembles this document and will

guide operations until amended or revised. The Interim Access Stage also describes recommended management actions given this kind of use. These actions will include consultation with federal and state agencies to comply with the endangered species acts and other environmental laws and recommendations for additional adaptive management protocols that could be implemented as the agencies' budgets are increased in the future.

Activities permitted during the Interim Access Stage will receive the appropriate environmental review (including associated public involvement requirements) for implementation of projects and adoption of subsequent detailed plans (i.e., NEPA review for projects only on federal lands; CEQA review for projects only on state lands; and joint CEQA/NEPA documents under a combined review process for projects on both state and federal lands.

These three stages of Plan Implementation are briefly described below:

- **Immediate Access Stage.** This is the period that begins on the Day of Conveyance and primarily represents a continuation of historic access. This Stage extends to the time when additional uses are proposed and adopted by the Department and BLM. During this Stage, the Property will be managed according to the following tenets:
  - Deed restrictions, including the provisions of the *Assignment of Stock Option, Escrow Account and Stock Option Deposit* will be in force.
  - There will be a continuation of historic public access, including access to beaches.
  - All Stewards will comply with existing federal, state, and local laws and regulations, including but not limited to the federal and state Endangered Species Acts; local land use, air quality, noise, and nuisance ordinances and standards; water quality regulations and water-rights laws; the Surface Mining and Reclamation Act; and the Coastal Act.
  - There will be a continuation of existing mining and agricultural leases (including U.S. Abalone) and other leases that survive transfer of ownership.
  - Public health and safety services, including police protection and fire protection, will be provided by local service agencies, supported by the Department and BLM to the extent possible.
  - BLM and the Department will implement their respective guidelines for basic services, including refuse collection, cleanup, and patrol.
- **Interim Access Stage.** This stage, perhaps 0-5 years after conveyance, BLM and the Department will initiate carefully considered actions to broaden the allowable uses of the Property. During the Interim Access Stage, the main emphases for management of the Property will be as follows:
  - Protection of threatened and endangered species;
  - Limited recreational use of the Property, consistent with the ability of the Department, BLM, and other agencies to provide services and infrastructure necessary to ensure public health and safety and the protection of threatened and endangered species;
  - Continuation of existing economic uses of the Property, including agriculture, grazing, and mining, consistent with legal and regulatory requirements and the protection of threatened and endangered species; and
  - Collaboration with community groups regarding strategies for management of the Property, and provision of services such as patrol, cleanup, and monitoring.
- **Long-term Access Stage.** This Stage would incorporate the remainder of the Coast Dairies Plan and would likely be codified in the BLM and Department general planning processes. This includes implementation of the:
  - Goals and Standards;
  - Management Zone Prescriptions;
  - Long-Term Trails and Access Program; and
  - Adaptive Management Program.

Organization of the Coast Dairies Long-term Resource Protection and Use Plan

The contents of the Coast Dairies Plan are as follows:

- **Executive Summary.** This section provides a concise overview of the Plan.
- **Introduction.** This section provides an overview of the Property and the purpose, intent, and intended use of the Plan.
- **Project History.** This section describes the historic uses of the Property and the sequence of events that led to its purchase by the Trust for Public Land.
- **Affected Environment.** This section presents a summary of the existing conditions on the Property as presented in the Existing Conditions Report. It serves as a "reader's guide" to the compendium of baseline studies included in the Existing Conditions Report, providing the kind of summary and overview necessary to understand the relative importance of the different resource/issue areas. This section includes an overview, a brief description of the regional setting, a description of each watershed on the Property, and a summary of applicable resource data organized by resource topic.
- **Opportunities and Constraints.** Similar to the Affected Environment, above, this section summarizes the results of the Opportunities and Constraints Analysis prepared for the Property.
- **Goals and Standards.** This section presents the Goals and Standards that are intended to guide future management of the Property. This is the beginning of the operational portion of the Plan – where the results of the Opportunities and Constraints Analysis, along with other decisions and recommendations, are shaped into a cohesive, useful land management plan that provides on-the-ground guidance for future land managers.
- **Management Zone Prescriptions.** This section provides guidance on how each watershed should be managed. The management zone prescriptions describe the future desired condition, a list of activities or facilities typically consistent with the zone, and a list of activities or facilities that would typically be inconsistent with the zone.
- **Plan Implementation and Public Access.** The access plan includes three tiers: what will occur on day of conveyance, the interim access stage (i.e., those portions of the Property recommended to be opened to public access as soon as feasible) and a long-term access program that describes the overall vision for ultimate access to the Property.
- **Adaptive Management Program.** The Adaptive Management Program includes measures and monitoring protocols and standards required by local, state, or federal regulation and provides recommendations on other measures that could be implemented by future land managers.
- **Appendices.** Appendices include applicable regulations, the list of preparers, bibliography, public comments and data on water resources.

INTRODUCTION

Introduction

Background

Location

The Coast Dairies Property (Property) is located along California's central coast in northern Santa Cruz County and surrounds the town of Davenport; the community of Bonny Doon is located to the northeast (Figure I-1). The Property is accessed via Highway 1 and is approximately eight miles north of the city of Santa Cruz, approximately 35 miles south of Half Moon Bay, and about 50 miles south of San Francisco.

There are numerous state parks in the region of the Property (Big Basin Redwoods State Park, Año Nuevo State Reserve, Wilder Ranch State Park, Henry Cowell Redwoods State Park, and The Forest of Nisene Marks State Park) as well as the Bonny Doon Ecological Reserve and Gray Whale Ranch. Four of the state parks and the reserve are in close proximity to the Property, forming a constellation of conservation lands (Figure I-2).

The approximately 7,000-acre Property consists of six distinct watersheds, more than seven miles of stunning coastal resources (including seven beaches), hundreds of acres of agricultural lands, 700 acres of redwood forest, critical habitat for endangered species (coho salmon, steelhead, California red-legged frog, and snowy plover), and other unique natural and cultural resources.

Planning Vision

Sense of Place

The Coast Dairies Property contains multiple distinct watersheds, biological and cultural resources of statewide importance, prime beachfront, and farming and mining activities that support community economic stability. The Property is complex and exemplifies the dramatic natural beauty of Santa Cruz County's North Coast. The Property's scenery and resources have elicited a sense of connection to the land for many generations of residents and visitors. At Coast Dairies, one sees the interface of the natural rugged coastline, sandy "pocket" beaches, coastal marine terraces, pastoral grasslands, densely forested upland and riparian corridors, and the developed uses of coastal agriculture, mining, Highway 1, and the town of Davenport.

Coast Dairies is the centerpiece of a regional network of conservation open space, providing opportunities for regional trail development and other recreational linkages as well as vital biological "corridors" that mitigate the effects of habitat fragmentation. The proximity of coastal mountains has isolated the Santa Cruz County shore and resulted in a high degree of significant biodiversity. The Property has six perennial watersheds situated partially or entirely within its boundaries. Among them, San Vicente Creek not only supports a self-sustaining population of federally threatened steelhead, but also contains one of the last remnant spawning runs of the threatened coho salmon south of San Francisco Bay.

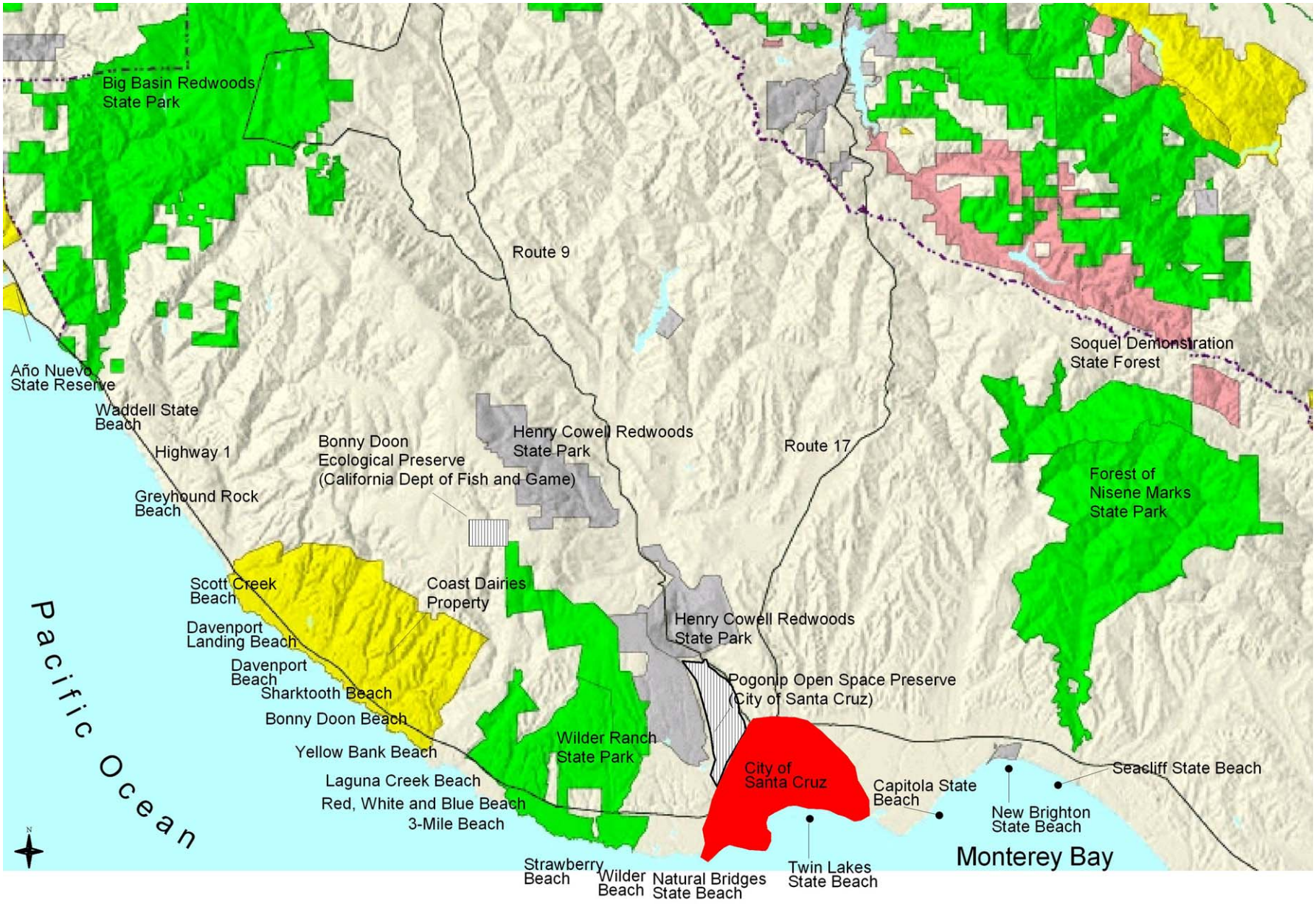
Management Vision and Goals

Goals identify a long-range vision for the management of the Property and must carefully balance multiple objectives, especially for an area as large, diverse, and complex as the Coast Dairies Property. This section presents the management vision and a set of conservation objectives specifically developed for the *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan).

SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure I-1

The North Coast and Coast Dairies Property



SOURCE: Bay Area Open Space Council, Environmental Science Associates, Pacific Meridian Resources, USGS

Figure I-2
Public and Conservation Lands
in the Project Region

There are several principles by which the Property as a whole will be managed, and with which all future management direction and decisions will be consistent. These principles are derived from:

- The *Assignment of Stock Options, Escrow Account and Stock Option Deposit*, developed as part of the real estate transaction between the Save-the-Redwoods League and the Trust for Public Land in March 1998;
- The Vision Statement developed by the Coast Dairies Steering Committee;
- The Existing Conditions Report (ECR) (ESA, 2001); and
- Regulatory direction of those agencies with existing or planned applicable jurisdiction for the Property.

Drawing from these sources, the following goals provide an overall direction for the general management of the Property. These goals have been developed specifically for the Coast Dairies Plan and are consistent with the mission of both the California Department of Parks and Recreation (Department) and the U.S. Department of the Interior, Bureau of Land Management (BLM).

Conserve and Enhance the Biological and Open Space Values

It is a goal of this Plan to preserve, protect, use, and enhance the open space values and intrinsic natural and pastoral qualities that make the Property important to the people of the local community, the region, the state, and the nation in perpetuity. Open space provides a sense of place and adds to the region's quality of life. Biological diversity, habitat quality, and open space values should be maintained at the highest possible levels.

Create New and Diverse Recreational and Educational Opportunities

The Property is a valuable recreational and educational resource for visitors from around the region, nation, and the world. It is a goal of this Plan to maximize opportunities for public access for recreation and enjoyment, consistent with the protection and preservation of the natural and cultural resources, agricultural uses, and the rights and interests of the Property's current lessees (e.g., RMC Pacific Material's mineral leases) or their successors. New and diverse recreational opportunities should maximize the potential for linkages with nearby lands while being compatible with protection of existing uses and natural resource values. The Property should provide opportunities for enjoyable and educational experiences within the Property's natural and cultural landscapes. Educational opportunities include the integration of sustainable coastal agriculture with programs designed to protect native biodiversity and other natural landscape values. People with diverse interests and expectations should be able to find a broad spectrum of opportunities, from solitude and quiet to group activities or active recreation. Appropriate access to the Property should be provided, and recreational facilities should be designed and sited to ensure protection of the natural, cultural, and social resource values.

Maintain and Enhance Sustainable Agriculture

Sustainable agriculture integrates three main goals: environmental health, economic profitability, and social and economic equity. One goal of the Coast Dairies Plan is to manage the land that was in agricultural row-crop production when TPL purchased the land in 1998 in a sustainable manner. The principles of sustainability are consistent with the protection of natural resource values, including protection of threatened or endangered species. Sustainability rests on the principle that one must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Stewardship of human resources includes consideration of social responsibilities, such as the working and living conditions of laborers, the needs of communities, and consumer health and safety, both in the present and the future. Stewardship of land and natural resources involves maintaining or enhancing this vital resource base for the long term.

Restore Sensitive Resources

The Property contains diverse biological communities that have experienced varying levels of human disturbance. The natural function

of sensitive communities of the Property, including coastal terrace prairie, riparian areas, wetlands, and floodplains, should be restored in areas where natural processes have been significantly impaired. Restoration activities should strive to return habitat to self-sustaining levels of complexity and diversity. Water quality should be maintained at the highest possible levels.

Protect Natural Forested Areas from Commercial Harvest

Forests are complex cycles of change and renewal. Trees, plant life, wildlife, insects, soil, water, atmosphere, and all the microscopic organisms of the forest ecosystem create a self-perpetuating, interdependent system of life. Affect one element and every other element in the chain – no matter how tiny or seemingly insignificant – is affected. It is a goal of this Plan to protect redwood trees and other forest resources from commercial harvest. Trees will not be felled, except to the extent determined necessary or desirable for public safety or for the health of the forest rather than a timber production forest.

Allow for Other Sustainable Economic Uses of the Land

To be sustainable, land use and recreation management goals will have to balance the maintenance of natural and cultural resources, accommodate existing uses, and promote appropriate of public access and recreation. It is a goal of this Plan to use any monetary compensation resulting from the commercial uses of the Property to meet obligations associated with operations and management of the Property, for endowment and/or funding of Property management, or for measures to maximize the public enjoyment of or the preservation and enhancement of the Property's natural and cultural resource values.

Use Adaptive Management as a Tool to Achieve Sound Long-term Stewardship of the Property

It is a goal of this Plan to achieve sound long-term stewardship of the Property through cost-effective, adaptive management (i.e., management designed to evolve over time in response to changing conditions assessed periodically by the land stewards).

Purpose and Need

The Purpose and Need are derived from three sources – the Vision Statement developed by the Coast Dairies Steering Committee; the *Assignment of Stock Options, Escrow Account and Stock Option Deposit,* developed as part of the real estate transaction between the Save-the-Redwoods League and the Trust for Public Land in March 1998; and discussions between funders and the Trust for Public Land.

Purpose of the Coast Dairies Plan

The purpose of the Coast Dairies Plan is to assess the value of natural, cultural, and social resource attributes and develop sustainable management strategies that can be implemented by the Department and BLM to balance and protect those values.

The specific purpose of the Coast Dairies Plan is to provide direction and guidance on how best to manage natural and physical resources, visitor use, development and use of lands and facilities, and resource protection of the Property. This Plan will serve as a State Park General Plan and as a BLM Resource Management Plan Amendment. Once completed, the Coast Dairies Plan will be used as a template against which future project implementation plans are reviewed to determine whether such projects will protect and enhance the values of the Property. As a result, the Coast Dairies Plan will provide general direction and guidance for future management decisions; it does not address the specific details of future projects.

Need for the Coast Dairies Plan

Once the Property has been transferred to the Department and BLM, the agencies will develop a comprehensive management plan for portions of the Property under their jurisdiction. The Coast Dairies Plan will serve as a:

- BLM Resource Management Plan Amendment[1] to the Hollister Resource Management Plan in accordance with the Federal Lands Policy Management Act; and
- State Park General Plan[2] in accordance with California Public Resources Code Section 5002.2.

Planning Overview

The Coast Dairies Plan was developed following a three-phased process: inventory, analysis, and planning. The Coast Dairies Existing Conditions Report represents the first phase and is summarized in Chapter III; the second phase, the Opportunities and Constraints Analysis, is described in Chapter IV. The Coast Dairies Plan provides a vision for the Property and represents the third phase of this process. This process was greatly benefited by input from both an active Steering Committee and Community Advisory Group (CAG). The Steering Committee met monthly for five years and the CAG attended over a dozen public meetings and commented extensively on work products during each of the three phases mentioned above.

Although broad in scope, the Coast Dairies Plan is intended to guide the long-term management of the Property by BLM and the Department. It is a general planning document that provides an ultimate purpose and vision for management of the Property, rather than specific proposals. Implementation plans, which will eventually tier off of this Plan, will focus on how to implement an activity or project needed to achieve a long-term goal. Implementation plans may direct specific projects as well as ongoing management activities or programs. Implementation plans affecting the Property would be consistent with the policies set by this Plan. The Coast Dairies Plan, and future specific projects or implementation plans, will need to comply with the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA) as well as all other applicable laws and statues, which could require additional environmental and other site studies to assess the potential impacts of future proposals.

Planning Hierarchy

The Coast Dairies Plan will not exist in a vacuum – it is one of many documents that together form a management framework for the Property. Appendix A describes the role of the Coast Dairies Plan within the existing regional planning framework and its relationship to other plans and legislation.

Agency Review and Approvals

Table I-1 identifies agency anticipated review and approvals necessary for full implementation of the Coast Dairies Plan. Additional detail is provided in Appendix A.

TABLE I-1: AGENCY REVIEW AND APPROVALS FOR THE COAST DAIRIES PLAN

Agency	Required Approval
Bureau of Land Management	Record of Decision/Determination of Coastal Act Consistency
California Department of Parks and Recreation	Notice of Determination
California Coastal Commission	Consistency Determinations
County of Santa Cruz	Coastal development permits

1 Public lands managed by BLM are governed by Land Use Plans. Current land use planning regulations require the development of Resource Management Plans (RMPs). Older BLM management plans, developed under earlier regulations, were called Management Framework Plans (MFPs). The BLM's Hollister Resource Area, which includes the Coast Dairies property, adopted an RMP in 1984. Until the RMP is amended through the Coast Dairies Plan approval process, guidance for management will come from the existing RMP. All BLM actions must be consistent with adopted RMP and Amendments.

2 The general plan is the primary management document for a unit of the State Park System, establishing its purpose and a management direction for the future by providing a defined framework for a unit's development, ongoing management, and public use. Thereafter, this framework assists in guiding daily decision-making and serves as the basis for developing more detailed management and site-specific project plans.

Planning Issues

The following issues were developed from concerns raised during the public scoping process, by the CAG, and by the Steering Committee.

Natural Resources

Streams, Fisheries, and Riparian Resources

There are six creeks or streams located on the Property, from Molino Creek along the northwest edge of the Property, to Laguna Creek on the southeast boundary (Scott Creek, is adjacent to the Property north of Molino and some of the Scott Creek watershed is within Coast Dairies). These creeks and streams are the most vulnerable habitats on the Property. Their watersheds provide important habitat for anadromous, freshwater, and estuarine fish species and amphibians. Fish found in these creeks include at least three special-status species – steelhead, coho, and tidewater goby. Although degradation of fish habitat on the Property from various land uses and activities has been substantial, significant habitat quality remains and the potential for stream and riparian restoration is high.

Wetlands and Water-Associated Habitats

There are an estimated 100 acres of wetland or water-associated habitats found on the Property. Significant wetlands are located at the mouth of Laguna and Scott Creeks (Scott Creek wetlands are north of the Property). These wetlands include a mosaic of emergent wetland plants interspersed with open water areas.

Natural Communities and Special-Status Species

Wildlife and plant communities found on the Property are diverse. Plant communities include oak woodlands, second-growth redwood forest, mixed forest, riparian corridors, wetlands, annual grasslands, coastal terrace prairie, and coastal scrub. The Property includes at least six sensitive plant associations and provides habitat for numerous plant and wildlife species of concern. Among many other species, American badger, big-eared bat, snowy plover, brown pelican, steelhead, coho, tidewater goby, red-legged frog, and southwestern pond turtle have been reported on the Property.

Exotic Species

The introduction of non-native species can threaten the viability of native species, particularly rare, threatened, and endangered species. Examples in some areas include non-native wild pigs and the introduction of French broom and pampas grass in areas of native plant habitats. At Coast Dairies, the relative absence of bullfrogs at the present time probably contributes to healthy red-legged frog populations.

Beaches and Coastal Resources

The Property includes seven miles of beach and coastal frontage.[3]. Despite steady visitation and use, these beaches remain in a natural condition and retain significant habitat features. Several of the major beaches include coastal wetland complexes, cliffs and ledges, and seeps, intermixed with intertidal rocks and tidepools.

Grassland and Grazing Management

An estimated 1320 acres of scrub, grasslands, and forested areas are leased for grazing for the purposes of managing the coastal habitat. Cattle are seasonally stocked at relatively low densities, except near San Vicente Creek. Cattle were moved out of the canyon surrounding this creek in 2002 to aid in protecting sensitive habitats.

[3] Major beaches within the Property include the southern portion of Scott Creek Beach, Davenport Landing Beach (facilities at this beach managed by the County), Davenport Beach (accessed through RMC property), Sharktooth Beach, Bonny Doon Beach, Yellowbank Beach, and Laguna Creek Beach. There is confusion regarding the names of several of these beaches: both Sharktooth and Yellowbank beaches are sometimes referred to as Panther Beach; Sharktooth is also sometimes called Davenport Cove, Cabbage or Sawtooth. This document uses the most commonly used names for these beaches.

Cultural Resources

Archeological Sites

As home to Native Americans for thousands of years, the Property is likely rich with archeological sites, both historic and prehistoric. Prehistoric sites are important for their research value and as a tangible link to the heritage of culturally associated Native Americans. Historic sites can provide information important to understanding past land use and management.

Historic Structures and Cultural Landscapes

Historically significant structures and landscapes exist on the Property. Some cultural landscape features that date from historic times represent homesteading and early tourism.

Visitor Experience

Recreation

Recreation potential for the Property is vast – from passive and quiet solitude to active recreation and group activities. The type, amount, and compatibility of different recreation activities are foremost concerns of the Coast Dairies Plan.

Trails

Trails provide visitor access to and through the Property. "Volunteer," or informal, trails have developed between Highway 1 and the shoreline. Trails throughout the remainder of the Property are scarce and provide no regional connections.

Views

The Property offers panoramic views of the coast and surrounding landscape. Although much of the Property contains significant vistas, these areas are not readily accessible by the general public.

Health and Safety

The Department and BLM strive to protect visitors from natural hazards while maintaining opportunities for high-quality visitor experiences. Health and safety measures should be designed in such a way as to neither restrict natural processes nor impose on the natural setting.

Land Use, Land Development, and Facilities

Agricultural and Associated Housing

Approximately 700 acres along the lower marine terraces and coastal bluffs are or have been planted in row crops, primarily artichokes and Brussels sprouts. These crops thrive in the foggy climate. A small percentage of this acreage is devoted to organic production. Water from local streams has been diverted for irrigation. Ancillary structures include farm buildings, stock ponds, and irrigation reservoirs. There are several farm-labor residences located throughout the Property that are owned and managed by Property farming tenants.

Mining

Approximately 780 acres of Coast Dairies land is leased long-term to RMC Pacific Materials (formerly Lone Star) for shale quarrying and cement operations. RMC Pacific Materials also owns 9,000 acres adjacent to the Property where it conducts quarry operations and timber harvest.

Aquaculture

Approximately four acres of land is currently leased for abalone aquaculture at Davenport Landing. Other potential aquaculture resources include mussels.

Logging

The Property has a long history of logging. Second-growth redwood and other soft and hardwood species abound on the Property, and adjacent lands are currently being logged.

Town of Davenport

The small, unincorporated town of Davenport is nestled within the center of the Property, northeast of Highway 1 and eight miles north of the city of Santa Cruz. Davenport residents have expressed concerns regarding impacts to the community from changes on the Coast Dairies Property.

Transportation

The primary roads serving the Property and surrounding areas include Highway 1 and Bonny Doon Road, both of which are paved, two-lane roads. Highway 1 bisects the Property along the coastline while Bonny Doon Road crosses the Property perpendicular to the coast. The California Department of Transportation (Caltrans) right-of-way for Highway 1 varies from 100 to 300 feet in width. Secondary public roads serving the Property include Davenport Landing Road, Swanton Road, Old Coast Road, Laguna Road, and San Vicente Road. County bus lines serve Davenport at Highway 1. Access to the interior of the Property is provided over numerous graded dirt roads, most of which are secured by locked gates at public road frontages.

A Union Pacific Railroad line extends from Santa Cruz, running parallel with Highway 1, and terminates at the RMC plant in Davenport. This line presently carries only local freight and runs approximately three times per week. The railroad right-of-way varies from 60 to 240 feet in width.

Public Access and Parking

Bonny Doon Beach is served by a Caltrans parking lot and beach access improvement completed in August 1997. Additional public access and parking is provided at Davenport Landing. The road frontages along Highway 1 serve as informal parking areas that access volunteer footpaths to the shoreline. Much of the inland highway frontage has been secured by livestock fencing and is not typically accessed by the general public.

Other Issues: Planning Processes, Management, and Operations

Private Property

There are private parcels adjacent to and within the Property boundary. Coordination and communication can reduce or avoid potential conflicts with private owners.

Coordination with Other Plans and Regulations

The Coast Dairies Plan exists within a complex framework of federal, state, regional, and local plans and regulations. Examples of other plans of particular importance are the County of Santa Cruz General Plan and the Local Coastal Program.

Public Involvement

Comments and participation of the general public, local communities, stakeholders, and others are important in the formulation and refinement of this Plan. Cooperative, collaborative relationships with these parties will help ensure the protection and enhancement of the Property.

Land Transfer and Plan Implementation Stages

Land Transfer

The Department and BLM intend to manage the approximately 7,000-acre Property following the Seamless Management Principle described herein. However, to facilitate the real estate transfer, the Property will be divided and conveyed separately to the agencies (and Agri-Culture, a non-profit agency closely affiliated with the Santa Cruz Farm Bureau). At the agencies' request, the Property coastside of Highway 1 (and the area surrounding the Laguna Inn) will be

transferred to the Department, and most of the portion of the Property inland of Highway 1 will be transferred to BLM. Agri-Culture will acquire and manage the agricultural land inland of Highway One. (TPL selected Agri-Culture after BLM announced in the summer of 2003 that it could not acquire the inland agricultural land because managing row crop agriculture was not consistent with its agency mission.) The Department will manage agricultural leases on the coastal side of the Property. BLM will regulate mining, oversee grazing, and provide some control of invasive weeds and feral pigs. It will also offer the Department scientific and other support and, if possible, will recruit volunteers to conduct tours and assist with research.

Plan Implementation Stages

This Plan describes both the fully funded management of the land and immediate and interim use strategies. The immediate use stage will detail an access plan that will take affect upon conveyance. This access plan will include continued beach use, a coastal trail if funding is available, and public use of some farm roads. The immediate access plan will also describe required management actions given this kind of use. These actions will include consultation with federal and state agencies to comply with the endangered species acts and other environmental laws and recommendations for additional adaptive management protocols that would be implemented as the agencies' budgets are increased in the future. The Trust for Public Land will complete the Plan before the Property is transferred to the Department and BLM.

Activities described under the Plan will receive the appropriate environmental review (including associated public involvement requirements) for implementation of projects and adoption of subsequent detailed plans (i.e., NEPA review for projects only on federal lands; CEQA review for projects only on state lands; and joint CEQA/NEPA documents under a combined review process for projects on both state and federal lands.

PROJECT HISTORY

Project History

Property History and Purpose Acquired

In the 1860s, two intermarried Swiss families, the Respinis and the Morettis, formed the Coast Dairies & Land Company (CDLC) and acquired in its name the lands of two entire Spanish grants, from Scott Creek in the north to Laguna Creek in the south. The Swiss dairymen put cows on the hillside pasturelands and coastal terraces. In 1906, a large cement plant was built at Davenport, drawing hundreds of Italian immigrants to work there; the enterprise survives today as the RMC Pacific Materials cement plant. By the 1920s, the families that owned the CDLC had moved back to Switzerland – they and their heirs continued to lease land to local farmers and dairy operators employing a series of local land managers. By mid-century, better refrigeration and transportation gave dairies east of the mountains competitive advantages, and the coastside dairies closed. In the 1950s, except for the cement plant and a few leased artichoke and Brussels sprouts fields, the stretch of coast from Santa Cruz to Half Moon Bay was more or less as it had been in the 19th century – in some ways even less settled, populated, and exploited.

But California was growing rapidly, and in the 1960s Santa Cruz was poised to expand north toward Davenport. The absentee landlords were two generations removed from the coast, and selling to a developer was tempting. In the 1970s, Pacific Gas & Electric Company held an option on the Property with a view to building a nuclear power plant, until the likelihood of a major earthquake eliminated the site from further consideration. In 1993, the California Coastal Conservancy secured an option on the Property, but when a 1994 statewide parks bond measure failed to pass, the Property went back on the market.

Given the long list of parkland purchases awaiting funding, the likelihood was dwindling that any public institution would be able to step forward to protect the land. Federal spending from the Land and Water Conservation Fund to buy parkland and wildlife habitat had dropped nearly 70 percent since 1980. In the same period, state funding for park expansion fell about 90 percent. In 1996, a developer held an option on the Property with a plan to develop it as 139 separate parcels.

In 1998, the Save-the-Redwoods League, in cooperation with several public and private partners, including the David and Lucile Packard Foundation, the Trust for Public Land (TPL), the Land Trust of Santa Cruz, and the California Coastal Conservancy, halted the threat of development by negotiating a purchase of the development company's stock option in the corporation. The Save-the-Redwoods League then assigned its right to purchase the option to the TPL. The TPL exercised its option in October 1998, pursuant to a stock option agreement entitled *Assignment of Stock Option, Escrow Account and Stock Option Deposit,* purchasing the CDLC and its Coast Dairies Property. At the time of its acquisition, the Property was one of the three largest privately held tracts of land remaining in single ownership along coastal California between San Francisco Bay and the Mexican border. Property acquisition provided an unparalleled opportunity to undertake actions to ensure the preservation of the Property's signature attributes in perpetuity.

During the process of purchasing the CDLC, the TPL issued a request for proposals to locate an entity to receive the fee ownership of, and assume the long-term management and stewardship responsibilities for, the Property. Based on proposals received, two agencies, the California Department of Parks and Recreation (Department) and the U.S. Department of the Interior, Bureau of Land Management (BLM), were chosen for ultimate ownership and joint long-term stewardship of the Property.

This *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan) was developed under the auspices of the Coast Dairies Steering Committee and a Memorandum of Understanding (August 8, 2000) between the Department, BLM, and TPL. Development of the Plan has been conducted in consultation with federal, state, and local governments and the interested public. The Steering Committee includes representatives of BLM, the Department, TPL, Save-the-Redwoods League, Land Trust of Santa Cruz County, and California Coastal Conservancy.

EXISTING CONDITIONS

Existing Conditions

Overview

As of August 31, 1998, the Coast Dairies Property (Property) was an estate with title vested in the Coast Dairies and Land Company, Inc. (CDLC), also shown on record as Coast Dairies & Land Co., Inc., a Corporation. The most recent title report was prepared by First American Title Insurance Company, 330 Soquel Avenue, Santa Cruz, CA 95062 and issued on September 16, 1998.

The Property is situated in the state of California, in an unincorporated area of Santa Cruz (approximately six miles north of the city of Santa Cruz), and on the coast between Laguna Creek at its southern boundary and Scotts Creek at its northern boundary. The Property extends inland approximately three miles and contains nearly 7,000 acres. It is bisected by two public roads: Highway 1 along the coast and Bonny Doon Road inland. The Property is subject to multiple lease agreements, varying in size from less than an acre to nearly 1,000 acres (RMC Pacific Materials), and several dozen easements and agreements.

The Coast Dairies Property includes multiple distinct watersheds, biological and cultural resources of statewide importance, and prime beachfront. The Property has a long history of farming and mining that supports agricultural traditions as well as community economic stability. The management recommendations presented in the *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan) are fully supported by information collected in the Existing Conditions Report (ECR) (ESA, 2001). The ECR is referenced in this chapter and included in this Plan, both by reference and by its attachment directly to the document in compact disk (CD) format. This chapter presents a summary of the ECR findings, updating information where necessary.

Biological Resources

Regional and Project Setting

The Santa Cruz coastal region has a Mediterranean climate and is a mosaic of native and exotic grasslands, upland scrubs, wetland communities, riparian scrubs and forests, and upland oak, mixed evergreen, and redwood forests. According to the "bioregional" characterizations developed as part of California's Agreement on Biological Diversity (a multiagency memorandum signed in 1993), the area is near the regional separation between the Bay Area–Delta and South–Central Coast Bioregions, which positions Santa Cruz County within the range of species specific to both bioregions. In addition, the coastal mountains partially confine the area, resulting in a high level of biodiversity.

There are six perennial streams on the Coast Dairies Property: Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. A small portion of Scotts Creek flows near the northern boundary of the Property. The watersheds of several of these streams are entirely or almost entirely on the Property. The larger streams, Laguna Creek and San Vicente Creek, however, have watershed areas that extend well beyond the Property boundary.

The watersheds of the Santa Cruz County coast originate in the Santa Cruz Mountains, which are located relatively close to the Pacific Ocean. As such, the streams of this area typically drain small watersheds and, because of their relatively short length, are referred to as "short-run streams." The San Vicente Creek watershed, for example, has a total area of only about 11 square miles and main stem length of approximately 9 miles (CDFG, 1998). The small size of the watersheds concentrates aquatic habitat in the same way it does terrestrial habitat.

Botanical and Wetland Resources

Vegetation

The Property currently supports 19 distinct native vegetation communities and four communities dominated by introduced non-native species (Figure III-1).[1] These include: two dune communities (active coastal dunes and northern foredune); two grassland communities (California annual grassland series and purple needlegrass series); four scrub and chaparral communities (central dune scrub, California sagebrush series, blue blossum series, and coyote brush series); six upland woodlands and forests (coast live oak woodland, mixed evergreen forest, mixed conifer series, knobcone pine series, redwood series, and eucalyptus/Monterey cypress forest); three riparian communities (coast live oak riparian series, arroyo willow series, and red alder series); and two seep and marsh communities. These plant communities vary in terms of diversity.[2]

Vegetation Condition

While the Coast Dairies Property supports a number of native vegetation communities, many, if not all, have been affected by the wide variety of uses the land has seen over the past 200 years. For example, the coastal terrace prairies, comprising a diversity of perennial bunchgrasses and wildflowers and historically covering much of the landscape, have been virtually eliminated by agriculture and grazing and replaced by low-diversity, non-native grasslands and crops. Fire exclusion during the last 100 years has resulted in shrub encroachment on grasslands, imbalances in species composition, and fuel loading in the shrub and forest plant communities. The old-growth redwood forest that once grew in the upper watersheds of the Property was clear-cut. The forest regenerated from old-growth stumps, but is not yet mature enough to exhibit the old-growth characteristics important to such species as the endangered marbled murrelet. Overall, past land uses have had a profound influence on the distribution, extent, and diversity of native vegetation on the Property.

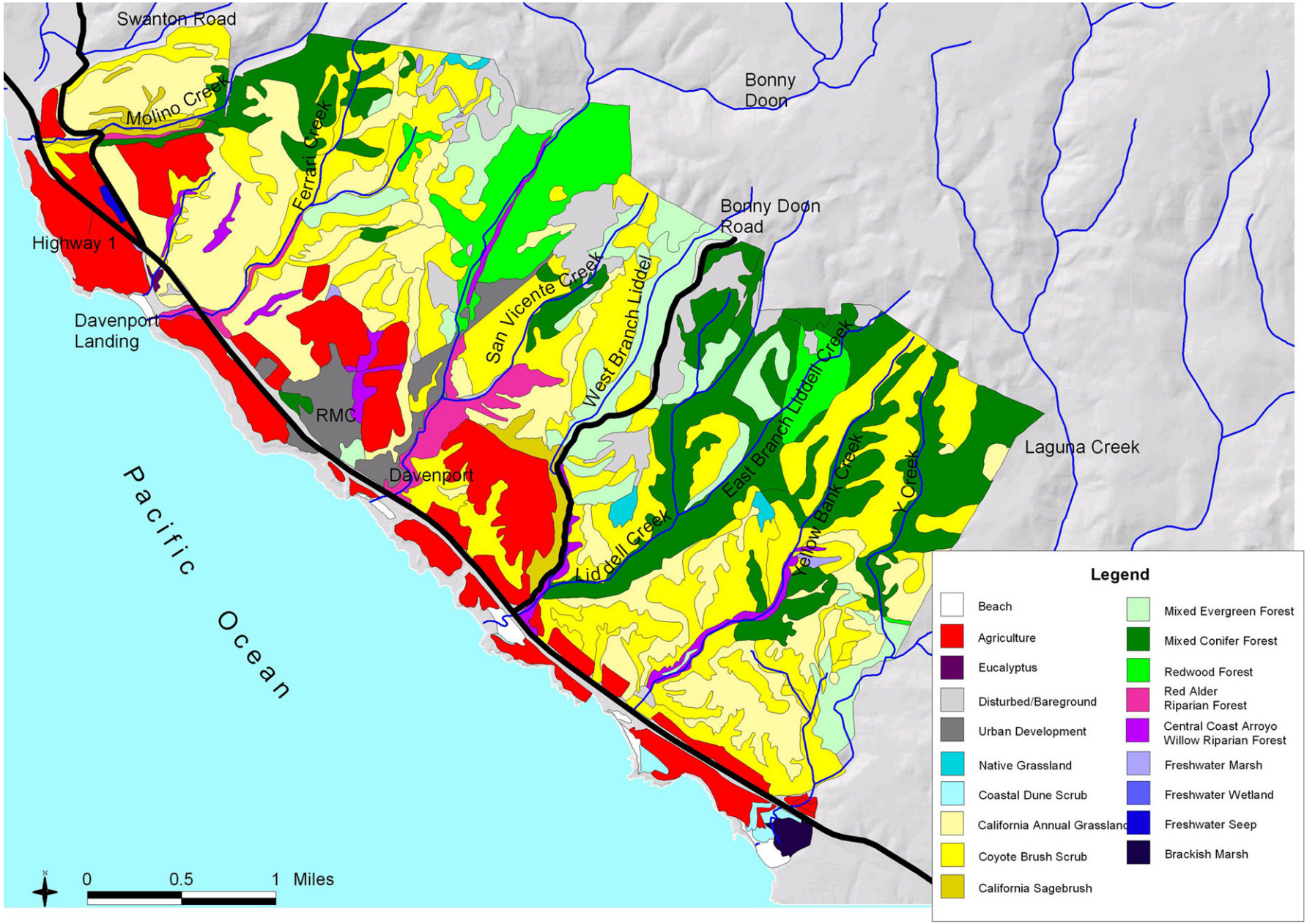
Non-native and invasive plants of concern on the Property include French broom (*Cytisus monspessulanus*), pampas grass (*Cortaderia jubata*), purple star thistle (*Centaurea melitensis*), yellow star thistle (*Centaurea solstitialis*), cape ivy (*Delairea odorata*), hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*). Infestations of broom and pampas grass are centered around areas of mining activity, while populations of star thistle are commonly associated with agricultural or grazing lands.

Even though native species diversity has been reduced, the Property still supports a number of plant communities considered unique or unusual (ECR, Table 3.1-1). Some are relatively intact, meaning that most, if not all, characteristic species are still present. Others, although still readily identifiable, are missing many of their typical components.

Several significant vegetation communities, including northern coastal salt marsh (Holland, 1986), ponderosa pine series, Monterey pine forest, northern coastal salt marsh (Holland, 1986), and northern interior cypress forest (Holland, 1986), are documented as occurring within the vicinity of the Property (CDFG, 2000). None of these plant communities have been observed on Coast Dairies, although individuals belonging to the dominant species comprising them do occur. A number of other sensitive plant communities are present, including California sagebrush series, blue blossum series, arroyo willow series, coast live oak series (riparian and upland), central dune

[1] Natural communities are recurrent combinations of species that reflect parallel responses to similar combinations of environmental conditions and are not dependent on human intervention. For this discussion, native vegetation pertains to those species present in California prior to colonization by Europeans, while species such as wild oats and brome grasses, which dominate much of the current California landscape, are considered naturalized. Vegetation communities that are dependent on human intervention (i.e., sowing seeds, planting saplings, irrigation) such as irrigated agriculture or landscaping are considered introduced (non-natural) communities.

[2] The term ”diversity” is defined as the total number of plant species and their relative abundance within a community type.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-1
Vegetation Communities
on the Coast Dairies Property

scrub, coast live oak series, freshwater seep, northern foredune, purple needlegrass series, red alder series, and redwood series. Sensitive plant communities with occurrences are listed in the ECR, Table 3.1-1.

Special Status Plant Species

As discussed below, a number of species known to occur on or in the vicinity of the Coast Dairies Property are accorded "special status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some species are formally listed and receive specific protection defined in federal or state endangered species legislation. Other species have no formal listing status as threatened or endangered, but are designated as "rare" or "sensitive." These designations are made on the basis of policies adopted by federal or state resource agencies, or by local governmental agencies to meet local conservation objectives, or by organizations with acknowledged expertise, such as the California Native Plant Society (CNPS). These species are referred to collectively as "special-status species" in this Plan, following a convention that has developed in practice but has no official sanction. BLM policy requires that "special status" or "sensitive" species receive the same level of protection and consideration afforded species listed as threatened or endangered, except that formal consultation with the U.S. Fish & Wildlife Service is not required.

To date, six nonlisted special-status species have been found during surveys conducted on the Property for this Plan and by previous investigators (ECR, Table 3.1-2). Santa Cruz clover (*Trifolium buckwestiorum*) is a CNPS List 1B species; California bottlebrush grass (*Elymus californicus*) and Santa Cruz Island oak (*Quercus parvula* var. *parvula*) are CNPS List 4 species; and common muilla (*Muilla maritima*), Gray's clover (*Trifolium barbigerum* var. *andrewsii*), and Michael's rein orchid (*Piperia michaelii*) are designated as locally rare.

Federal and State Listed Species

Based on an examination of general distribution and habitat requirements, as well as an assessment of available habitat on the Property, the following species were determined to have moderate or high potential for occurrence on the Property and are therefore presumed present until further survey results prove otherwise.

- Monterey spineflower (*Chorizanthe pungens* var. *pungens*)
- Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)
- Robust spineflower (*Chorizanthe robusta* var. *robusta*)
- Santa Cruz tarplant (*Holocarpha macradenia*)
- San Francisco popcorn flower (*Plagiobothrys diffusus*)
- Hickman's potentilla (*Potentilla hickmanii*)

Coast Dairies Wetlands

Specific wetland classes identified on the Property include riverine (rivers, creeks, and streams), palustrine (shallow ponds, marshes, swamps, sloughs), and lacustrine (lakes and deep ponds).

Wetlands within the Coast Dairies Property are most commonly riparian in nature and include aquatic, riparian, meadow, and floodplain communities. The riparian zone is the plant community adjacent to a river or stream channel and serves as the interface between the river and the surrounding prairies, floodplain, and upland plant communities. It may be best described as the zone of direct interaction between land and water. Riparian areas are characterized by a combination of high species diversity, density, and productivity. Riparian communities are among the most impacted on the Property due to the effects of logging and stream diversion. These effects include trampling, and placement of above- and below-ground infrastructure, including conveyor belts, dams, bridges, and pipelines.

The following Cowardin (1979) classifications were used to group streams on the Property.

- *Riverine upper perennial*. Six major creeks (Scotts Creek [a small portion], Molino Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek;
- *Palustrine forest*. The riparian forest habitats along most of the major creeks and their tributaries subject to various flooding regimes; and
- *Palustrine scrub shrub*. Riparian scrub (e.g., willow) habitat along the lower reaches of five major creeks (San Vicente Creek, Ferrari Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek) and their tributaries subject to various flooding regimes.

In addition, the two palustrine emergent types described below have slightly different ecological functions and a less direct connection to streams.

Seasonal freshwater seeps (freshwater seep [Holland, 1986]) are commonly found in grasslands at the heads of major creeks and tributaries. ECR Figure 3.1-1 depicts freshwater seeps that were observed on the Property. Freshwater seeps form on soil surfaces underlain by Santa Cruz Mudstone (the most abundant geologic type underlying the Coast Dairies Property [ECR, Section 4.2]), Santa Margarita Sandstone, and Lompico Sandstone. These are areas where water is present at or near the ground surface due to relatively permeable, poorly cemented, and friable sandstone formations. The presence of these soils indicates numerous freshwater seeps are likely present on the Property. The two largest areas of observed seepage occur in the Molino Creek watershed near the Warnella Road Extension, and in the Yellow Bank Creek watershed near Liddell Pipeline Road.

Secondly, coastal brackish marsh as defined by Holland (1986) lies at the mouth of Laguna Creek. This marsh primarily supports California bulrush and sedges. Salinity levels may increase at high tide or during periods of low freshwater input from Laguna Creek.

Terrestrial Wildlife Resources

When terrestrial and aquatic biologists fanned out across Coast Dairies in 2000, their assignment began with general observations and moved to the specific. The specific information is provided below, but it does not entirely capture the value of the land as a whole. Reviewing the "Survey Summary Forms" submitted daily by the team members, a picture emerges that is greater than the sum of its parts. It was not uncommon for observations of gray whales, sea otters, pigeon guillemots, peregrine falcons and snowy plovers to occur on the same afternoon, sightings of 20 red-tailed hawks in a few hours. Field-note comments such as "excellent red-legged frog breeding pond!" were proven correct by later in-depths surveys. Raccons, deer, herons, thrushes, multiple shorebird and waterfowl species shared the pages of these notes with records of evidence of trespass and erosion. In sum, Coast Dairies promise as a center for coastal biodiversity far outweighs the problems, and strongly influenced the planning direction described in subsequent chapters of this Plan.

Overview of Habitats

Wildlife habitats are not as delineated as vegetation communities, which are characterized by certain plant species adapted to specific environmental conditions. Wildlife habitats are areas where organisms live, and comprise various vegetative communities that support different life-cycle needs, such as foraging areas, nesting areas, and shelter from predators. High-quality wildlife habitat on the Coast Dairies Property is present in all of those areas not directly affected by agriculture and structures – and even these areas can be important to certain species, as noted below.

Although the habitat for birds and mammals on the Property has been strongly influenced by the history of resource use and extraction (ECR, Section 1.0), intact habitats are present in all of the vegetative communities, especially the riparian areas. Coast Dairies wildlife habitats are categorized according to the California Department of Fish and Game (CDFG) Wildlife Habitat Relationships System (Zeiner et al., 1988; Mayer and Laudenslayer, 1988).

Given definitions described in the 1972 Coastal Zone Management Act, the Coast Dairies Property ends at the mean high water line. However, actions taken under the Plan may affect oceanic resources.

Special-Status Species

A list (ECR, Table 3.2-2) of special-status animal species reported to occur within the vicinity of the Property was compiled on the basis of data in the California Natural Diversity Data Base (CNDDB) (CDFG, 2000), review of biological literature of the region, and consultation with local experts (ECR, Section 3.2.7.2). The list is intended to be comprehensive and will be used as the basis for identifying impacts and mitigation during the environmental analysis phase of Plan development. At that time, special-status animal species that typically occur within habitats present on the Property but not specifically identified during surveys will require further inventory.

Special-Status Species Known to be Present

Figure III-2 displays the special-status wildlife locations documented during the ECR data collection process. Others may occur (ECR, Table 3.2-5) and many species of local interest have been reported as anecdotal observations (e.g., white-throated swifts [*Aeronautes saxatalis*] in the San Vicente Railroad cut). More detailed discussion of the most significant of these species and groups of species is provided below.

Snowy Plover

The snowy plover (*Charadrius alexandrinus nivosus*) was listed as threatened in 1993, primarily because of poor reproductive success resulting from human disturbance and predation, combined with permanent or long-term loss of nesting habitat to urban development.

Shortly after the Property came under the interim management of the Trust for Public Land (TPL), the Pacific Coast population of the western snowy plover received the additional protection of a critical habitat designation (Federal Register, 1999).[3] Two areas important to snowy plover were identified on or adjacent to Coast Dairies: Scotts Creek Beach, northwest from the 60-foot contour line of the south end (straddling the Property boundary), and Laguna Creek Beach, essentially the entirety of the beach below the 20-foot contour (USGS, 1981). Both sites were occupied by breeding plovers during the preparation of the Plan.

California Red-Legged Frog

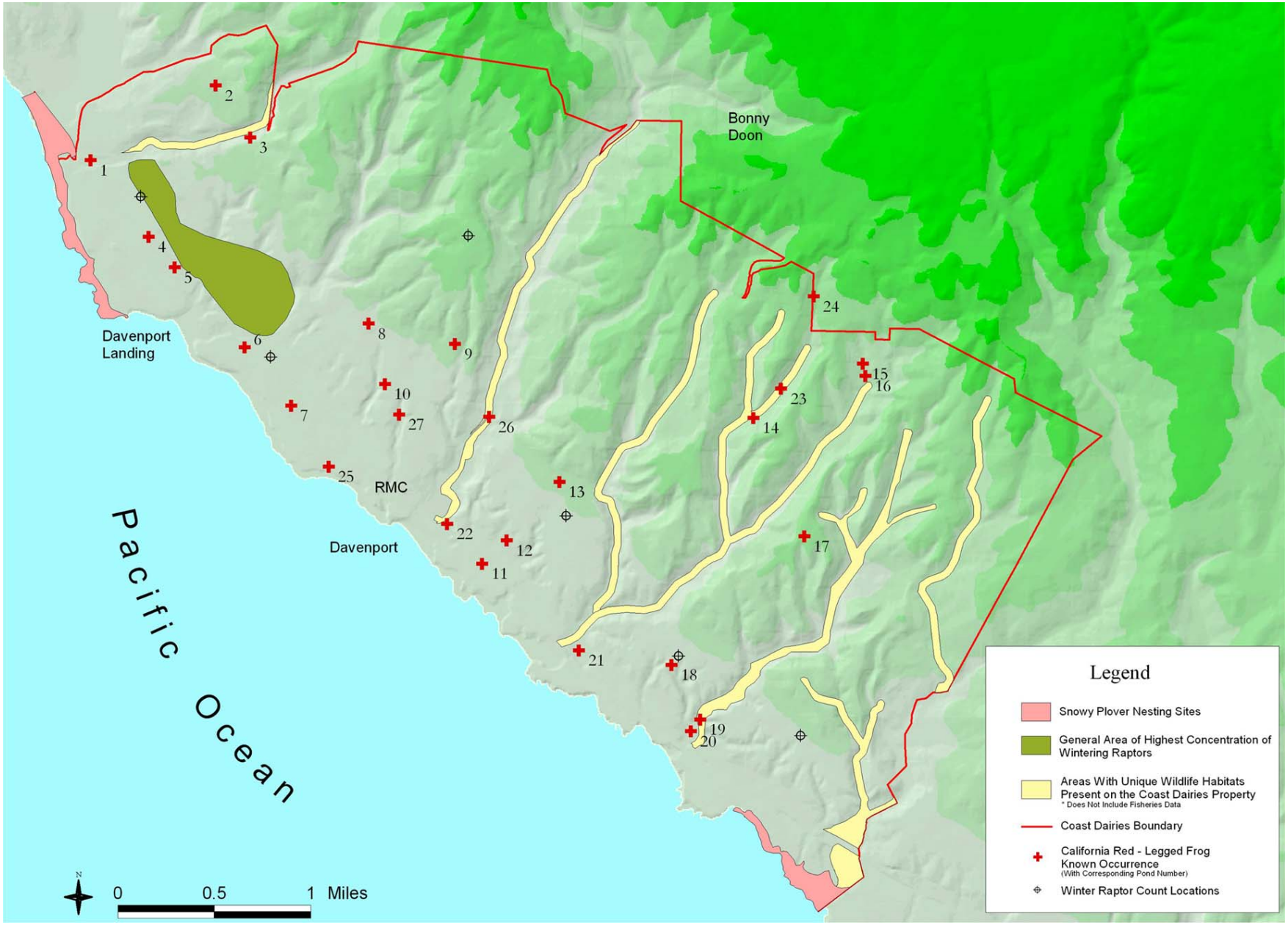
The California red-legged frog (*Rana aurora draytonii*) is federally listed as threatened.

Critical habitat was also designated by the U.S. Fish and Wildlife Service (USFWS) for the red-legged frog (Federal Register, 2001). However, it was withdrawn on July 2, 2002, reinstated on July 24, and again withdrawn on November 9. The official timetable for redrawing critical habitat boundaries requires the USFWS to act by 2005.

Using the first designation, the nearest unit mapped as critical habitat for red-legged frog is Unit 14, the San Mateo–Northern Santa Cruz Unit. Unit 14 consists of coastal watersheds within San Mateo County and northern Santa Cruz County that drain into the Pacific Ocean, and reaches to a point approximately 10 miles south of Point Año Nuevo. Unit 14 includes portions of the Property along the Scott's Creek watershed.

Adult and/or sub-adult red-legged frogs were observed at 20 ponds on Coast Dairies Property (ECR, Table 3.2-4 and Figure III-2). Six of these ponds (3, 4, 5, 9, 13, and 21) are agricultural ponds that are dependent upon water diversions to fill. Seven of the ponds (1, 8, 19, 20, 22, 26, and 27) are impoundments or diversions within creek

[3] Critical habitat is defined by the Endangered Species Act as "essential to the conservation of the species," and such a designation imposes extensive responsibilities on any federal agency (e.g., the U.S. Department of the Interior, Bureau of Land Management [BLM]) whose policies might affect this habitat.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-2
Special-Status Wildlife Locations
on the Coast Dairies Property

channels and fill naturally. One of the ponds (2) is an impounded spring and one of the ponds (10) is a seasonal wetland that forms near the Davenport cement plant. Three ponds (15, 16, and 23) are sediment basins at the Bonny Doon limestone quarry and are actively maintained as part of a habitat conservation plan (HCP). One of the sites (Pond 24) is a sediment basin at the limestone quarry that is being managed for red-legged frogs as part of the HCP. One of the sites (Pond 14) is a wetland mitigation area constructed by RMC Pacific Materials near the quarry.

Breeding by red-legged frogs was documented at 12 ponds, either by the presence of tadpoles (Ponds 2, 3, 5, 8–10, 14, 19, 21, and 24) or by the presence of calling adults (Pond 27). Surveyors (Biosearch Wildlife Surveys) suspected that breeding was successful at most of these ponds, although Pond 3 dried early in the season, and water diversions to Pond 23 were unreliable.

In summary, California red-legged frog is widely distributed on the Coast Dairies Property, particularly at the lower elevations, and is one of its most important and sensitive resources. Sites at which breeding was documented are found in all watersheds except Laguna Creek. Although not surveyed as part of this effort, all named creeks and many of their tributaries provide nonbreeding habitat.

It is important to note that no bullfrogs were observed on the Coast Dairies site. This non-native species has been implicated in the decline of red-legged frog throughout much of its range.

Peregrine Falcons and Other Raptors

Peregrines. *Falco peregrinus* were formerly federally listed as endangered. They were delisted in 1999 by the USFWS, but are still considered endangered by the State of California. Peregrines were observed twice during the 2000 ECR nest surveys. On May 22, 2000, a molting adult peregrine was observed (from Swanton Road) soaring over the coastal cliffs and sloping terrain east of Molino Creek. The second sighting was a sub-adult (one-year-old bird) observed soaring over the coastal cliffs north of Bonny Doon Beach.[4]

Other Special-Status Species Likely To Be Present

Table 3.2-5 in the ECR presents special-status species with *any* potential to occur on the Coast Dairies Property. The list below is more predictive, and the species should be presumed present.

- Rhinoceros auklet (*Cerorhinca monocerata*)
- Grasshopper sparrow (*Ammodramus savannarum*)
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)

Unique Habitats and Associations

A total of 405 individual observations of 10 species of raptors (nine diurnal, one nocturnal) were observed during seven surveys from December 5, 2000 to January 26, 2001. Red-tailed hawks (*Buteo jamaicensis*) were by far the most numerous raptor, with 313 counted. Red-tailed hawks were nearly 10 times more numerous that the next most abundant species, American kestrel (*Falco sparverius*), which totaled only 33. The total number of raptors counted per session for all six stations increased steadily from an initial low of 42 on December 18, 2000 to a high of 84 during the last count on January 26, 2001. The combined average count was 58 raptors per survey session. Since their distribution was not uniform throughout the Property, and the overall wintering raptor densities were extraordinarily high, the area with the densest concentration was designated a “unique habitat association.”

The areas of highest raptor use observed at Coast Dairies were the fields in the elevation transition zone from the interior boundary of the first coastal terrace to the second coastal terrace between Molino Creek and Warnella Road (ECR, Figure 3.2-1). Management of this area appears to have affected the vegetation and thus the raptor prey base

[4] Other raptors discussed below under Unique Habitats and Associations

and raptor use (e.g., recent cultivation adjacent to land that lay fallow In 2000 and contained tall, dense stands of herbaceous plant stalks). Raptors were clearly most abundant where ground had low, grassy cover. Many raptors were observed standing and foraging on the ground or perched on low fence posts. This behavior suggests that they were foraging on pocket gophers (*Thomomys bottae*).

Fishery Resources

Fisheries are clearly a preeminent concern on the Coast Dairies Property. Of the six perennial watersheds situated partially or entirely within Coast Dairies Property lines, San Vicente Creek is arguably the most significant in terms of fishery resources. San Vicente Creek not only supports a self-sustaining population of federally listed threatened steelhead (*Oncorhynchus mykiss*), but also contains one of the last remnant populations of the state-listed endangered coho salmon (*Oncorhynchus kisutch*) south of San Francisco Bay. Although degradation of fish habitat on the Property has been substantial, significant habitat quality remains, and the potential for stream and riparian restoration on these creeks is high.

Although anadromous (ocean-maturing) salmonids (salmon and steelhead) have been observed in only a few of the Coast Dairies streams during recent surveys, particularly San Vicente Creek and Liddell Creek, there is little doubt that historic populations were significantly larger than those recently reported, and that most, if not all, of the six streams historically supported salmonid populations. In accordance with the latter assumption, the ECR did not conduct any fish surveys to inventory species and population sizes, an exercise that not only unnecessarily stresses fish, but also provides little information about a stream's potential for supporting special-status and common fish. Instead, the ECR concentrated on determining the existing habitat suitability and diversity and identifying limiting factors that may prevent aquatic habitats from functioning.

Principle stream attributes are briefly described below. For purposes of this discussion, Ferrari Creek and Y Creek, normally considered part of the Molino and Laguna Creek watersheds, respectively, are treated separately. ECR Table 3.3-1 (Coast Dairies Stream Reach Characteristics) and Figure 3.3-1 provide more quantitative information and map stream reaches.

Molino Creek

Although the stream length and watershed size of Molino Creek are relatively small compared to other coastal streams in the region (e.g., Scotts Creek, San Vicente Creek), the stream does provide limited habitat for anadromous salmonids and does not appear to contain impassable barriers downstream of potential spawning and rearing sites. The primary limiting factor on Molino Creek may be natural – the small watershed area does not appear to produce sufficient storm runoff to maintain optimal water depths throughout the spring, even with the upstream on-channel reservoir being operated as a flow-through system.

Ferrari Creek

With respect to the geomorphologic and biotic conditions of the stream, Ferrari Creek appears to provide adequate habitat for a small salmonid population. The primary limiting factor on this creek is clearly the presence of difficult-to-pass and/or impassable man-made migration barriers. As is the case with Molino Creek, the small watershed size of Ferrari Creek may also limit water availability.

San Vicente Creek

San Vicente Creek is a relatively productive steelhead stream providing adequate spawning and rearing habitat for the species. A general lack of deep pools, which provide important coho rearing habitat as well as summer thermal refugia, was noted during the stream surveys and by previous researchers (McGinnis, 1991; CDFG, 1996). However, a large number of coho have recently been found in this stream (see below). The CDFG has funded recent efforts to increase both woody cover features and pool availability. The total stream length available to salmonids was significantly increased

through the removal of a concrete dam identified by McGinnis (1991). Further aspects of the stream that may create suboptimal salmonid conditions are the generally high levels of sand and silt, and potentially high stream temperatures due to limited channel shading, particularly in the lower reaches. The source of sedimentation was not identified, but old quarries located upstream of the Coast Dairies Property may contribute to the observed conditions.

Liddell Creek

All three branches of Liddell Creek are exposed to severe sedimentation due to the soil types in this watershed and ongoing mining operations (see Chapter V). This sedimentation appears to be the primary limiting factor in this watershed, although the dense canopy cover in this system has also been shown to limit primary production, and thus food supplies for fish (McGinnis, 1991). While dense canopy cover is a natural condition, the input of fine sediments undoubtedly reduces available spawning habitat.

Yellow Bank Creek

At the time of the ECR surveys, Yellow Bank Creek had no surface water connection to the ocean. The stream passes through two bore tunnels under the railroad tracks and Highway 1. At the location where the creek exits the downstream bore onto the beach, a 3-foot drop with a very shallow plunge pool may present a migration barrier during parts of the year. Upstream of the reservoir formed by Yellow Bank Dam, natural stream reaches provide both spawning and rearing habitat for salmonids.

Laguna Creek

No significant limiting factors were identified in the surveyed downstream portion of Laguna Creek. However, the City of Santa Cruz operates a diversion site permitted for unrestricted withdrawals upstream of the Property. According to the CDFG, the City diverts close to 100 percent of the headwater flows from Laguna Creek (Anderson, 2000, 2001), and the source of water flows observed on the Coast Dairies Property is believed to be entirely from tributaries such as Y Creek.

Y Creek

Y Creek, a tributary of Laguna Creek, is a relatively steep stream characterized by an abundance of cascades, boulders, and bedrock. Although there appears to be adequate habitat for a small steelhead population, all fish observations occurred near the creek's confluence with Laguna Creek. No significant limiting factors were identified.

Special-Status Fish Species

Coho Salmon

Coho salmon that are part of the central California coast Evolutionarily Significant Unit (ESU) of the species are federally listed as threatened and state-listed as endangered south of San Francisco Bay. Historically, coho were widespread, inhabiting most major river basins around the Pacific Rim, from central California to Korea and Japan. As with many species, coho salmon are most abundant in the central portion of their range and less common in the northern and southern fringes of their natural distribution (CDFG, 1998). California represents the southern margin of the species' natural distribution, and coastal streams of Santa Cruz County constitute the very southern extent of coho. Historically, coho salmon are believed to have used all or most of the accessible coastal streams along the San Mateo and Santa Cruz County coastline.[5] However, habitat destruction and degradation, as well as changes in oceanic conditions and increased pinniped predation, among other reasons, have brought coho salmon to the brink of extinction in this area (CDFG, 1998; Weitcamp et al., 1995). At present, natural and self-sustaining runs of coho south of

[5] In the spring of 2001, Dr. Kenneth Gobalet of California State University, Bakersfield wrote a brief, unpublished document discussing the absence of coho remains at archeological sites south of San Francisco. One of the sites (SCR-117: see ECR Section 5.6) was noted as containing steelhead but not coho. While emphasizing that "absence of evidence is not the evidence of absence," he stated that, "To this point the lack of data are consistent with the position that no coho or chinook salmon were prehistorically present in any streams south of San Francisco."

San Francisco Bay are believed to occur only in Gazos, Waddell, and Scotts Creeks (CDFG, 1998).

Coho spawning migrations from the ocean to freshwater streams or rivers usually begin after the first heavy rains in late fall or winter have opened sandbars (where present[6]) at the mouths of the creeks. The timing of their migration varies somewhat throughout their range, but in the short coastal streams of central California, coho typically return to fresh water from November through February. Females construct redds (spawning "nests") near the head of a riffle in substrate consisting of gravel and small cobble. Newly hatched fry (embryos) remain in the interstices of the gravel for approximately three weeks before emerging and schooling in still, shallow water along stream margins. As they grow (known as "parr" during the spring), juvenile coho disperse to pools where they set up individual territories. After spending the following summer, fall, and winter in the stream, the immature yearling coho begin to migrate downstream toward the ocean in spring. During this time, juveniles undergo smoltification, the process of adapting to the marine environment. After two years of growing and sexually maturing in the ocean, coho return to their natal streams as three-year-olds to begin the life cycle again.

Occurrence on the Coast Dairies Property. Adult coho salmon have occasionally been observed in San Vicente Creek, one of nine streams south of San Francisco Bay identified by CDFG as potentially instrumental in restoring the region's coho runs to a state of sustainable viability. The following coho occurrences, listed in chronological order, have been recorded during the past two decades:

- An unknown number of coho were observed in 1981 by Harvey & Stanley Associates (1982);
- Two migrating coho were observed in 1991 by McGinnis (1991); and
- CDFG found three juveniles in 1996, but observed none in 1997 (CDFG, 1998).

6 San Vicente Creek is the only coho stream south of San Francisco Bay that does not have a sandbar at its mouth. This is due to its redirection through a bedrock tunnel.

A major discovery of coho on Coast Dairies was made in the fall of 2002, when scores of salmon were observed in San Vicente Pond, an agricultural water feature. Withdrawals from this pond were halted upon this discovery, and ongoing restoration and management of this resource is occurring in consultation with resource agencies. The issue of agricultural water and salmonids became a major planning influence in the latter stages of Plan preparation, and it is worth noting that preliminary data suggest that agricultural ponds may provide *both* habitat benefit and substantial risk to salmon.

Regardless of whether or not coho salmon occur on any other Coast Dairies streams, the National Marine Fisheries Service (NMFS) designated critical habitat for central California coast coho salmon in 1999, and all Coast Dairies streams are included in this listing. The designation covers "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years)," as well as some major dams (Federal Register, 1999).

Steelhead

The central California coast steelhead ESU is federally listed as threatened and is a California species of concern.

The species *O. mykiss* exhibits varying degrees of anadromy. Nonanadromous forms of the species are usually known as rainbow trout, while the anadromous form is called steelhead. Although rainbow trout and steelhead have long been classified within the same species, the former is not protected by state or federal regulations. Distinguishing the two forms in the field is difficult at best, thus complicating the determination as to whether or not a listed species occurs within the stream where the observation is made. However, it is unusual for the two forms to co-occur in coastal watersheds, where they are typically separated by migration barriers (Busby et al., 1996). In cases where *O. mykiss* occur upstream of relatively recent barriers, such as the reservoir dams on some Coast Dairies streams, these landlocked populations are believed to be able to resume their

migrating life cycle if the barriers were to be removed (Busby, 1996), and thus retain their status as threatened steelhead.

Steelhead migrate to marine waters after spending up to seven years in freshwater, although two to three years is more common (Busby et al., 1996). They then typically reside in marine waters one to three years prior to returning to their natal stream to spawn as three- or four-year-olds. Unlike salmon, steelhead are iteroparous, meaning they can spawn more than once before they die; in California, females commonly spawn twice before they die. The spawning season can run from December through May, depending on the stream, with most spawning occurring in January through March. The spawning, hatching, and rearing life stages are similar to those of coho salmon and other anadromous salmonids, although steelhead typically utilize a greater proportion of the watershed for spawning, while coho generally reproduce in the low-gradient coastal portions of streams.

Two reproductive forms of steelhead are recognized, the "stream maturing" and "ocean maturing" forms (also termed summer-run and winter-run, respectively), which describe the level of sexual development following return to the freshwater environment. The central California coast ESU consists entirely of winter-run steelhead (Busby et al., 1996).

Occurrence on the Coast Dairies Property. Recent observations have confirmed the presence of steelhead in three Coast Dairies streams: San Vicente Creek, Liddell Creek, and Laguna Creek (Harvey & Stanley Associates, 1982; McGinnis, 1991; CDFG, 1996; CNDDB, 2000). Harvey & Stanley Associates conducted the only study in which steelhead population data were collected on all three creeks during the same season. These surveys showed that San Vicente Creek contained the highest steelhead density, whereas steelhead were least abundant in Liddell Creek.

In addition to these confirmed steelhead occurrences, biologists made streamside observations of *O. mykiss* during the spring 2001 stream reconnaissance surveys. Young-of-the-year and/or yearlings were observed in *all* surveyed creeks, including Y Creek. Some of these observations were made upstream of what appeared to be impassable or difficult-to-pass migration barriers, suggesting that some of the fish may be landlocked steelhead or resident rainbow trout.

The NMFS also designated critical habitat for central California coast steelhead in 2000. The wording of the designation (Federal Register, 2000) is essentially identical to that used for coho salmon critical habitat and also includes all Coast Dairies streams.

Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) is listed federally as an endangered species and is a California species of special concern. However, tidewater goby populations north of Orange County have been proposed for delisting by the USFWS because more recent data collected on the species suggests that the original listing rule overestimated the species' risk of extinction (Federal Register, 2001). The delisting of the goby in northern and central California appears to be imminent and may take place prior to the completion of the Coast Dairies Plan.

The tidewater goby is a benthic fish that inhabits shallow lagoons and the lower reaches of coastal streams. It differs from other species of gobies in California in that it is able to complete its entire life cycle in fresh to brackish water. This goby appears to be mainly an annual species, although individuals in the northern part of the range may live up to three years (Moyle et al., 1995).

Tidewater gobies typically inhabit areas of slow-moving water, avoiding strong wave actions or currents. Particularly important to the persistence of the species in lagoons is the presence of backwater, marshy habitats, as well as annual sandbar formation, which keeps the fish from being flushed out to the ocean during winter flood flows (Smith, 1999). Preferred water temperatures generally range from 8 to 22 degrees Celsius, and water depths are usually less than 3 feet.

The tidewater goby is endemic to California and is distributed in brackish water habitats along the coast, from Agua Hedionda Lagoon, San Diego County, in the south to the mouth of the Smith River (Tillas Slough), Del Norte County, in the north (Moyle et al., 1995). Although the species was originally believed to be restricted to low-salinity waters (Federal Register, 1994), tidewater gobies are capable of living in saline waters reaching over 50 parts per thousand (ppt) (Moyle et al., 1995). Large populations have been observed in lagoons ranging from fresh water (e.g., Soquel Creek and Pescadero Creek) to ocean salinities (Corcoran Lagoon and Moran Lagoon) (Smith, 2000, 2001).

Occurrence on the Coast Dairies Property. Tidewater gobies are known to occur in the lagoon and downstream portion of Laguna Creek, as well as in Scotts Creek, just north of the Property boundary (CNDDB, 2000).

Nonlisted Fish Species

Several common and nonlisted fish species have been observed on the Coast Dairies Property during past fishery studies (Harvey & Stanley Associates, 1982; CDFG, 1996; CDFG, 1998). These include coast range sculpins (*Cottus aleuticus*), prickly sculpins (*Cottus asper*), and threespine sticklebacks (*Gasterosteus aculeatus*).

Physical Resources

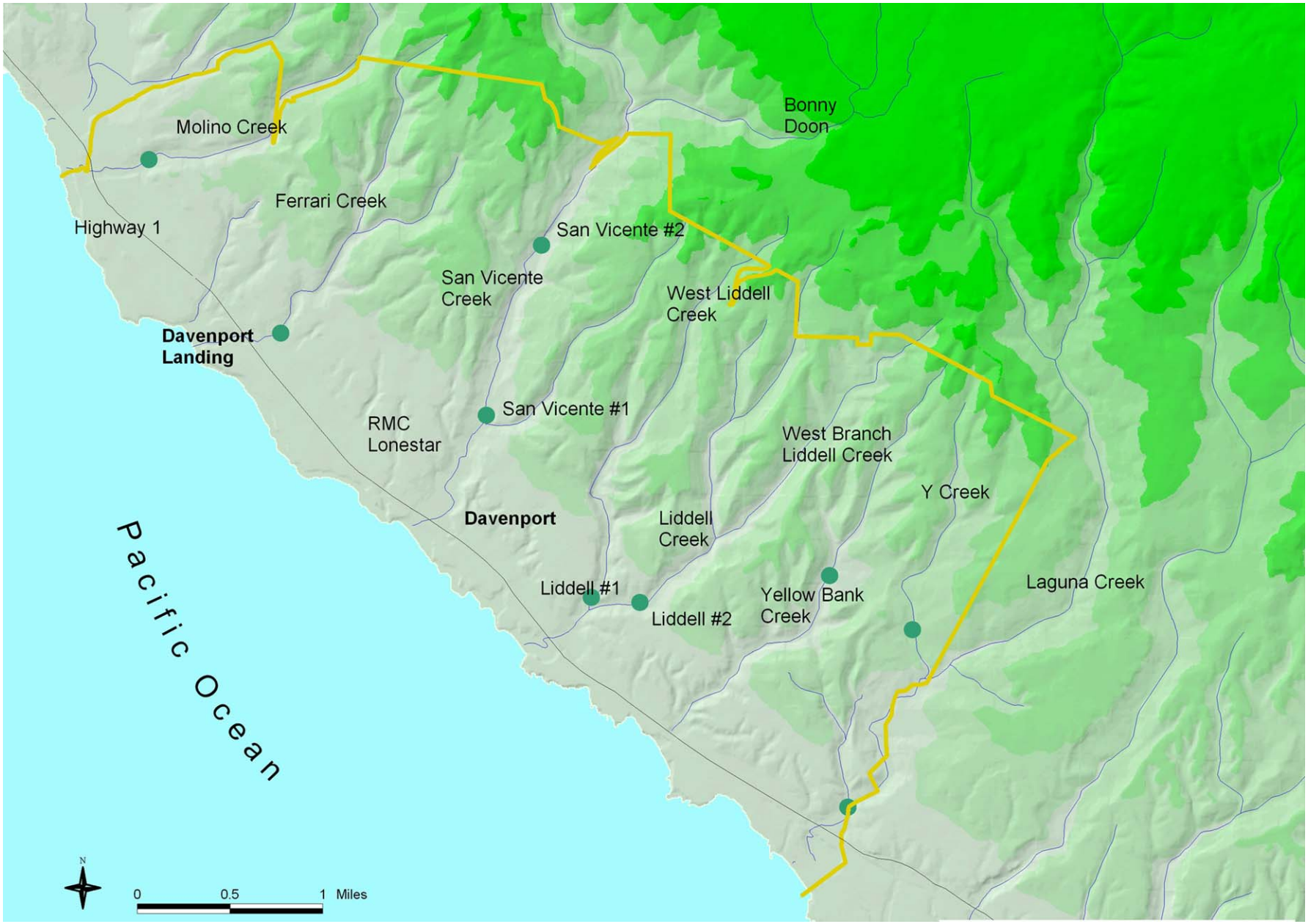
Hydrology

There are six perennial streams on the Coast Dairies Property: Molino Creek, Ferrari Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. The watersheds of several of these streams are entirely or almost entirely on the Property. The larger streams, Laguna Creek and San Vicente Creek, however, have watershed areas that extend well beyond the Property Boundary. As part of the Existing Conditions studies, the hydrology of the region, the Property, and in particular these six streams was investigated. The objectives of this hydrologic assessment were to determine the physical characteristics of each stream and its watershed, the general condition of each stream and its watershed, the sensitivity of each of the six watersheds to disturbance, and the natural and human-induced disturbance conditions within each watershed that indicate the stream's suitability for salmonids.

The Santa Cruz Mountains, like most of central California, are marked by winter rains and summer drought. The streams on the west side of the Santa Cruz Mountains drain relatively small watersheds. The largest of the Coast Dairies watersheds, San Vicente, has an area of just under 12 square miles. Most of the streams draining the west side of the Santa Cruz Mountains flow through steep-walled canyons to the Pacific Ocean. These streams tend to exhibit "flashy" (rapidly rising and falling) winter flows in response to storm events, which themselves are intensified by the orographic effect of the mountains. As the dry season progresses and the soil dries out, the streams continue to be fed by seeps and springs. Summer "base" flow at any point in a stream is therefore reflective of the cumulative rate of emergence of groundwater into the stream channel.

In the fall of 2000, nine stream monitoring stations were established on the Property: two each on San Vicente Creek, Liddell Creek, and Laguna Creek, and one each on Molino Creek, Ferrari Creek, and Yellow Bank Creek (Figure III-3). These nine stations served as the basis for analysis of water flow, water quality, and watersheds. Using these data, land use, topography, geology, vegetation, and other factors can be related to the conditions observed in the stream channels themselves.

The evaluation of hydrologic existing conditions on the Property was hindered by the lack of historic records for the Coast Dairies streams, particularly records of stream discharge (rate of flow). The U.S. Geological Survey (USGS) has established gauging stations at San Vicente Creek and Laguna Creek only, and the gauging records for these streams are relatively brief. Therefore, data were used from gauging stations on other streams in the Santa Cruz Mountains and extrapolated to the streams on the Coast Dairies Property.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-3
Stream Monitoring Stations on the Coast Dairies Property

Comparative Analysis of Coast Dairies Streams and Their Watersheds

This section presents the analysis of existing conditions in the six Coast Dairies streams and their watersheds. The analysis is based on data gathered at the nine monitoring stations, and on physical attributes of the watersheds garnered from the geographic information system (GIS) under development for the Coast Dairies Plan. The analysis focuses on the physical aspects of the watersheds that affect the natural suitability of each of the Coast Dairies streams for salmonids, and on observed and calculated indicators of watershed disturbance that affect water quality, channel morphology, and salmonid habitat.

Fish Flows

The stream surveys report the presence of "steelhead-like" salmonids on all of the Property's streams, both above and below migration barriers. It is assumed that the fish above the barriers are land-locked steelhead that would resume their anadromous behavior if the barriers were removed. As part of the hydrologic assessment, discharge data were used to determine whether flow was adequate for migration.

The NMFS recently adopted a policy recommending that the minimum bypass flow for water rights should be set equal to the median unimpaired February or March discharge (whichever is greater). Table 4.1-8 in the ECR shows the conditions at each monitoring station for the estimated median February discharge. Subsequent to publication of the ECR, minimum bypass flows were recalculated for each of the six Coast Dairies streams for the median March discharge, which was estimated to be larger than the February discharge (Jackson, 2001). This information can be used in the Coast Dairies Plan as a basis for decisions regarding water use.

Conditions at Bankfull Discharge

The concept of bankfull is central to understanding the morphology of stream channels. Bankfull discharge, the flow at which the active stream channel is just full, is the discharge that shapes the channel. Leopold, et al (1964) have pointed out that, over an extended period, moderate flood flows move the most sediment: while large flood events move great amounts of material, they are very rare; on the other hand, small floods occur frequently, but do little work. E. D. Andrews (Leopold, 1994 p. 127) demonstrated quantitatively that the "effective discharge," the channel forming flow, was very close to bankfull discharge. For many rivers, the bankfull discharge occurs about every 1.5 years. The hydraulic conditions for bankfull discharge at each monitoring station are given in Table III-1.

The Importance of Geology to Salmonids

The nature of a stream's bed material is one of the factors that determines the suitability of the stream as salmonid habitat. The rocks, sand, and silt found on the bed of a stream (bed material) are derived from the various alluvial and bedrock units within the watershed. The nature and occurrence of the various geologic units in a watershed determine the quality of the bed material. The relative abundance, distribution, orientation, and susceptibility to weathering of individual geologic units determine the relative amount of bed material derived from each geologic unit. Three aspects of the rocks on a streambed affect spawning success for salmonids: density, durability, and texture.

The density of the bed material plays a role in the success of salmonid spawning because density determines if a rock will be transported by a given discharge. Solid rock is generally assumed to have a density of 2.65 times that of water. Santa Cruz Mudstone has a porosity of about 35 percent. Therefore, rocks derived from Santa Cruz Mudstone have about 65 percent of the density of solid rock. The lower density of mudstone rocks implies that a given mudstone rock will be transported by the creek at a lower discharge than a similar-sized piece of granite.

Therefore, smaller discharges are required to initiate bedload transport of mudstone compared to granite rocks of the same size. Hence, salmonid eggs laid on a streambed composed mostly of mudstone-derived rock are more likely to be scoured during periods of

TABLE III-1: HYDRAULIC CONDITIONS FOR BANKFULL DISCHARGE

Creek	Watershed Area sq miles	Stage feet	Average Depth feet	Width feet	Width to Depth Ratio	Cross Section Area sq ft	Velocity ft/sec	Bankfull Discharge cfs	Exceedence Probability
Molino	1.50	1.99	1.17	9.6	8.3	11.2	4.01	45.0	0.30%
Ferrari	1.28	1.91	1.45	11.0	7.6	16.1	2.28	36.7	0.33%
San Vicente #1 (Lower)	10.49	3.13	2.09	24.3	11.6	50.7	4.97	252	0.50%
San Vicente #2 (Upper)	9.89	2.77	1.58	22.2	14.0	35.2	6.34	223	0.58%
Liddell #1 (West)	1.29	1.82	1.20	7.9	6.6	9.5	4.08	38.8	0.30%
Liddell #2 (Main)	1.90	2.12	1.05	12.9	12.3	13.6	3.44	46.9	0.46%
Laguna	7.60	2.59	2.94	14.6	5.0	42.8	5.59	239	0.27%
Y Creek	0.79	1.64	1.22	6.3	5.2	7.7	3.21	24.8	0.27%
Yellow Bank	0.60	1.73	0.68	8.8	13.0	5.9	3.21	19.1	0.26%

Note: Hydraulic conditions at each monitoring station for the estimated bankfull discharge.

high discharge than eggs laid in a bed derived from granitic material under the same flow regime.

The durability of the rocks on the streambed also plays a role in determining the stream's suitability for salmonid spawning. The Santa Cruz Mudstone is not very durable and tends to shatter easily. Therefore, mudstone rocks are likely to be broken, and wear down more readily while they are being carried along the bed of streams during flood events. Since the mudstone rocks tend to break easily, they will tend to retain their angular appearance and would likely disintegrate and break down to fine-grained materials before they achieve a well-rounded shape. Igneous rocks are much more durable, tending to resist breakage during the sediment transport process, and develop a smooth, rounded appearance over time.

Texture refers to the size of the individual grains in a rock. The sedimentary Santa Cruz Mudstone is composed of relatively fine-grained material (silt and clay) compared to igneous or metamorphic rock, which could include crystallized minerals of various sizes and hardness. Upon weathering, weakly consolidated, less dense, fine-textured rock will provide more fine material (clay, silt, and small sand) to a streambed than a hard, durable, fine-textured rock. The weathering and erosion processes that transport the sedimentary rocks to the stream will tend to break the rock and result in a mixture of fine and coarse particles being deposited into the stream channel.

A streambed with a high percentage of silt and clay (fine material) is less suitable for salmonid spawning and rearing than one composed mainly of coarse material.

In general, conditions for salmonids are suboptimal in streams dominated by sedimentary rock. The igneous and metamorphic rocks have normal density, are fine to coarse grained, are durable, and in general provide better conditions for salmonids. Table III-2 shows the percentage of the watershed above each monitoring station dominated by sedimentary rock.

TABLE III-2: EROSION HAZARD POTENTIAL FOR COAST DAIRIES WATERSHEDS

Monitoring Station	Percent of Watershed Covered by Hydrologic Soil Group C or D	Soil Rank	Percent of Area with Slopes > 20%	Slope Rank	Percent of Watershed Covered by Sedimentary Rock	Geology Rank	Sensitivity Rank	Erosion Hazard Potential
Molino	78	8	20	7	91	7	22	High
Ferrari	87	9	23	9	90	6	24	High
San Vicente #1	8	2	5	3	33	2	7	Low
San Vicente #2	4	1	5	1	30	1	3	Low
Liddell #1 (West)	65	7	18	5	73	4	16	Moderate
Liddell #2 (Main)	40	5	19	6	74	5	16	Moderate
Laguna	20	3	6	4	45	3	10	Low
Y Creek	36	4	5	2	96	8	14	Moderate
Yellow Bank	58	6	22	8	100	9	23	High

Note: The sensitivity rank for the nine study watersheds is calculated by summing the rank of each watershed for the soil, slope, and geology factors. The erosion hazard potential is assigned depending on the value of the sensitivity rank, as explained in the text.

Salmonid Suitability

San Vicente Creek watershed has the lowest percentage of sedimentary rocks and the highest percentage of igneous or metamorphic rocks. Therefore, based only on the geology, San Vicente Creek is expected to provide the most suitable bed materials for salmonids.

Slightly more than 50 percent of the Laguna Creek watershed is covered by igneous and metamorphic rock, and just less than 50 percent of the watershed is covered by sedimentary rock. Therefore, based only on the geology, Laguna Creek is expected to provide bed material that is moderately suitable for salmonids. The Laguna Creek bed material should be less optimal than the San Vicente bed material, but superior to the bed material found in Liddell Creek.

The geology of the Liddell Creek watershed is mostly sedimentary (over 70 percent), but about 20 percent of the watershed is metamorphic or igneous. Therefore, based only on the geology, Liddell Creek is expected to provide bed material that is less suitable for salmonids than San Vicente or Laguna Creeks. However, the geology of Liddell Creek is expected to produce bed material that is more suitable for salmonids than a creek with little igneous or metamorphic rock, such as Molino Creek (0.75 percent), or no igneous or metamorphic rock, such as Ferrari Creek and Yellow Bank Creek.

Watershed Sensitivity

For the purposes of this report, *watershed sensitivity* is defined as "… the sensitivity of a watershed to the disruption of its ecological or hydrological processes."

One of the key indicators of disruption of the aquatic ecosystem and its supporting hydrologic processes is a change in the fundamental rate at which sediment is delivered to the stream network. Estimating the potential erosion hazard for each unit of the landscape is a first step in understanding how a watershed's rate of sedimentation will respond to disturbance. Such a measure is useful for regional planning decisions but is not a substitute for site-specific fieldwork to address the needs of individual projects. This is because soils and geologic unit map boundaries are not precise, as they smooth differences in order to present a regional view.

To help guide the discussion of the erosion hazard potential for the nine study watersheds, a rating scheme was devised based on the information available for the Property. The method uses information about the soils, slopes, and geology of each watershed to assign an erosion hazard potential of low, moderate, or high. The derivation of the erosion hazard potential is described in the following sections.

Soils. The soil survey maps for Santa Cruz County were used to map the distribution of hydrologic soil groups in the watershed above each monitoring station. Hydrologic soil groups are used to estimate runoff from precipitation. Soils are placed into one of four groups on the basis of their ability to absorb additional water after they have been thoroughly wetted to simulate infiltration from long-duration storms. The soil groups are labeled A through D in descending order of infiltration rate.

Table III-2 shows the percent of watershed above each monitoring station that is overlain by hydrologic soil groups C and D. A watershed with a high proportion of hydrologic soil groups C and D would be expected to produce more storm runoff than a watershed with a low proportion of its area covered by hydrologic soil groups C and D, all other factors being equal. The watershed with the lowest proportion of area covered by soil groups C and D was assigned a rank of 1, and the watershed with the highest proportion of groups C and D was assigned a rank of 9. Table III-2 shows the soil factor rank for each watershed.

Steep Slopes. Steep slopes provide the energy needed to move material downslope towards the stream system. The percentage of each watershed with slopes in excess of 20 percent is shown in Table III-2. The watershed with the smallest percentage of steep slopes was assigned a rank of 1, and the watershed with the highest amount of steep slopes was assigned a rank of 9.

Geology. Mount (1977) rated the susceptibility to erosion of each geologic unit in the San Lorenzo River watershed. Mount's rating system was applied to the geologic units in the Coast Dairies study watersheds. Mount's system assigned a numerical value to each unit (ECR, Figure 4.1-26). Figure 4.1-30 in the ECR shows the percentage of each study watershed in each erosion susceptibility class. Mount assigned a susceptibility to erosion rating of either high or very high erosion to the type of sedimentary rocks found in the Davenport area.

Table III-2 shows the percentage of each watershed underlain by sedimentary rocks. The watershed with the lowest percentage of sedimentary rocks was assigned a rank of 1, and the watershed with the highest percentage of sedimentary rocks was assigned a rank of 9.

Calculating the Erosion Hazard Potential. The sensitivity rank was determined by summing the soil rank, slope rank, and geology rank. The sensitivity rank can range from a low of 3 to a high of 27. Watersheds were assigned an erosion hazard potential according to the following scheme:

Sensitivity Rank	Erosion Hazard Potential
3 –10	Low
11 – 19	Moderate
20 – 27	High

The results of the ranking of the watersheds for the nine Coast Dairies monitoring stations is presented in Table III-2.

Turbidity and Salmonids

The relative magnitude of a stream's suspended sediment load (indicated by turbidity) can be used to determine whether water quality is causing conditions that are stressful to salmonids. There is an indication in the literature (Trush, 2001) that a chronic high sediment load interferes with the ability of juvenile salmon to find food. Dr. Trush's literature survey indicates that juvenile salmonids begin to have difficulty in finding food when the turbidity level is about 25 nephelometric turbidity units (NTU). A 1963 study for the State Water Resources Control Board by J.E. McKee and H.W. Wolf found that turbidity in excess of 400 NTU might be harmful to some fish life stages. The number of days that the turbidity is equal to or exceeds the 25 NTU threshold can be taken as an indication of a chronic elevated turbidity and suspended sediment load. The number of days that the turbidity is equal to or exceeds the 400 NTU threshold is taken as an indication of short duration but very high (acute) turbidity and suspended sediment load.

In an effort to determine whether water quality conditions in the Coast Dairies streams are harmful to salmonids, the turbidity-discharge relationship for each monitoring station was applied to the synthetic hydrograph (based on the San Vicente gauge for the 1969–1984 water years) for the station.[7] The number of days that the estimated turbidity exceeded 25 NTU and 400 NTU were counted, and is shown in Tables 4.1-13 and 4.1-14 of the ECR for a hypothetical 10-year period. This information is summarized in Table 4.1-15 in the ECR. Next, the relative ranks for chronic turbidity were converted into ratings from low (1 or 2) to high (5 or 6), and the relative ranks for acute turbidity were converted into ratings from low (1–3) to very high (23). Table III-3 shows the acute and chronic turbidity rankings, along with the erosion hazard potential ranking described previously.

TABLE III-3: RELATIVE RANKING FOR CHRONIC AND ACUTE TURBIDITY AND EROSION HAZARD POTENTIAL

Monitoring Station	Erosion Hazard Potential	Chronic Turbidity Rating	Acute Turbidity Rating
Molino	High	Moderate	Low
Ferrari	High	Moderate	Low
San Vicente #1	Low	Low	Low
San Vicente #2	Low	Low	Low
Liddell #1	Moderate	Moderate	Very High
Liddell #2	Moderate	Moderate	Very High
Laguna	Low	Moderate	Moderate
Y Creek	Moderate	High	Moderate
Yellow Bank	High	High	High

Note: The relative ranks for chronic and acute turbidity were converted into ratings from low to high. The acute turbidity rating is a measure of the suspended sediment load expected during storms. The chronic turbidity rating is a measure of the suspended sediment load expected between storms and chronic. The erosion hazard potential is a measure of the sediment load an undisturbed watershed would be expected to deliver to the stream.

Conclusion: Erosion Hazards, Water Quality, and Salmonid Suitability for the Coast Dairies Watersheds

Table III-3 shows that Yellow Bank Creek has a high erosion hazard rating and high levels of chronic and acute turbidity. Yellow Bank is incising over a significant portion of its total length. It is suspected that high rainfall intensities in February 1998 triggered the incision. The leading nickpoint of the incision process is about 1,500 feet upstream of the Yellow Bank sampling station. The three nickpoints observed are about 5 feet high. The banks are steep and undercut in places. The incision process is probably generating both chronic and acute turbidity. However, the stream flows over the Santa Margarita Sandstone upstream of Liddell Pipeline Road, which could be a source of acute turbidity. In addition, an abandoned road runs along Yellow Bank Creek, the upper watershed has been logged in the past, and the City of Santa Cruz's water pipeline and access road run along a steep tributary to Yellow Bank Creek upstream of the monitoring station. The roads and pipeline might also be sources of the chronic turbidity. It is recommended that an additional sampling station be established between the leading nickpoint and Liddell Pipeline Road to determine if the incision process accounts for all of the elevated turbidity.

Table III-3 shows that Laguna Creek has a low erosion hazard potential, but moderate levels of chronic and acute turbidity. A small tributary joins Laguna Creek just a few feet upstream of the sampling station. Laguna Road parallels this small tributary. Both the road and the stream are shown to cut through the Santa Margarita Sandstone on the geologic map. The road and tributary could be contributing some of the chronic and acute turbidity observed in Laguna Creek. About 25 percent of the Laguna Creek watershed is underlain by loosely cemented sandstone that is highly erosive if exposed. A significant length of lower Laguna Creek is flanked on the eastern side by the Lompico Formation. There are several landslides marked on the map through the lower section of the creek. A short distance

[7] The assumption used here is that the hydrograph constructed for the 1969–1984 period is representative of recent historic conditions at the Property.

upstream from the sampling station, there is a ribbon of Santa Margarita Sandstone on both sides of Laguna Creek for about 2,000 feet.

Table III-3 shows that both Molino Creek and Ferrari Creek have a high erosion hazard potential, a moderate chronic turbidity, and a low acute turbidity. The low acute turbidity rating suggests that no major sediment sources are activated during storm events, and that the source of the moderate chronic turbidity is not producing significant amounts of turbidity during storm events. The monitoring station on Ferrari Creek is located next to a cattle-feeding area. The banks of the creek adjacent to the sampling station have been severely trampled by the cattle. Ferrari Creek has a slightly higher relative chronic turbidity rating than Molino Creek, which suggests that the banks of Ferrari Creek and Molino Creek should be examined for chronic turbidity sources. Exclusionary fencing to limit the cattle's access to the creek should also be considered. Additional turbidity samples upstream of the feeding area on Ferrari Creek should be taken to determine the contribution from the damaged banks.

There is a large landslide just upstream of the Molino Creek monitoring station. The base of this slide could be contributing a portion of the chronic turbidity. The upper reservoir on Molino Creek was not in operation during the sampling period. It is possible that fine material that had been previously deposited in the reservoir is being remobilized by the stream.

Table III-3 shows that both Liddell #1 and Liddell #2 have moderate erosion hazard potential rankings and moderate chronic turbidity rankings, but very high acute turbidity levels. Quarry operations are occurring in the watershed above both of these monitoring stations. There is a large landslide complex in the Santa Cruz Mudstone at the confluence of the East Branch and the main stem of Liddell Creek. The road adjacent to East Branch Liddell Creek cuts across the base of a portion of the slide complex. This complex is upstream of the Liddell #2 monitoring station. Cattle graze upstream of Liddell #2, and it is possible that some of the chronic turbidity is the result of cattle damage to streambanks.

About 14 percent of the Liddell #1 watershed and about 26 percent of the Liddell #2 watershed are underlain by the Santa Margarita Sandstone. The Santa Margarita Sandstone is poorly cemented, and in some cases is essentially loose sand. It is subject to severe erosion where the topsoil has been removed. The road along the canyon bottom of East Branch Liddell Creek (upstream of Liddell #2) cuts through the Santa Margarita Sandstone. Sand deposits were seen on the road and associated drainage ditches in December 2000. There are also two landslides in this sandstone formation along East Branch Liddell Creek.

The very high rating for acute turbidity at the Liddell #1 and Liddell #2 monitoring stations is probably due to the quarry operations, especially those operations, such as roads, that disturb the Santa Margarita Sandstone. Landslides may also be contributing a portion of the sediment load during significant rainfall events.

Additional turbidity sampling stations should be established on Liddell Creek below the outlet of the sediment detention ponds for the quarries. Another station should be established upstream of the slide complex and on both the main stem and the East Branch of Liddell Creek to determine if the slide complex at the confluence is contributing a disproportionate amount of turbidity to the stream.

The very high acute turbidity suggests that disturbed Santa Margarita Sandstone is capable of supplying a large sediment load. The evaluation of the Property's roads, presented in Section 4.2 of the ECR, further discusses road-related sedimentation.

Table III-3 shows that both San Vicente #1 and #2 have low rankings for erosion hazard potential, chronic turbidity, and acute turbidity. Table 4.1-15 in the ECR shows San Vicente #1 has a higher relative rank for acute turbidity than San Vicente #2. The watershed between San Vicente #1 and #2 seems to be contributing a higher load of sediment than the watershed above San Vicente #2. Most of the watershed between San Vicente #1 and #2 is underlain by the Santa Cruz Formation. There is almost a continuous complex of landslides between San Vicente #2 and the bridge over San Vicente Creek.

Below the bridge, it is common to see cattle grazing near the creek. The road along the creek, above the bridge, is cut into the canyon wall and crosses the bottom of the slide complex. One of the sediment detention basins for the quarry is located on the small tributary watershed that enters San Vicente Creek downstream of San Vicente #2.

The road along San Vicente Creek should be treated to control sediment (see evaluation of roads in the ECR, Section 4.2). A turbidity sampling station should be established on the small tributary below the sediment basin.

Geology

Geomorphic Setting

The Santa Cruz Mountains form the mountainous spine of the San Francisco Peninsula and extend from Daly City in the north, 80 miles southeast to the Pajaro River, near Watsonville, where they merge with the southern Gabilan Range. The maximum elevation of the Santa Cruz range is about 3,800 near New Almaden (San Jose), but the average summit height reaches 2,500 feet. The western margin of the Santa Cruz range between San Francisco and the city of Santa Cruz is distinguished by the dramatic coastline formed where the bedrock uplands of the range meet the Pacific Ocean. Landscapes along this portion of coast can be abrupt, with steep coastal terrain and rocky shores, or can be more gradual, formed on flat elevated marine terraces that slope gently downward from mountainous uplands to sandy beaches.

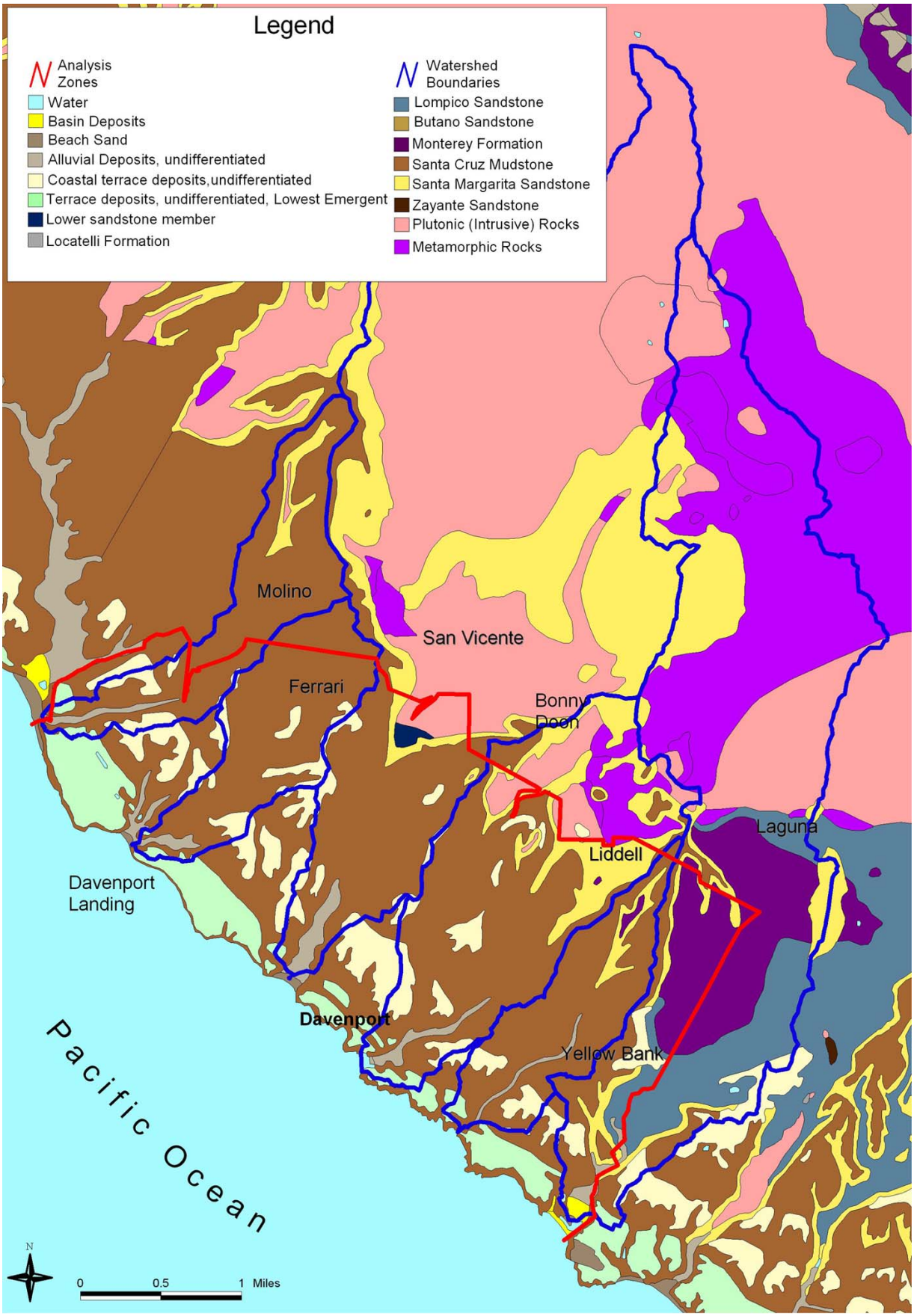
The approximately 7,000-acre Coast Dairies Property extends west from the steep bedrock uplands across older elevated marine terrace to the coastline, which can either be open sandy beaches or rocky, resistant shoreline. The most characteristic feature of the shoreline along the Property boundary is the sheer cliff, which forms the seaward edge of the youngest marine terrace (sometimes referred to as the 100-foot terrace). This marine terrace, sometimes up to 1.5 mile in width, supports Highway 1, the town of Davenport, and Brussels sprout production. Three other terraces ranging in elevation from 100 feet (youngest) to 850 feet (oldest) are easily recognizable on the Coast Dairies Property. Compared to the younger and lower marine terraces, older terraces located at higher elevations tend to be more heavily eroded and deformed. The Davenport marine terrace complex, as this feature is sometimes called, is unique for its complete erosional history and represents an important element to understanding the coastal geologic processes along the San Mateo and Santa Cruz County coastline.

As one travels inland from the broad 100-foot terrace to older and higher marine terraces, the terrain steepens and displays a landscape formed of deeply incised canyons. Flowing water within the six primary watersheds on the Coast Dairies Property (Molino, Ferrari, San Vicente, Liddell, Yellow Bank, and Laguna) have continually down-cut through the older marine terrace to develop this relief. The ridgecrests marking the eastern boundary of the Property roughly define the contact of the overlying marine terraces and older bedrock.

Stratigraphy of the Coast Dairies Property

The geologic materials underlying the Coast Dairies Property range from Cretaceous-age (beginning 136 million years ago) granitic and metamorphic rocks to alluvial deposits laid down during the Quaternary Period (from about 2 million years ago to the present). This section briefly discusses each of the rock types found on the Property and includes a discussion of rocks found east of the Property within the upper reaches of the Property's watersheds. A geologic map is provided as Figure III-4.

Perhaps the oldest rocks exposed on the Coast Dairies Property and to the east towards Ben Lomond Mountain are the crystalline plutonic and metamorphic rocks that include schist and marble and that were intruded at one time by granitic rocks. These basement rocks are part



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-4
Geology in the Coast Dairies Area

of the rock mass, or magmatic arc,[8] known as the Salinian Block. Tectonic uplift of Ben Lomond Mountain is thought to have been responsible for uplift of the "Salinian Block" basement rocks in this area.

During the Tertiary Period (from about 54 million years to 2 million year ago), the Coast Ranges were slowly rising above the sea and becoming dry land. During this time, it is believed that the seas periodically inundated the area, depositing a variety of sedimentary rocks over the crystalline basement rocks (described above). These rocks range from the older Lompico Sandstone to the younger Santa Cruz Mudstone, which occupies a large portion of the Coast Dairies Property. Certain Tertiary rocks, underlying the eastern portion of the Property, supply the shale quarried by RMC for its cement production operations.

Younger Quaternary sedimentary deposits overlie the Tertiary-age units, especially the Santa Cruz Mudstone. These were typically deposited starting about 2 million years ago, and deposition of these young sediments continues to this day. They include both marine depositional units and nonmarine (i.e., those deposited as recent alluvium from the upland sources to the east).

Seismicity

The Coast Ranges of California contain both active and potentially active faults and are considered a region of high seismic activity. The 1997 Uniform Building Code (UBC) locates the entire Bay Area, including the Davenport area, within Seismic Risk Zone 4. Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake (Lindenburg, 1998). The USGS Working Group on California Earthquake Probabilities evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area. The result of the evaluation indicated a 70 percent likelihood that such an earthquake event will occur in the Bay Area between 2000 and 2030 (USGS, 1999).

[8] A magmatic arc is a region of high volcanism and seismicity where the subducted plate lies below oceanic or continental crust.

The San Andreas Fault Zone to the east and the San Gregorio Fault Zone to the west represent the two principal active faults within the region (ECR, Figure 4.2-3). The San Andreas Fault Zone forms the eastern boundary to the Salinian Block, and the San Gregorio Fault Zone runs parallel to the coast and represents the westernmost zone of active faulting in the Bay Area. These faults are known as right-lateral strike-slip faults, or those with principal movement parallel to the trend of the fault. Right-lateral strike-slip movement of the San Andreas fault, for example, means that the western portion of the fault is slowly moving north, while relative motion of the eastern side is to the south.

Unlike the active faults in the region that have exhibited movement in historic time (or within the last 11,000 years), the Zayante fault is considered a potentially active fault and shows evidence of movement within the last 1.6 million years. The Ben Lomond fault is a pre-Quaternary fault in which evidence of movement is typically not recognizable, but the fault is not necessarily inactive (Jennings, 1994). These faults are located between 10 – 20 miles of the Property.

Geomorphic Features of the Coast Dairies Property

Marine Terraces

As discussed above, one of the more distinct geomorphic features of the Coast Dairies Property is the marine terraces that stair-step from the coastline east to an elevation of about 800 feet above sea level. Through geologic history, the formation of marine terraces has dictated the landforms we see today.

The lowest and youngest terrace (the 100-foot terrace) is the best defined, while the oldest and highest of the four terraces (at approximately 840 feet above sea level) is heavily dissected and eroded. Understanding the formation of these terraces requires three basic assumptions: (1) no terrace is older than the Pleistocene in age; (2) all terraces visible today at the Coast Dairies Property were cut into Santa Cruz Mudstone; and (3) it is difficult to determine whether

climatic fluctuation or tectonic uplift was predominantly responsible for successively lowering the sea level to facilitate their formation.

Marine terraces form by wave action that erodes away a relatively flat bench. Formation of these terraces is associated with high-energy erosion of a sheer sea cliff and deposition of near-shore marine sediments on the newly eroded bench. As sea level falls or tectonic forces uplift the land surface, the wave-cut platform is raised above sea level and exposed. This uplift also exposes the near-shore sediments that were deposited on the bench during its formation. Examples of such deposits are observable today as the coastal terrace deposits and the lowest emergent coastal deposits that mantle the two lower marine terraces.

Mass Wasting

Mass wasting refers to the failure and downslope movement of soil and rock under direct forces of gravity. Mass wasting includes slow processes such as soil creep as well as the rapid dislodgment of large masses of material, such as landslides, debris flows, and rockfalls. The susceptibility of land (slopes) to failure is dependent on the slope angle and geology as well as on the amount of rainfall, unnatural disturbances, and seismic activities. Processes of mass wasting vary with location on the Coast Dairies Property.

Block landslides and shallow debris flows are evident to some degree in the upper reaches of the Property's watersheds, where steep canyons have down-cut into old terrace deposits. The weathering Santa Cruz Mudstone, with its blocky structure and prevalent fracture patterns, fails as block-slides. On hillsides with less slope, colluvial debris can fail as slumps. Large masses of landslide debris are mapped along Scotts Creek (beyond the Property boundary); Molino Creek about one mile east of Highway 1; and along San Vicente Creek, near the eastern Property boundary (Clark, 1981). It is very likely that many small block-slides occurred in the steeper portions of the Santa Cruz Formation following the Loma Prieta earthquake in 1989. Undercut streambanks reduce slope stability along the upper stream and result in localized bank failures or slumping. In the upland canyons, continual weathering of exposed bedrock accumulates as talus and is deposited on lower slope reaches as angular, well-sorted colluvium.

The dominating mass-wasting process along the seacliffs is the continual dislodgment of fractured Santa Cruz Mudstone and erosion of the overlying terrace deposits. This mass wasting is initiated by the various weathering mechanisms affecting the seacliffs, including wind, wave action, and water seepage. Occasional rockfalls vary in size but can dislodge large volumes of material. Undercutting from wave action, vegetation, water seepage, or human interference constitutes the primary mechanisms capable of triggering a seacliff rockfall.

Pocket Beaches

The coastline of the Coast Dairies Property contains the three major shoreline types that shape the coast of California: continuous beach, seacliff, and pocket beaches. Approximately one-third of California's coastline holds pocket beaches, while the other two-thirds contain continuous beach and seacliffs. Pocket beaches are one of the many unique geomorphic features that enhance the dramatic coastline along the Coast Dairies Property. Typical pocket beaches are roughly concentric in shape, concave seaward, and are bounded at each end by a resistant rock outcrop. On the Property, the mouth of San Vicente Creek, Liddell Creek, and Yellow Bank are the best examples of pocket beaches. Sediment delivery from the onshore creeks as well as longshore coastal drift (littoral currents) provide these beaches a continual supply of sand.

Soil Resources

The types of soil on the Coast Dairies Property vary widely depending on location, slope, and underlying parent material. On the Coast Dairies Property, different types of soils form on the marine terraces, mountainous woodland areas, and mountainous areas with brush vegetation. The NRCS has mapped approximately 25 different soil types within the Property (NRCS, 1980). Table 4.2-2 in the ECR presents these soil types by slope and identifies those soils

considered by the U.S. Department of Agriculture (USDA) to be "Prime Farmland" and "Farmland of Statewide Importance." In general, these two classifications indicate that particular soil types meet the criteria used by the USDA to classify high-quality, high-yield soils that require especially diligent conservation.

Soil Erosion

As discussed above, mass wasting provides talus and sediments from the weathering and erosion of steeply sloped areas with exposed bedrock and alluvium. These colluvial and alluvial materials can eventually find their way to streams and contribute coarse-grained material and fine-grained sediment to the stream system. Mass wasting triggered by natural occurrence alone would not significantly degrade the stream channels, due to the infrequency of landslide and debris-flow events. However, mass wasting initiated by human activity such as road cuts, unstable construction fill, poor drainage, and excessive runoff from roads can deliver considerably more sediment to a watershed.

Road-Related Erosion

As part of the study of existing conditions on the Property, the Property's road network was mapped and surveyed. The results of this survey are presented in ECR Section 4.2 (Geology), and summarized below and in Figure 3-5. Figure 3-5 shows the road network, as well as numbered road sites that were identified in the survey as problematic, usually because of their apparent impact on aquatic resources. Figure 3-5 categorizes the roads on the property into five classes: primary roads, which are the main, public thoroughfares that pass through the property, including Highway 1, Bonny Doon Road, and Swanton Road; secondary roads, the larger, all-season roads that provide access to the interior of the property, including Warnella Road, San Vicente Road, and Y Creek Road; tertiary roads, which are generally single-track, un-surfaced farm roads and tracks; used and abandoned railroad alignments, including the Union Pacific line and the abandoned Cement Plant Railroad; and RMC's conveyor belt.

Roads have a profound impact on the hydrology and surface processes of the land across which they are built. Where roads are built across slopes, they are usually constructed by first cutting a bench into the hillside, and then casting the spoil material on the hillside below the bench. The effects of this type of construction, known as "cut and fill," are increased hillslope steepness (both in the cut slope above road and the fill slope below the road), an interruption of runoff and of any streams flowing down the slope, and, in some cases, an interruption of subsurface flow through exposure of subterranean channels. Unless care is taken to prevent it, roads tend to capture and concentrate runoff, both from rainwater hitting the road surface itself as well as from runoff coming down slopes and small stream channels onto the road surface. Concentrated runoff gains erosive power with flow volume, slope angle, and distance. Typically, concentrated runoff from road surfaces and road ditches eventually finds its way into natural stream channels, either through direct discharge at a point where the road crosses the stream, or through gullies down the hillslope to the stream below. When this occurs, as it does frequently on the Coast Dairies Property, sediment (particularly fine material such as clay, silt, and sand eroded from cut banks, road ditches, road surfaces, and gullies) is delivered to the stream channel. Upper Quarry Road, in the Liddell Creek watershed, is an example of a road with frequent stream crossings at which polluted runoff enters the stream system. All six of the perennial, fish-bearing streams on the Coast Dairies Property exhibit signs of excessive fine sediment in their beds, much of which can be attributed to roads. Effects of fine sediment on aquatic habitat is discussed in Section 3.3, Fisheries Resources, and in Section 4.1, Hydrology, of the ECR.

Roads constructed across slopes tend to encounter stream channels along their routes. Road builders have several options for constructing a road across a stream. The most common stream-crossing structures are bridges, culverted fills, armored sills, humboldt or log crossings, and ford (wet) crossings. All of these crossing structures are represented at Coast Dairies, but the most common are culverted crossings. To construct a culverted crossing, a road builder lays a pipe in the streambed and fills the channel around and on top of the

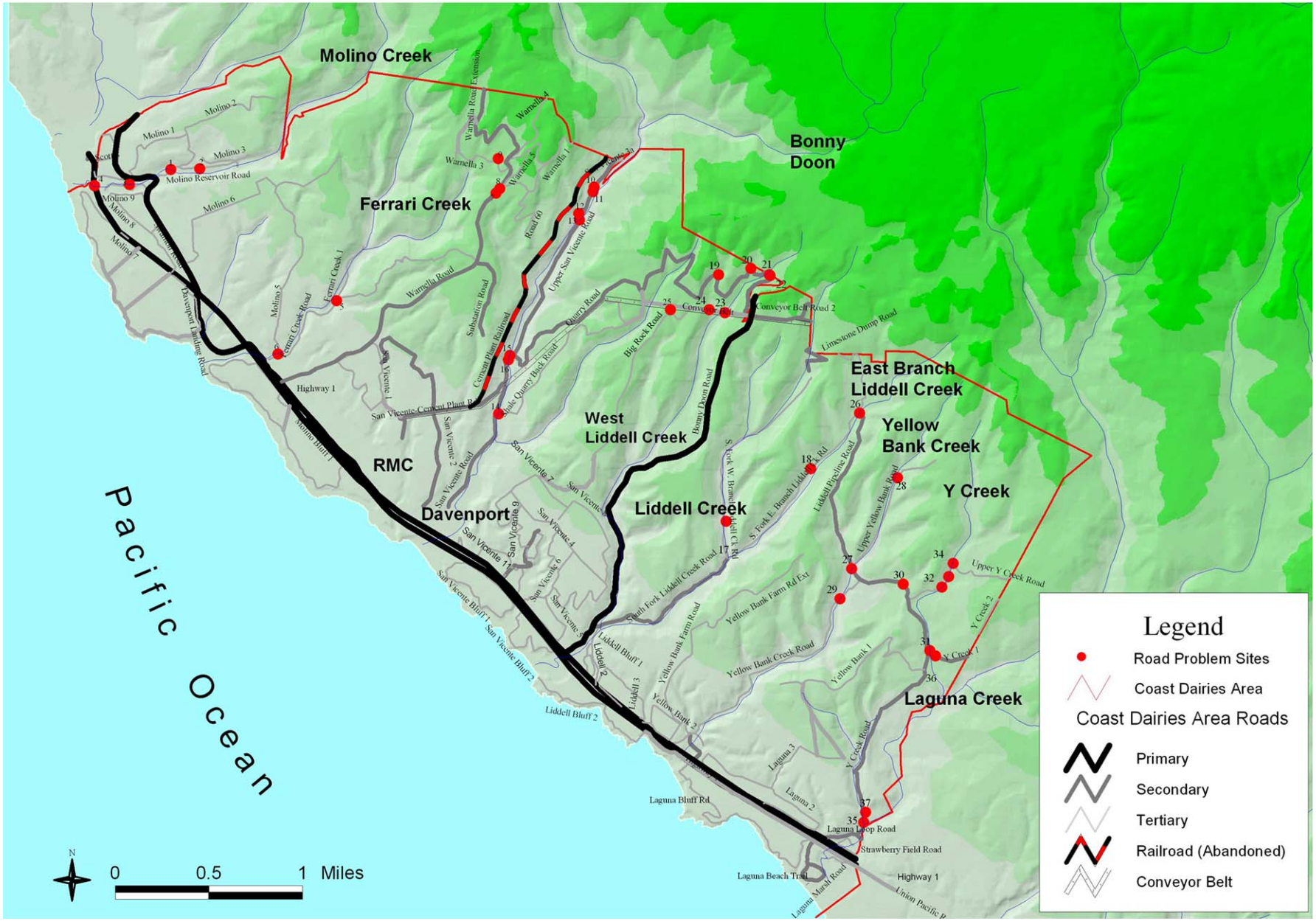
pipe. Often, in order to save on the cost of pipe, shorter lengths are used, and the pipe is laid not in the natural streambed, but on top of some of the fill material. Consequently, the outlet of these culverts is onto the fill surface on the downstream side of the structure, which will erode unless a downspout is fitted to the culvert or the fill face is armored.

Typical problems with culverted crossings, all of which can be seen at Coast Dairies, include undersized pipes, plugged pipes, collapsed or rusted pipes, and erosion below the pipe's outlet. When culverts plug, which usually occurs during large storms when stream discharge is high and the capacity of a stream to transport large sediment and debris is at its maximum, the culverted crossing becomes a dam. Depending on the configuration and size of the structure and the volume and duration of the stream's flow, the stream may overtop this dam. This may result in a partial or complete washout of the structure, or in the diversion of the stream down the road alignment to the next stream or some other outlet, which will itself likely become a gully. Fill washouts and stream diversions are catastrophic events that may cause the delivery of hundreds or thousands of cubic yards of sediment to stream channels. Properly constructed and maintained culverted crossings reduce the possibility of washouts and prevent diversions. Examples of washouts at Coast Dairies include site 1 on Molino Creek and site 29 on Yellow Bank Creek (Figure III-5). Examples of streams that have diverted in the past due to plugged culverts are site 12 on a tributary to San Vicente Creek, and site 24 on a tributary to West Liddell Creek.

Where culverts are placed in fish-bearing streams, particularly in anadromous streams such as the six major creeks on the Property, special care must be taken to ensure that the culvert does not present a barrier to fish migration. Culverts may prevent upstream migration of salmonids if they are too steep, too long, or if the outlet is perched too high above the natural channel. There are numerous culverts on the Property that may prevent migration of salmonids, from the culverts and bores beneath Highway 1 and the Union Pacific Railway grade, to an exceptionally long and poorly placed culvert beneath the RMC conveyor belt on West Liddell Creek (site 25).

The shape of the road surface itself determines the hydrologic effects of the road and to some extent defines the options for draining the road. The three techniques for shaping a road are insloping (grading the road surface so that it drains toward the cut bank or uphill side of the road); out-sloping; and crowning (grading the road so that the highest point runs down the middle of the roadbed). Outsloped roads tend to sheet water off of their outside edge and therefore tend not to cause accumulation or concentration of runoff. Outsloped roads should still, under most circumstances, be fitted with drainage structures to ensure that runoff does not flow down along the road grade, particularly on steeper gradient roads. This may be accomplished with waterbars, which are temporary structures often constructed on seasonal roads prior to the onset of fall rains, or rolling dips, which are broad, shallow depressions excavated into the road surface that catch any water flowing down the road surface and direct it to the outside edge of the road. An example of an outsloped, dipped road on the Coast Dairies Property is Warnella Road Extension (Figure III-5).

It was determined in the course of the road survey that Coast Dairies roads vary widely in their design, method of drainage, standard of construction, surface, and upkeep. Many roads on the Property have been abandoned, and some of these are overgrown and impassable, even on foot. Many lack any real shape: they are neither insloped, outsloped, nor crowned, and many lack any kind of drainage structure at all. These shapeless, undrained roads are often minimally maintained and exhibit varying degrees of degradation. Most of the roads that provide access to the farm buildings and fields are adequately maintained for their purpose of providing egress and ingress for workers and equipment. Some are rock surfaced for all-weather use. Roads associated with the quarry operations and the conveyor belt tend to be well-maintained, all-season roads. Several are paved with concrete, while others are rock surfaced. These roads, however, tend to be insloped and ditched, and road drainage was



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-5
Roads on the Coast Dairies Property

designed with little regard to aquatic habitat. Paradoxically, while these roads may be the "best" on the Property in terms of their standards of construction and maintenance, they are among the worst in terms of their impact on biological resources; most are also located within the watersheds of San Vicente Creek and Liddell Creek, which contain the best salmonid habitat on the Property (ECR, Section 3.3).

Every one of the major streams on the Property has a road running along it. These riparian roads, some of which are abandoned, are of particular concern because of their potential and realized impact on aquatic habitat. Riparian vegetation is removed when riparian roads are constructed. The road surface may remain wet throughout the rainy season, and in areas of seeps and springs they may stay wet through the dry season. Vehicles traveling on wet, unprotected surfaces tend to churn the road surface, and subsequent runoff carries away loose soil particles. Because of their proximity to streams, it is very difficult, even on a well-designed road, to prevent sediment-laden runoff from entering the channel. Riparian roads tend also to require frequent stream crossings, both on the main channel of the stream they are following, and also on whatever tributaries they intercept along their route. Finally, riparian roads allow access of all kinds into sensitive stream protection zones.

Between the Property's streams, roads leading to the interior of the Property cross the marine terraces and climb the bluffs between them. These roads, which include Warnella Road (paved), Molino 1, Molino 2, Molino 6, and Yellow Bank Farm Road, are the most stable, lowest-impact roads on the Property, even though several of them traverse its entire width. These roads experience minimal run-on, since they lack hillslopes above them; they tend not to accumulate much runoff, but rather shed water onto the surrounding terraces. Where these roads climb the bluffs between terraces they may entrain water along their alignment, since most lack a defined shape and have no drainage structures, and the result is rutted surfaces. Typically, however, runoff from these stretches of road and the sediment it carries eventually spill onto the terrace at the bottom of the slope, and the sediment never enters a stream channel. These roads were for the most part constructed to avoid stream crossings. They provide excellent access to the interior of the Property, links to the regional road system of the Santa Cruz Mountains, spectacular views, and, except where they cut through sensitive habitat such as native grasslands (ECR, Section 3.1), minimal environmental impact.

Human Uses

Water Rights and Diversions

California Water Law Background

California water rights can be complex and confusing. The Water Commission Act of 1914 established the current permit system for the appropriation of water. Today, provisions governing the appropriation permit system are set forth in the California Water Code, and the State Water Resources Control Board (SWRCB) has been granted the authority to administer permits and licenses for California's surface water. Basically, this body of law recognizes two very different types of rights: riparian and appropriative. Other types of rights exist in California as well, such as reserved rights (water set aside by the federal government for the public domain) and pueblo rights (a right based on Spanish and Mexican law). California water law also allows an overlying landowner to pump groundwater. Groundwater rights are not addressed in this section, as the Coast Dairies Property does not have appreciable groundwater resources.

Surface Water Rights

Riparian Rights. Riparian water rights are derived from ownership of land that is adjacent to a source of water. A riparian right entitles the landowner to use a correlative share of the water flowing past his or her property. A riparian right owner does not need a permit from the SWRCB or any other type of governmental approval. Riparian rights apply only to water that would naturally flow in the stream and do not entitle a water user to divert water to storage for use at some other

time (unless storage is less than 30 days) or on land outside of the watershed. Riparian rights remain with the property when it changes hands, although the right may be lost if the parcel is severed from the adjacent water source. Riparian rights have a higher priority than appropriative rights (see below). Amongst riparian right holders, however, priority is equal, and during low flows all share the shortage of water; hence, riparian rights are characterized as "correlative" rights.

Appropriative Rights. Appropriative rights derive from making a claim to divert water from the river or stream. An appropriative right allows storage of the water and reasonable and beneficial use of the water on land outside of the watershed. The dual water system created by recognition of both riparian rights and appropriative rights, and the inherent contradictions, prompted numerous legal disputes over many years and resulted in a California constitutional amendment that requires all use of water to be "reasonable and beneficial." This amendment further defines irrigation as a beneficial use.

Pre-1914 Rights. Prior to 1914, there was no formal permitting system. At that time, appropriators (mostly miners and nonriparian farmers) took control of and used whatever water they desired. These rights are recognized today and have priority over post-1914 rights. All appropriative rights are subject to the rule "first in time, first in right." For instance, a pre-1914 right holder may be junior to another pre-1914 right holder, and both pre-1914 right holders would be senior to any post-1914 right holder.

Current Appropriations, Agreements, and Water Usage

The documentation filed with the SWRCB to record appropriated water includes an Application to Appropriate Water when filed on the basis of a post-1914 right, and a Statement of Water Diversion and Use when filed on the basis of a pre-1914 right or a riparian right. Appropriations affecting the Coast Dairies Property and documented with the SWRCB are summarized in Table 5.1-1 of the ECR. Water diversion locations associated with these appropriations are shown in Figure 5.1-1 of the ECR.

The following streams flow through the Coast Dairies Property: Scotts Creek (a small segment), Molino Creek, San Vicente Creek, Liddell Creek, Yellow Bank Creek, and Laguna Creek. Water has consistently been diverted from all these streams and stored for agricultural uses. However, Laguna Creek is the only stream for which there is documentation of appropriation at the SWRCB. In addition, regulations under the jurisdiction of the California Department of Fish and Game (CDFG) require that diversion structures and facilities be regularly permitted. Coast Dairies lessees have generally not been in compliance with these regulations. Development of this Plan has attracted regulatory interest from state and federal fishery agencies. This scrutiny, the lack of documented water rights, and the lack of diversion permit compliance led CDLC to stop allowing diversions for irrigation in 2002. Santa Cruz County has recently convened a "Coast Dairies Agricultural Working Group" to explore opportunities to retain irrigated agriculture as a sustainable practice on the Coast Dairies Property. Specific water rights information originally presented in Section 5.1 of the ECR is summarized below. More specific information is available in the ECR.

Appropriations from Streams Directly on Property

Documentation regarding Laguna Creek consists of Application 17329 and Application 19238. Application 17329 was filed October 17, 1956 by the CDLC. Permit 10897 was issued October 23, 1957 and License 5898 was issued December 7, 1959 to CDLC. Coast Dairies filed a licensee report with the SWRCB stating the prior three years' water use. Data on actual water use associated with this licensed right have not been located; therefore, it is assumed that the licensee report is accurate. The license allows direct diversion of 0.33 cubic feet per second (cfs) from May 1 to December 1 of each year for the specified purpose of irrigation (Ellison, Schneider, and Harris, 2000, 2001).

Application 19238 was filed February 16, 1960, and although the applicant's identity is currently unknown, the primary contact is listed as Stephanie Mills. Permit 12529 was issued November 29, 1960, and License 7800 was issued August 3, 1966, presumably to CDLC. The license allows 26 acre-feet for storage from January 1 to May 1 for

irrigation purposes (Ellison, Schneider, and Harris, 2000, 2001). Until 2002, Coast Dairies leasees consistently irrigated with water from Laguna Creek, but precise amounts were never recorded or documented.

Coast Dairies also filed Application 30203 on December 21, 1992, requesting a right to divert water from Scotts Creek and Molino Creek with the intention to store the water in a constructed off-stream reservoir. Protests were levied against this application, and these issues remained unresolved when TPL purchased CDLC in 1998. CDLC staff determined that the Property relied on water from Scotts Creek, and that CDLC did not have an appropriate claim on water from that watershed. It had also become clear that Scotts Creek could no longer support its fisheries and maintain historical irrigation diversions. Application 30203 was ultimately rejected and canceled by SWRCB on June 20, 2000, in accordance with the CDLC's request on May 30, 2000 to withdraw the application (SWRCB, 2000).

Appropriations from Streams With a Point of Diversion Beyond the Coast Dairies Property Line That May Affect the Amount of Water Flowing on the Property

The previous section discussed water being directly appropriated as it flowed through the Property. This section addresses the six Coast Dairies streams in the broader context of their point of origin. In some cases, water is appropriated directly from the streams, but beyond the Coast Dairies Property boundary. Scotts Creek is included because a small portion of the creek is within the Coast Dairies Property.

Scotts Creek. Scotts Creek originates near Big Basin Redwoods State Park and flows through the uppermost northern section of the Coast Dairies Property before it terminates at the ocean. Three permits to appropriate water from Scotts Creek have been issued by the SWRCB: 2898, 2899, and 18335. The specified uses for these diversions are domestic and irrigation (Ellison, Schneider, and Harris, 2000, 2001). More specific details of these permits are discussed in the ECR (Pages 5.1-3 through 5.1-4).

Molino Creek. Molino Creek originates beyond the northeastern corner of the Coast Dairies Property, runs through the upper northern part of the property, and eventually flows to the ocean. Until the winter of 1999/2000, CDLC was appropriating water from the upper reaches of Molino Creek, claiming a riparian right documented by Statement of Water Diversion and Use 11351, and storing it in the Molino Creek diversion dam. The dam was largely destroyed in a storm during the winter of 1999/2000, and there are currently no plans to repair the damage. When the dam was in place, between 65 and 75 acre-feet of water were used between April and October (Ellison, Schneider, and Harris, 2000, 2001).

During the growing seasons of 2001 and 2002, some water was diverted downstream by Jim Cochrane of Swanton Berry Farms into a reservoir between Swanton Road and Highway 1, and a connected reservoir near the labor camps (Smith, 2001). This water was primarily utilized for irrigation, with domestic usage accounting for approximately 12,000 gallons a day. Diversions have occurred from Molino Creek between March and December (Coast Dairies, 2001). Available agricultural information indicates Swanton Berry Farms was using only 51 acre-feet of water.

San Vicente Creek. San Vicente Creek has several (legal) points of origin, the uppermost near Ben Lomond Mountain. There are additional points of origin near Deadman Gulch. RMC Pacific Materials, the only San Vicente Creek water user documented with the SWRCB, operates an industrial plant with water appropriated by a claimed pre-1914 right: Statement of Water Diversion and Use 8351. RMC has constructed a reservoir adjacent to the plant that is fed from diversion points at both San Vicente Creek and Mill Creek (the latter through Statement of Water Diversion and Use 8350). The diversions take place off both creeks from an area below dam spillways, through either a 6-inch or 8-inch pipe, and are located in an area that is unaffected by seasonal stream fluctuations. Historically, a portion of RMC's water was used for irrigation by Seaside Ranch on the Coast Dairies Property. Additional irrigation diversions came from an unnamed creek (referred to as Ferrari in the ECR). The small dam

that allowed this agricultural diversion was removed in 2001 due to concerns regarding its stability. Seaside Ranch has been fallow since the 2000 growing season (Smith, 2001).

RMC is also the sole-source provider of raw water for the cities of Davenport and New Town. A split pipe drawing from RMC's lines off San Vicente Creek and/or Mill Creek transports water to the County's Sanitation District for treatment prior to distribution. Residents at Davenport and New Town have an unmetered water source. The volume of use among these entities (RMC, Seaside Ranch, Davenport, and New Town) has not been quantified (Reppert, 2001). The information available electronically from the SWRCB indicates direct diversion of 566 acre-feet from January 1 through December 31, but does not indicate what year(s) the water is used (Ellison, Schneider, and Harris, 2000, 2001).

Liddell Creek. There are three branches to Liddell Creek: West Liddell Creek, Liddell Creek, and the East Branch. Liddell Creek appears to originate and terminate on the Coast Dairies Property, and SWRCB records do not indicate appropriation. The east and west branches originate just beyond the Coast Dairies Property line and eventually merge into Liddell Creek. Appropriations are made from tributaries to Liddell Creek, which will be addressed in the following tributary appropriations section.

Yellow Bank Creek. Yellow Bank Creek appears to originate and terminate on Coast Dairies Property. There is no SWRCB documentation indicating appropriation from this stream at any point.

Laguna Creek. Laguna Creek originates near Ben Lomond Mountain and terminates just before it reaches the ocean. The City of Santa Cruz claims a pre-1914 right to appropriate from Laguna Creek, recorded with the SWRCB as Statement of Water Diversion and Use 2042. The most recent statement reports that between approximately 287 and 715 million gallons of water were used from January 1 through December 1 in the period 1994 to 1996 for municipal purposes (Ellison, Schneider, and Harris, 2000, 2001).

Appropriations from Tributaries of Streams Running Through the Coast Dairies Property That May Affect the Amount of Water Flowing on the Property

There are tributaries associated with most of the streams flowing through the Property. Appropriations from these tributaries are addressed below.

Tributary to Scotts Creek. Mill Creek is the main tributary to Scotts Creek from which water is appropriated, although it appears unrelated to the Mill Creek that is a tributary to San Vicente Creek. Three permits have been issued to Lockheed Missile and Space Company for a total of 6.12 cfs from October 1 through December 31 for industrial use and fire protection. Specific details of these permits are discussed in the ECR (Pages 5.1-8 through 5.1-9). (Ellison, Schneider, and Harris, 2000, 2001).

Tributaries to Molino Creek. There is no SWRCB documentation indicating appropriation or use from a tributary to this stream.

Tributaries to San Vicente Creek. Mill Creek is the main tributary to San Vicente Creek from which water is appropriated. Permit 2714 allows 0.23 cfs to be directly diverted from May 1 to October 1 for irrigation. The current owner of record is Andrew Davidson (Ellison, Schneider, and Harris, 2000, 2001).

Statement of Water Diversion and Use 8350 is held by RMC Pacific Materials with a claimed pre-1914 right. SWRCB records indicate direct diversion of 262 acre-feet from January 1 through December 31. Apparently, RMC uses this right in conjunction with Statement of Water Diversion and Use 8351 to operate its industrial plant (Reppert, 2001).

Statement of Water Diversion and Use 10008 was filed by W.G. Green claiming a riparian right. The most recent statement indicates that approximately 43,000 gallons were diverted from Mill Creek between May and October for years 1996 through 1998 for the purpose of irrigation (Ellison, Schneider, and Harris, 2000, 2001).

Tributaries to Liddell Creek. RMC holds Permit 3003, which allows direct diversion of 0.043 cfs from March 1 through December 1 for irrigation purposes. RMC has also filed a Statement of Water Diversion and Use for Liddell Spring #2, a tributary to the East Branch of Liddell Creek. RMC records indicate 3,940,000 gallons were diverted from Liddell Spring #2 between June and October 2000 for dust control associated with mining operations (RMC Pacific Materials, 2001).

A Statement of Water Diversion and Use was filed by the City of Santa Cruz claiming a pre-1914 right. The most recent statement shows that from January 1 through December 1 between 1993 and 1995, approximately 227 to 384 million gallons of water were used for irrigation and domestic purposes (Ellison, Schneider, and Harris, 2000, 2001).

Tributary to Yellow Bank Creek. There is no SWRCB documentation indicating appropriation or use from a tributary of this stream.

Tributaries to Laguna Creek. Reggiardo Creek appears to be the main tributary to Laguna Creek and the common source referenced in several Applications and Statements of Water Diversion and Use discussed in the ECR.

Two permits and one Statement of Water Diversion and Use (16589) are held by the Bonnymede Mutual Water Company for both direct diversion and storage. Specific details of these permits are discussed in the ECR (Pages 5.1-10 through 5.1-11). A request for license was filed April 17, 2000 specifying 0.06 cfs to be diverted from January 1 to December 31, not to exceed 14.6 acre-feet per year; however, the total quantity diverted under this and an existing license would not exceed 15.7 acre-feet per year. As of March 2001, the license had not been granted.

A Statement of Water Diversion and Use was filed by the City of Santa Cruz claiming a pre-1914 water right. The most recent statement indicates that millions of gallons were used from January 1 through December 31 for years 1992 through 1994, but the specific amount is not stated and was unavailable from the City. The specified uses are irrigation and domestic, and the source is Reggiardo Creek.

Water Use Documented By Agreements and Leases

In addition to the documentation filed with the SWRCB on appropriation and use of water from the different streams on the Property, agreements between Coast Dairies and various entities provide additional information about water use and commitments, as summarized below.

Agreements Between Coast Dairies and the City of Santa Cruz

Laguna Creek. There are agreements between Coast Dairies and the City of Santa Cruz whereby Coast Dairies uses water from Laguna Creek from four ¾-inch outlets (“faucets”). Specific details of this agreement are discussed in the ECR (Pages 5.1-11 and 5.1-21).

Liddell Creek. Through an agreement dated March 22, 1913 CDLC sold to the City of Santa Cruz all the real property and water rights of a parcel known as Rancho Arroyo De La Laguna near the head waters of the East Branch of Liddell Creek. Specific details of this agreement are discussed in the ECR (Page 5.1-21).

Agreements Between Coast Dairies and RMC Pacific Materials

San Vicente Creek and Liddell Creek. Agreements between Coast Dairies and Pacific Cement and Aggregates, a division of Lone Star Cement Corporation, allows Pacific Cement (now RMC Pacific Materials) to conduct its operations on portions of Coast Dairies land. These agreements also describe, with limited specificity, use of water by each party. Specific details of this agreement are discussed in the ECR (Pages 5.1-21 through 5.1-22).

Installation of Meters

To better understand water use on the Coast Dairies Property, CDLC has placed meters on all major streams to document water use on the Property. The information collected from the meters will be very useful in determining water rights, as it is used to provide accurate information in the licensee reports and in the Statements of Water Diversion and Use that may be filed with the SWRCB. Data collected from meters will also help to determine the extent of water use during different times of the year, as well as the amount of use during dry versus wet years.

Agriculture

Introduction

The coastal lands north of Santa Cruz are formed by a series of marine terraces. At Coast Dairies, a series of two coastal terraces comprise the land base suitable for crops. The lands along the ocean bluff form the first terrace and are bisected in several places by Highway 1. The second terrace forms on a bluff just behind the first, and has some of the best agricultural soils on the Property. Portions of the third terrace were farmed in the 1910s and 1920s, presumably plowed with teams of horses, but the lack of water and the availability of lands closer to the coast have mostly restricted use of this land to cattle grazing.

The dominant agricultural use of coastal lands along the Santa Cruz North Coast until the 1900s was livestock production. The shortage of labor and the difficulty of reaching urban markets made crop production a difficult proposition, but ranching and livestock operations were an attractive use of these lands. The summer fogs and cool coastal conditions extended the growing season for perennial grasses into the summer months, providing good pasture when most California grasslands were too dry. Beef cattle production and dairy operations could rely on both summer pasture and good hay production from dry-farmed fields.

In general, the group of dairies along the North Coast did well financially through the 1920s, but the Great Depression, coupled with changing transportation modes that allowed delivery of fresh milk to urban markets from more distant producers, made North Coast dairy operations increasingly marginal.

The production of high-value vegetables on the North Coast, which began in the early part of the 20th century, was enabled by a series of irrigation projects a few years earlier that allowed growers to convert land previously used for pasture and hay production to irrigated row crops. Vegetable growers, predominantly of Italian origin, found the unique summer climate suitable for specialty vegetables, especially artichokes and Brussels sprouts, which require a long, cool growing season. In 1919, it was reported that 600 acres of artichokes and other vegetables were being grown on the coast between Santa Cruz and Davenport (*Surf*, 1919).

The CDLC was seldom involved directly in agricultural production. Instead, CDLC established a practice early in the last century of leasing suitable lands to dairies, beef cattle ranchers, and vegetable growers. In the case of beef cattle and vegetable production, this practice continues today.

Land Resources

This section discusses the climatic conditions and land resources found on the Coast Dairies Property that have enabled the development of two distinct agricultural systems: one based on production of high-value specialty crops, and the other on livestock.

Climate

The cool summer Mediterranean climate, coupled with a long growing season of 250–275 days, is the principal factor that makes Coast Dairies' crop production environment unique not only in California but nationwide. More specific information regarding climate is discussed in the ECR CD, attached).

Soils

Several soil types are found on the areas of the Property that have been used historically for crops and pasture. The soils on lands utilized for crops are predominantly in the Elkhorn sandy loam and the Watsonville loam series. There can be considerable soil variation within a 20 to 30 acre field; some portions of the field may be very well drained, while other areas may have clay or impervious layers. There are also areas behind the city of Davenport that were at one time farmed by Seaside Ranch, where Pfeiffer gravelly sandy loam soils occur. The most common soils found on the grazing lands and at higher elevations are Bonny Doon loams, Aptos loams, and Los Osos loams. The major soil series found on the crop and range areas of the Property are further described in the ECR.

Cropping Patterns and Livestock Operations

The principal crop historically grown on the Property is Brussels sprouts, closely followed by artichokes. Other crops have also been planted in rotation with Brussels sprouts, such as leeks, peas, cabbage, and beans. Beans are particularly useful as a rotation crop because they increase soil fertility by fixing nitrogen in the soil. In many cases the leaseholders do not practice crop rotation, and Brussels sprouts are grown on the same land in successive years. Historically, livestock operations, both beef cattle and dairy, have been the primary agricultural activity on the Property. Figure III-6 shows the areas of the Property leased for crops and grazing when the ECR was prepared.

Markets

Conventional Crops and Markets

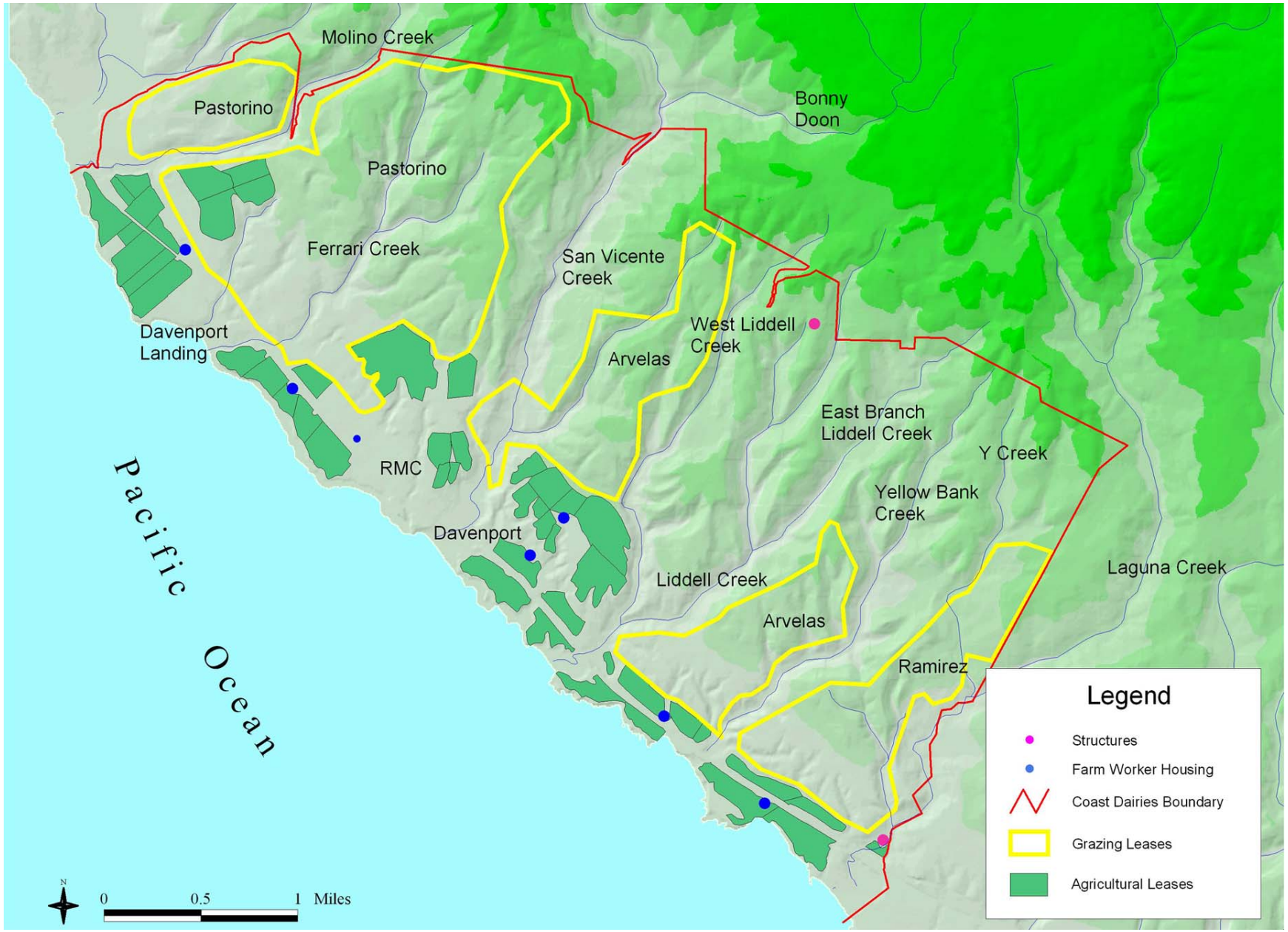
The production of Brussels sprouts has a long history, and a market for the product is well-established with both food processors (freezers) and purveyors of fresh produce. Santa Cruz County, and to a lesser extent Monterey County, are the principal commercial sources of Brussels sprouts for the entire U.S. market; Santa Cruz County alone meets half the total demand. Crop production statistics for Santa Cruz and Monterey Counties indicate that the market for the crop produced in California is fairly stable, but is gradually declining. Brussels sprouts have not won the same importance in the American diet as has their cruciferous cousin, broccoli. Furthermore, the advent of the global market and the North American Free Trade Agreement have increased competition by allowing importation into the U.S. of both frozen and fresh Brussels sprouts from Baja California, Guatemala, and Belgium.

By using a combination of early and late varieties, the harvest season can be extended from the end of June into January. Hand harvest is practiced in the summer months, and machine harvesting of the major portion of the crop takes place in the fall.

Artichokes also have been grown on the Property and in the region for a number of years, although the center of artichoke production remains in Castroville, Monterey Country. The market for artichokes has recently become more complex and unstable due to the introduction of an artichoke grown from seed and treated as an annual crop.

Distribution. Once harvested, Brussels sprouts and artichokes can either be packed in the field or sorted in a shed, and are then shipped to market. Smaller Brussels sprouts and artichokes are sent to processors, while larger sizes are sold in the fresh market. Once graded and packaged, fresh product is either shipped directly to customers throughout the U.S, transported to vegetable distributors in Santa Cruz, Watsonville, or Salinas for shipment with mixed loads, or shipped directly from packing facilities. Due to longer distances traveled, vegetable producers at Coast Dairies have higher farm-to-distribution point transportation costs than many of the vegetable growers in Watsonville or Salinas.

Organic Crops and Markets. The market for organically grown fruits and vegetables continues to grow rapidly in California. Some of California's larger fruit and vegetable producers have ventured into organic products, and compete with the more established, smaller organic growers. In 1993/1994, a study conducted by the UC Davis



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Figure III-6
Agricultural Leases
on the Coast Dairies Property

Agricultural Issues Center identified 1,129 registered organic farmers who reported sales of $78.3 million. At that time, the figure was considered to be artificially low, and currently farm production of organic crops in California could exceed $250 million. While this is still a small portion of the total fresh fruit and vegetable market, production and demand has continued to grow at the rate of 20 to 25 percent annually. If a center for organic crop production could be defined within California, it would likely be Santa Cruz County.

Coast Dairies has leased 41 acres of land to a well-established organic producer, Swanton Berry Farm. The company is owned and managed by Jim Cochran, who is also producing organic crops on leased land from Wilder Ranch State Park south of Coast Dairies.

Current Conditions and Trends

This section provides detail on the essential elements of the current agricultural use of the Coast Dairies Property: a description of the various crop and range operations, the existing infrastructure for agricultural operations, water supply and water usage, current use of agricultural pesticides and fertilizers, and common problems with erosion on the Property's agricultural lands.

Historically, Pfyffer Brothers was the largest grower at Coast Dairies. Until recently, Pfyffer Brothers farmed 373 acres of Brussels sprouts and artichokes and held one of the oldest leases on the Property, dating back to the early 1950s.

Seaside Ranch, owned by the Mondo family, initiated farming on the Property in the mid-1950s, with a cropping pattern similar to that of Pfyffer. When Seaside Ranch left the Property in 2001, the company was farming 175 acres. The Fambrini family also initiated farming on the Property in the 1950s and continued to farm through the 2002 season.

Current Lessees-Livestock. When TPL purchased CDLC, it developed and began instituting a Conservation Grazing Program (Amme, 1999). The primary goals of the Conservation Grazing Program are to: (a) utilize livestock under controlled conditions to enhance and restore native grasslands and oak woodland habitat; (b) increase habitat diversity; (c) control the dominance of exotic annuals and invasive weeds; and (d) protect wetland and riparian areas. The current management of grazing lands on the Property is governed by these goals and by the specific prescriptions contained in the Conservation Grazing Program.

The historic lessees for cropland are listed in Table 5.2-3 of the ECR, and conservation contracts for cattle operations are listed in Table 5.2-4 (of the ECR). Table 5.2-5 of the ECR summarizes the estimated livestock grazing capacity, expressed in animal unit months, for grazing under contract at the time the ECR was developed.

Agricultural Infrastructure

Each lessee is responsible for providing and maintaining their own water collection system, water distribution lines and pumps, structures for equipment storage, buildings for grading and storage, and worker housing. Each of the three historic lessees has a centralized equipment building and worker housing and/or bunkhouses. Fambrini Farm also operates a roadside market located on Highway 1 that adjoins a house. The principal agricultural structures on the three historic crop leases are shown on Figure 5.2-2 of the ECR.

Worker Housing

The farms on the Property have historically provided housing for some of their permanent employees as well as for seasonal workers. As a general rule, seasonal Brussels sprout and artichoke care and harvesting requires one worker per 10 acres.

Water Supply and Usage

The Property contains six distinct watersheds that drain into streams that provide water for crop production and livestock. Of these, the most important creeks in terms of volume of irrigation water for crop production are Molino and San Vicente Creeks. A variety of streams,

minor stream diversions, and springs provide water for livestock. Complications surrounding historical water use (discussed under Water Rights in the previous section of this Plan) have led to a moratorium on diversions for irrigation from Coast Dairies streams.

Historically, water was pumped from the water source to small holding reservoirs prior to irrigation. Water was moved from the holding ponds with electric pumps, providing pressure for the overhead sprinkler systems made up of movable aluminum pipes with sprinklers on standpipes. These periodic diversions will probably be replaced by off-stream water storage facilities, and drip irrigation systems will most likely be required.

Agricultural Chemical Nutrients and Pesticides and Herbicides

The principal agricultural chemicals applied to fields used for crops are plant nutrients, pesticides, and herbicides. In l987, the California Department of Food and Agriculture initiated a program requiring detailed reporting of the use of pesticides and herbicides. Growers must maintain a record of all applications of pesticides and herbicides by farm, field, and date of application. These data are sent to the county agricultural commissioner, who then sends the information to the California Environmental Protection Agency. There is not a similar reporting program for fertilizers.

There has been concern, particularly in the town of Davenport regarding pesticide drift in proximity to local residents and the elementary school. CDLC has required that the fields closest to the school be organically farmed.

Both Brussels sprouts and artichokes require pre-plant and annual application (usually once annually) of a balanced fertilizer. A combination of micronutrients may also be applied from time to time. Micronutrient combinations usually include iron, copper, and zinc in addition to other micronutrients required by the plants. Brussels sprouts as well as artichokes are long-growing season crops, thereby providing the opportunity for the buildup of insects and pests. Both crops also have exacting cosmetic standards, prompting higher pesticide use in order to meet specifications at harvest time.

Erosion

Erosion is a natural process that can be accelerated by any land use that removes vegetative cover and disturbs the soil. At Coast Dairies, agriculture may increase erosion in several ways, including overgrazing of pasturelands; wind action, which can be a source of gradual soil depletion; and heavy winter storms, especially those that occur before crops or annual grassland species have had an opportunity to grow and provide soil cover.

Feral pigs are an increasing problem on the Property, and in Santa Cruz County in general. They often run in packs and can cause extensive damage to a field, destroying any crop for that year. Feral pigs also root-up large areas, making the area subject to accelerated soil erosion.

Economics of Agricultural Operations

The ECR presents specific information regarding lease values at the time the report was produced. However, the most important condition adversely affecting lease values is the lack of an assured water supply; without an assured water supply, all other considerations are minor by comparison. Current efforts to secure water rights will effect economic viability of agricultural operations on Coast Dairies.

The low level of profitability in cattle grazing is likely to continue, although there are opportunities developing for premium sale of grass fed, hormone-free cattle. It is still likely that the cost to manage and monitor the conservation grazing operation will exceed financial returns. The primary return to CDLC from grazing is not financial; rather, funds spent on the management of the grazing program may be considered part of the cost to maintain and improve grasslands, increase biodiversity, reduce the growth of brush/biomass, and reduce the fire hazard on the Property.

Crop Profitability

Changes in ownership, new competition in the markets for crops traditionally grown on the Property, and recent regulatory actions are calling into question the long-term economic viability of the extent and type of agriculture that has been practiced at Coast Dairies for much of the past century. Even in good times, the profitability of conventional vegetable crops follows wide swings, depending on production costs and market price. Organic growers, particularly growers with niche and direct sales programs, have opportunities to dramatically increase gross income per acre. Although there is little published data on the cost of leasing certified organic irrigated cropland, there are indications that it could be worth $350 to $500 per acre, particularly in the future, as the demand for organic produce continues to increase. More information regarding organic farming is found in the ECR (Pages 5.2-25 through 5.1-26).

Recreation and Conservation

Historically, people have had access to the Coast Dairies beaches, and there seems to be little problem in the interface between recreation uses and agricultural operations. Wilder Ranch State Park indicates little problem, particularly with proper staffing and signage. In addition, Wilder Ranch retains 10 percent of the lease receipts in an environmental fund to be used to mitigate any historical or current environmental problems caused by the agricultural use of the land (Roth, 2001). Buffer zones between agricultural operations and recreational uses will likely be necessary along the coastal terrace bluffs. A 75-foot buffer for a trail or dirt roadway could provide access for agricultural equipment and harvesting crews as well as public use.

California Department of Conservation and California Coastal Commission

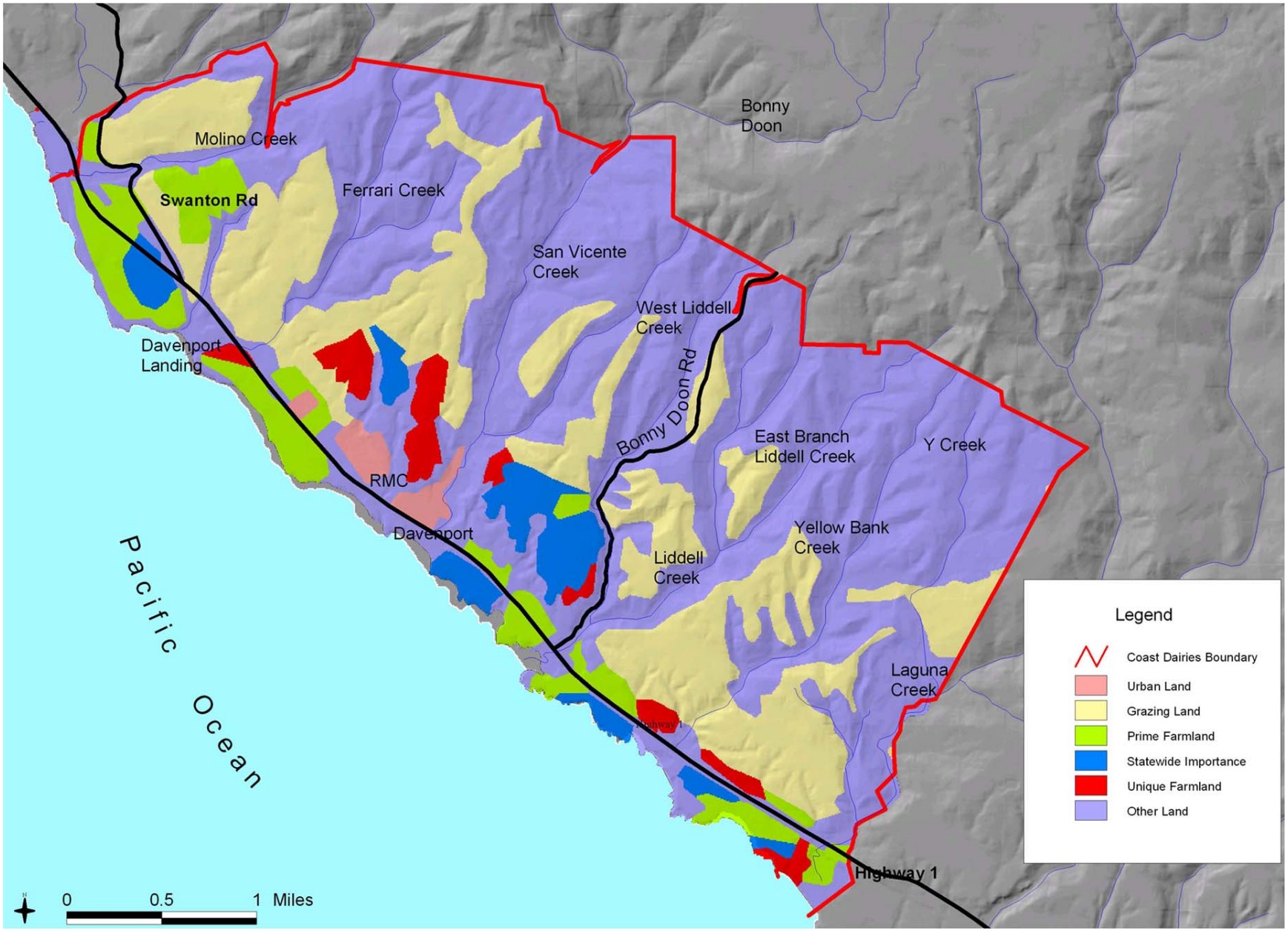
The majority of lands on the Property that have been cultivated and irrigated over the past five years are classified by the California Department of Conservation as a combination of Prime Farmland, Farmland of Statewide Importance, and/or Unique Farmland (Figure III-7; see ECR Section 4.2.7 for additional information on soil types and definitions). The terms are also considered and defined by the California Coastal Commission, whose jurisdiction extends inland approximately five miles. The Coastal Act states that the maximum amount of prime agricultural land should be maintained in agricultural production in order to preserve the agricultural economy of the area. Following guidance in the California Coastal Act and Santa Cruz County's Local Coastal Program, every effort will be made to maintain sustainable agriculture, if economically feasible, on the Coast Dairies property.

Mining

Background

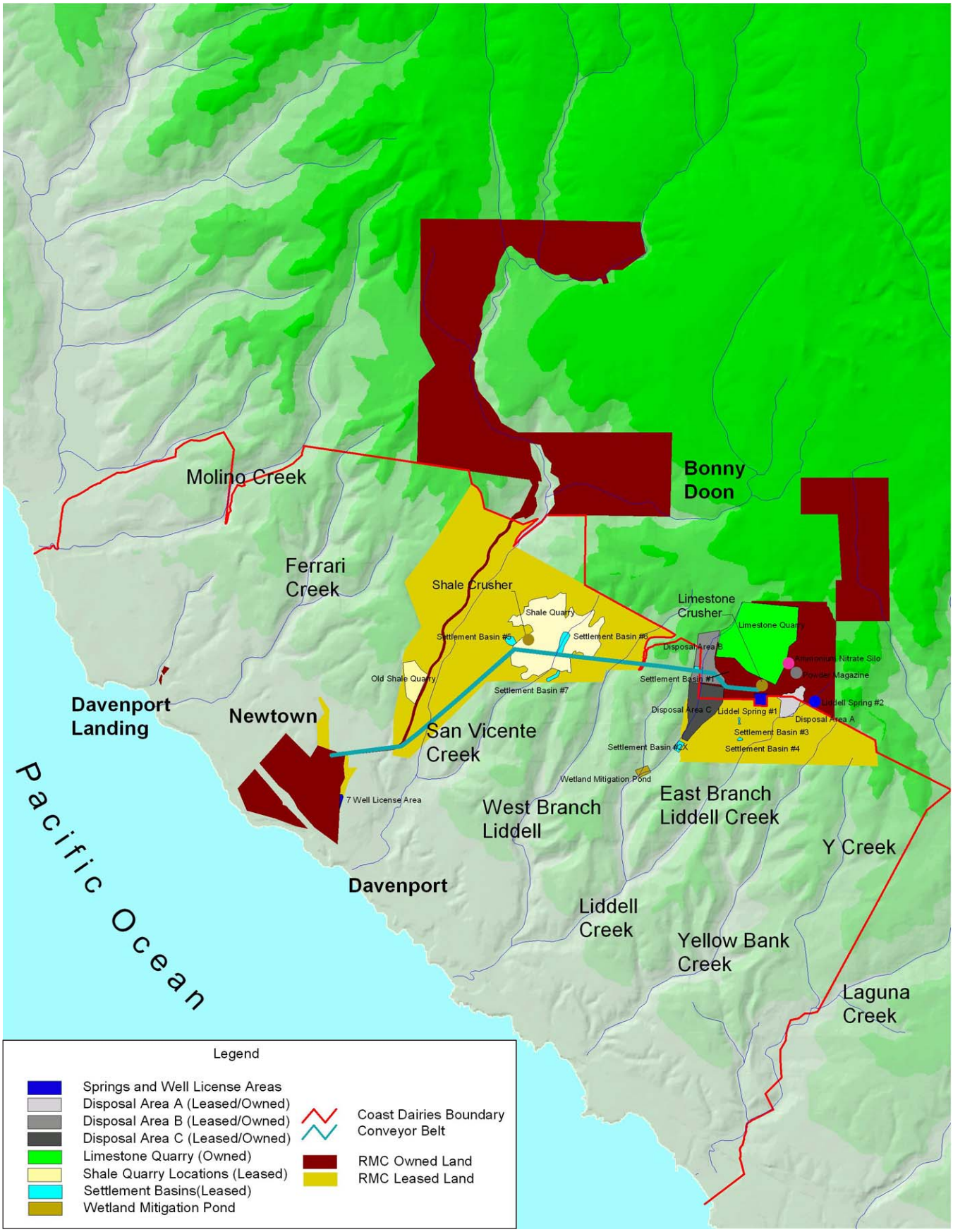
Mining is one of the existing land uses at the Coast Dairies Property. RMC Pacific Materials conducts mining operations in a shale quarry and limestone quarry and transports the mined materials from these quarries to its cement plant on a conveyor-belt system. RMC's Davenport Cement Plant is located along Highway 1, just north of the town of Davenport, and has been in operation since 1906. The Davenport Cement Plant is located on RMC-owned land and is largely surrounded by Coast Dairies land (Figure III-8). The RMC landholding also incorporates a historic railroad line that bisects the Coast Dairies Property. At one time, the historic rail line connected the plant to formerly active limestone and shale quarries. Timber harvest operations are currently conducted on a large portion of adjacent RMC land holdings east of Coast Dairies, totaling 9,350 acres (Sheidenberger, 2001).

On August 15, 1905, Mr. William Dingee, the "Cement King" and owner of the Standard Portland Cement Company, purchased 97 acres from the CDLC for the purpose of constructing the Davenport Cement Plant. The selection of the plant site was based on nearby limestone deposits in Ben Lomond Mountain, and the anticipated construction of a railroad line to the site by Southern Pacific (Santa Cruz Museum of Art and History, 2001). Standard Portland Cement



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Figure III-7
Department of Conservation Agricultural Land Categories on the Coast Dairies Property



SOURCE: Environmental Science Associates, Pacific Meridian Resources, RMC Pacific Materials, Madrone Landscape Group, Santa Cruz County GIS Department, USGS

Figure III-8
Mining Operations in the Coast Dairies Area

Company purchased additional acreage from Coast Dairies on September 26, 1905 for the purpose of constructing a railroad linking the proposed plant to quarry locations. Construction began on the plant in October 1905, shortly after the U.S. Government announced plans to construct the Panama Canal and Pearl Harbor Naval Base. Both of these federal projects would require vast quantities of cement. Devastation associated with the 1906 San Francisco earthquake and fire increased the regional demand for building materials, causing construction on the plant to accelerate. The plant began operation in late 1906, although construction continued until May 17, 1907. At the time, it was the second largest cement facility in the United States (Dupras, 1989).

The Standard Portland Cement Company was purchased by Pacific Coast Aggregates in the 1960s, which in turn was acquired by Lone Star Industries in the late 1960s. During the 1970s, Lone Star undertook a modernization of the Davenport Cement Plant to increase operating efficiency and improve environmental standards at the plant. This modernization included installation of air quality control equipment to reduce emissions of cement dust, and a partial redesign of the plant to increase production efficiency and lower energy consumption. The remodeled plant began production in August 1981 (Dupras, 1989). Lone Star's Davenport Cement Plant was then purchased by RMC in 1995. RMC is headquartered in Pleasanton, California, while its parent company, RMC Group, is located in the United Kingdom. In addition to the cement produced by the Davenport Cement Plant, RMC products include ready-mix concrete, aggregates, asphalts, and industrial sands.

Davenport Cement Plant

The Davenport Cement Plant is a highly visible part of the communities of Davenport, New Town, Davenport Landing, and Bonny Doon. The Davenport Cement Plant produces Portland cement, which is a fundamental binding ingredient of concrete. RMC produces approximately 900,000 tons of Portland cement annually (Sheth, 2001). More information regarding cement production is presented in the ECR (Pages 5.3-2 through 5.3-7).

By-products and Emissions

Cement kiln dust consists of the dust removed from kiln exhaust gases by pollution-control devices and is a by-product of cement manufacturing. More than 75 percent of cement kiln dust produced is recycled back into the kiln as raw materials. A portion of cement kiln dust cannot be recycled and is managed onsite in a monofill, or sold for use in construction as a road subbase material or as a stabilizer to reduce the expansive properties of clayey soils. Currently, all cement kiln dust that is not being recycled is sold, and existing stockpiles of cement kiln dust in the monofill are gradually being sold (Sheth, 2001).

Stockpiled cement kiln dust is managed in the monofill by RMC in accordance with Waste Discharge Order #99-23 from the California Regional Water Quality Control Board, Central Coast Region (RWQCB). Management practices include covering the monofill with plastic tarps to minimize wind-blown particulates. Additionally, 15 groundwater monitoring wells and piezometers are installed adjacent to the monofill for the purpose of monitoring groundwater elevations and quality. A portion of the existing monofill is located on land leased from Coast Dairies by RMC (Arkfeld, 2001). Two of the 15 groundwater monitoring wells are located on Coast Dairies land leased by RMC, and an additional five wells are located on Coast Dairies land that is not leased by RMC (Adenhuysen, 2001).

Cooling water and stormwater runoff from the plant are discharged to an unnamed stream adjacent to the Davenport Cement Plant that flows into the Pacific Ocean. Water released from the plant goes through a neutralizing system, whereby carbon dioxide is bubbled into the water to lower the pH prior to discharge. Water quality is monitored for toxicity, pH, and minerals in accordance with RMC's National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB (Arkfeld, 2001).

Air pollutants generated through cement manufacturing include sulfur dioxide, nitrogen dioxide, and particulates. Air pollution control equipment at the plant includes a sulfur dioxide removal scrubbing system and an electrostatic precipitator to control stack emissions. Air

emissions are continually monitored for sulfur dioxide, nitrous oxide, and opacity (Sheth, 2001).

Mining Operations

RMC leases approximately 780 acres from Coast Dairies for its shale quarrying operations, associated waste disposal areas, settlement basins, and covered conveyor-belt system from the shale and limestone quarries to the cement plant (Schmidt, 1997). The limestone quarry and a portion of the waste disposal areas are located on RMC-owned property. The limestone and shale quarries operate Monday through Friday between 7:30 a.m. and 5:00 p.m. The conveyor-belt system operates between 7:00 a.m. and 11:00 p.m. The shale and limestone quarries are classified as mineral resource areas by the Santa Cruz County General Plan (Santa Cruz County, 1994). However, these quarries are not classified as mineral or aggregate resources by the California Department of Conservation, Division of Mines and Geology (CDMG, 1983).

Limestone Quarry

RMC conducts mining operations in its limestone quarry, located within its 9,000-plus-acre property east of Coast Dairies, a few miles from the Davenport Cement Plant. The limestone quarry is located near the East and Middle Branches of Liddell Creek and has been identified through hydrologic studies as being within a groundwater recharge zone (Thomas Reid Associates, 1996). The limestone quarry consists of 272 acres and has been in operation since 1969. Approximately 15 to 20 percent of the mined rock is not suitable for Portland cement and is directed into waste disposal areas (Walker, 2001).

Blasting Materials

An ammonium nitrate storage silo, containing solid pearls of the blasting substance, is located on a road southeast of the quarry area. A powder magazine is located near the ammonium nitrate storage silo, where gel tubes of explosives are stored (Figure III-8). The gel tubes, measuring approximately 5 inches wide by 30 inches long, are used for blasting during wet conditions (Walker, 2001).

Groundwater

Groundwater beneath the limestone quarry restricts the depth of blasting activity and quarry operations. The floor of the quarry cannot exceed depths of 750 feet above mean sea level to avoid potential interaction with groundwater. Santa Cruz County mining regulations require a minimum 20-foot separation between the groundwater table and mining activities. RMC's quarry floor is located 65 feet above the highest recorded groundwater elevation in the area, amply satisfying Santa Cruz County regulations (Thomas Reid Associates, 1996).

Multiple groundwater monitoring wells have been installed upgradient and downgradient of the limestone quarry to monitor potential impacts to groundwater from limestone quarry operations (Reppert, 2001). Seven groundwater monitoring wells within the limestone quarry are tested for turbidity, nitrates, iron, manganese, and total coliform. Groundwater monitoring is conducted in accordance with a December 1, 1964 agreement between RMC and the City of Santa Cruz. Under this agreement, RMC has indemnified the City against diminution of the quantity or deterioration of the quality of water issuing from Liddell Spring #1, which is used by the City as a municipal water supply source and is located downgradient of the limestone quarry. The City has agreed not to contest limestone quarry operations under the terms of this agreement, which sets forth minimum flow rates to be met each month at Liddell Spring #1, and water quality parameters governing bacteria, turbidity, color, taste, odor, and chemical constituent concentrations (Thomas Reid Associates, 1996).

When the quarry is closed (date unknown at this time) reclamation and revegetation of the limestone quarry will begin.

Shale Quarry

Shale is the second largest component of Portland cement, comprising approximately 10 percent of total input materials. Shale is

a sedimentary sandstone that is naturally high in silica, a necessary component of cement. RMC mines shale from its shale quarry, located on 183 acres of land leased on the Coast Dairies Property approximately one mile east of the Davenport Cement Plant. The shale quarry is located between San Vicente Creek and the West Branch of Liddell Creek. Approximately 76 acres of the shale quarry are in production, and RMC is utilizing silica-rich rock originating from the limestone quarry. When in production, shale is typically mined from the quarry only two or three days a week.

Reclamation

Reclamation of the shale quarry is ongoing, with existing reclamation efforts focusing on inactive quarry areas. Final reclamation will include stabilization of cut slopes and benches to minimize the potential for future rockfalls and slope instability. Disturbed areas, cut slopes, benches, and certain access roads will be ripped and de-compacted prior to revegetation. Available information does not specify which shale quarry access roads are included in reclamation plans (Madrone Landscape Group, 2001). Reclamation of the shale quarry began in 1997 and is slated to continue through quarry closure (Madrone Landscape Group, 2001).

Covered Conveyor-Belt System

The covered conveyor-belt system transports raw materials from the quarries to the Davenport Cement Plant. There are seven conveyor lines that link together to transport material approximately 3.5 miles from the quarries to the Davenport Cement Plant (Figure III-8).

Waste Disposal Areas

Unusable rock, fines, and overburden materials from the limestone quarry are directed into waste disposal areas (Thomas Reid Associates, 1996). Three waste disposal areas (A, B, and C) have been created for storage of overburden and unusable materials; however, only one waste disposal area (Area C) is currently in use. These waste disposal areas are partially located on RMC- and Coast Dairies-owned land (Figure III-8).

Sedimentation Basins

RMC has four active sedimentation basins for its limestone quarry operations: settlement basins 1, 2X, 3, 4, 5, 6, and 7 are in the vicinity of the shale quarry. All settlement basins are located on property leased from Coast Dairies (Figure III-8). More information regarding waste disposal areas and sedimentation basins is presented in the ECR (Pages 5.3-12 through 5.3-13).

Wetland Mitigation Ponds

Three ponds have been constructed adjacent to Liddell Creek, as shown on Figure III-8. These ponds are wetland mitigation areas to compensate for the loss of wetland habitat associated with the creation of waste disposal areas and a settlement basin. These ponds are maintained and monitored in accordance with RMC's Habitat Conservation Plan, which was developed to monitor California red-legged frog populations and minimize potentially adverse impacts to frog populations and habitat resulting from RMC operations (Madrone Landscape Group, 2001).

Facility Access

Materials departing and arriving at the plant by truck must travel along Highway 1, the only public road that connects to the plant. Primary access to the quarries is through Bonny Doon Road, which connects to Conveyor Belt Road 2. Roadways between the cement plant, conveyor-belt line, quarries, waste disposal areas, and settlement basins all terminate within either RMC or Coast Dairies properties.

Roadways

Numerous roadways are used on RMC and Coast Dairies properties for mining and quarry operations. These roads allow for transportation of equipment, materials, and vehicular traffic between the Davenport

Cement Plant, shale and limestone quarries, waste disposal areas, sedimentation ponds, explosives storage areas, and wetland mitigation areas (Figure III-8). A portion of these access roads predate RMC mining operations (Madrone Landscape Group, 2001).

Large trucks travel between the Davenport Cement Plant and the shale quarry or limestone quarry on Cement Plant Road to San Vicente Road, Upper Quarry Road, and Conveyor Belt Roads 1 and 2. However, primary access to the quarries is through Bonny Doon Road, with trucks connecting to the limestone quarry via Conveyor Belt Road 2, and to the shale quarry via the Upper Quarry Road. Maintenance trucks make about 10 trips per day. Maintenance trucks can travel on these roads any time, seven days per week, 24 hours per day. Most maintenance trips occur on weekdays between 7:30 a.m. and 5:00 p.m., and also on Saturdays between 7:00 a.m. and 3:00 p.m., as mechanics are sometimes scheduled to work on machinery when the quarries are not in operation.

Leases and Land Use Agreements

RMC currently leases approximately 780 acres from Coast Dairies for cement plant and mining operations. Leased areas include the shale quarry, waste disposal areas, conveyor-belt system, settlement basins, and acreage surrounding the Davenport Cement Plant, as summarized in ECR Table 5.3-3 and depicted on Figure III-8.

An inactive shale quarry is located on the Coast Dairies Property adjacent to RMC's former railroad line. This quarry was historically leased by RMC for mining purposes, but was abandoned following the opening of the existing shale quarry in 1969 and the associated construction of the covered conveyor-belt system (Sheidenberger, 2001).

Additionally, RMC owns 30 acres west of Highway 1 that has been leased to Coast Dairies for agricultural purposes.

Public Health and Safety

Due to public safety concerns and Mining Safety and Heath Administration (MSHA) regulations, public access to RMC properties must be restricted. Blasting occurs at the limestone quarry, located adjacent to the Coast Dairies Property. This activity can occur two times per week, between 7:30 a.m. and 5:00 p.m. Prearranged blasting times are 11:40 a.m. or 3:00 p.m. RMC can blast at other times, but must call the Santa Cruz County Planning Department in advance. RMC has an Alcohol, Tobacco and Firearms (ATF) license to blast limestone.

RMC has several procedures in place to protect public health and safety during blasting activities. Along the access road to the limestone quarry, an entrance gate has been installed adjacent to the office building to block public access. At the entrance gate, a sign is installed alerting employees and visitors of potential blasting activities, and a blue flashing light above the sign is activated in the morning prior to detonation. Before blasting, guards are placed at all entry points into the blast area, and standard audible warnings are used prior to and during the countdown (Thomas Reid Associates, 1996). MSHA regulations require a clearance zone of 50 feet for blasting (Walker, 2001).

Public health and safety concerns associated with RMC operations on the Coast Dairies Property include the rock crusher (located on the shale quarry) and the covered conveyor-belt system. The conveyor-belt system is 3.5 miles long and consists of numerous moving parts. In accordance with MSHA regulations, an emergency pull cord has been installed along the length of the conveyor-belt system, as the conveyor is not guarded. This cord has the capability to halt the entire conveyor-belt system.

Mining Economics

Mining is a very small portion of Santa Cruz County's economy, constituting less than 4.5 percent of jobs countywide (California Employment Development Department, 2000). There are seven active

mining operations in the county; however, many of these mines have reached the limits of their boundaries or the mineral resources have been exhausted, indicating that the number of active mines is likely to drop in the near future. The potential for new mines to be developed in Santa Cruz County is low, as federal, state, and local regulations in the area are not supportive of this type of land use. Limestone, shale, sand, gravel, and granite are the primary materials mined in Santa Cruz County.

RMC employs approximately 170 people for operations at the cement plant and quarries. The majority of these employees work exclusively in the Davenport Cement Plant. Mining operations employ 16 to 20 people.

Regulatory Compliance

Mine Safety and Health Administration

The MSHA is a division of the U.S. Department of Labor. MSHA administers the provisions of the Federal Mines Safety and Health Act of 1977 (Mine Act), and enforces compliance with mandatory safety and health standards as a means to eliminate fatal accidents, reduce the frequency and severity of nonfatal accidents, minimize health hazards, and promote improved safety and health conditions in the nations' mines (Mine Safety and Health Administration, 2001).

U.S. Fish and Wildlife Service

California red-legged frogs, a federally endangered species, were identified at the limestone quarry in 1996. Following consultation with the USFWS, RMC developed a habitat conservation plan (HCP) for California red-legged frog in the Bonny Doon quarries settlement basins. This plan will remain in effect until August 4, 2009; a status report is submitted annually to the USFWS. RMC holds an incidental take permit (#TE844-722-0) from the USFWS, issued on August 5, 1999. The permit is subject to compliance with the HCP. Elements of the HCP include inspections of settlement basins by a qualified biologist prior to sediment removal activities. Should any frogs or larvae be identified during this inspection, sediment removal work will not commence (RMC, 2001).

Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (SMARA) provides for the reclamation of mined lands as necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. Surface mines operating within the state of California are required to have lead agency–approved reclamation plans, financial assurances, and permits prior to conducting mining activities (State of California, 1975). Santa Cruz County is the lead agency for SMARA.

Reclamation Plan and EIR

Reclamation plans are required for all mining operations under SMARA regulations. The State Mining and Geology Board has jurisdiction over final reclamation plans. The *Bonny Doon Quarries Revegetation and Reclamation Plan* was produced for RMC in 1996 and revised in February 2001 by the Madrone Landscape Group. The reclamation plan was prepared in compliance with SMARA and Santa Cruz County mining regulations. An environmental impact report was prepared for the reclamation plan in accordance with CEQA requirements (RMC, 2001). These documents reside in the project archives.

California Regional Water Quality Control Board

As required by the Regional Water Quality Control Board (RWQCB), RMC has an industrial stormwater pollution prevention plan (SWPPP) for mining operations, WDID #3 44S010829, and submits an annual report to the RWQCB. RMC's cement kiln dust monofill is regulated by Waste Discharge Order #99-32 from RWQCB. Cooling water and stormwater runoff from the plant are monitored for toxicity, pH, and minerals in accordance with RMC's NPDES Permit #CA0048682 from the RWQCB.

Monterey Regional Air Quality Control Board

RMC has multiple permits with the Monterey Regional Air Quality Control Board for quarry operations that require the use of dust suppression equipment and watering to minimize fugitive dust generated by quarry operations (RMC, 2001). These permits are summarized in the ECR (CD attached).

California Department of Fish and Game

RMC holds a 1603 Lake and Streambed Alteration Permit with the CDFG for work associated with sediment removal in several settlement basins. This five-year permit was obtained in 1999.

County of Santa Cruz Permits and Conditions

The Santa Cruz County Mining Ordinance requires that all existing mining operations obtain a certificate of compliance. The purpose of this requirement is to allow the County to review existing operations and impose mitigating measures as necessary to achieve compliance with approved quarry plans, SMARA, and county policy standards. RMC has a Mining Certificate of Compliance (#89-0492) issued by Santa Cruz County for operations associated with RMC's Use Permit #3236-U. Santa Cruz County mining regulations include noise requirements that cannot be exceeded. Mining operations were in compliance with Santa Cruz County noise regulations during 2000 (RMC, 2001).

Recreation, Access, and Visual Resources

Regional Recreation Setting

The coast and mountains between Santa Cruz and Año Nuevo contain an arc of conserved public lands centered around the Coast Dairies (Figure I-2 in Chapter I). Beaches are either dedicated public lands or are considered semipublic, since access to them is largely secured through the 1972 Coastal Zone Management Act and the legal principle of "implied dedication," which essentially validates historical use.

Regional Beaches

Major beaches north of the Coast Dairies Property include Greyhound Rock Beach, Waddell Creek Beach (part of Big Basin Redwoods State Park), Año Nuevo State Reserve, and Gazos Creek Beach. Major beaches immediately to the south of the Property include Four-Mile Beach, Three-Mile Beach, Strawberry Beach, Sand Plant Beach, Fern Grotto Beach, Wilder Beach, and Red, White and Blue Beach (Figure I-2 in Chapter I). Although there are no existing data documenting specific use patterns at the North Coast beaches, a consistent increase in visitors has been observed over the past two decades. Between 1981 and 1986, for example, visitor-days at Santa Cruz County beaches went from an estimated 2.1 million to 3.3 million (County of Santa Cruz, 1991).

Regional Parks and Open Space

Parks and open space in the region include beaches (described above), seven state parks, and open space lands administered by the City of Santa Cruz. Three state parks and one state reserve – Big Basin, Año Nuevo, Henry Cowell Redwoods, and Wilder Ranch – lie to the north, east, and south of the Coast Dairies Property. Gray Whale Ranch, a public open space administered by the Department, lies between Wilder Ranch and Henry Cowell Redwoods. City-administered open space includes properties such as the Pogonip (Figure I-2 in Chapter I). Although there is no existing documentation of formal or informal trail accesses between the Coast Dairies Property and these state parks and open spaces, there are two potential linkages provided by secondary roads. At the southern end of the Property, the road along the East Branch of Liddell Creek, Yellow Bank, and Y Creek Roads accesses Smith Grade, which in turn reaches Gray Whale Ranch via Woodcutter's Trail. At the northwest end, a spur to Warnella Road approximately three miles north of the property boundary dead-ends above Big Creek drainage, and is mirrored, on the opposite side of the drainage about a mile away, by a trail from the southeastern corner of Big Basin Redwoods State Park.

Regional Access

Highway 1 and, to a lesser extent, Bonny Doon Road are the main travel corridors that provide direct access to the Coast Dairies Property from regional destinations north, east, and south of Santa Cruz County. The California Department of Transportation (Caltrans) maintains the Highway 1 right-of-way, which varies in width. Existing parking areas along Highway 1 are located either partially or wholly within this right-of-way. Caltrans therefore has jurisdiction over any improvements made at these parking areas and has the right to require encroachment permits for proposed ingress and egress to the parking lots connecting with the highway (County of Santa Cruz, 1991).

Coast Dairies Property Recreation

Authorized Recreation Uses

Coast Dairies Beaches Description, Access, and Recreation Use. There are a dozen or so beaches at the Coast Dairies Property (Table III-4 and Figure I-2). However, information on the existing conditions, access, and recreation uses are presented only for the seven major Property beaches. Descriptions are derived principally from site reconnaissance and the North Coast Beaches Master Plan. The seven major beaches include the southern portion of Scott Creek, Davenport Landing, Davenport Beach, Sharktooth, Bonny Doon, Yellow Bank, and Laguna Creek, listed from north to south.

Miscellaneous Public Access and Use in Nonbeach Areas. Throughout the inland areas of the Coast Dairies Property, miscellaneous recreation uses are informally authorized. For example, San Vicente Trail and Warnella Road are two major trailheads used by the community and visitors to the Coast Dairies Property. RMC issues annual revocable permits to access its lands, which are honored on the Coast Dairies Property, for such activities as walking, jogging, bicycling, and dog walking (Smith, 2000). Tours of the Property are regularly offered and conducted by Landsmiths.

TABLE III-4: COAST DAIRIES BEACHES PROFILE[9]

Name of Beach	Size in Square Ft.	Carrying Capacity[a]	Average Demand[b]	Available Space[c]	Targeted Supply[d]
Scotts Creek	609,000	609	90	10	18
Davenport Landing	92,000	92	35	20	50
Davenport Bluffs & Beach	65,000	79	40	60	26
Sharktooth	13,320	13	15	55	0[e]
Bonny Doon	238,514	239	100	50	60
Yellow Bank	122,826	123	80	80	80
Laguna Creek	303,000	303	50	30	0[e]

a Optimum number per 1,000 square feet of beach as measured between high and low tides.
b Number of vehicles based on observations made during summer weekends in 1987.
c Approximate number of off-highway parking areas.
d Number of parking spaces represented in the North Coast Beaches Master Plan – total of 353.
e No change to existing parking conditions.

Unauthorized Recreation Uses

For the most part, information on activities that take place on the Coast Dairies Property is available only through onsite observations. Trespassing, criminal behavior, and other unauthorized activities on the Coast Dairies Property do occur throughout inland portions of the Property and the scenic coastal beaches. Such behavior may range from beach goers crossing over lands that are leased to farmers, to poaching, littering, and trampling on sensitive habitat areas.

9 Revised table from the County of Santa Cruz, *North Coast Beaches Master Plan*, 1991.

Coast Dairies Property Access Routes and Access Points

Access Routes

In the Coast Dairies Property, there are only a few major trailheads and county-maintained roads. The major routes are Warnella Road and San Vicente Road. The majority of existing access routes documented are either farm roads or paths used by agricultural and grazing leaseholders, maintenance roads used by the Santa Cruz Water Company, or private roads for RMC Pacific Materials. It is evident that these three entities currently use and maintain these access routes, as some unimproved paths would otherwise be indistinguishable, especially to the outside visitor. The ECR includes an overview of the road network at Coast Dairies (ECR, Section 4.2.8.2 and Figure 4.2-4).

Access Points

There are very few available access points for vehicles to park or pull out for temporary stops within the Coast Dairies existing road network. In most cases, those parking options are available in unimproved dirt areas off Highway 1 or graded dirt/gravel buffer spaces between Highway 1 and the coast. These access points include areas where it is relatively safe or convenient for cars to stop and pull over, but most are not established parking spaces. The ECR includes a discussion of paved parking lots, unpaved parking areas, unimproved parking areas, and miscellaneous access points on the Coast Dairies Property (ECR, Section 5.4.4.2).

Existing Access and Recreation Overview

Access

Independent of other considerations, areas with the highest potential to establish site-specific recreation staging areas are situated near multiple-access routes and potential parking spaces. Such recreation staging areas could be envisioned as developed trailheads with signage, scenic interpretive areas, or visitor centers with parking. One potential site is the Old Laguna Inn and the surrounding structures, which has access via Laguna Creek Road that continues inland, connecting into other trails and paths. This area could serve as an important service entry point for visitors approaching the Coast Dairies inland areas from the south.

Access Routes and Points

To date, the Coast Dairies Property, particularly the inland zones, has few direct access routes off Highway 1. Bonny Doon, Swanton, and Laguna Roads are among the more discernible access routes off Highway 1 inland. Several graded dirt roads provide moderate access within the watersheds on the inland property and have potential to become more developed trails or paths. Generally, access crossing the watersheds is limited to unimproved paths, such as cow paths across grasslands and the winding, graded dirt roads found in the Molino watershed zones. These unimproved paths could be connected within zones to create trail systems and inter-watershed loops.

In terms of access points, there are very few parking options available for vehicles coming from either the north or south on Highway 1. Existing (already heavily used) paved parking areas can be found in places, such as outside restaurants and shops in the town of Davenport. Graded parking areas as well as unimproved parking areas off Highway 1 have the potential to become longer-term parking lots and/or shorter-term scenic pullouts. Currently, cars park where it is relatively safe or convenient to stop, regardless of whether or not the area has been established for parking.

Visual Resources

Overview

The Coast Dairies Property provides a scenic interface of rugged coastline, sandy beaches, coastal agricultural terraces, pastoral grasslands, and densely forested uplands and riparian corridors (photos III-1 and III-2). The dominant built feature on the Coast Dairies landscape is the RMC Pacific Materials Davenport Cement Plant, with

Photo III-1: Rugged Coast Dairies coastline at Yellow Bank Beach

Photo III-2: Open grassland and scrub in the Liddell Creek watershed

a tower that rises 245 feet above the landscape. In addition, the county has designated three scenic roads in the vicinity of the Coast Dairies Property, including Highway 1, Bonny Doon Road, and Swanton Road. The public vistas from these roads are afforded the highest level of protection by Santa Cruz County (County of Santa Cruz, 1994). The scenic roads have been incorporated into the visual resources analysis.

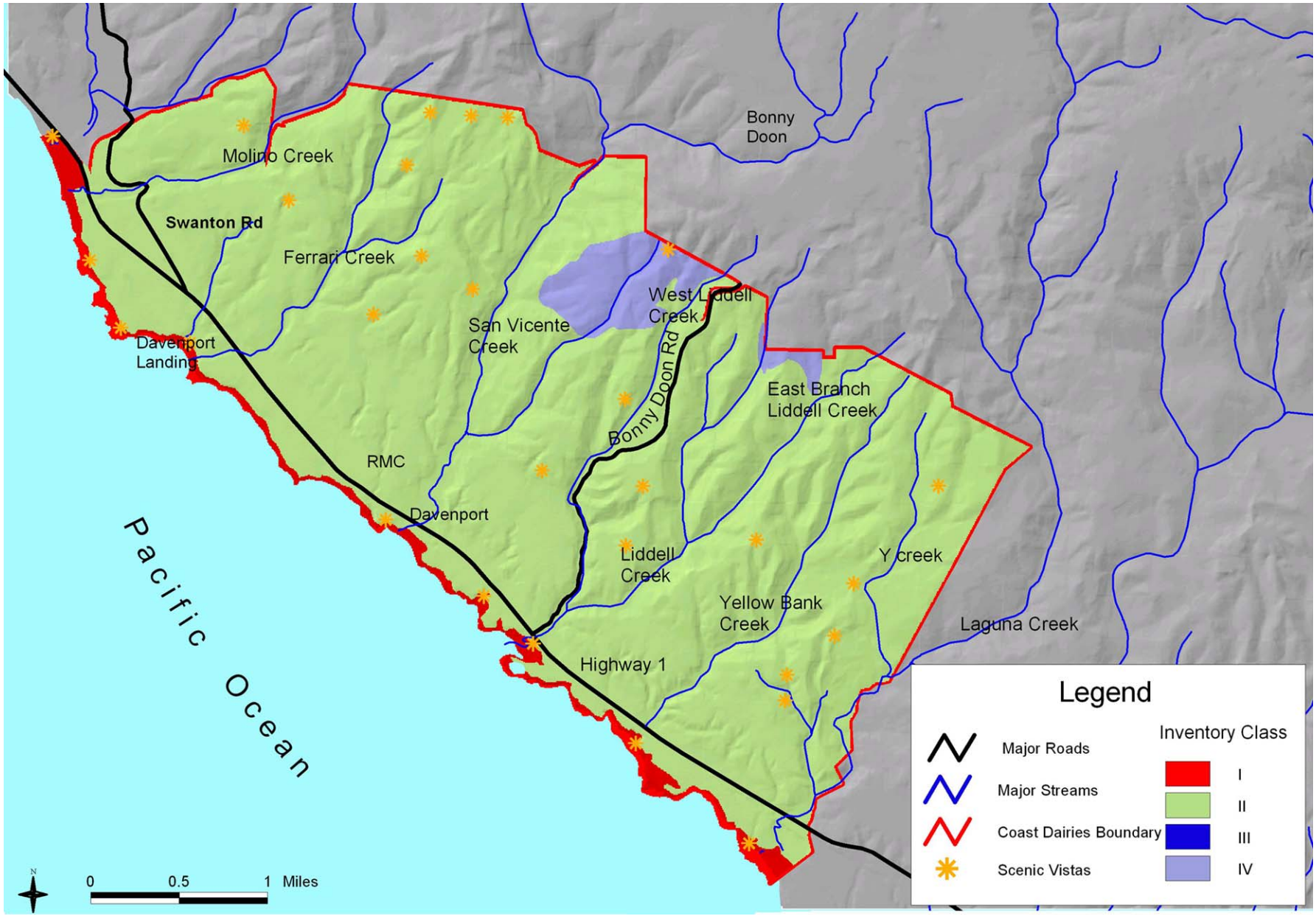
Scenic Vistas

The Coast Dairies Property affords many scenic vistas of the Pacific Ocean and the Property itself. A total of 29 scenic vistas have been identified (Figure III-9), based on accessibility, topography, and the quality of the viewshed from the scenic vista. The vistas provide examples of views of and from the Coast Dairies Property and are not intended to be an exhaustive catalogue. The vistas are predominantly available along the coastal bluffs and on areas of high topography on the Coast Dairies Property. Locations along the coastal bluffs provide short-range views of the Pacific Ocean, beaches, and rugged coastline, and medium- and long-range views of the Coast Dairies Property.

Locations in the upland areas of the Coast Dairies Property provide expansive views of the Property, as well as medium- to long-range views of the Pacific Ocean and the surrounding region. Locations in the upland areas of the Coast Dairies Property also provide visually interesting views of interior Property features, including wet meadows and unique trail corridors (photo III-3).

Visual Resource Inventory

BLM's Visual Resource Inventory was used to characterize the visual resources of the Coast Dairies Property. The Visual Resource Inventory provides a useful framework for determining the visual resource values of varied landscapes. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and delineation of distance zones (ECR, Section 5.4.6).



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-9

Visual Resource Inventory of the Coast Dairies Property

Photo III-3: Scenic vista of a trail corridor

Based on these three factors, areas are placed into one of four visual resource classes, which represent the relative value of the visual resources. Class I represents the most valued visual resources. The Class I designation is limited to "Special Areas" where management objectives frequently require special consideration for the protection of visual values. Class II represents highly valued visual resources. Class III represents moderately valued visual resources, and Class IV represents least-valued resources (BLM, 1986).

Visual Resource Class Assignments

The Coast Dairies Property includes three of the four classes: Class I, Class II, and Class IV. As shown in Figure III-9, the majority of the Coast Dairies Property is designated as a Visual Resource Class II area, in recognition of the high scenic quality of the Property. The Coast Dairies beach area is designated as a Visual Resource Class I area. RMC Pacific Materials' active shale quarry, disposal area C, and settlement basins #3 and #4 are designated as a Visual Resource Class IV area, which represents least-valued visual resources. These areas have low scenic quality and sensitivity level ratings.

The visual resource classes provide the basis for assessing the visual values during the resource management planning process. The visual resource classes are a useful informational tool in planning efforts to characterize visual resources and visual management objectives of the area. During the resource management process, the visual resource class boundaries and objectives may be adjusted as necessary to reflect resource allocation decisions (BLM, 1986).

Land Use and Land Tenure

Land Use

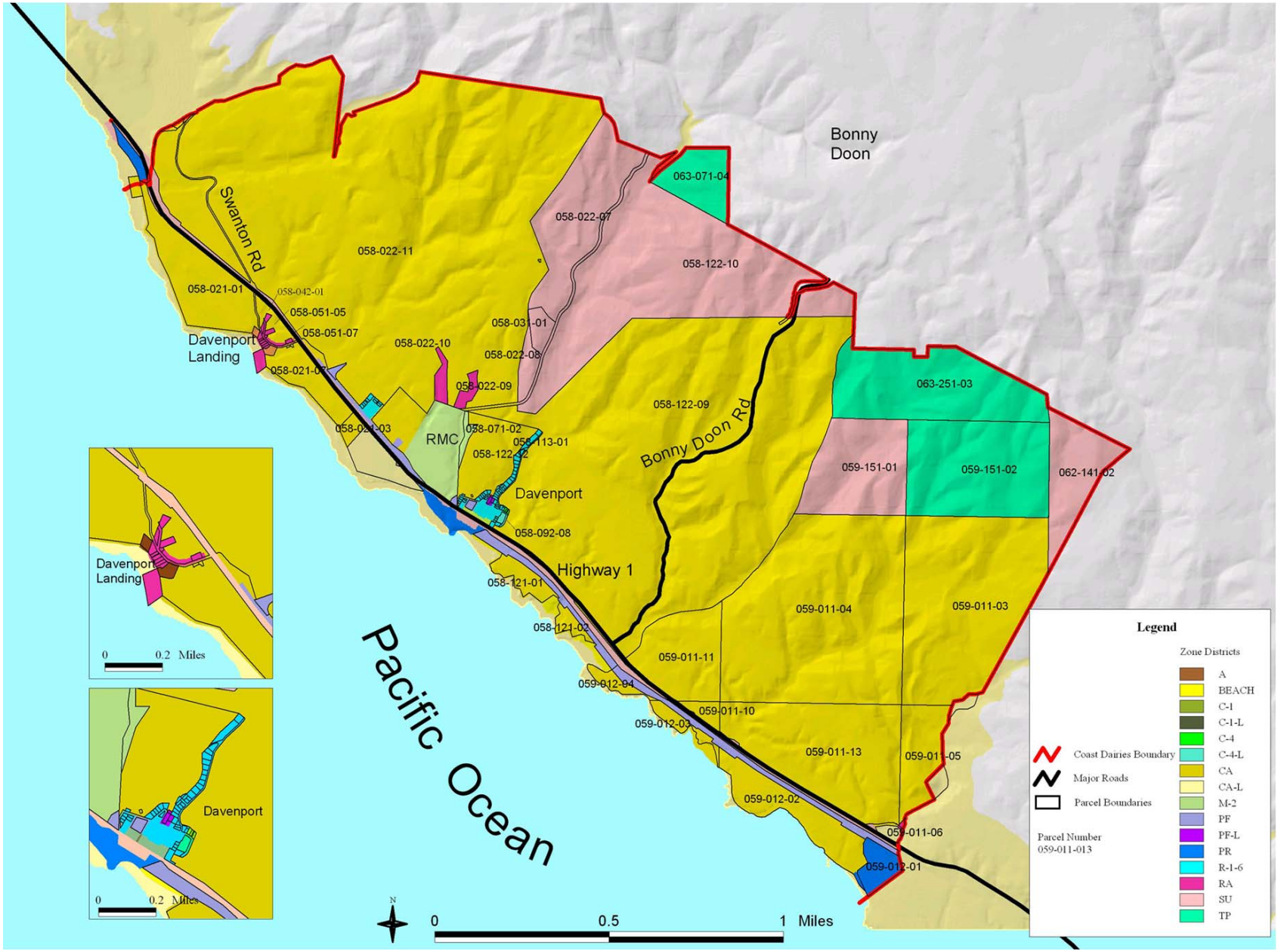
The 1994 Santa Cruz County General Plan and Local Coastal Plan divides the land into large land use designations that are then further subdivided into zoning districts. In general, the land use designations provide long-term guidance, and specific guidance is incorporated in the zoning districts.

Five land use designations cover the Coast Dairies Property: Agriculture (AG), Resource Conservation (O-C), Quarry/Mining (Q), Mountain Residential (R-M), and Urban Residential, Low Density (R-UL) (Figure III-10). Within those designations, there are nine zoning districts on the Property: Commercial Agriculture (CA), Commercial Agriculture - Historical (CA-L), Light Industrial (M-2), Public Facilities (PF), Parks and Recreation (PR), Single-family Residential (R-1-6), Residential Agriculture (RA), Special Use (SU), and Timber Production (TP) (Figure III-11).

Actual land uses on the Coast Dairies Property are mapped in Figure III-12, including recreation and open space, agriculture, mining, residential and commercial, and transportation corridors.

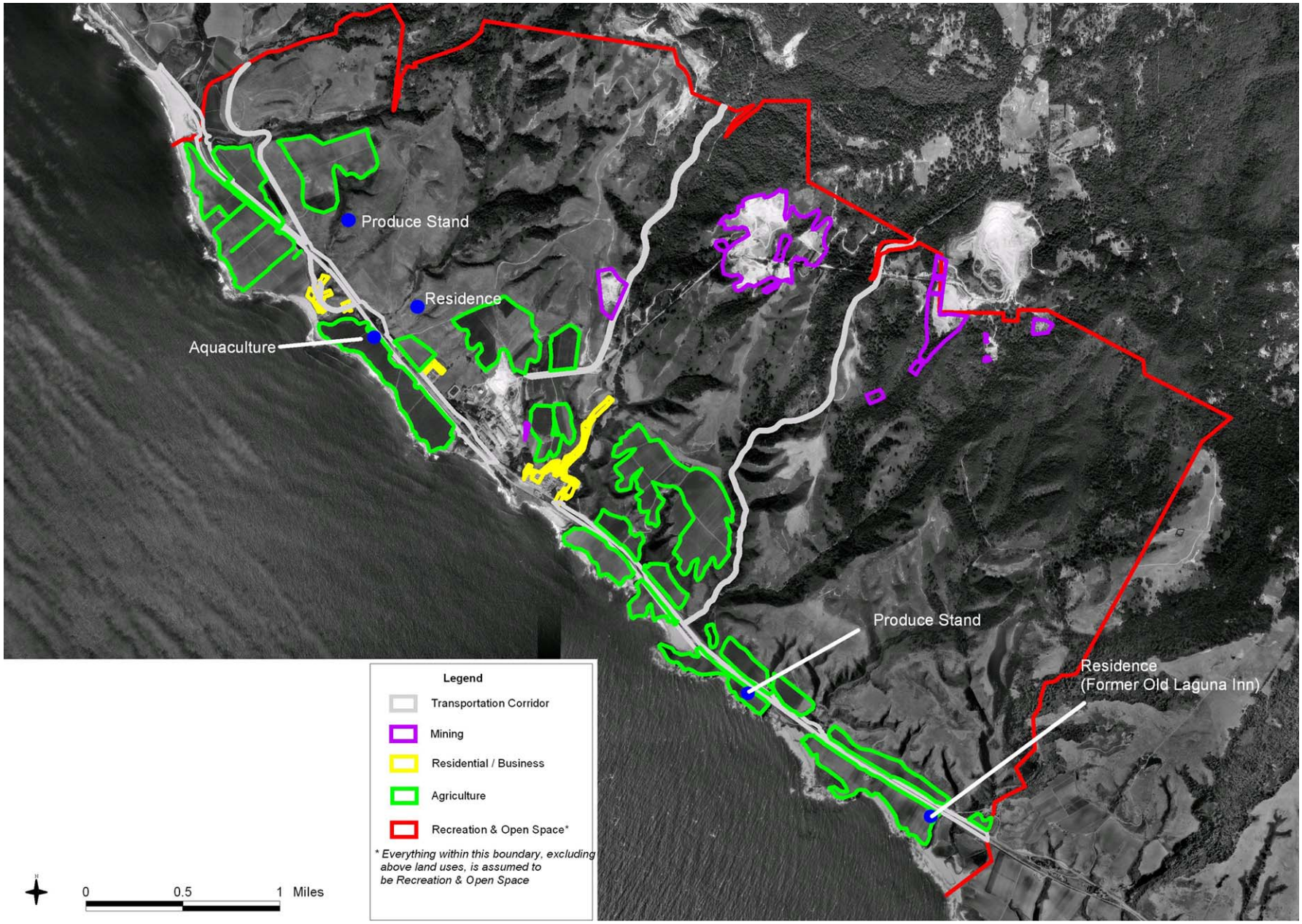
SOURCE: County of Santa Cruz, Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-10
County Land Use Designations



SOURCE: County of Santa Cruz, Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-11
County Zoning Districts



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Figure III-12
Land Uses on the Coast Dairies Property

Recreation and Open Space

The cool, somewhat isolated beaches along the Coast Dairies Property's coastline are the sites of most of the recreation that takes place on or near the Property. Recreation on other parts of the Property includes some unauthorized camping and hunting, which has resulted in littering and the trampling of sensitive resource areas. Although the entire Property has the potential to be used for recreation, only the beaches are accessible for public recreation.

Beaches. A dozen or so beaches along the shore of the Coast Dairies Property provide unique opportunities to experience the interface of land and sea along the North Coast. The main beaches along the coast, from north to south, include Scotts Creek Beach, Davenport Landing Beach, Davenport Bluffs and Beach, Sharktooth Beach, Bonny Doon Beach, Yellow Bank Beach, and Laguna Creek Beach.

Coast Dairies owns access to all of these beaches, with the exception of Scotts Creek Beach and the main access to Davenport Beach, which is largely owned by Santa Cruz County. Coast Dairies, however, does own a small portion of that beach at the far southern end.

Forest. The forested uplands of the site consist of oak/mixed woodland and redwood/Douglas-fir forest, as well as riparian corridors with alder and willow riparian forests. Although rare, there is a knobcone pine forest on the uppermost ridges of the middle and east forks of Liddell Creek, an area that is the least disturbed wooded area on the site. Some grazing takes place in the areas where the grasslands reach into the woods, and various roads wind through the forests. In the RMC leaseholds, the forests, including the riparian stands, are subject to complete removal to accommodate quarry operations (Smith, 2001).

Grasslands. Non-native grasslands cover approximately half the Coast Dairies Property, primarily in the first and second terraces. Historically, the grasslands have been used for cattle grazing, a use that continues on most of the grasslands today. Some native perennials mix with the non-native grasses, and the areas that have not been grazed are susceptible to invasion by non-native thistles. In 2001-2002, a few hundred acres of grasslands on the Property were been damaged by wild pigs (Smith, 2001).

Chaparral. The chaparral/scrub zone, ubiquitous in this part of the California coast, lies relatively undisturbed on the steepest slopes of the site – areas where it is impossible to farm or graze (Smith, 2001).

Ponds/Streams/Marshes. The Property and its immediate vicinity contain diverse wetland types, including marshes, ponds, creeks, wet meadows, and seeps. Over 100 acres of wetlands have been mapped by aerial photo interpretation. Because aerial photo interpretation does not account for wet meadows and seeps, the actual acreage of wetlands on the Property is likely much higher (Schmidt, 1997).

Agriculture

Although the land of the Coast Dairies Property was historically leased to dairy farmers, beef cattle ranchers (for grazing), and vegetable and fruit growers, today only the last two types of agriculture remain on the Property.

Grazing/Rangeland. Pasture lands are managed under three contracts for the grazing of beef cattle in the northern, central, and southern portions of the Property, over a total area of 1,320 acres. These contracts stipulate that the tenants follow a Conservation Grazing Plan, prepared and reviewed annually, that protects grasslands and oak woodland habitat and increases habitat diversity.

Row Crops. Crops grown on the Property range from Brussels sprouts and artichokes to leeks, peas, cabbage, and beans. Swanton Berry Farms, a producer of organic strawberries, bush berries, and mixed vegetables, has leased a 41-acre parcel to the north of the town of Davenport, and hopes to further expand organic crop production by establishing other satellite organic farms on the Property. In total, 323 acres of the Property are leased to four fruit and vegetable growers. Three of the lessees farm on irrigated land; one dry-farms hay on 144 acres.

The Coast Dairies Property is in transition in terms of ownership, management, lessees, and water usage. A difficult agricultural economy and the listing of coho salmon and steelhead as endangered species in 1999 have limited the renewal of crop leases.

Mining

Cement Plant. While not on the Coast Dairies Property, the Davenport Cement Plant has a prominent presence in the area. In operation since 1906, it produces approximately 875,000 tons of Portland cement annually, and is fed raw materials from its shale quarry on the Coast Dairies Property and the limestone quarry on the adjoining, 9,000-acre parcel owned by RMC Pacific Materials.

Quarry. RMC leases just approximately 780 acres of Coast Dairies Property land (Schmidt, 1997), of which approximately 115 acres are currently in shale-mining production. Once scraped from the hillside, the shale is crushed at the quarry and carried to the cement plant on a covered conveyor-belt system. Seven conveyor lines linked together form the material transport system between the quarries and the cement plant.

As part of the two quarrying operations, RMC has established several waste-disposal sites and sedimentation ponds. One disposal area, waste disposal area C, is in active use on RMC-leased land on the Coast Dairies Property, and covers about 24 acres. All of RMC's seven sedimentation ponds are on the Property, also on land leased by RMC.

Residential and Commercial

Residential. Onsite housing is limited to two habitable residences with associated structures, and dormitory housing for seasonal agricultural workers. One of the residences is east of Highway 1 at Laguna Creek, and the other sits on Cement Plant Road.

At the inholdings of Davenport and its surrounding community (Davenport, New Town, and Davenport Landing), there are approximately 60 mostly single-family, detached residential units. Only two vacant residential lots remain in Davenport; a few more still exist on Swanton Road, though not on the Coast Dairies Property.

Commercial. No commercial activity per se takes place on the Coast Dairies Property, with the exception of two seasonal produce stands on Highway 1 operated by Fambrini and Swanton Berry Farm. While the agriculture and mining on the Property generate materials that contribute to commercial activities, those activities take place offsite.

U.S. Abalone, one of the largest abalone producers in the country, leases three acres at Davenport Landing for abalone aquaculture (Schmidt, 1997). The operation yields both abalone meat and cultured abalone pearls.

Numerous small businesses exist in the town of Davenport. Restaurants, a bed-and-breakfast, and a grocery store complement artisans producing glassware, knives, paintings, and other crafts.

Transportation Corridors

Highway 1 hugs the coastline as it passes through the Property, nearly parallel to the Union Pacific Railroad. The two rights-of-way vary greatly, with Caltrans' ranging from 100 to 300 feet, and Union Pacific's from 60 to 240 feet. Heading inland from the coast, the county-maintained Bonny Doon Road also crosses through the Coast Dairies lands.

Land Use Compatibility

There are several places on the Property where the County's land use designations appear to be incompatible with some of the actual land uses. For instance, portions of RMC-leased land have Mountain Residential designations but actually surround mining uses – in this case, the conveyor lines for RMC's operations. Similarly, next to the Davenport Cement Plant, a parcel leased by RMC is designated Mountain Residential but supports the cement plant operations. These apparent inconsistencies are resolved by the more specific County zoning districts, which name the former areas as Special Use and the

latter as Light Industrial. Several parcels are also designated as TP-Timber Production; however, the conditions under which TPL purchased CDLC require that no commercial logging of redwoods take place on the Property.

County zoning districts present one potential land use incompatibility on the site. The Residential Agriculture zoning district is generally set aside for single-family dwellings outside the Urban and Rural Services lines. RMC leases a portion of a canyon adjacent to the cement plant that is zoned Residential Agriculture. Contrary to the residential zoning district, the company has filled the canyon with cement kiln dust. This former canyon is now level with the adjacent farmland and is incapable of supporting plant growth, even with a layer of topsoil. Its setting, surrounded by agricultural uses and a mountain of dust, makes it an unlikely choice for residential uses of any type (Smith, 2001; Simonds, 2001). This incompatibility in use is explained by the fact that, with approval, the County allows for a variety of nonresidential activities in the Residential Agriculture zoning district.

With the exceptions of this nonresidential use of a Residential Agriculture parcel and the ban on timber production, the more precise zoning districts do reflect the real uses taking place on the Coast Dairies Property and remove apparent incompatibilities between the County land use designations and actual land uses on the site.

Land Tenure

Land tenure encompasses private inholdings, leases, and easements of the Coast Dairies Property (Figure III-13). This section discusses the inholdings of private landowners other than Coast Dairies adjacent to or surrounded by the Coast Dairies Property. In addition, this section addresses leases and easements within the property boundary of the Coast Dairies Property.

Inholdings

The inholdings include land holdings of RMC Pacific Materials, the community of Davenport, an aquaculture farming operation, the State of California, the County of Santa Cruz, Union Pacific Railroad, and PG&E (ECR, Table 5.5-1).

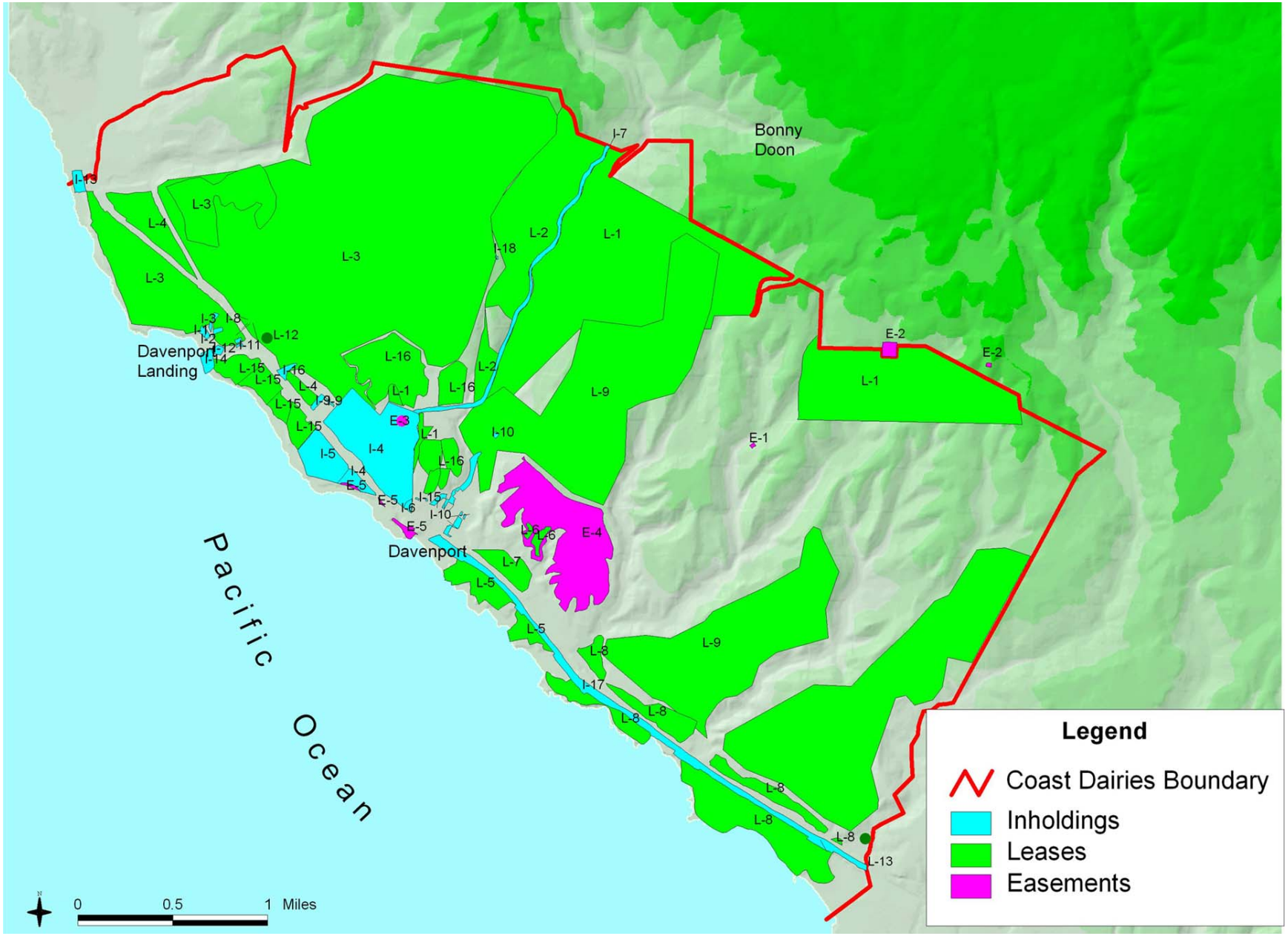
RMC Pacific Materials. Historically, RMC Pacific Materials (formerly RMC Lone Star) has been the owner of the largest landholding on the Coast Dairies Property, which includes the RMC Davenport Cement Plant (identified as I-1 through I-7 on ECR, Table 5.5-1).

Community of Davenport. The community of Davenport includes Davenport, Davenport Landing, and New Town (identified as I-8 through I-10). These historic towns have a combined population of 200 and contain both residential and commercial uses, including art galleries, a hotel, restaurants, and a convenience store.

U.S. Abalone. U.S. Abalone, a division of Silver King Oceanic Farms, is located west of Highway 1 in the northern section of the Coast Dairies Property. U.S. Abalone is the primary abalone farm in Santa Cruz County and one of the largest producers in the U.S. The company owns three separate parcels of land in Davenport Landing (identified as I-11 and I-12). U.S. Abalone also leases land from Coast Dairies, as discussed under “Leases.”

State of California and the County of Santa Cruz. The State of California owns two parcels of land within the Coast Dairies Property (identified as I-13 and I-14). Both parcels are leased to Silver King Oceanic Farms, Inc. (i.e., U.S. Abalone) and are further discussed under “Leases.” The County of Santa Cruz owns one parcel in the town of Davenport that is occupied by an above-ground storage tank that is currently not in use (identified as I-15).

Union Pacific Railroad. Union Pacific Railroad owns three parcels within the Coast Dairies Property associated with its railway operations. Two parcels include railroad tracks and run parallel to Highway 1 (both identified as I-18), while one parcel (identified as I-17) is used for train turnouts.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure III-13
Land Tenure on the Coast Dairies Property

PG&E Substation. A PG&E substation on the Coast Dairies Property is located west of Highway 1 off of Warnella Road. The substation occupies an 0.11-acre parcel owned by PG&E (identified as I-19).

Leases

The CDLC leases land to private entities for a variety of uses, including mining, agriculture, aquaculture, and residential use (ECR, Table 5.5-2). The private inholdings on the Coast Dairies Property that are leased to entities have been noted in the discussion above.

RMC Pacific Materials. RMC leases approximately 780 acres from Coast Dairies for its shale quarrying operations, associated waste disposal areas, sediment ponds, and the covered conveyor-belt system from the quarry to the cement plant (identified as L-1 and L-2 on ECR Table 5.5-2).

Agriculture. Engaged in beef cattle production and dairy operations, Coast Dairies leases 2,613 acres of land to agricultural producers. The land in agricultural use is located along the coastal bluffs and is bisected in several places by Highway 1 (identified as L-3 through L-10 and L14 through L-16).

U.S. Abalone. In addition to U.S. Abalone's inholdings, the company leases a 14-acre parcel from Coast Dairies for aquaculture (identified as L-11). This parcel is south of Davenport Landing. U.S. Abalone leases a second parcel from Coast Dairies between Davenport Landing and Highway 1 (identified as L-11), which is not actively used. The State of California owns two parcels on the coast that are leased to U.S. Abalone as well. One parcel consisting of 3.9 acres is described as vacant. The other parcel, which consists of about 4.2 acres, maintains current operations.

Residential. The Coast Dairies Property also includes two structures that are leased to residential tenants who have lived on the Property for many years.(identified as L-12 and L-13).

Easements and Agreements

Within the overall boundary of the Coast Dairies Property, certain groups and agencies have rights-of-ways that permit use of the Coast Dairies Property. These rights-of-way, which are referred to as easements in this report, belong to the CDFG, the City and County of Santa Cruz, RMC Pacific Materials, Caltrans, PG&E, and the California Coastal Conservancy (ECR, Table 5.5-3).

California Department of Fish and Game. RMC inholdings and leased lands contain wetlands subject to the jurisdiction of the U.S. Army Corps of Engineers (identified as E-1 on ECR Table 5.5-3). The CDFG has mandated that RMC must have an approved maintenance and monitoring plan for current projects involving these wetlands. A Memorandum of Understanding was reached between CDFG and RMC in March 1998 involving mitigation for adverse quarrying effects on wetlands. To date, the terms of this agreement are not being carried out due to unresolved issues between CDFG and RMC (Shipper, 2001).

The City and County of Santa Cruz. The City of Santa Cruz has had rights to Liddell Spring and Liddell Creek on the Coast Dairies Property since 1917. The City's easement (identified as E-2) also includes a water pipeline and access to the waterline for maintenance purposes (Santa Cruz County, 1999). This includes an access road with a 10-foot right-of-way around the pipes (Bentley, 2001).

The County of Santa Cruz easement includes an agreement dated January 9, 1996 for the sale of tertiary-treated wastewater. The agreement was entered into between the Davenport County Sanitation District, which owns the sewage treatment plant, and the CDLC. The wastewater is generated by RMC Pacific Material's operations, which divert water from San Vincente and Mill Creeks, and is given primary treatment in a plant located just above the cement plant on RMC property (identified as E-3). The Santa Cruz County Department of Public Works has a general easement with RMC that allows them to access the Property to perform maintenance on the tanks as needed (Jesberg, 2001).

County of Santa Cruz Agricultural Conservation. In May 1999, the County of Santa Cruz purchased development rights to approximately 164 acres of land for $766,000 within the Coast Dairies property from the CDLC. The purchases are located on the second coastal terrace between San Vicente and Liddell creeks (identified as E-4). The purchase agreement stipulates that the land can only be used for agricultural purposes, and allows tenants to live on the land only if it is used for agricultural conservation purposes (CDLC, 1999). Currently, a farmer leases 11 acres of land for agricultural production. His lease commenced March 2001 and extends until February 2004.

RMC Pacific Materials Offer to Dedicate Public Access. In 1981, RMC Pacific Materials offered to dedicate five discrete parcels (identified as E-5) for public accesses. RMC's Offer to Dedicate Public Access was accepted by the Santa Cruz County Land Trust in February 2001.

Caltrans. Highway 1 extends along the western edge of the Coast Dairies Property. Caltrans holds and maintains a right-of-way for Highway 1 and the immediate surrounding area in order to perform necessary maintenance. Temporary easements are sometimes required to allow for construction of maintenance structures, such as sound walls, to be placed along Highway 1 (Zambo, 2001). Currently, no maintenance is occurring. The Caltrans easement is not mapped on Figure III-13.

PG&E. PG&E maintains powerline easements on the Coast Dairies Property that originate at the substation. These powerlines connect to and serve the RMC Davenport Cement Plant exclusively. PG&E is permitted to remove any trees or brush within the easement area or that otherwise may be endangering the facility. Maintenance within the easement is performed once a year; however, CDLC has worked with PG&E to selectively remove only those trees that are clearly causing a hazard (Chavez, 2001). The PG&E easement is not mapped on Figure III-13.

California Coastal Conservancy Irrevocable Offer to Dedicate. In 1997, the California Coastal Conservancy offered $6 million to develop public access for a segment of the Coast Dairies Property coastal lands. The Conservancy intends to preserve open space, provide public access to and along the coast, and protect the natural and agricultural resources of the Property. This easement is not mapped on Figure III-13.

Historical, Cultural, and Archeological Resources

Regional Setting

The Coast Dairies Property contains a wide range of cultural resources that represent the long span of occupation and land use that began in prehistory and has continued into the present. The resource inventory includes prehistoric and historic archeological deposits; objects, structures, and buildings (the built environment); historical landscapes; and places of traditional value to groups in present-day society. The Coast Dairies Property has a robust history, and the cultural resources discussed in this section are its tangible remains.

Archeological Resources

Previous Research

Since the 1970s, only a handful of surveys and a few test excavation projects conducted under CEQA guidelines have occurred within the Coast Dairies boundaries. Of the approximately 7,000 acres of Coast Dairies land, only about 3 percent (240 acres) has been surveyed for archeological resources.

Only two sites on the Property have been the focus of archeological attention. Site CA-SCR-117, also known as the Davenport Landing Site, has been the subject of a number of surveys, trenching, and test excavation projects during the last 25 years (Stafford, 1975; Roop, 1976a; Chavez, 1989; Clark, 1994, 1996; Fitzgerald and Ruby, 1997). It is the only archeological site within Property boundaries where professional excavation has taken place and an intact cultural deposit has been unearthed. Radiocarbon dating places the site's occupation between ca. A.D. 1680 and A.D. 1505, making this one of the more important sites in Santa Cruz County by virtue of its occupation by

Native Americans just prior to and perhaps during the time of Euro-American contact (Fitzgerald and Ruby, 1997).

The other site, CA-SCR-18, is in the modern town of Davenport. This site was first discovered and recorded in 1950 when three burials were unearthed during construction of a bakery (UCAS, 1950). In 1977, it was again the venue of a major salvage project by the University of California, Santa Cruz following an unauthorized excavation of a house foundation (Edwards, 1978). All back-dirt from the excavated area was screened, and numerous artifacts and the remains of one burial were discovered. The recovered cultural materials were analyzed and later stored at the university.

Site Assessments

The main goal of the site assessment effort was to assess the quality of existing site records and to verify site locations as plotted on USGS 7.5-minute topographic maps (Davenport and Santa Cruz quadrangles) by the Northwestern Information Center. At the outset of the project, a records search disclosed 23 recorded archeological sites within and along the periphery of the Coast Dairies Property boundaries. Each site record was examined thoroughly for content and clarity as to the subject site's description and location. Various survey, excavation, monitoring, and environmental impact reports involving these 23 sites were also reviewed to obtain additional information about site presence and location. This review indicated that all of the site records, with the exception of one, are of very low quality; they provide little information, and some even present conflicting site locations (ECR, Table 5.6-1). In contrast, available technical reports referencing the sites are more useful, and reveal that many sites have been relocated during recent archeological investigations, verifying their existence and location.

A representative sample (11 of 23) of sites were visited and analyzed to assess each site record's validity, verify location, and determine site integrity (ECR, Section 5.6.4). Sites were selected that had not been relocated during recent investigations, and were visited in February 2001. The 12 sites that were not visited had been relocated during previous surveys and/or excavation projects conducted under CEQA guidelines or during academic research projects.

Predicted Historic Archeological Resources

Ranch and Dairying Complexes

The Coast Dairies Property was most extensively used during the late 19th and early 20th centuries for livestock production and dairy operations. Dairy operations were by necessity complex. In addition to large dairy barns, the operation usually included residences, bunkhouses, milk sheds, equipment storage sheds, and corrals and pens. The dairy ranches also supported large haying operations, incorporating hundreds of acres of nearby fields into the ranch.

Photos in the Project Archives demonstrate the formation of a historic dairy site. Portions of four aerial photographs taken in 1928, 1940, 1956, and 1967 show the development of the site and changes over time. This dairy ranch (unnamed) is located on Coast Dairies Property. It is very likely that the original buildings at the site predate the turn of the century. None of the buildings in the aerial photos are now standing, although a recent ground check revealed a scatter of diverse historic materials on the ground surface. It is safe to assume that buried deposits such as privies, trash dumps, cellar remains, and the like are present in the area of the former dairy operation.

A description of known ranch complexes is provided below. Only the Molino Creek Dairy site was visited. Other sites are predicted based on historical aerial photographs and oral history testimony (see the Project Archives).

Molino Creek Dairy. Also known as Davenport Dairy, and Cuclis Dairy or Ranch, this site is marked by several degraded structures, a standing concrete milk house, and a large storage cellar presumably used to store and age cheese (later to store wine). The dairy was operated until the beginning of World War II by the Cuclis family (Jack Cuclis was a Greek émigré form Crete, who had first worked in the quarries at the cement plant). The dairy operation is visible on the 1928 aerial

photographs (Project Airphoto Archives, Flight 1928D) and probably dates to the 1880s.

Big Ranch. This ranch complex was operated most recently by Fred Pfeiffer, the rancher who ran cattle in much of the upland area of the Coast Dairies Property. The complex is visible on aerial photos from 1928 (Project Airphoto Archives, Flight 1928D, Frame 16, and Project Archives, Lud McCrary Interview No. 1, Note B). Some buildings are still standing at the site.

Ferrari Creek (Muchitini) Ranch. This ranch complex was located on Ferrari Creek east of Davenport Landing. Oral history respondents recalled that the ranch was upstream from Davenport Landing, had a hog pen over the creek, and also recalled a fish hatchery (Project Archives, Tom and Richard Dietz Interview). There are no remaining structures at the site, and the potential for historic archeological deposits is unknown. The complex is visible on the 1928 aerial photograph (Project Airphoto Archives, Flight 1928D, Frame 16).

Charlie Pinkham Place and Agua Puerca School. This complex of buildings near the Southern Pacific Railroad included the Pinkham residence and the Agua Puerca Schoolhouse. Charlie Pinkham was a county road foreman and, in addition to his residence the county, maintained two or more buildings as maintenance garages (Project Archives, Lud McCrary Interview No. 1).

Yellow Bank Creek and Dairy. This dairying complex was near the mouth of Yellow Bank Creek and, like the Molino Creek (Cuclis) Dairy, is one of the best remembered operations on the North Coast of Santa Cruz County. The complex probably dates to the late 19th century; at one time it had at least 10 structures and buildings, and was the headquarters for the CDLC from the time of the company's formation in 1901. The complex is clearly visible on the 1928 aerial photographs (Project Archives, Lud McCrary Interview No. 1, 1928D, Frame 13, Note D).

Trash Dumps. Two trash dumps were identified during oral history research (Project Archives, Tom and Richard Dietz Interviews). Two dumps in the vicinity of Davenport were said to have been used for several years, beginning at least in the 1920s, but probably as early as the early 20th century. These were described as community disposal areas, and probably contain the full range of domestic, commercial, and possibly industrial refuse.

Other Potential Sites

Davenport Landing. Peter Davenport developed Davenport Landing as a shipping point for the North Coast in 1867. A small community built up around the pier, including both commercial and residential structures (see ECR Section 1.2.5, Davenport's Landing). The town was destroyed by fire in 1913 and while some structures were rebuilt, the fire effectively marked the end of the community. A few buildings are visible on the 1928 aerial photograph (Project Archives, Lud McCrary Interview No. 1, 1928D, Frame 16).

The Built Environment

The built environment at the Coast Dairies Property comprises a wide variety of both buildings and structures that represent predominant historical themes, including agriculture, transportation, and recreation. Buildings and structures at the Property consist of residences, bunkhouses, barns, storage and curing buildings, corrals, dams, trestles, and a variety of other structures that typically accompany farming or ranching operations. The built environment can be understood in the context of these major historic themes, and draws its value (importance or significance) from these associations. The value of the Property's built environment may be described in terms of research potential, interpretive value, and the potential for reuse.

Research Potential

The complexes of buildings and structures found in or associated with the coastal creek drainages represent the agricultural history of the property. These complexes have the potential to provide data to help

understand that history. The Cuclis Dairy (a.k.a. Molino Creek or Davenport Dairy) on Molino Creek (described above) provides an excellent example of research potential at Coast Dairies. This settlement area now contains the collapsed or nearly collapsed remains of three buildings (bunkhouses and a milk house) and a large stone-lined storage structure carved into a nearby hillside. The remains of other buildings and structures, as well as the remnants of daily activities, are almost certainly part of this complex in the form of archeological deposits. Through the remains of the built environment, in combination with oral testimony and documentary evidence (particularly historic aerial photography), the chronology of the development of the local dairy industry can be described, including its important interactions with the social life, subsistence economy, and ethnicity of the community and the larger society.

Interpretation Using the Built Environment

The standing buildings and structures (even though in various states of disrepair or collapse) provide the most immediate avenue for interpreting the history of the Property. Perhaps the most striking structure on the Property, the “cheese house” or “cheese barn” on Swanton Road, north of Davenport, provides an excellent example of the interpretive potential of a single building in its setting. The large, barnlike structure was originally a cheese storage facility that produced hard milk products for distant urban markets, and thus represents the dominant dairying activity of the late 19th and early 20th centuries. The building’s function is clearly marked by the ventilating cupola, and the construction shows a level of detail and finish work not seen in the ordinary dairy barns of the region. This building alone provides an excellent vehicle for describing the origins of the early cheese and butter industry, the history of the Italian-Swiss dairying families, and changes in the industry. Since the building is in its original setting (i.e., not surrounded by nonagricultural development), it is a natural springboard for interpreting the broader patterns of land use associated with dairying-hay operations, truck and subsistence farming, water management, and transportation.

Use and Reuse of the Built Environment

The buildings and structures on the Coast Dairies Property provide limited though real reuse opportunities, for interpretative purposes or as part of the long-range management infrastructure at the Property. Buildings such as the cheese barn or buildings in the Laguna Creek complex may retain sufficient integrity to be used in a number of ways, including interpretive displays, offices, or even equipment storage. Many buildings, however, do not appear to possess (and perhaps never did possess) sufficient structural integrity to be fitted for reuse. Professional structural evaluation of these structures is a necessary first step before considering any reuse.

Public safety is also an important issue in reuse of buildings and structures. Farming practices, particularly after 1930, were heavily dependent on the use of pesticides (including rodenticides) and herbicides. It is possible or even probable that residues or accumulations of these hazardous materials will be found in or around structures and buildings or in the soil or groundwater in the vicinity of farming complexes.

Socioeconomics

Regional Socioeconomy

Population

According to the California Department of Finance, the population of Santa Cruz County was 255,800 at the beginning of 2001. The county seat is located in the city of Santa Cruz. The city itself has a population of 56,000 (California Department of Finance, 2001). Approximately 50 percent of the county’s population lives in its unincorporated areas.

Employment and Income

Santa Cruz County has a diversified economy. The services sector is the largest employer, accounting for approximately 27 percent of jobs in the county in 1999. Retail trade and government are the next two

largest employment sectors, accounting for 20 and 18 percent of the county's job base, respectively (California Employment Development Department, 2000).

Based on a review of Employment Development Department (EDD) job-specific projections, employment in Santa Cruz County is expected to increase at rates equal to those experienced in the recent past (California Employment Development Department, 2000). The EDD also projects that approximately 85 percent of job growth in the county will occur in the government, retail, and services sectors. The most recent EDD employment projections for the county do not account for the very recent slowdown in the economy, particularly the technology sector, which may affect Santa Cruz County job creation trends and unemployment levels in the fairly near term.

In 2000, there were 141,800 residents of Santa Cruz County in the labor force. In that same year, the county's unemployment rate was 5.6 percent (California Department of Finance, 2001).

Recreation/Tourism. Santa Cruz County's 29 miles of coastline, beach access, 47,087 acres of state-owned parks and parkland, and 850 acres of county-owned parkland make it uniquely equipped to meet consumer recreation needs and preferences (Santa Cruz County Department of Economic Development, 1999).

Although Santa Cruz County draws national and international visitors, the majority of its tourists originate from the San Joaquin Valley. Visitors from these regions are especially prevalent during the summer, when residents of California's interior seek to escape the heat. According to the California Division of Tourism, visitors from outside of California account for only about 5 percent of total tourism/recreation visitation to Santa Cruz County (Hook, 2001).

Local Economy

Population

The community of Davenport (Davenport) includes the town of Davenport, New Town, Davenport Landing, and Swanton Road. According to the 1990 Census, the population of the community of Davenport was 42 households. The most recent estimate of total population is approximately 200.

Employment and Income

In 1989, the per capita income of Davenport residents was $30,840 (U.S. Census, 1990b). The breakdown of household income in 1989 shows that eight households in Davenport had incomes between $17,500 and $19,999, eight had incomes between $75,000 and $99,999, and 20 had incomes between $100,000 and $124,000 (U.S. Census, 1990b). The disparity in household incomes is consistent with the pattern of migration to Davenport over the last 20 years. The original inhabitants of Davenport were employees at the cement plant who had relatively lower income levels (Wennberg, 2001). Over time, the coastal appeal of the Davenport area has attracted inhabitants who commute to high-paying job centers such as Silicon Valley. As the economy grows and pushes demand for housing, household incomes in the Davenport area are likely to continue to increase.

Although Davenport was originally built as a company town for the cement plant, very few Davenport residents currently work at the plant (Pallin, 2001). Some residents are craftspeople that work in town, while others are employed in local businesses. The majority of Davenport's residents, however, commute to Santa Cruz. Some of the newer residents who moved to Davenport during the mid- to late 1990s work in the Silicon Valley.

Cement. The RMC Pacific Materials cement plant is located north of the town of Davenport (south of New Town). RMC is the largest private landowner in Santa Cruz County; in addition to the land it

leases on the Coast Dairies Property to extract shale for the cement plant, RMC owns approximately 10,000 acres of property in the immediate vicinity. About 90 percent of the RMC-owned land is timbered (Highlander, 1998). The remainder contains a quarry located just east of the Coast Dairies Property that provides limestone to the cement plant. RMC Pacific Materials is a private holding company that employees approximately 150 people at its Davenport cement production facility (Sheth, 2001).

RMC Pacific Materials cement produced in Davenport is shipped all over Northern California. Cement from this location has been used in such notable construction projects as the Golden Gate Bridge, Bay Bridge, San Francisco International Airport, Pac Bell Park in San Francisco, the Transamerica Building, and Bay Area Rapid Transit (BART). In 1998, RMC produced approximately 875,000 tons of cement at its Davenport facility and realized about $40 million in revenues (Highlander, 1998). Less than 20 percent of RMC's total U.S. sales are from cement produced at its Davenport cement facility (RMC Pacific Materials, 2001).

Aquaculture. U.S. Abalone was founded in 1990, when the venture took over a site previously occupied by a salmon farm. In 1999, U.S. Abalone was the country's second largest abalone farm, with 400 shareholders in the company. U.S. Abalone sells abalone meat and produces cultured abalone pearls. In 1999, the company had 11 employees and generated about $1 million in sales. Several years ago, the company raised $2 million dollars through a private sale of stock options via the Internet.

Commercial. Many of the small businesses within the Davenport community are owned and operated by Davenport residents. Local-owned businesses include the New Davenport Cash Store, Whale City Bakery, and the Davenport Bed and Breakfast. Residents of Santa Cruz own other businesses, such as the La Cabana Taquería and Lundberg Glass Studios. These businesses employ both residents and nonresidents of Davenport.

Davenport has a strong local artisan industry. The primary products of the local artisan industry are glassware, knives, paintings, and other crafts. The Lundberg Glass Studios and the David Boyes Knives Gallery are well-known throughout the local community, Santa Cruz, the neighboring Bay Area, and the nation. Their main customers are visitors to Davenport. At present, David Boyes plans to discontinue the sale of knives at the gallery and sell knives only through the Internet. The gallery will continue to sell etchings and other products. Whale Hedge Watercolors and the Gallery of Eden also cater to nonlocals, especially tourists. At Aeolus Boat Company, owner Bill Grunewald has been building rowboats and dories in a former livery stable for 35 years, with a lengthy waiting list of customers.

There are several restaurants in Davenport catering to locals, tourists, and workers coming to the Davenport area from other parts of Santa Cruz County. The New Davenport Cash Store, La Cabana Taquería, and the Whale City Bakery, Bar, and Grill are located on Highway 1. The owner of La Cabana Taquería reports a strong lunchtime crowd of tourists, travelers, and workers (Landeros, 2001).

The New Davenport Cash Store, a restaurant and gift shop, and the Davenport Bed and Breakfast have been in Davenport for almost 25 years. Of the 75 to 80 people employed by the New Davenport Cash Store and the Davenport Bed and Breakfast, approximately 15 are Davenport residents. Ten years ago, the restaurant served approximately 75 people a day in the summer. Today, the owners estimate they serve about 800 people a day on popular holidays. The Bed and Breakfast has 12 units, most with ocean views (McDougal, 2001).

Arro's Country Store, a grocery and convenience store, is another business on Highway 1 that serves both locals and tourists. Most Davenport residents do their grocery shopping in the city of Santa Cruz and patronize Arro's for small items in between trips to Santa Cruz. Arro's Country Store also has a deli that is a popular local meeting place.

The community of Davenport is surrounded by the Coast Dairies Property on the south, east, and north sides, and the Pacific Ocean on the west. Further commercial development in Davenport and New Town is constrained by the limited space and the fact that most of the usable land within the Davenport community has already been developed. Nonetheless, some opportunities may still exist through redevelopment of lots or unused buildings within the town of Davenport and New Town.

Existing commercial enterprises, especially those involving tourism, are profitable and have future potential growth as area tourism continues to increase. Informal conversations with resident business-owners suggest that there is potential for new commercial operations to prosper in Davenport. Tourist-oriented commercial services along California's coast generally pay high rents due to the sales volumes generated by their location.

Recreation and Tourism. Davenport is well-known for its scenic location, artisan studios, and whale-watching opportunities. It is a convenient rest stop for travelers on Highway 1. The most common visitors to Davenport, as measured by sheer numbers, are tourists on buses passing through the area. Currently, three to four tour buses stop in Davenport each day. Tourists generally eat in the restaurants, shop in the gift and artisan shops, and enjoy the picturesque charm of the area. Some visitors stay overnight in Davenport. The Davenport Bed and Breakfast caters to these visitors.

Clearly, tourism is important to local businesses. The owners of the Davenport Bed and Breakfast note that, over the last ten years, Davenport has increasingly become a destination in and of itself. They base this conclusion on the steadily increasing average length of stay by their guests. Several years ago, one-night stays formed the core of their business. Today, however, most visitors stay several nights, enjoying biking, whale watching, and hiking. According to the Bed and Breakfast's owners, most visitors come from within 100 miles. The Bed and Breakfast performed a survey of its visitors ten years ago and found that 80 percent of guests were repeat customers (McDougal, 2001).

Anecdotal information from the owners of the Davenport Bed and Breakfast corresponds with state and regional trends in tourism. The trend most likely to affect Davenport is the increased demand for outdoor activities such as visiting parks, hiking, and water recreation, which are abundantly available in the Davenport area.

Housing

Although the 1990 Census recorded 36 housing units in the community of Davenport, an informal, onsite survey in early 2001 indicated that this figure is now higher (U.S. Census, 1990b). This change suggests an increase in population since the 1990 Census.

The majority of houses in Davenport are single-family detached units. The land area of Davenport has not changed since the town was originally founded. Lack of space for growth, limited housing supply, and increased interest in Davenport by residents of the Bay Area have caused housing prices to increase sharply in recent years. There are two vacant residential lots that remain in Davenport (one under proposed development at the time the ECR was prepared), but all other residential lots in the town have been developed. Although lots on Swanton Road have steadily been developed over the years, a few sites still remain. According to data obtained from the Santa Cruz County Assessor, in 1999 a home-site in the community of Davenport of between one and five acres sold for approximately $725,000 (Santa Cruz County Assessor, 2001).

Additional review of Santa Cruz County Assessor data indicates rapid escalation in the price of residences in the community of Davenport. For example, a single-family residence that sold in 1985 for $325,000 was sold in 1993 for about $880,000. This translates to an average annual increase in price of about 15 percent during the period. A second single-family residence that sold in 1984 for $130,000 was purchased in 1999 for $700,000, which translates to an average

annual increase of 12 percent during the period (Santa Cruz County Assessor, 2001). While no major remodels of these residences were recorded with the Assessor, improvements to the structures may have influenced this price escalation. Nonetheless, these examples support the general finding that the cost of housing in Davenport has been rapidly on the increase.

Farm worker housing is an important issue in Davenport, and a major problem in agricultural areas throughout the county, such as Watsonville and the Pajaro Valley. Increased demand for housing in the Davenport area and the associated price escalation has severely limited the ability of agricultural workers on the Coast Dairies Property to secure local housing. Lack of affordable housing for farm and other low-wage workers has important implications for future agricultural production at the Coast Dairies Property.

OPPORTUNITIES AND CONSTRAINTS

Opportunities and Constraints

Introduction

As discussed in Chapter I, the *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan) is expected to function as an amendment to the U.S. Department of the Interior, Bureau of Land Management (BLM) Resource Management Plan for the Hollister Resource Area and as a General Plan for the California Department of Parks and Recreation (Department). The Plan will be the basis for the Proposed Action for subsequent NEPA/CEQA Analysis, and is expected to be adopted as an RMP Plan Amendment and State Parks General Plan. The two source documents for the planning process, BLM's *Land Use Planning Handbook* (BLM, 2000) and the Department's *Planning Handbook* (California Department of Parks and Recreation, 1998), both require the collection of baseline information as the first step. That effort produced the Existing Conditions Report (ECR) (ESA, 2001), which was summarized and updated in Chapter III and is extensively referenced in this chapter.

The next step was to analyze and integrate the information inventory to provide the basis for land use decisions in the Plan. This is variously called the "Analysis of the Management Situation" (BLM) and the "Analysis of Causes" (Department). The more general term in the planning lexicon, and the one used here, is opportunities and constraints analysis (OCA). The OCA was designed to generate the Goals and Standards and the Management Zone Prescriptions described in Chapters V and VI. The OCA process does so in a manner that logically links baseline information with management direction, as well as allowing for public review and input.

Analysis Zones

The boundaries of the management zones described in Chapter VI were another project of the OCA process. The OCA required an interim zoning tool so that the Property could be examined in a reasonable number of generally similar polygons. In the ECR, the Coast Dairies Property was divided into mapped areas, called the "Analysis Zones," that were generally similar in the type and condition of natural resources. These zones are described in Section 2.0 of the ECR and mapped in Figure IV-1. Many of the ECR sections used the Analysis Zones merely as a convenient way of describing where certain resources were located and certain activities took place. Other ECR sections (such as Wildlife and Recreation/Visual) essentially previewed the OCA process by rating certain Analysis Zones with a numerical score.

The ECR mapped some 33 discrete, individually named Analysis Zones. During the OCA process, completed during two Planning Team[1] meetings in August and September 2001, OCA relative values for each "attribute" were assigned to each Analysis Zone. Attributes are essentially the section headings of the ECR, and opportunities and constraints derive directly from the information presented therein.

The scoring is described in greater detail below; in brief, the highest scores for certain attributes became the main themes for prescriptions. Analysis Zones with similar prescriptions were aggregated into a much smaller number of individually labeled Management Zones, for which prescriptions were generated. These prescriptions are presented in Chapter VI.

[1] The Coast Dairies Steering Committee includes representatives of the Bureau of Land Management, California Department of Parks and Recreation, Trust for Public Land, the Save-the-Redwoods League, the Land Trust of Santa Cruz County, and the California Coastal Conservancy. In January 2000, the Steering Committee selected Environmental Science Associates (ESA) of San Francisco as the prime consultants to prepare the Plan. Members of the Steering Committee (ECR, Table I-1) and the consultant team (ECR, Table I-2) are collectively referred to as the Planning Team.

SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure IV-1
Watersheds and Zone Types

The Scoring Process

The Planning Team used the information (mapped and text) from the ECR to develop a series of qualitative "scores" for each Analysis Zone (AZ), rated Low, Moderate, or High. The scores reflect a judgment as to whether, for each attribute, the AZ has high opportunity value or, in the case of a constraint, whether the attribute constrains other resources or uses. Maximal constraint is also rated "High." The explanations of the scores are given for each attribute below.

The combination of 12 attributes and 33 zones presented some logistical challenges and required several days of meetings to evaluate all 396 planning areas. The highest scores (for either an opportunity or a constraint) provided the first suggestion of the "prescription type" for the AZ (i.e., the emphasis attributes). Zones with the same prescription type became the rough-cut Management Zones.

How Were the Opportunity Values Assigned?

Historical/Cultural

A ranking of Low was assigned if there are no known sites. Moderate was assigned if there is the likelihood of a site. A High was assigned if there is a known site. For prehistoric sites, the Team referred to ECR Table 5.6-1; for historic sites, to ECR Section 5.6.

Botanical/Wetlands

The opportunity score for botanical/wetlands was driven by the presence in an Analysis Zone of any rare or unique resource feature. It was scored as a Low if there are no known or predicted rare or unique features, a High if a rare or unique feature is known or presumed present. The Team referred to ECR Tables 3.1-1 and 3.1-3, and to geographic information system (GIS) data on the extent within different zones of redwood forest.

Wildlife

For the opportunity score for wildlife, presence of a species listed as threatened or endangered (state or federal) guaranteed a score of High. The presence of habitat with high species diversity usually rated a score of Moderate or High. The Team used ECR Table 3.2-7 as a source.

Fisheries

The fisheries opportunity ranking was based on the capability of a zone to support salmonids, as described in Section 3.3 of the ECR. Since all of the streams on the Coast Dairies Property support either resident or anadromous salmonids, and since all of the streams are included in the critical habitat designation for steelhead, all of the stream AZs received a rating of High. Laguna Marsh also received a High rating, because of the likelihood that steelhead use the estuary for rearing and acclimation as smolts.

Hydrology

The hydrology opportunity ranking indicated the value of the resource based on water quality indicators and water flow measurements. For the purposes of this exercise, "opportunity" does not imply opportunity for restoration (if human disturbance factors were removed), but the observed hydrological attributes of the streams at the time of the ECR. The same rank was applied throughout each watershed. A rank of Low indicated that the stream draining the watershed has limited flow (20 percent winter exceedence flow [i.e., flow reached at least 20 percent of the time during the winter season] is less than 5 cubic feet per second [cfs] as per ECR Table 3.3-2) and/or the stream has a chronic or acute turbidity rating of "high" (ECR Table 4.1-16). A rank of Moderate indicated that the stream draining the watershed has moderate flow (20 percent winter exceedence is 5.1 to 10 cfs) and/or the stream has chronic and acute turbidity ratings of low or moderate. A rank of High meant that the stream draining the watershed has high flows (20 percent winter exceedence is greater than 10 cfs) and/or the stream has chronic and acute turbidity ratings of low or moderate.

Geology/Roads

The Planning Team decided not to assign a geology opportunity score, because all geological characteristics are captured by other attributes (e.g., “recreation” for viewing cliffs, “agriculture” for soil fertility).

Water Rights[2]

Water-rights opportunity scores were based on the availability of stream flow, determined by the presence of water rights upstream of the Property boundary or on the Property but held by parties other than Coast Dairies (ECR, Table 5.1-1 and Figure 5.1-1), and the calculated Maximum Cumulative Instantaneous Diversion Rate (MCIDR) (ECR Table 3.3-2). Water-rights scores applied throughout a watershed. A score of Low was assigned to watersheds in which the stream is subject to water rights above the Property line or water rights held by parties other than Coast Dairies, and the MCIDR is < 5 cfs; or to streams without water rights with an MCIDR < 1 cfs. A score of Moderate was assigned to watersheds in which the stream is subject to no water rights above the Property line or held by other parties, and the MCIDR is between 1 and 5 cfs; or to streams that are subject to water rights above the Property line or held by other parties, but the MCIDR is > 5 cfs. A score of High was assigned to watersheds in which the stream is subject to no water rights above the Property line or held by other parties, and the MCIDR is > 5 cfs.

Agriculture

The opportunity score evaluated prime farmland, slope, soils, and presence of water. Main sources were ECR Tables 5.2-2, 5.2-3, and 5.2-4, and Figure 5.2-4. A ranking of High included Prime Farmland, Farmland of Statewide Importance, or Unique Farmland; Moderate included row crops, flat terrain, or good soils; Low was assigned to areas with a potential for other forms of cultivation (ECR, Page 5.2-37) and grazing.

Mining

The Planning Team determined that mining should have only a constraint score.

Recreation/Visual

The Planning Team referred to ECR Pages 5.4-23 to 5.4-27 and ECR Figure 5.4-5 for the visual resource evaluation. A rank of High meant high access potential, high-quality vista points value, and a Class I visual zone (ECR Section 5.4.1.2); a rank of Moderate meant a Class II visual zone; and a rank of Low meant poor access, low number of vista points, and Classes III and IV visual zones.

Land Tenure and Applicable Law

Neither attribute was rated for opportunities.

How Were the Constraint Values Assigned?

Historical/Cultural

The historical and cultural constraints depended on the integrity of the resource, with site type and condition the primary factors. Poor site type and poor condition were rated as Low (i.e., already in a disturbed or degraded condition, which new uses of the Property would be unlikely to affect). A site was rated as Moderate if it was accessible but resistant to damage (e.g., bedrock mortar). Good site type and good condition usually ranked a High. The rank of Low was used as a base in the case of unknown resources. The Planning Team referred to ECR Table 5.6-1.

[2] The scoring system described here was the one actually used in the process at that stage. Clearly, the broader question of water rights became a planning consideration when assessing community water needs and when consultation with regulatory agencies began over the acquisition of water rights for farmers on the Property.

Botanical/Wetlands

The criteria included sensitivity to human and livestock impacts (e.g., trampling, collecting, and herbivory). A rating of Low indicated resources that are resistant to trampling, grazing, and collecting. For example, all riparian areas are considered sensitive to trampling and would be rated as High, as would perennial grasslands, but redwood stands, with a low sensitivity to disturbance, scored as Low.

Wildlife

Wildlife constraints include animals that have special status and areas with high species diversity. A rating of High included wildlife that are sensitive to human disturbance, particularly during breeding. A rating of Moderate included wildlife with habitat sensitive to trampling (e.g., ground nests). A rating of Low included wildlife with some resistance to disturbance (e.g., red-legged frog, which can coexist with ponds created and used for agricultural irrigation).

Fisheries

The constraint ranking for fisheries indicated the degree to which likely land uses within the AZ would negatively affect salmonid habitat, particularly in relation to the likelihood that there would be an increase in erosion and sedimentation and a decline in water quality. A rank of Low indicated that the zone does not drain directly into a fisheries stream. A rank of Moderate indicated that the zone has a low to moderate erosion hazard rating (EHR), and that the stream draining the watershed has low chronic and acute turbidity ratings. A rank of High indicated that the zone has a moderate or high EHR, and/or that the stream draining the watershed has a moderate or high rating for either chronic or acute turbidity.

Hydrology

The hydrology constraint ranking was based on the EHR (ECR Table 4.1-12), which indicated the sensitivity of an AZ to disturbance. The additional data available in the GIS system (ECR, Section 2.6) determined the EHR score for each AZ, based on the percentage of the area within the AZ that is underlain by sedimentary rock; the areas that have slopes greater than 2 percent (ECR Figure 4.1-15); the area mapped by the U.S. Geological Service as “mostly landslide”; and the areas within Hydrologic Soil Groups C and D (ECR Figure 4.1-29). A rank of Low was assigned to AZs with an EHR score of 0 to 100; a rank of Moderate was assigned to AZs with an EHR score of 101 to 170; a rank of High was assigned to AZs with an EHR score over 171.

Roads

The roads constraint ranking was based on the road density within the zone. Using GIS, the length of all roads mapped within the zone (see also ECR, Figure 4.2-4a and 4.2-4b) was calculated. To account for the higher impacts by larger or more heavily used roads, a weighting factor was applied to road lengths. A rank of Low was assigned to AZs with a weighted road density (WRD) of less than 30 feet/acre; a rank of Moderate was assigned to AZs with a WRD between 30 and 100; a rank of High was assigned to AZs with a WRD over 100.

Water Rights

Any diversion of stream flows on the Property is highly constrained by the needs of salmonids and the restrictions of the Endangered Species Act. This might be considered a universal constraint, but the Team elected to look at the water-rights constraint as an expression of an ability to develop off-stream storage. Using this criterion: Low was assigned if off-stream storage was difficult or impossible; Moderate was assigned if off-stream storage was possible, although moderately difficult or expensive; and High was assigned if off-stream storage exists or could be relatively simply developed.

Agriculture

For existing agriculture, the Team referred to ECR Figures 5.2-2 (leases) and 5.2-3 (waterworks). A High constraint was assigned to existing conventional row crops; existing grazing or organic row crops were ranked as Moderate, and adjacent areas were ranked as Low.

Mining

The mining constraint was based on mining facilities, leases, operations, and operational corridors; ECR Figure 5.3-1 was used for reference. RMC Pacific Materials ownership, long-term leases, or disposal areas were ranked High (regardless of whether the lease area was currently being mined); the conveyor belt and mitigation ponds ranked as Moderate, and AZs adjacent to mined areas ranked Low.

Recreation/Visual

The constraint rating was tied to visual resources. Highly visible areas from transportation corridors, especially Highway 1 (which is how most people experience Coast Dairies), received a High; this includes the bluff zones and beaches. A rating of Moderate was assigned to less visible areas, and a rating of Low to seldom seen areas.

Land Tenure

Based on ECR Figure 5.5-2 and Pages 5.5-15 through 5.5-22, constraints were tied to existing commitments: High for inholdings and long-term leases such as mining, Moderate for shorter-term leases such as agriculture and easements with restrictions, and Low for a regular easement such as the California Department of Transportation (Caltrans) easement on Highway 1.

Applicable Law

These constraints are based on the application of the Endangered Species Act, National Historic Preservation Act, and the Clean Water Act, the California Coastal Act and the Surface Mining and Reclamation Act, among others. Some laws are not specific to certain AZs, but rather apply Property-wide.

Preliminary Zone Emphasis

The summation exercise brought to the forefront the attributes of highest importance within each of the Analysis Zones and also served as a way of identifying specific issues not reflected in the scoring but which needed to be part of the prescription.

The Planning Team concluded that there is a substantial difference between attributes within the different watersheds. This is because the watersheds themselves are very different at Coast Dairies. San Vicente Creek is the only stream on the Property that supports coho salmon; Liddell Creek is characterized by very high acute turbidity; Molino watershed has roads that stand up well under current use, but also includes 40 percent of the known locations of California red-legged frog on the Property.

While certain AZs might be grouped into similar Management Zones (e.g., for beaches and for agricultural lands), the Planning Team concluded that the primary planning emphasis should be placed on watersheds, which is reflected in the Management Zone locations and prescriptions in Chapter VI.

Sensitivity Classes

The Sensitivity Class was another tool derived from the OCA process. A Sensitivity Class is a ranking of how “constrained” the zone appears to be for future uses. It is an outcome of the constraints portion of the exercise described above. Largely driven by natural resource concerns, a high sensitivity score (3 on a scale of 1 through 3) strongly influenced the Management Prescriptions for that zone.

Public Review of the Opportunities and Constraints Analysis

The planning process for Coast Dairies moved from its inventory stage, which produced the ECR, to the first stage of planning during the fall of 2001. The preparers produced a hard-copy draft OCA that received preliminary Steering Committee approval in early November 2001 and was subsequently distributed to Community Advisory Group (CAG) members, with comments received at a CAG meeting on December 1, 2001.

How Comments Were Received and Considered

A December 1, 2001 meeting was held, as was a second CAG meeting on January 26, 2002. A combination of written and verbal comments was presented at that meeting, and written comments were accepted until February 10, 2002. It became evident to the Planning Team that the planning process in general and the CAG in particular would benefit from seeing exactly how comments would be incorporated. In April 2002, a *Summary of Comments and Responses* was created as a stand-alone document and distributed to the community. The *Summary* clarified language, rectified technical errors, revised Goals and Standards, and added new ones. These changes are reflected in Chapter V and Chapter VI.

GOALS AND STANDARDS

Goals and Standards

Overview

The *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan) is intended to function as an amendment to the Bureau of Land Management's (BLM) Hollister Resource Management Plan and as a General Plan for the California Department of Parks and Recreation (Department). The Plan will be the basis for the Proposed Action for subsequent NEPA/CEQA Analysis, and is expected to be adopted as an RMP Plan Amendment and State Parks General Plan. Policies derived from these sources also serve as management direction and are included throughout this description of the Goals and Standards. Guidance is taken from "Planning Area Policies" in the *Hollister Resource Management Plan and Record of Decision* (BLM, 1984) and the *Planning Handbook 2002, California Department of Parks and Recreation* (California Department of Parks and Recreation, 1979), and Chapter 18 of the California Department of Parks and Recreation Operations Manual.

Goals are broad statements of desired outcomes – for example, "maintain ecosystem health and productivity," or "promote community stability." Standards describe the physical, natural, or social condition or degree of function a resource must meet in order to sustain certain principals or provide more specific direction for interpreting the goal – for example, land, health, or water quality standards. The Goals and Standards for the Property are defined and expressed in categories of Natural Resources, Cultural Resources, Social Resources, and Management Operational Goals.

Natural Resource Management Goals

General Planning Goals and Management Guidelines

The Property Managers (the term Property Managers used herein refers to BLM, the Department, or other long-term property managers of the Coast Dairies Property) shall perform the following:

- Evaluate potential effects to all known or potential habitat for sensitive, rare, threatened, or endangered species prior to implementing actions. Consult with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) in accordance with Section 7 of the Federal Endangered Species Act and with the California Department of Fish and Game (CDFG), when appropriate.
- Protect or enhance riparian areas during planning and development.
- Locate and design any future projects to protect and enhance enjoyment of the primary resources.[1] The primary purpose for development is to place visitors in an optimal relationship with the resources, for recreational enjoyment and understanding of those resources.
- Identify the total framework of environmental and ecological factors influencing the Property, including those arising from human activities; promulgate and apply resource management techniques required to negate deleterious human influences; and achieve the environmental objectives established by the Coast Dairies Plan.
- Systematically remove invasive exotic species as resources permit, except in those areas where they are perpetuated as part of a cultural resource.
- Maintain the natural faunal habitat to the extent possible. The natural wildlife habitat is defined as wildlife resources and habitat that occurred on the Property before Euro-American modification.

[1] Primary resources for the Property are those identified in individual Goals and Standards.

- Control and regulate the climbing of rocks, peaks, coastal bluffs, and other eminencies to prevent deterioration of such features.
- Harmonize visitor facilities such as trails, steps, railings, etc. with the natural and cultural environments of the Property.

Natural Resource Goal 1 – Maintain, protect, and/or improve current and potential future designated Critical Habitat for listed species.

The Property includes designated critical habitat[2] for western snowy plover, California red-legged frog, central California coast steelhead, and central California coast coho salmon. These habitats are currently degraded by direct human use, water extraction, and impediments to migration.

Snowy Plover – Natural Resource Standard 1.1. Snowy plover nesting areas shall be managed according to the results of consultation with USFWS and consistent with the *Western Snowy Plover Systemwide Management Guidelines* (California Department of Parks and Recreation, 2002), and the local snowy plover management plan currently under development. As appropriate, implement Adaptive Management Protocol(s) (see Chapter VIII).

Anadromous Fish – Natural Resource Standard 1.2. All streams with the potential to support salmonids shall be managed in a manner that allows sufficient water flow and water quality to support migration, spawning, and rearing of steelhead and coho salmon. This standard may be met by implementing management actions or pursuing modifications in land use practices and specific improvements in habitat quality. These actions could include, but are not limited to, the following:

- Consult with NMFS and the California Department of Fish and Game (DFG) and implement protection and enhancement measures as appropriate.
- Cease water appropriations from all streams until appropriative permits are secured for water diversion and storage.[3] It is assumed that the appropriative permits will restrict diversions to the period between December 15 and March 31, will require maintenance of stream-specific bypass flows, and will limit withdrawals to stream-specific maximum diversion rates. Furthermore, it is assumed that the existing infrastructure for water diversion and storage will have to be replaced to allow for diversion during high flows during the wet season and storage in off-stream reservoirs during the dry season. As appropriate, implement Adaptive Management Protocol(s) (see Chapter VIII).
- Most Coast Dairies streams contain some type of in-channel impediment to migrating salmonids in the form of dams and inadequate culverts or bedrock bores. While some of these appear to allow for successful fish passage during specific flow regimes, others present a formidable or insurmountable barrier to fish movement. Evaluate, remove, or redesign potential stream impediments, either solely as Property owners or in concert with the California Department of Transportation (Caltrans), Union Pacific Railroad, Santa Cruz County, NMFS, CDFG, and/or other appropriate agencies or leaseholders.
- Survey all salmonid streams periodically to assess the quality of spawning and rearing habitat (see Chapter VIII). Prepare and implement site-specific plans to enhance riparian and in-stream conditions as necessary.
- Refer to agricultural goal and standard (Social Resource Goal 1) regarding water use.

2 Critical habitat is described for the snowy plover in the Existing Conditions Report Section 3.2.3.2. Salmonid critical habitat was present on all perennial streams on the Property. Red-legged frog critical habitat was designated on the Property adjacent to the first unnamed drainage tributary of Scotts Creek above its discharge on Scotts Creek Beach. The status of many critical habitat units was under litigation or review as of Plan preparation, but designation of critical habitat is required under the Endangered Species Act and will likely be applied to the Property in some form.

3 Estimates of necessary minimum flows were made in 2001 and further research was ongoing through the period of Plan preparation.

Natural Resource Goal 2 – Minimize direct or indirect harm or harassment ("take") of individual listed animals. Institute or participate in active programs for listed species recovery, pursuant to direction provided in approved recovery plans for listed species.

In addition to designated critical habitat, Coast Dairies supports individual animals and/or suitable habitat for species listed under the state and federal endangered species acts. For example, California red-legged frog is well distributed throughout the Property outside of mapped critical habitat, primarily but not exclusively in ponds created for agricultural or mining purposes. While this suggests that current land uses and red-legged frogs are compatible, it also raises the possibility that changes in land use patterns could result in an incidental "take" of the species. This goal applies to all state and federally listed species that occur on the Property now or in the future.

California Red-Legged Frog – Natural Resource Standard 2.1. Manage California red-legged frogs and their habitat, especially ponds occupied by frogs but created for agriculture or mining, in accordance with USFWS requirements. As appropriate, implement Adaptive Management Protocol(s) (see Chapter VIII).

Natural Resource Goal 3 – Develop and allow uses that are compatible with wildlife activity, productivity, and diversity. Maintain and enhance wildlife movement across the Property and between the Property and other natural areas.

Property Managers shall balance recreation and access with protection of resources, favoring low-impact activities in areas with high wildlife use.

Riparian-Dependent Birds – Natural Resource Standard 3.1. Riparian-dependent birds are one of California's most vulnerable wildlife communities. Manage riparian areas to sustain the abundance and diversity of riparian-dependent avifauna.

Raptor Diversity – Natural Resource Standard 3.2. One of Coast Dairies unique wildlife attributes is the number and diversity of raptors (birds of prey) that overwinter in the grasslands and terraces of the Molino watershed. Manage areas of high wintering raptor densities to sustain the abundance and diversity of birds of prey.

Domestic Dogs – Natural Resource Standard 3.3. No person shall permit a dog to run loose, or turn loose any animal in any part of the Property. No person shall bring a dog into, permit a dog to enter or remain, or possess a dog on the Property unless on a leash of no more than 6 feet in length and under the immediate control of a person, or confined in a vehicle. Land managers may authorize exceptions to this restriction for working dogs (livestock herding, guard dogs, search & rescue, etc.), and dog trials and similar special events.

Natural Resource Goal 4 – Manage the Property to protect and restore native grasslands, native forest stands, and unique vegetation associations, and to contain or reduce the spread of non-native species.

Exotics – Natural Resource Standard 4.1. Establish and implement a long-term program to control and/or eradicate exotics to prevent the establishment and spread of non-native species and potential displacement of native species and communities. Priority for control efforts shall be given to those species most invasive and conspicuous on the Property. The role of grazing, agriculture, and other management practices shall be considered in this program.

Prescribed Fire – Natural Resource Standard 4.2. The use of prescribed fire shall be considered for ecosystem management on the Property. If prescribed fire is deemed desirable and feasible, a Property-wide prescribed fire management plan shall be prepared and implemented.

Grazing – Natural Resource Standard 4.3. Assess the ecological health and stability of Coast Dairies grasslands and use grazing as a tool for maintaining the health of Coast Dairies grasslands. Because overgrazing can promote the spread of weeds, especially star thistles, evaluate the grazing program upon transfer of title to determine appropriate season-of-use,

class of livestock, and/or the continuation of grazing. The evaluation shall consider effects of the grazing program on perennial grass recovery, noxious weeds, riparian/anadromous fish restoration, other plant or wildlife management objectives, and fuels management. In the interim, an Adaptive Management Protocol (see Chapter VIII) will base yearly stocking rates and management decisions on BLM's *Standards for Rangeland Health* (BLM, 2000). During this interim period, grazing shall be authorized on a year-to-year nonrenewable lease. Grazing is not limited to commercial livestock and may include the reintroduction of native herbivores.

Exotic Animal Species – Natural Resource Standard 4.4. Non-native animal species shall be discouraged through appropriate habitat management and, when necessary, by direct control measures. Wild pigs on the Property regularly damage areas of native vegetation, making these areas more susceptible to erosion and invasion by exotic plant species. While bullfrogs are not known to occur on the Property, their deleterious impact to California red-legged frogs necessitates vigilance to detect any future occurrences and to implement rapid, effective control measures. Other non-native animals identified as threats to managed lands shall be evaluated on a case-by-case basis.

Stream Ecosystems – Natural Resource Standard 4.5. Riparian areas contain a high diversity of native plant species, provide habitat for a broad variety of terrestrial, avian, and amphibian animal species, and are an essential component of stream ecosystems. All riparian areas on the Property, whether within or outside of designated Stream Protection Zones (see Natural Resource Goal 10), shall be considered important biological and aesthetic resources, and shall receive a high priority for restoration and a high level of protection from disturbance.

Natural Resource Goal 5 – Protect state or federally listed plants and sensitive plant communities.

Sensitive Plants – Natural Resource Standard 5.1. Prior to significant ground-disturbing activity or a prescribed burn, affected areas will be surveyed[4] for the presence of state or federally listed plants or sensitive plant communities. Operations with impacts that cannot be successfully mitigated shall be avoided.

Natural Resource Goal 6 – Restore watershed function and rectify sediment and soil stability problems.

Overall, the geologic formations of the Coast Dairies Property have a relatively high (for coastal California) inherent stability. Nevertheless, past land uses and the presence of soils with high erosion potential have resulted in substantial destabilization of at least two watersheds: Yellow Bank watershed and Liddell watershed. Yellow Bank Creek is incising over a major portion of its length, and open and abandoned roads and pipelines are potential sources of observed chronic turbidity. Quarry operations appear to be contributing to very high turbidity in all branches of Liddell Creek.

Watershed Function – Natural Resource Standard 6.1. Watershed function shall be restored and human-induced soil erosion and stream sedimentation problems addressed on the Property to the extent practicable. Property Managers should cooperate with lessees, adjacent landowners, and regulatory agencies to address watershed issues affecting the Property. Property Managers shall prepare and implement watershed protection and enhancement plans as necessary.

Roads and Trails – Natural Resource Standard 6.2. Standards for siting, constructing, upgrading, maintaining, and decommissioning roads and trails shall be based on best management practices from all available sources (e.g., Weaver and Hagans, *Handbook for Forest and Ranch Roads*, 1994).

Mining - Natural Resource Standard 6.3. BLM will coordinate with RMC to refine mining operations and development plans to reduce erosion and other natural resource impacts.

[4] Surveys will follow *Guidelines for Conducting Research on Rare, Threatened and Endangered Plants and Plant Communities* (CDFG, 1997).

Natural Resource Goal 7 – Designate and manage appropriate portions of the Coast Dairies Property with special management status consistent with applicable federal and state regulations.

BLM ACEC and Special Recreation Management Area – Natural Resource Standard 7.1. All areas of the Property under BLM jurisdiction shall be designated as a BLM Area of Critical Environmental Concern (ACEC)[5] under the Federal Land Policy and Management Act (Section 103a) and a Special Recreation Management Area. BLM's designation of an ACEC is a formal designation that is conducted in concert with resource management plans under 43 Code of Federal Regulations (CFR) 1610.7-2. The goals of the ACEC are to protect and restore riparian and stream habitat for anadromous fish, protect red-legged frog habitat, restore perennial grasslands, and allow compatible recreation access and uses. Constraints include closure of the ACEC to off-highway vehicle use (see also Management and Operational Goal 3), and prohibitions on timber harvest, and future mining, or mineral, oil, or gas exploration beyond current lease boundaries.

California Coastal Commission Environmentally Sensitive Habitat Areas – Natural Resource Standard 7.2. Other areas of the Property may be considered and managed as Environmentally Sensitive Habitat Areas as defined by California Coastal Commission.[6]

Mining Areas - Coordinate with RMC to refine mining operations and development plans to reduce erosion and other natural resource impacts.

5 Such an area is defined under the Federal Land Policy and Management Act as ". . . areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards."

6 An Environmentally Sensitive Habitat Area is defined in the Public Resources Code 30107.5 as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments."

Natural Resource Goal 8 – Protect natural wetlands from fill and effects of recreational, agricultural, grazing, mining, and operational activities. Wetlands are areas that meet the definition used by the U.S. Army Corps of Engineers and/or the California Coastal Commission.

Wetlands – Natural Resource Standard 8.1. Delineate wetlands and apply protection measures during project design and implementation. Wetlands shall be delineated by qualified staff or wetland specialists and clearly marked prior to work. Perform activities in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc. Limit or restrict recreational and other activities to minimize impacts to wetland resources.

Natural Resource Goal 9 – Protect cliffs and bluffs from the effects of recreational and agricultural activities.

Coastal bluffs are the seaward edges of marine terraces uplifted from the seabed (California Coastal Commission, 1987) and are a distinctive feature of the Property that provides habitat for nesting and roosting birds such as black swift.

Coastal Bluff Surveys – Natural Resource Standard 9.1. Surveys should be conducted on the use of coastal bluffs by roosting and nesting birds. Limit or restrict recreational and agricultural activities to minimize impacts to these resources.

Natural Resource Goal 10 – Establish a Stream Protection Zone to protect and enhance riparian resources.

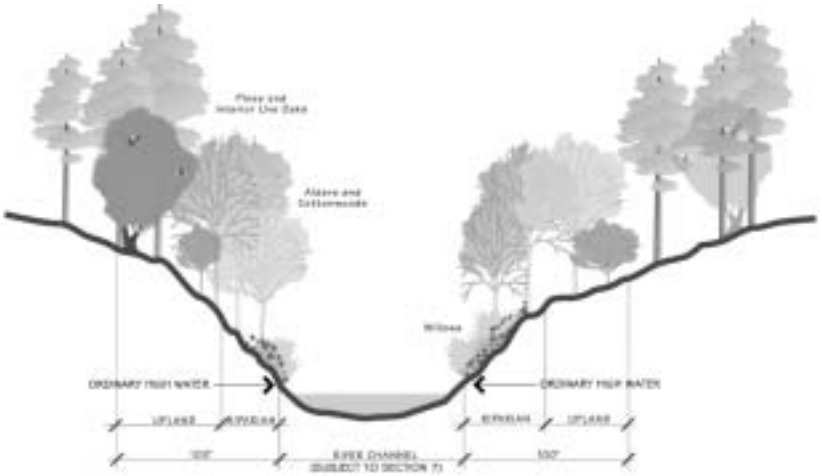
The areas immediately adjacent to the stream channel, along with the stream channel itself, are particularly important to the health and proper functioning of the aquatic ecosystem. These areas allow for the main channel to link with backwater areas, tributaries, and groundwater systems; provide for increased channel diversity; and contribute sources of needed nutrients and woody debris to the system. Additionally, they can help protect surrounding development from potential flood damage and can be used to filter runoff water draining into the aquatic system.

The Stream Protection Zone would provide a buffer area for natural flood flows, channel formation, riparian vegetation, and wildlife habitat and would protect streambanks from human-caused impacts and associated erosion. The zone is intended to protect and enhance resources at a higher standard than that of the underlying management zones.

The specific areas included with the Stream Protection Zone may shift over time to follow the movement of the stream channel itself. The zone includes the stream channel itself and might extend 100 feet[7] on both sides of the stream as measured from the ordinary high-water mark (Figure V-1).

Within the Stream Protection Zone, future actions shall be consistent with the following conditions:

- Nonessential facilities (including, but not limited to, riprap, levees, diversion walls, impoundments, bridges, bridge abutments, roads, campsites, buildings, utilities, and other structures) shall not be located in the Stream Protection Zone, except when they meet the following two criteria: (1) where required for access to or across the stream, for health and safety, or for the maintenance of historic properties; and (2) where it is impractical to locate them outside the Stream Protection Zone.
  - Existing facilities meeting these criteria may remain, and they may be replaced, repaired, or relocated within the Stream Protection Zone, but only if the replacement, repair, or relocation does not directly and significantly affect resources or would reduce current impacts to resources.
  - New facilities and development may be constructed in the Stream Protection Zone only when they meet these criteria and when located where they do not materially impair the natural function of the stream, impede linkages to tributary inflow and backwater areas, or disrupt contribution of woody debris to the river.
- Actions within the bed and banks of a stream to construct, replace, repair, or relocate essential facilities (i.e., primary roads and bridges, wastewater collection and treatment, water supply, electrical distribution, and similar facilities) and facilities that directly protect and enhance resources may be permitted provided that:
  - Project design minimizes impacts to the stream, interference with linkages to tributary inflow and backwater areas, and disruption of the contribution of woody debris to the system.



National Park Service, 2001

FIGURE V-1
Stream Protection Zone Cross-Section

[7] The width of the buffer area is generally in accord California's Forest Practice Rules (14 CCR 916), but somewhat less than Riparian Reserves for Federal lands as designated by BLM. Santa Cruz County Code Section 16.30.040 stipulates a 50 foot buffer in most cases. The number is to a degree a conservative best estimate meant to apply to a wide range of conditions at Coast Dairies.

  - The project incorporates mitigation measures to avoid or reduce impacts.

- Other existing facilities that are not addressed above shall be removed at the earliest practicable opportunity, when major rehabilitation is needed, or when a facility is no longer of use.

Cultural Resource Management Goals

General Planning Goals and Management Guidelines

The Property Managers should:

- Manage the Property for the protection of cultural resources. Protect cultural resources from damaging or degrading influences, including deterioration or adverse modification of their environments. Prior to implementation of surface-disturbing activities, including range development and vegetation manipulation, qualified personnel shall define, inventory, and evaluate the action's Area of Potential Effect for cultural resources. Inventory, identification, and evaluation of cultural resources across the Coast Dairies Property shall also occur. Property Managers shall conduct consultation with the State Historic Preservation Officer, the Native American Heritage Commission, and the Advisory Council on Historic Preservation, as necessary.

Cultural Resource Goal 1 – Identify and protect cultural resource sites from impacts due to park operations, natural resource management actions, and visitor use. Where appropriate and consistent with protection, develop programs to use cultural resource assets for interpretive purposes.

Only two prehistoric archeological sites on the Property have received focused scientific research. Overall, there is a lack of reliable resource inventories for the Coast Dairies Property. The built historic environment of the Property contains a number of structures and buildings of varying age and use. Property Managers shall identify, evaluate, protect, and preserve cultural resources on the Property.

Evaluate possible future interpretation of, or use by Native American groups of, archeological sites.

Social Resource Management Goals

General Planning Goals and Management Guidelines

The Property Manager shall:

- Operate recreational facilities to enable the public to access and use the Property for recreation activities and to see, enjoy, and understand the primary resources, including natural resources and coastal agriculture. Endeavor to expand the range of experiences currently available in the North Coast area.

- Protect the viewsheds from the Coast Dairies Property from potentially degrading intrusions. Manage the Property consistent with Visual Resource Classes I, II, and IV, as identified on Figure III-9.

- Increase coordination with local, state, and federal law enforcement agencies to resolve unauthorized uses of the Property.

- Close and rehabilitate all roads not required for administrative purposes or public use, subject to available funding.

- Evaluate the ability of Property environments to withstand the impact of visitor use, agriculture, grazing, and other leaseholder operations. Developments in any unit of the Property shall not be of such capacity, nor uses be of such intensity, that significant ecological damage or deterioration of any environmental factor can reasonably be expected to occur. If deterioration is caused by overuse, take management actions to reduce or eliminate the effect and to rehabilitate damaged resources.

Social Resource Goal 1 – Promote and maintain sustainable coastal agriculture, consistent with resource protection and stipulations included in the original land transfer. Livestock grazing, for the purposes of this goal, is not considered agriculture and is addressed under Natural Resource Goal 4.

Sustainable Agriculture – Social Resource Standard 1.1. Maintain irrigated vegetable row-crop agricultural and dryland farming within the coastal terrace and coastal terrace bluff areas that were in agricultural production as of the date of purchase (October 1998), as long as such agriculture is sustainable and economically viable (i.e., is conducted without subsidy from the Property Managers). In the event that current practices cannot be sustained, preference shall be given to organic farming methods and low water-use crops and methods. Orchards and vineyards are viewed as crops that are incompatible with the character of the existing agricultural landscape and shall not be permitted.

Agricultural Leases – Social Resource Standard 1.2. Offer existing Coast Dairies agricultural leases at fair market value. It is acknowledged that sustainability and economic viability of agriculture at Coast Dairies will be affected by the increased costs of water supply driven by Natural Resource Standard 1.2, which directs that all streams should be managed in a manner that allows sufficient water flow and quality to support steelhead and coho salmon. Water supply infrastructure and capital improvements to meet this standard may be provided by the Property Managers, the lessees or other appropriate parties, based on the availability of the necessary financial resources. Property Managers shall not be responsible for such infrastructure. Should agricultural production cease in any given area for a period of ten consecutive years (following conveyance), Property Managers may choose to revise the Agricultural Management Zone applied to that area (see Chapter VI) to the underlying Watershed Management Zone. Priority shall be given to natural landscape restoration and, where appropriate, recreation.

Agricultural Buffers – Social Resource Standard 1.3. Agricultural operations shall be conducted to allow a minimum buffer of 75 feet from the edge of any coastal terrace bluff edge, and 50 feet from the edge of any stream or identified California red-legged frog breeding pond. Buffer areas may be used for development of recreation trails or natural habitat restoration. Pesticides shall not be used within 200 feet[8] of residences and public buildings.

Social Resource Goal 2 – *Prohibit future mining or mineral, oil, or gas exploration beyond the current lease obligation.*

Current mineral operations will continue under local, state, and federal regulatory constraints. BLM will manage mining leases and right-of-ways, and will assist the County of Santa Cruz and the State of California in continuing enforcement of the California Surface Mining and Reclamation Act (SMARA). Any new mineral exploration within existing lease boundaries will require specific environmental review and associated regulatory approval. At the expiration of the current lease and after mandated restoration actions, the former lease lands will be managed according to the underlying Watershed Management Zones described in Chapter VI.

Insufficient environmental protective measures for mining activities may have historically resulted in adverse environmental impacts on the Coast Dairies Property. For example, inadequately designed settlement basins may have resulted in overflow of sediment-laden water and levee failure, causing erosion, sedimentation, and degradation of water quality in Liddell Creek and San Vicente Creek.

Mining Mitigation, Monitoring, and Reporting Program – Social Resource Standard 2.1. Ensure compliance with the mitigation and monitoring program contained in Santa Cruz County's Certificate of Compliance for mining activities on the Property. This program includes measures intended to decrease adverse environmental impacts from RMC Pacific Materials operations.

Mining Reclamation Plan – Social Resource Standard 2.2. A revised reclamation plan detailing past, current, and future reclamation of Bonny Doon Quarries has been prepared (Madrone Landscape Group, 2001). This plan does not incorporate reclamation and revegetation of all roads that are currently used by RMC. BLM will work with Santa Cruz County

[8] The distance was chosen to reflect the "agricultural buffer" considerations contained in Santa Cruz County Code 16.50.095.

cooperatively to review, evaluate, and revise, as necessary, the Mining Reclamation Plan for consistency with agency requirements and the needs of the Property as public land.

Social Resource Goal 3 – Limit commercial uses of the Property to those consistent with the Plan, including the goals and standards, management zones, trails program, and adaptive management program, and in accordance with the following:

Timber Harvest– Social Resource Standard 3.1. Prohibit harvesting of any trees or other fiber products for commercial purposes under any circumstances. Subject to this standard, trees may be cut if necessary for public safety or for the health of the forest as a natural reserve rather than a timber production forest, and wood thus obtained may be used on the Property.

Commercial Uses – Social Resource Standard 3.2. Any monetary compensation resulting from the commercial uses of the Property shall be used to:

- Meet obligations associated with operations and management of the Property;
- Endow and/or fund Property management; and
- Maximize the public enjoyment of and/or the preservation and enhancement of the Property's natural and cultural resource values.

Where retention of fees for use onsite is inconsistent with federal or state agency policies or regulations, Property Managers shall seek waivers or exceptions to their regulations where practical and feasible.

Social Resource Goal 4 – Maximize opportunities for public access, recreation, and enjoyment consistent with protection and preservation of natural and cultural resources, public health and safety, agricultural uses, and other leases.

Recreation on the Property shall be encouraged primarily through the development of a comprehensive trail system that would accommodate a variety of visitor experiences. As part of this Plan, the Property will include a Coastal Trail[9] developed along the coastal terrace seaward of Highway 1.

Interim Access Stage – Social Resource Standard 4.1. This Plan identifies and recommends trails considered suitable for immediate public use Chapter VII. A Coastal Trail[10] is included among the trails considered suitable for immediate public use.

Long-term Access Implementation Stage – Social Resource Standard 4.2. Potential trails not identified for immediate public use shall be further reviewed and detailed in a comprehensive Trail Plan. Evaluate current trail opportunities and experiences available in the region and design a Coast Dairies Trail Plan to expand the range of trail experiences and settings available to North Coast trail users (see Chapter VII). Opportunities for loop trails that take the public through a variety of habitats shall be given a high priority. Where feasible, opportunities for shared recreational use of trails may be considered. However, some trails will be designed for hiking use only. Appropriate use of trails shall be determined based on the desired social and resource conditions. See also Social Resource Standard 4.4, below.

ADA Access – Social Resource Standard 4.3. All possible opportunities for trails that comply with the Americans with Disabilities Act (ADA) shall be examined and given a high priority.

Allocating Trail Use – Social Resource Standard 4.4. Off-trail or off-road (cross-country) use shall be prohibited in all areas. For a trail to be determined open to any non-pedestrian use, the following criteria will be evaluated:

- Impacts of erosion/sedimentation
- Ability to monitor and repair trail damage

9 General planning standards for the coastal trail are described in the document *Standards and Recommendations for Accessway Location and Development* (California Coastal Commission and California Coastal Conservancy, 1981)

10 Only those segments of the Coastal Trail that currently exist will be open for immediate public use. The existing trail on the Coast Dairies coastal bluffs does not form a continuous trail corridor along the entire length of the Coast Dairies Property.

- Impact on emergency service response system and S&R capability
- Infrastructure availability (parking, sanitation, etc,)
- Safety
- Compatibility with desired social environment

Social Resource Goal 5 – Establish appropriately sited visitor facilities to provide public information and education without compromising existing use patterns of the town of Davenport.

Two potential sites for visitor contact facilities are under consideration: one at the Cheese Barn within the Molino watershed, the other near the site of the Laguna Creek Inn (at Laguna Creek and Highway 1). The Cheese Barn site is marked by several degraded structures and a large storage cellar that held both cheese and wine. Access from Highway 1 is available, and the interpretive potential is heightened by the availability of excellent oral history testimony (Project Archives, Maria Cuclis Tomares Interview). The Laguna Creek Inn site is near one of only two habitable residences on the Property, east of Highway 1 at Laguna Creek. It has similar access and interpretive values. Either or both sites may be developed as visitor contact facilities. Both sites are separated from Davenport and are at opposite ends of the Property, meet the intent to preserve the community character of Davenport, and are consistent with Cultural Resource Goal 1.

> *Entrance Facility* – Social Resource Standard 5.1. Any entrance facility should provide visitor contact and day-use parking as well as immediate access to trails. A site plan will be prepared to provide for park offices and interpretive exhibit space. The intent of the entrance station is to orient the visitor to the Property's history, ecology, ongoing economic activity, and the unique state and federal partnership that manages it.

Social Resource Goal 6 – Provide opportunities for public recreation and enjoyment, such as picnic facilities, campgrounds, and appropriate utilities to support such recreational facilities, consistent with public health and safety, protection and preservation of natural and cultural resources, agricultural uses, and other leases.

Social Resource Goal 7 – Maintain the existing pastoral visual character of the Property. Ensure that future development is consistent with the Visual Resource Classes assigned to the Property in the Existing Conditions Report and Santa Cruz County's visual resource policies.

Management and Operational Goals

General Planning Goals and Management Guidelines

The Property Managers shall:

- Participate in efforts to maintain coastal agriculture. Support for and/or approval of specific proposals (such as the construction of new water storage facilities) would be subject to appropriate environmental reviews. Such activities will not be subsidized by the Property Managers.
- Continually strive to protect and enhance Property resources.
- Provide or arrange for adequate public safety, fire, rescue, and law enforcement services to ensure that public use of the Property does not impose an unacceptable burden on local fire and safety agencies.
- Provide appropriate administration and maintenance facilities.
- Use principles of sustainability in the design and implementation of all park facilities. To the greatest degree possible, structures shall be designed and built and all lands shall be managed to maximize the long-term sustainability of all park resources.

Management and Operational Goal 1 – Operate in accordance with Bureau of Land Management and California Department of Parks and Recreation mission statements, planning area policies, resource management directives, executive orders, the vision statement for Coast Dairies, and the legal terms of Property transfers.

Management and Operational Goal 2 – Create a model for seamless state/federal park management.

Joint management of parklands is not new, but there is little precedent directly applicable to the Property. In 1994, the Department and the National Park Service agreed to jointly manage a four-park area containing 45 percent of all the old-growth redwood forest remaining in California. In 2001, the National Oceanic and Atmospheric Administration and CDFG developed a joint state/federal process to consider marine reserves in the Channel Islands National Marine Sanctuary.

Between BLM and the Department there is considerable overlap in mission (resource protection and sustainable use) and considerable difference in operational policy (e.g., grazing, mining). The goal for joint state and federal management of the Property is "seamless" cooperation: joint state and federal management roles with a division of labor invisible to the public. To the visitor, the jurisdictional boundaries between lands managed by the Department and by BLM at Coast Dairies should be transparent. To the extent practicable, Property Managers will commit their respective resources, staff, equipment, and facilities for the common protection of all resources contained within the Property as well as for the appropriate enjoyment and appreciation by the public, without regard to agency ownership. Agencies will share resources and staffing to avoid duplication, and take maximum advantage of each agency's specialized experience and capabilities. Agencies will work with Agri-Culture to incorporate seamless cooperation strategies with agricultural operations.

Rules and Regulations – Management and Operational Standard 2.1. Rules and regulations for implementing provisions of the Plan shall apply to all of the Property, including any property retained by the Coast Dairies and Land Company.

Special Use Permits – Management and Operational Standard 2.2. The process for obtaining permits or permissions for any special uses shall be clear and consistent.

Public Information – Management and Operational Standard 2.3. Whenever possible, signage, public information, and educational materials shall be produced in a format approved by both agencies.

General Procedures – Management and Operational Standard 2.4. Provisions for the above, and also including but not limited to yearly budget procedures, staffing, and law enforcement, shall be developed in a separate memorandum of understanding between the agencies, which shall be made part of the Plan.

- To the extent practicable, commit respective resources, staff, equipment, and facilities assigned to the Property for the common protection of all resources contained within the Property as well as for the appropriate enjoyment and appreciation of the same by the public, without regard to agency ownership.
- Incorporate the Vision Statement, *Assignment of Stock Options, Escrow Account and Stock Option Deposit*, and Coast Dairies Plan into eventual guidance for management of the Property.
- To the extent practicable and subject to maintaining agency identity, perform work without regard to agency affiliation. Both parties shall project the concept of cooperative management to park visitors, neighbors, and governmental agencies through the use of signing, publications, and other instruments of communication.
- Establish cooperative operating procedures and practices that result in efficiencies and cost savings accruing to both partners. All savings accruing there from shall be used to enhance resource protection and provide services to visitors.
- Develop joint operating procedures and standards to ensure the effective and efficient accomplishment of activities, including but not limited to: visitor services, resource protection, public information, interpretation and publications, resource management, maintenance, design and construction, planning, signage, and the development of policies.

- To the extent practicable, jointly staff work groups and committees.
- Jointly develop and implement management plans for the Property.
- Provide access for employees to both agencies' training opportunities and conduct orientation for new employees, including a workshop on the history of the agencies and their partnership.
- To the extent practicable, develop reports for agency and public use that incorporate cooperatively generated parkwide statistics using a consistent procedure (e.g., interpretive contacts, visitation, and ranger patrol statistics).
- Ensure that both agencies' management and support staff in Santa Cruz, Hollister, and Sacramento provide support to Property staff to promote cooperative operations in the best interest of the partnership. Agency senior staff and managers shall also provide flexibility and latitude in agency policy and procedures, consistent with applicable federal and state laws, to assist in achieving these objectives.
- Coordinate the review of, and provide unified comments on, non-Property plans and issues that affect Property interests.
- Develop a joint status report on progress and accomplishments for the Property to be submitted annually to the Department Director and the BLM State Director.

Subsequent Planning – Management and Operational Standard 2.5. Any subsequent management plan prepared at the direction of this Coast Dairies Plan (e.g., fire management plan, comprehensive Trail Plan) shall specifically address any differences in agency operations or procedures, detail respective roles and responsibilities, and provide unequivocal direction for all parties formalized by appropriate signatures from each managing entity.

Management and Operational Goal 3 – Maintain the character of the pastoral landscape unless and until it is determined that conversion to other uses to enhance the Property's natural resources and biodiversity values would be desirable, feasible, and beneficial.

The pastoral landscape, as the term is used here, characterizes the most basic experience that visitors have when encountering Coast Dairies. The Property is unique in combining aspects of a working landscape with dramatic vistas and biologically productive habitats.

Coast Dairies is not "parklike" at present, nor is it wilderness; it shows people living within an ecosystem rather than on the outside, looking in. This is at the core of the agricultural goal (Social Resource Goal 1 and Social Resource Standard 1.1, Sustainable Agriculture). Management and Operational Goal 3 attempts to interpret this goal from the visitor's perspective.

Off-Highway Vehicles – Management and Operational Standard 3.1. Off-highway vehicle[11] (OHV) use, except for administrative purposes, shall be prohibited on the Property. The reasons for this prohibition are as follows:

- The Property contains highly erosive soils, and there is a clear need to avoid increased surface disturbance and sedimentation to critical fisheries habitat (including federally listed or threatened Coho and steelhead) in all five watersheds of the Property.
- OHV use can be expected to conflict with other land uses, including agricultural operations, mining operation, habitat restoration, and lower-impact recreational activities.

[11] For the purposes of this Plan, off-highway vehicles (OHVs) include any motorized vehicle taken off a highway or an established road. A BLM resource management plan needs to determine whether an area is open, closed, or restricted to OHVs. In accordance with Natural Resource Goal 7, Management and Operational Goal 3, and Management and Operational Standard 3.1, the Coast Dairies Property will be closed to OHVs.

- OHV use is out of character with the goal to maintain the pastoral landscape and the Property's natural, cultural, and biodiversity values. While the desires of potential user groups may have equal validity, there is an imperative, both inherent and expressed in the Coast Dairies vision statement and the stock option, in preserving the existing pastoral qualities of Coast Dairies.

Management and Operational Goal 4 – Investigate and remediate past land uses that may have placed hazardous wastes in locations that could impair surface and groundwater resources, or pose an unacceptable health risk to humans.

Hazardous Waste Inventory – Management and Operational Standard 4.1. If necessary, develop an action plan to remove or treat soil or water contamination to meet all regulatory standards.

Chemical Use – Management and Operational Standard 4.1. The use of all chemicals on the Property shall conform to all applicable county, state, and federal regulations to avoid any inadvertent hazardous materials spills or chemical contamination in soil or water.

Management and Operational Goal 5 – Resolve any outstanding issues regarding appropriative or riparian water rights.

Water Rights – Management and Operational Standard 5.1. During preparation of the Coast Dairies Plan, efforts have been underway to fully document (and if necessary obtain) water rights for the Property (see also Natural Resource Goal 1). Santa Cruz county has convened a working group to explore obtaining water rights for the Property in collaboration with the Trust for Public Land, BLM, the Department and Agri-Culture. If these issues are not resolved at the time of land transfer, Property Managers shall continue this effort. This Plan recognizes that, due to the presence of endangered species, water use will probably be limited to riparian rights, and even these rights may be difficult to establish.

Management and Operational Goal 6 – Encourage the development of a permanent support group and/or a joint venture initiative to assist Property Managers with the long-term stewardship of the Coast Dairies Property.

This goal could include the establishment of a Cooperating Association such as a "Friends of Coast Dairies"–type organization and/or a volunteer program similar to BLM's Bicycle and Equestrian Trails Association at Fort Ord or the Department docent program to assist with on-the-ground management, restoration, and monitoring needs.

Management and Operational Goal 7 – Develop a university liaison program to coordinate research and applied management and to fully utilize the academic community in Coast Dairies monitoring and management.

Opportunities abound to expand on existing relationships and build new partnerships with the University of California and California State University systems. Educational institutions should be encouraged to propose and conduct research on the Property, work on collaborative research, on-the-ground management training and environmental education efforts and to be an integral part of the Adaptive Management Program. Involvement of local California community colleges (e.g., West Valley College's Park Management Program) should also be considered and encouraged.

Management and Operational Goal 8 – Coordinate Coast Dairies management with that of regional state parks, reserves, and ecological preserves, City of Santa Cruz open space, and other public lands such as the BLM Coastal Monument and Monterey Bay National Marine Sanctuary.

Management of natural resources along this portion of the central coast has become a regional priority. Resource protection, landscape-level planning, biological connectivity, provision of recreation and interpretive opportunities, and efforts to conserve additional land between Half Moon Bay and Monterey are best served by a collaborative approach. Property Managers will endeavor to participate in regional habitat conservation planning and other landscape-level analysis, and to integrate future management of Coast Dairies with regional needs.

Management and Operational Goal 9 – Determine the extent of public access and use of the Coast Dairies Property based on an annual assessment of available funds, staffing, and other support.

Access and use may be reduced or restricted, particularly in areas of highest resource sensitivity and vulnerability, whenever adequate funding and staffing (including volunteers) are not available to provide basic levels of public safety services and monitoring of vulnerable and at-risk resources.

Management and Operational Goal 10 – Amend or revise the Coast Dairies Plan as necessary to address new information, identify inaccuracies in old information, and accommodate new land management and ecosystem restoration priorities and methodologies that are consistent with the Coast Dairies Plan.

The Coast Dairies Plan can be revised through a plan amendment or plan revision. Plan amendments change one or more of the terms, conditions, or decisions of the approved Coast Dairies Plan. For example, Plan amendments may include those decisions relating to desired outcomes; measures to achieve desired outcomes, including resource restrictions; or land tenure decisions. Plan amendments will most often be prompted by the need to consider a proposal or action that does not conform to the Coast Dairies Plan; implement new or revised policy; respond to new, intensified, or changed uses on public land; or consider new information from resource assessments, monitoring, or valid scientific studies.

Plan revisions may involve preparation of a new plan to replace the existing one. Plan revisions are necessary if monitoring and evaluation findings, new data, new or revised policy, or changes in circumstances indicate that the entire Plan or major portion of the Plan no longer serve as a useful guide for resource management. Plan revisions are prepared using the same procedures and documentation used for new plans.

MANAGEMENT ZONE PRESCRIPTIONS

Management Zone Prescriptions

Overview

This section defines the management zones recommended for the Coast Dairies Property. Management zoning is a technique used to classify areas and prescribe future desired conditions, visitor activities, and facilities. The principle is well established in public wildland management. For example, the 1988 National Park Service *Management Policies* describes a system identifying how different management strategies will best meet the objectives and purpose of a park. The delineation of management zones by the National Park Service is based upon the nature of a park's natural and cultural resources; all past, existing, and anticipated uses; and park management objectives. In 1998, the California Department of Parks and Recreation (Department) applied this concept to its lands as follows:

> Management Zones are the first and most general attempt to define spatially the management scheme for a unit...They may be based on geographic relationships; resource values; ecological parameters; management issues, goals or objectives; types and intensities of land use; or visitor use or experiences.

Prescriptive management zoning recognizes that various areas of a park have different uses and purposes, and may be managed differently while remaining compatible with the park's mission. The term "management zone" as used herein is defined as:

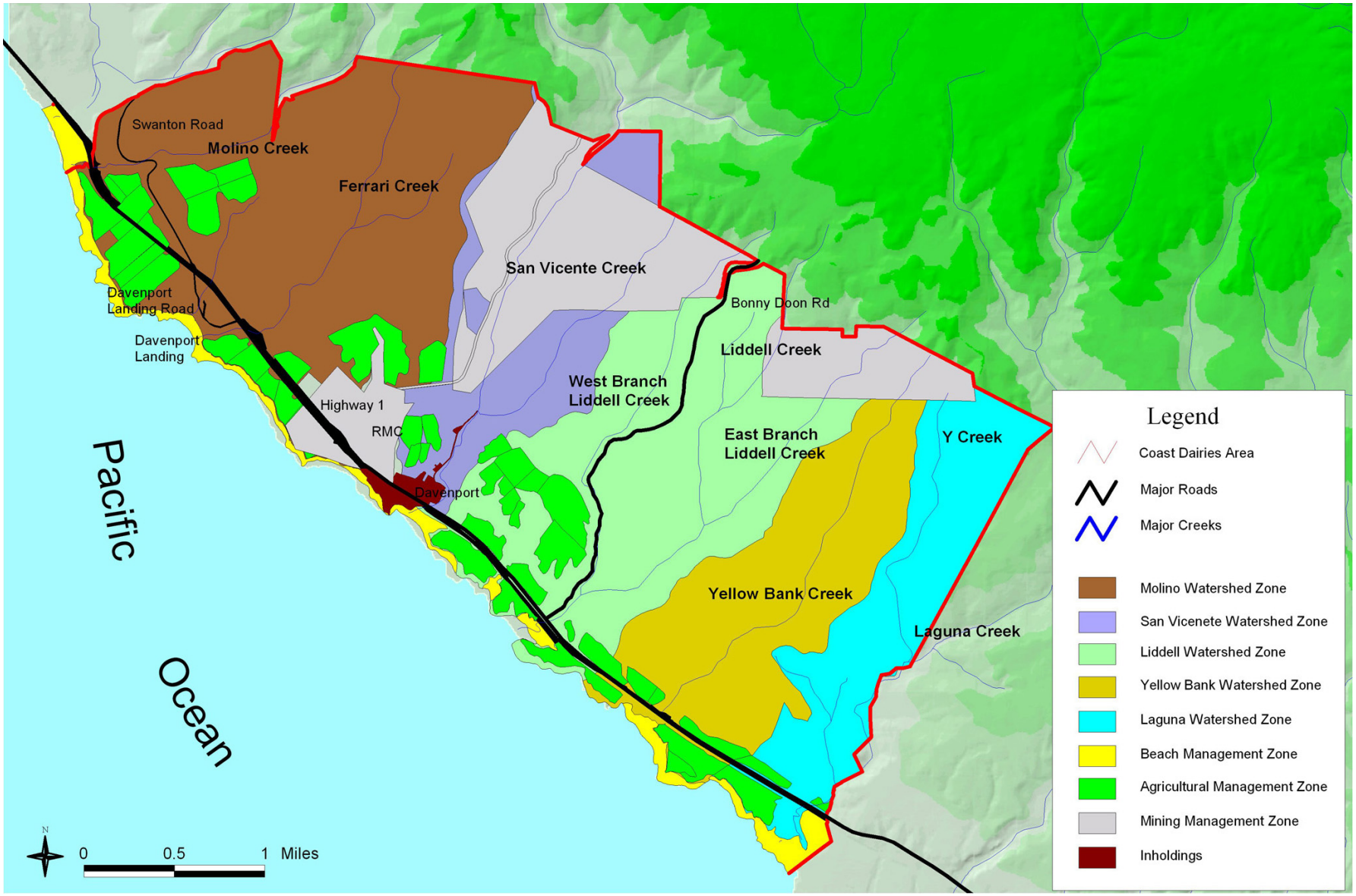
> A geographical area for which management directions or prescriptions have been developed to determine what should and should not occur in terms of resource management, visitor use, access, facilities or development, and park operations. Each zone has a unique combination of resource and social conditions, and a consistent management prescription. Different actions can be taken by the Property Managers in different zones to ensure the area is managed consistent with the prescribed desired condition for that zone.

To derive these prescriptions in a defensible manner (i.e., as expressions of what the land can support), and to determine what the size and location of these zones might be, the Planning Team[1] prepared an opportunities and constraints analysis. Generally, an *opportunity* is a value judgment, a reflection of how important an area is to a particular resource or use (e.g., wildlife or agriculture), that evaluates a current condition and not a hypothetical future state that could be obtained after management is applied. A *constraint* is an assessment of compatibility with other uses or resources within a given zone.

Zoning Categories

The management zones for the Coast Dairies Property fall into four general categories: (1) Watershed Management Zone, (2) Beach Management Zone, (3) Agricultural Management Zone, and (4) Mining Management Zone (Figure VI-1). Zoning prescriptions list typical activities, allowed facilities, and examples of facilities not allowed in each zone. These lists are not exhaustive. When determining whether a specific use or facility is appropriate to a management zone, Property Managers should consider the general character of development and desired resource and visitor experience conditions described for that zone. Each zone prescribes the *maximum* level of activities and facilities. In practice, lower levels of visitor use and facilities may be provided than are allowed for in the zoning prescriptions. Existing uses or facilities that are not compatible with the management prescriptions of their zones could be removed, relocated, or modified over time. Management zones generally allow for the repair, maintenance, and reconstruction of established facilities (such

[1] The Planning Team included members of the Steering Committee and the consultant team and are individually identified in Tables I-1 and Table I-2 of the ECR.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure VI-1
Management Zones of the Coast Dairies Property

as structures, utilities, roads, etc.) unless specifically noted. All zones also allow for scientific research and monitoring activities, particularly related to the analysis of visitor experience and resource protection.

Uses or activities allowed in a management zone may be subject to limitations over time. If ongoing monitoring (as implemented through the Adaptive Management Program) indicates that impacts on the resource or visitor experience are no longer at an acceptable level, previously designated areas may be further restricted. Management zone prescriptions can also be temporarily superceded by contingencies, such as the need to respond to emergencies. For example, trails, roads, and facilities may be temporarily closed because of fire or flood.

Relationship to Goals and Standards

The Goals and Standards are applied over the entire property, as appropriate. Where the management prescription and a particular Goal and Standard are in conflict, whichever provides the greater protection and enhancement of resources would take precedence.

Watershed Management Zones

Prescriptions for each of the Property's watersheds are presented in this section. In this discussion, Watershed Management Zones are not equivalent to physical watersheds: beach areas, areas used for agriculture, and areas used for mining have a separate zone designation.

Molino Watershed Management Zone

Watershed Overview

The Molino watershed, which includes most of the physical watersheds of Molino Creek and Ferrari Creek, is the largest Watershed Management Zone and has the most complex combination of attributes. The upper portion of the watershed is dominated by woodlands and scrub intermixed with grasslands, while the lower terraces support agriculture.

Two major streams occur within the Molino Watershed Management Zone: Molino Creek and Ferrari Creek. Molino Creek has an existing in-stream dam that was damaged in recent winter storms; a dam on Ferrari Creek, also damaged in recent storms, has been removed, and that part of the creek has been restored. Although a relatively large volume of irrigation water has in the past been diverted for crop production, both streams continue to support limited habitat for anadromous steelhead and landlocked rainbow trout.

The majority of the zone is underlain by sedimentary rock. Erosion hazard is high in the vicinity of Molino and Ferrari Creeks, moderate within the wooded and scrub areas, and low within the grasslands and terraces. There is consistent input of sediment to both streams even between storm events, indicating ongoing disturbance within the watershed.

The Molino Watershed Management Zone supports mixed conifer and redwood forests, scrub communities, native and annual grasslands, and riparian and wetland communities. Grazing leases extend through a majority of the grassland, scrub, and woodland communities. The Molino woodland and scrub communities have a high proportion of grassland openings and grassland/woodland edge. Wildlife diversity is presumed high and relatively disturbance-tolerant. The watershed supports anadromous salmonids and snowy plover and has 40 percent of the known locations of California red-legged frog on the Property. Grasslands and agricultural terraces off of Warnella Road support a diverse array of wintering raptors, while coastal bluffs provide nesting habitat for rhinoceros auklet.

The coastal terraces include both active and fallow agriculture and contain farm worker housing and farm structures, as well as the historic Cheese Barn located near the southern bank of Ferrari Creek. Roads within this watershed are among the most stable on the Property. Warnella Road provides good access to the interior of the

Property with minimal problems, due to its alignment along relatively stable marine terraces and the bluffs.

Refer to the Beach Management Zone for description of and prescription for Property beaches, the Agricultural Management Zone for a description of and prescription for the Property's agricultural activities, and the Mining Management Zone for a description of and prescription for mining on the Property.

Management Prescription and Desired Future Conditions

The Molino Watershed Management Zone will be managed to allow for more intensive recreational activities, such as hiking, walking, biking, horseback riding, picnicking, and large group gatherings. This zone will be managed with a moderate tolerance for resource degradation from visitor use.

Visitors to the Molino Watershed Management Zone could spend significant periods of time enjoying the Property's resources in a relatively accessible setting. This zone enhances opportunities for visitors to enjoy more intensive recreational activities, thus contributing to the diversity of experiences. Trails envisioned for this watershed are discussed in Chapter VII. Visitors can expect moderate to high numbers of encounters with other users and crowding on certain peak days. Large groups could use these areas.

Due to the larger volume of visitors, the Molino Watershed Management Zone will be managed with moderate tolerance for resource degradation from visitor use in specified areas. To protect and enhance cultural, biological, and hydrologic resources, more extensive resource protection measures could be needed to direct visitor use away from sensitive resources. Examples include boardwalks adjacent to sensitive habitats, fencing to prevent trampling and overuse, removal or modification of fish migration barriers on Molino and Ferrari Creeks, and decommissioning and restoration of unnecessary roads. By encouraging higher visitor use in this watershed, adjacent and more resource-sensitive watersheds on the Property will experience lower visitor use.

Activities – The following activities will be typical in this watershed:

- Hiking and walking
- Photography and nature study
- Picnicking and social gathering
- Bicycling
- Horseback riding
- Interpretive programs
- Overnight tent camping – only within a campground setting and by permit
- Grazing to maintain ecosystem health
- Agriculture and mining – refer to the Agriculture Management Zone and Mining Management Zone, respectively

Facilities – The following are examples of facilities that could be allowed in this watershed:

- Visitor / interpretive center
- Picnic facilities
- Designated campsites of moderate size
- Marked trails (trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, drinking fountains, etc.)
- New roads (constructed for visitor-use management and protection of sensitive areas)
- Day-visitor parking
- Support facilities, such as restrooms and picnic tables
- Utilities such as water and electricity associated with facilities

The following are examples of facilities or uses that will **not** be allowed in this watershed:

- Campsites

San Vicente Watershed Management Zone

Watershed Overview

The San Vicente Watershed Management Zone is dominated by woodland, forest, and scrub communities. San Vicente Creek is the only stream on the Property that supports coho salmon and is one of the few streams south of the Golden Gate Bridge with a coho run. San Vicente Creek also supports a healthy steelhead run, and overall has the best salmonid habitat on the Property. In addition, the San Vicente Watershed Management Zone has the most extensive area of redwood forest on the Property. Other sensitive resources within the watershed include habitat for California red-legged frog, bats, raptors, and San Francisco dusky-footed woodrat.

A large portion of the physical watershed of San Vicente Creek on the Property is leased by RMC Pacific Materials. Mining activities include a large, active shale quarry; several abandoned quarries; conveyor line; and an extensive road network. The old San Vicente Railroad alignment, which cuts across the north side of the canyon high above the creek, is a private in-holding. Lower portions of the watershed support active and fallow agriculture and contain farm worker housing and farm structures. The town of Davenport is situated within a private in-holding along the lower portion of San Vicente Creek.

The San Vicente watershed has the highest percentage of igneous bedrock of the five Coast Dairies watersheds, and consequently the erosion hazard potential for the watershed as a whole is low. The watershed includes areas of steep land and landslides. Water quality sampling during the winter of 2000/2001 indicated that San Vicente Creek has the lowest suspended sediment and turbidity readings of the Coast Dairies streams. The lower sampling station had significantly higher turbidity levels than the upper station, indicating that a disproportionate volume of the stream's sediment load is entering the system from the Property itself. San Vicente Creek is a source of drinking water for the Town of Davenport.

Refer to the Beach Management Zone for description of and prescription for Property beaches, the Agricultural Management Zone for a description of and prescription for the Property's agricultural activities, and the Mining Management Zone for a description of and prescription for mining on the Property.

Management Prescription and Desired Future Conditions

San Vicente Creek has the best salmonid habitat and supports the only coho salmon run on the Property. As such, the primary management focus for the watershed is the protection and enhancement of the anadromous fishery. Land uses and management activities that threaten the quality of salmonid habitat (e.g., increasing sediment to the stream system or disturbing streambanks or riparian areas) will be limited.

The San Vicente Creek Watershed Management Zone will be managed to protect the natural and physical processes of the watershed and its immediate environment. Agencies will coordinate with RMC to refine mining operations and development plans to reduce erosion and other natural resource impacts. Other than trails, the San Vicente Creek Watershed Management Zone will exhibit natural conditions, with high-quality native habitats. There will be high native plant and animal species diversity and relatively minimal disturbance and human impact.

By limiting use and development, the San Vicente Creek Watershed Management Zone also protects and enhances cultural, scenic, and recreational resources, such as spectacular views, cultural sites, and opportunities for solitude and primitive recreation.

The San Vicente Creek watershed will be characterized by low to moderate levels of use on marked trails and associated areas. This watershed will have areas for quiet solitude with minimal intrusion on

natural quiet. In some locations, sections of paved or rocked trails and fencing could be used to direct visitor use away from sensitive ecosystems. The San Vicente Creek watershed will be managed with a low tolerance for resource degradation due to visitor use, and management action could be taken to redirect use if such degradation occurred.

Most visitors will experience this area by hiking or walking. Trails may be relatively easy to access or require considerable walking and skill. Encounters with other visitors will be infrequent. Marked trails will allow for visitors with a diversity of abilities to experience these areas. Recreational access may be restricted on a seasonal basis to protect resources. Though the area is not directly accessible by vehicles or from parking areas, noise from nearby vehicles or activities could affect visitor experiences in this watershed.

Examples of protection measures that could be implemented include coordination with RMC Pacific Materials to refine mining operations and reduce erosion, and evaluation, correction of existing fish migration barriers, preservation of cultural resources, and restoration of natural processes affected by contemporary development and use, and restoration of natural cycles and dynamics to sustain native plant and wildlife species; these measures could entail redesign or realignment of the existing road system, and modification and repair of the sediment basins. There is an urgent need to address historic and ongoing sources of sediment and erosion, including roads and other disturbed areas, in order to protect and enhance water quality and salmonid habitat. This watershed also encourages the protection and enhancement of cultural resources, including archeological sites, by limiting development and access. Restoration of natural resources such as riparian areas, wetlands, and native habitats will also contribute to the restoration of the cultural landscape.

Activities – The following activities will be typical in this watershed:

- Hiking and walking
- Photography and nature study
- Interpretive programs
- Grazing to maintain ecosystem health
- Agriculture and mining – refer to the Agriculture Management Zone and Mining Management Zone, respectively

Facilities – The following are examples of facilities that could be allowed in this watershed:

- Marked trails (trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, drinking fountains, etc.)
- Utilities such as water and electricity associated with facilities

The following are examples of facilities that will **not** be allowed in this watershed:

- New roads
- Day-visitor parking
- Support facilities, such as restrooms and picnic tables
- Visitor or interpretive centers
- Food services
- Campgrounds

Liddell Watershed Management Zone

Watershed Overview

The Liddell Watershed Management Zone supports mixed evergreen and redwood forest, scrub communities, native and annual grasslands, and wetland and riparian communities. All three branches of Liddell Creek support steelhead trout. Other sensitive resources

within the watershed include cultural artifacts and habitat for California red-legged frog, bats, raptors, and knobcone pine.

The upper portion of Liddell Creek's physical watershed is dominated by RMC Pacific Materials operations. Portions of the watershed upstream of the Property are owned by RMC Pacific Materials, and a large portion of the upper watershed within the Property boundary is leased to the company. The lease area includes a large spoils disposal area for the limestone quarry and three sediment basins located on each of the stream branches. Lower portions of the Watershed support active and fallow agriculture and contain farm worker housing and farm structures.

Outcroppings of the highly erosive Santa Margarita Sandstone in the upper watershed, mining operations, water diversions, and the extensive road network appear to have a profound effect on the hydrology, water quality, and aquatic and terrestrial biology of Liddell Creek. Winter water quality monitoring indicates a high level of disturbance in the watershed, with moderate chronic turbidity and very high acute turbidity. The very high acute turbidity indicates that storm events are delivering far more sediment to the stream network than would be expected in an undisturbed state. The City of Santa Cruz's Liddell Spring water diversion further affects stream resources.

Refer to the Beach Management Zone for description of and prescription for Property beaches, the Agricultural Management Zone for a description of and prescription for the Property's agricultural activities, and the Mining Management Zone for a description of and prescription for mining on the Property.

Management Prescription and Desired Future Conditions

Liddell Creek has the second best salmonid habitat and fish run on the Coast Dairies Property. As such, the primary management focus for the watershed is the protection and enhancement of sensitive resources, including the anadromous fishery.

The Liddell Watershed Management Zone will be managed to protect the natural and physical processes of the watershed and its immediate environment. Other than trails, the watershed will exhibit natural conditions and native habitats. There will be high native plant and animal species diversity and relatively minimal disturbance and human impact in portions of the watershed outside the existing mining lease.

By limiting use and development, the Liddell Creek Watershed Management Zone also protects and enhances cultural, scenic, and recreational resources, such as spectacular views, cultural sites, and opportunities for solitude and primitive recreation.

The Liddell Creek watershed would be characterized by low to moderate levels of use on marked trails and associated areas. This watershed would have areas for quiet solitude with minimal intrusion on natural quiet. In some locations, sections of paved or rocked trails and fencing could be used to direct visitor use away from sensitive ecosystems. The watershed will be managed with a low tolerance for resource degradation due to visitor use, and management action could be taken to redirect use if such degradation occurred.

Most visitors will experience this area by hiking or walking. Trails may be relatively easy to access or require considerable walking and skill. Encounters with other visitors will be infrequent. Marked trails will allow for visitors with a diversity of abilities to experience these areas. Recreational access may be restricted on a seasonal basis to protect resources. Though the area is not directly accessible by vehicles or from parking areas, noise from nearby activities (e.g., mining operations) could affect visitor experiences.

Resource protection activities will include preservation of cultural resources, removal or modification of fish migration barriers, restoration of natural processes affected by contemporary development and use, and restoration of natural cycles and dynamics to sustain native plant and wildlife species. Examples of protection measures that could be implemented include coordination with RMC Pacific Materials to refine mining operations and reduce erosion, and evaluation and correction of existing fish migration barriers; these

measures could entail redesign or realignment of the existing road system, and modification and repair of the sediment basins. The prescription for this zone also encourages the protection and enhancement of cultural resources, including archeological sites, by limiting development and access. Restoration of natural resources such as riparian areas, wetlands, and native habitats will also contribute to the restoration of the cultural landscape.

Activities – The following activities will be typical in this watershed:

- Hiking and walking
- Photography and nature study
- Interpretive programs
- Grazing to maintain ecosystem health
- Agriculture and mining – refer to the Agriculture Management Zone and Mining Management Zone, respectively

Facilities – The following are examples of facilities that could be allowed in this watershed:

- Marked trails (trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, drinking fountains, etc.)
- Utilities such as water and electricity associated with facilities

The following are examples of facilities that will **not** be allowed in this watershed:

- New roads
- Day-visitor parking
- Support facilities, such as restrooms and picnic tables
- Visitor or interpretive centers
- Food services
- Campgrounds and lodging

Yellow Bank Watershed Management Zone

Watershed Overview

Yellow Bank Creek's watershed is prototypical of the general character of Coast Dairies: it rises from sandy beaches and coastal terraces through prairies and shrubs to the heavily wooded interior at the top of the Property. Yellow Bank Creek itself is a small perennial stream that supports a landlocked population of rainbow trout, due to the presence of three migration barriers near the mouth of the stream. Other sensitive resources within the watershed include California red-legged frog, native grasslands, redwoods, riparian communities, a high number of raptors, limestone cliffs that may provide nesting habitat for peregrine falcons, and cultural artifacts. Although the coastal terraces are relatively narrow compared to the other terraces on the Property, they still support row crop agriculture. Grasslands and scrub communities are leased for grazing.

Yellow Bank Creek watershed has a high erosion hazard potential. Approximately 80 percent of the watershed is underlain by sedimentary rock, and water quality monitoring indicates that the stream has high ratings for both chronic and acute turbidity. Yellow Bank Creek is actively incising. A nickpoint is migrating upstream and threatens to undercut the City of Santa Cruz's water pipeline from Liddell Spring, as well as Liddell Pipeline Road. The active incision and the bed material indicate that Yellow Bank Creek is sensitive to disturbance, particularly to any land use that increases runoff.

Refer to the Beach Management Zone for description of and prescription for Property beaches, the Agricultural Management Zone for a description of and prescription for the Property's agricultural activities, and the Mining Management Zone for a description of and prescription for mining on the Property.

Management Prescription and Desired Future Conditions

The Yellow Bank Watershed Management Zone will be managed to allow for more intensive recreational activities, such as hiking, walking, biking, horseback riding, picnicking, and large group gatherings, with a moderate tolerance for resource degradation from visitor use. Visitor use will be concentrated in the lower portion of the watershed, where erosion potential is lessened, reserving the upper portion for resource conservation classification.

Visitors to Yellow Bank watershed could spend significant periods of time enjoying the Property's resources in a relatively accessible setting. This zone enhances opportunities for visitors to enjoy more intensive recreational activities, thus contributing to the diversity of experiences. Trails envisioned for this watershed are discussed in Chapter VII. Visitors can expect moderate to high numbers of encounters with other users and crowding on certain peak days. Large groups could use these areas.

Due to the larger volume of visitors, the Yellow Bank watershed will be managed with moderate tolerance for resource degradation from visitor use in specified areas. To protect and enhance cultural, biological, and hydrologic resources, more extensive resource protection measures may be needed to direct visitor use away from sensitive resources. Examples include boardwalks adjacent to sensitive habitats, fencing to prevent trampling and overuse, removal or modification of fish migration barriers on Yellow Bank Creek, strict erosion control measures, and decommissioning and restoration of unnecessary roads. By encouraging higher visitor use in this watershed, adjacent and more resource-sensitive watersheds on the Property will experience the desired lower visitor use.

Activities – The following activities will be typical in this watershed:

- Hiking and walking
- Photography and nature study
- Picnicking and social gathering
- Bicycling
- Horseback riding
- Interpretive programs
- Overnight tent camping – only within a campground setting and by permit
- Grazing to maintain ecosystem health
- Agriculture and mining – refer to the Agriculture Management Zone and Mining Management Zone, respectively

Facilities – The following are examples of facilities that could be allowed in this watershed:

- Picnic facilities
- Designated campsites of moderate size
- Marked trails (trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, drinking fountains, etc.)
- New roads or trails (constructed for visitor-use management and protection of sensitive areas)
- Support facilities, such as restrooms and picnic tables
- Utilities such as water and electricity associated with facilities

The following are examples of facilities or activities that will **not** be allowed in this watershed:

- Visitor or interpretive center
- Campsites or camping outside of designated areas

Laguna Watershed Management Zone

Watershed Overview

The majority of the Laguna Creek watershed is located outside the Coast Dairies Property. Portions of the watershed within the Property include the lower portion of Laguna Creek and the majority of the Y Creek sub-watershed. Both Laguna Creek and Y Creek support anadromous steelhead trout. The watershed also includes archeological resources and the historic area of the Laguna Inn. The upper portions of the watershed are leased for grazing, while the lower portions support row crop agriculture.

Although Laguna watershed has a low erosion hazard potential, portions of the watershed are underlain by the highly erosive Santa Margarita and Lompico Sandstones. Laguna Creek was assigned a moderate rating for both acute and chronic turbidity, indicating that sedimentation is an issue. Y Creek was assigned a moderate rating for acute turbidity and a high rating for chronic turbidity, indicating that sediment is bleeding into the stream between storm events.

Refer to the Beach Management Zone for description of and prescription for Property beaches, the Agricultural Management Zone for a description of and prescription for the Property's agricultural activities, and the Mining Management Zone for a description of and prescription for mining on the Property.

Management Prescription and Desired Future Conditions

The Laguna Watershed Management Zone will be managed to allow for more intensive recreational activities, such as hiking, walking, biking, horseback riding, picnicking, and large group gatherings, with a moderate tolerance for resource degradation from visitor use. Visitor use will be concentrated in the lower portion of the watershed, reserving the upper portion for resource conservation classification.

Visitors to Laguna watershed could spend significant periods of time enjoying the Property's resources in a relatively accessible setting. This zone enhances opportunities for visitors to enjoy more intensive recreational activities, thus contributing to the diversity of experiences. Trails envisioned for this watershed are discussed in Chapter VII. Visitors can expect moderate to high numbers of encounters with other users and crowding on certain peak days. Large groups could use these areas.

Due to the larger volume of visitors, the Laguna watershed will be managed with moderate tolerance for resource degradation from visitor use in specified areas. To protect and enhance cultural, biological, and hydrologic resources, more extensive resource protection measures may be needed to direct visitor use away from sensitive resources. Examples include boardwalks adjacent to sensitive habitats, fencing to prevent trampling and overuse, removal or modification of fish migration barriers on Laguna Creek, and decommissioning and restoration of unnecessary roads. By encouraging higher visitor use in this watershed, adjacent and more resource-sensitive watersheds on the Property will experience the desired lower visitor use.

Activities – The following activities will be typical in this watershed:

- Hiking and walking
- Photography and nature study
- Picnicking and social gathering
- Bicycling
- Horseback riding
- Interpretive programs
- Overnight tent camping – only within a campground setting and by permit
- Grazing to maintain ecosystem health
- Agriculture and mining – refer to the Agriculture Management Zone and Mining Management Zone, respectively

Facilities – The following are examples of facilities that could be allowed in this watershed:

- Visitor or interpretive center
- Picnic facilities
- Designated campsites of moderate size
- Marked trails (trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, drinking fountains, etc.)
- New roads (constructed for visitor-use management and protection of sensitive areas)
- Day-visitor parking
- Support facilities, such as restrooms and picnic tables
- Utilities such as water and electricity associated with facilities

The following are examples of facilities or activities that will **not** be allowed in this watershed:

- Campsites or camping outside of designated areas

Beach Management Zone

Beaches Overview

The Coast Dairies Property includes seven named beaches and additional unnamed pocket beaches along more than seven miles of dramatic coastline. Named beaches on the Property include Scott Creek Beach, Davenport Landing Beach (operated by the County of Santa Cruz), Davenport Bluffs and Beach, Sharktooth Beach, Bonny Doon Beach, Yellow Bank Beach, and Laguna Creek Beach.

Beaches within Molino watershed extend from the northern end of the Property to the shoreline opposite the cement plant. In the northern portion of this zone, Molino Creek meets the ocean at Scott Creek Beach. The entire area of Scott Creek Beach, including the portion on the Property, is considered critical habitat for western snowy plover. The Molino watershed also includes Davenport Landing Beach, which is used year-round and has one of the most consistent use patterns of any of the beaches on the Property. It is easily accessible from the road, which encourages its use by families with children and older and disabled persons (there is a disabled access ramp). A private in-holding, the U.S. Abalone aquaculture facility, is located on Davenport Landing Beach.

Beaches within the San Vicente watershed include Davenport Bluffs and Beach and several pocket beaches, extending along a 17-acre area between the Union Pacific right-of-way and the ocean, just south of the town of Davenport. San Vicente Creek passes through its bedrock tunnel and onto Davenport Beach before entering the ocean. Access to the beach is across the railroad right-of-way.

The Liddell watershed includes approximately 15 acres of beach, including Bonny Doon Beach and Sharktooth Beach. Sharktooth Beach is the smallest of the named beaches on the Property, and its size varies from year to year. The beach is surrounded by 40-foot-high cliffs, and access consists of a steep and dangerous path. The steep slopes adjacent to the beach are well vegetated, although the area near the path has been eroded. Bonny Doon Beach is a larger, more accessible beach. The mouth of Liddell Creek, at the outlet of the bedrock bore beneath the Union Pacific Railroad grade, is on Bonny Doon Beach. A highly disturbed sand dune, nearly devoid of its native vegetation, occupies the southern end of Bonny Doon Beach.

Yellow Bank watershed has 27 acres of beach, including Yellow Bank Beach, which is located where Yellow Bank Creek empties through its bedrock bore into the sea. Yellow Bank Beach has a northern and a southern section, separated by a rocky point passable only at low tide. The beach is currently used for recreation.

The southern portion of the Property terminates at Laguna Beach and the largest brackish marsh on the Property. Laguna Beach is one of the most sensitive areas of the Property, providing critical habitat for western snowy plover and marsh rearing habitat for steelhead. The beach is currently used year-round and has recently been the site of large, un-permitted gatherings, which are presumed to contribute to the low nesting success of western snowy plover in recent years. There is good access to the beach by several well-established trails.

Management Prescription and Desired Future Conditions

Coast Dairies beaches play a dual role, providing valuable and critical habitat for threatened and endangered species as well as prized recreational opportunities and public access. The Beach Management Zone prescription aims to preserve and enhance both of these resources, with the primary management focus being the protection and enhancement of both biological resources and recreational opportunities and public access. At Laguna Beach and Scott Creek Beach, the emphasis is on the protection and enhancement of habitat for threatened and endangered species. Recreation and public access will be the emphasis for all other beaches.

The Beach Management Zone will be managed to protect the natural and physical processes of the watershed and its immediate environment. Other than trails, beach access, and limited visitor facilities, the Beach Management Zone will exhibit natural conditions, with high-quality native habitats. There will be high native plant and animal species diversity and relatively minimal disturbance from human impact. The limited development allowed in this zone will be designed to be consistent with the surrounding landscape and to protect and enhance the scenic and recreational resources, including the spectacular vistas. Visitor use of sensitive areas, such as Laguna Beach or Scott Creek Beach, may be addressed through seasonal beach closures, signage, fencing, public information, and other management actions. For example, closures of Laguna Beach and Scott Creek Beach may be necessary during the nesting season for western snowy plover (May 1 through August 31). Public information and outreach should accompany any modification in access or use.

Overall, the Beach Management Zone will be characterized by moderate levels of use, where visitors could spend significant periods of time enjoying the Property's resources in a relatively accessible setting. During certain times of the year or in a particular area (e.g., a small pocket beach), visitor encounters will be low, providing opportunities for quiet solitude with minimal intrusion on natural quiet. However, at other times of the year (e.g., summer holidays), visitor use would be high, with crowded conditions and moderate to high numbers of encounters with other users. Noise from nearby vehicles or activities could affect visitor experiences along beaches. Driving on Property beaches is prohibited except as necessary by Property Managers or their designees to protect public health and safety or to protect resources.

Trails and beach access will be relatively easy. Visitors may access Property beaches either directly from existing roads, such as Highway 1, or by established trails. Access will allow for visitors with a diversity of abilities to experience these areas. The Property Managers will pursue opportunities to provide safe access to all beaches, which could include, for example, an agreement with or easement across the railroad right-of-way to provide visitor access to Property beaches.

Resource protection and enhancement activities in this management zone will include preservation and restoration of natural processes affected by contemporary use and development, removal or modification of fish migration barriers, and restoration of natural cycles and dynamics to sustain native plant and wildlife species. Examples of activities that could be pursued include restoring and revegetating the sand dune at the southern end of Bonny Doon Beach and improving fish passage. Long-term resource protection should include removal of the Highway 1 and Union Pacific Railroad fill, which were built on the historic beach and lagoon areas of the Property's creeks, their replacement with free-span bridges, and restoration of fish passage, lagoons, and estuarine habitat. This management zone also

encourages the protection and enhancement of cultural resources, including archeological sites, by restoring natural habitats that contribute to the cultural landscape.

Activities – The following activities will be typical in this management zone:

- Walking and hiking
- Photography and nature study
- Swimming, wading, and water sports
- Picnicking
- General beach play
- Ocean Fishing[2]
- Interpretive programs

Facilities – The following are examples of facilities that could be allowed in this management zone:

- Marked trails, including the Coastal Trail (trails could include bridges, stairs, and other necessary facilities for public access and safety)
- Directional, safety, informational, interpretive, and regulatory signs
- Facilities to protect public health and safety or resources (e.g., toilets, garbage and recycling collection, fencing, etc.)
- Utilities such as water and electricity associated with facilities
- Support facilities, such as restrooms and picnic tables
- Day-visitor parking, where appropriate

The following are examples of facilities or activities that will **not** be allowed in this management zone:

- New roads
- Visitor or interpretive centers
- Food services
- Campgrounds or camping and lodging

[2] All fishing on the Property (freshwater and marine) is regulated by the California Department of Fish and Game. Coast Dairies managers will administer access to fishing areas.

Agricultural Management Zone

Agricultural Overview

At Coast Dairies, a series of coastal terraces comprise the land base suitable for crops. The lands along the ocean bluff form the first terrace and are bisected in several places by Highway 1. The second terrace forms on a bluff just behind the first, and has some of the best agricultural soils on the Property.

The production of high-value vegetables on the North Coast began in the early part of the 20th century, enabled by a series of irrigation projects a few years earlier that allowed growers to convert land previously used for pasture and hay production to irrigated row crops. The principal crop historically grown on the Property is Brussels sprouts, closely followed by artichokes and strawberries. Other crops have also been planted in rotation with Brussels sprouts, such as leeks, peas, cabbage, and beans. Beans are particularly useful as a rotation crop because they increase soil fertility by fixing nitrogen in the soil. In many cases, the leaseholders do not practice crop rotation, and Brussels sprouts are grown on the same land in successive years.

Lessees are responsible for providing and maintaining their own water collection systems, water distribution lines and pumps, structures for equipment storage, buildings for grading and storage, and worker housing. Each of the three historic lessees has a centralized equipment building and worker housing and/or bunkhouses. Fambrini Farm and Swanton Berry Farm also operate roadside markets on Highway 1.

Historically, people have had access to the Coast Dairies beaches, and there seems to be little problem in the interface between recreation uses and agricultural operations. Wilder Ranch State Park indicates little problem, particularly with proper staffing and signage. Buffer zones between agricultural operations and recreational uses will likely be necessary along the coastal terraces.

Management Prescription and Desired Future Conditions

Areas designated as an Agriculture Management Zone will be managed to encourage sustainable coastal agriculture, consistent with resource protection and with the provisions of stipulations included in the original land transfer. Vegetable row-crop agricultural and dryland farming will be maintained on the coastal terrace and coastal terrace bluff areas that were in agricultural production as of the date of purchase (October 1998), as long as such agriculture is sustainable and economically viable (i.e., conducted without subsidy from the land management agencies). Orchards and vineyards are viewed as incompatible with the character of the existing landscape and will not be permitted.

Coast Dairies agricultural leases will be offered at fair market value. It is acknowledged that sustainability and economic viability of agriculture at Coast Dairies will be affected by the increased costs of water supply, driven by Social Resource Standard 1.2, which directs that all streams should be managed in a manner that allows sufficient water flow and quality to support steelhead and coho salmon. Water supply infrastructure and capital improvements to meet this standard may be provided by the Property Managers, the lessees or other appropriate parties. Should agricultural production cease in any given area for a period of ten consecutive years, the land managers may revise the management zone to the underlying management zone for that watershed.

Agricultural operations will be conducted to allow a buffer of at least 75 feet from the edge of any coastal terrace bluff edge, and at least 50 feet from the edge of any stream or identified red-legged frog breeding pond. Buffer areas may be used for development of trails or natural habitat restoration. Opportunities to remove or modify fish migration barriers should be explored. This zone provides opportunities for education in such fields as sustainable coastal agriculture, with programs designed to protect native biodiversity and other natural landscape values. Agrotourism is appropriate within this area. Agricultural farm-labor housing will be continued by agricultural leaseholders.

The Agriculture Management Zone will include the trails considered suitable for immediate public use. The trails are described in Chapter VII, Trails and Access Program.

Activities – The following activities will be typical in this management zone:

- Farming
- Agrotourism
- Hiking and walking
- Bicycling
- Horseback riding
- Photography and nature study
- Interpretive programs
- Cooperative educational and demonstration programs with the University of California, Santa Cruz; California Polytechnic Institute; or other institutions
- Grazing to maintain ecosystem health

Facilities – The following are examples of facilities that could be allowed in this management zone:

- Agriculture-related facilities
- Farm housing
- Toilets and toilet enclosures (as necessary to protect resources)

- Marked trails (some trails could have remnant paving, soil amendments, or hardened surfaces; stairs, walls, fencing, and other trail features could be constructed for visitor-use management and protection of sensitive areas)
- Directional, safety, informational, and regulatory signs, and minimal interpretive signs when required for protection of resources
- New roads, where appropriate and necessary
- Utilities associated with facilities

The following are examples of facilities or activities that will **not** be allowed in this management zone:

- Visitor center (except farm-related facilities)
- Interpretive center (except farm related facilities)
- Campsites or camping
- Visitor lodging

Mining Management Zone

Mining Overview

RMC Pacific Materials currently leases approximately 780 acres from Coast Dairies and Land Company (CDLC) for cement plant and mining operations. Leased areas include the shale quarry, waste disposal areas, conveyor-belt system, settlement basins, and acreage surrounding the Davenport Cement Plant. An inactive shale quarry is located on the Coast Dairies Property adjacent to RMC's former railroad line. This quarry was historically leased by RMC for mining purposes, but was abandoned following the opening of the existing shale quarry in 1969 and the associated construction of the covered conveyor-belt system (Sheidenberger, 2001). RMC's Davenport Cement Plant is located along Highway 1, just north of the town of Davenport, and has been in operation since 1906. The Davenport Cement Plant is located on RMC-owned land and is largely surrounded by Coast Dairies Property. A limestone quarry and a portion of the waste disposal areas are also located on RMC-owned property.

RMC's shale quarry is located on 183 acres of Coast Dairies land approximately one mile east of the Davenport Cement Plant. The shale quarry is between San Vicente Creek and the West Branch of Liddell Creek. Approximately 76 acres of the shale quarry are in production. In addition, RMC is utilizing silica-rich rock originating from the limestone quarry. During production, shale is typically mined from the quarry only two or three days a week. Other RMC facilities located on land leased by CDLC include the covered conveyor-belt system, which transports raw materials from the quarries to the Davenport Cement Plant, three waste disposal areas for storage of overburden and unusable materials, sedimentation basins, and numerous roadways.

Reclamation of the shale quarry is ongoing, with existing reclamation efforts focusing on inactive quarry areas. Final reclamation will include stabilization of cut slopes and benches to minimize the potential for future rockfalls and slope instability. Disturbed areas, cut slopes, benches, and certain access roads will be ripped (i.e., decompacted) prior to revegetation. Available information does not specify which shale quarry access roads are included in reclamation plans (Madrone Landscape Group, 2001). Reclamation of the shale quarry began in 1997 and is slated to continue through quarry closure (Madrone Landscape Group, 2001).

Three ponds have been constructed adjacent to Liddell Creek for wetland mitigation to compensate for the loss of wetland habitat associated with the creation of waste disposal areas and settlement basins. These ponds are maintained and monitored in accordance with RMC's Habitat Conservation Plan, which was developed to monitor California red-legged frog populations and to minimize potentially adverse impacts to frog populations and habitat resulting from RMC operations (Madrone Landscape Group, 2001).

Management Prescription and Desired Future Conditions

Areas designated as Mining Management Zones will be managed to allow for mining activities. Mineral exploration and extraction will continue under local, state, and federal regulatory constraints. No new mineral exploration or mining will occur outside of existing lease boundaries. Any changes in mining operations not currently permitted will require new environmental review. Mineral exploration may include subsurface exploration, if consistent with applicable environmental regulations.

Insufficient protective measures for mining activities in the past have resulted in multiple adverse environmental impacts on the Property. For example, inadequately designed settlement basins resulted in overflow of sediment-laden water and levee failure, subsequently causing erosion, sedimentation, and degradation of water quality in Liddell Creek and San Vicente Creek. However, the mitigation and monitoring program included in Santa Cruz County's Certificate of Compliance includes measures intended to decrease adverse environmental impacts from RMC operations. Close monitoring and enforcement of these measures is crucial for protection of the Property's natural resources and quality of visitor experience. After fulfillment of the terms of the existing long-term lease, areas zoned as mining will revert to the underlying San Vicente or Liddell Management Zone, as applicable. Examples of protection measures that could be implemented include coordination with RMC Pacific Materials to refine mining operations and reduce erosion, and evaluation, correction of existing fish migration barriers, preservation of cultural resources, and restoration of natural processes affected by contemporary development and use, and restoration of natural cycles and dynamics to sustain native plant and wildlife species; these measures could entail redesign or realignment of the existing road system, and modification and repair of the sediment basins.

Areas designated as Mining Management Zones will be managed to encourage responsible mining consistent with resource protection. All infrastructure and improvements necessary to support mining activity will be provided by the lessee or party other than the Property Manager. Additional mining outside the current lease area is prohibited.

Mining operations will be conducted to allow a buffer of at least 50 feet from the edge of any stream or identified red-legged frog breeding pond. Visitor use will be prohibited, or limited to only those portions of leased lands where visitor access can be accommodated in a safe manner consistent with the mining lease.

Activities – The following activities will be typical in this management zone:

- Mining-related activities

Facilities – The following are examples of facilities that could be allowed in this management zone:

- Mining-related facilities
- Directional, safety, informational, and regulatory signs, and minimal interpretive signs when required for protection of resources
- Utilities associated with facilities
- Trail crossings, where such crossings are appropriate given operational and health and safety concerns
- New roads, where appropriate and necessary

The following are examples of facilities or activities that will **not** be allowed in this management zone:

- Extended trails
- Visitor or interpretive center
- Campsites or camping
- Visitor Lodging
- Picnic facilities
- Day-visitor parking
- Food services

PLAN IMPLEMENTATION AND PUBLIC ACCESS AT COAST DAIRIES

Plan Implementation and Public Access at Coast Dairies

Overview

This chapter outlines the somewhat complex process by which planning is completed and formally approved by the land stewards, and how public access and use of the Property parallels this process. As noted in Chapter I, this Plan was developed to serve as a State Park General Plan and as a Bureau of Land Management (BLM) Resource Management Plan Amendment, but has not been adopted by either agency. Using the Plan as a framework for the Proposed Action in the National Environmental Protection Act (NEPA) and California Environmental Policy Act (CEQA) process, the agencies will develop alternatives for their particular transfer area and complete the environmental analyses..

This process will take some time, acknowledging the realities of state and federal budgets and staff availability. The public (through the Community Advisory Group [CAG]), the Steering Committee, and the Planning Team have all asked these questions:

"*What will happen on the day the land is transferred ("conveyed') to the public agencies and immediately thereafter: where can visitors go, what can visitors do (what kind of access will they have), and how will this affect individuals, and local communities? What will the land stewards actually do?"*

The approach agreed upon by the Steering Committee was to make as much of the Property available as soon as possible, consistent with the Deed Restrictions and Mission Statement (See Chapter I). However, any access that may have an effect on the environment or falls under other regulations requires compliance with both CEQA and NEPA and the other applicable laws discussed in Appendix A. The resulting three stage access program discussed in this chapter can at first appear cumbersome, but is the best compromise between protecting the resources of Coast Dairies while allowing visitors to appreciate and use them.

The *Coast Dairies Long-term Resource Protection and Access Plan*, as presented in previous chapters, suggests general direction to land managers. The Three Stage Access Program presented below includes a brief description of how each stage determines access and what additional planning documents and approvals are necessary. The term "access" as used here comprises both public access and other uses. The simplest and most benign uses, or those which can be considered identical to existing conditions on the Property, are allowed first. This is the "Immediate Access Stage," and will be operational shortly after conveyance. As funding becomes available (0 -5 years after conveyance) additional access may be provided, but only to the extent that significant impacts to the environment can be avoided. If the agencies offer additional (but limited) access during this period this will be called the "Interim Access Stage." In the longer term (5-10 years after conveyance) a full Plan will emerge that more closely resembles this document and will guide operations until amended or revised. Even at this "Long-term Access Stage," future specific projects or implementation plans that interpret the general planning direction (such as a visitor center) will need to comply with CEQA and NEPA, which could require additional environmental and other site studies.

Table VII-1 displays in schematic form the relationship between the stages and their content, timelines, necessary approvals.

This chapter discusses the three stages. The chapter also includes additional concepts regarding trails because of their importance to the public and their role at the core of public lands management. As part of the Existing Conditions Report (ECR) process, data were gathered about the extant road system and the roads and watersheds rated for factors of stability and potential connectivity in

TABLE VII-1: PLANNING IMPLEMENTATION STAGES

Planning Implementation Stage	Approximate Time for Implementation	Planning Document	CEQA/NEPA Compliance	Other Environmental Compliance	Access	New Facilities	Other Considerations
Immediate Access	Fall 2003	This Plan and the Existing Conditions Report serve as a management resource.	A Categorical Exclusion / Exemption may be filed by either BLM or the Department to allow for immediate use which does not change existing conditions on the Property.	The Immediate Access Stage is not expected to trigger the need for additional environmental compliance.	There will be a continuation of historic public access, including access to beaches (e.g., similar to existing use – no upgrade of roads to use as trails). The historical use on the inland portion of the Property is considered to be existing inholdings, easements, and leases	None	▪ No change in current management ("status quo.") ▪ Deed restrictions and vision statement ▪ Compliance with existing laws and regulations (including protection of threatened and endangered species) ▪ Continuation of existing mining and agricultural leases ▪ Public health and safety services, including police protection and fire protection, will be provided by local (Davenport and County) agencies, supported by the Department and BLM to the extent possible
Interim Access	After Conveyance 0-5 years)	Interim Access Plan	Initial Study / Appropriate environmental documentation [Level of review must be determined at a later date]	▪ Potential partial rezoning - LCP and County General Plan Amendment ▪ Consultation with Resource Agencies as appropriate	Limited recreational use of the Property, consistent with the ability of the Department, BLM, and other agencies to provide services (e.g., coastal trail, existing farm roads	Access-related facilities (e.g., parking areas, toilets, etc…)	▪ Deed restrictions and Vision Statement ▪ Protection of threatened and endangered species ▪ Continuation of existing economic uses of the Property, including agriculture, grazing, and mining, consistent with legal and regulatory requirements and the protection of threatened and endangered species ▪ Collaboration with community groups regarding strategies for management of the Property, and provision of services such as patrol, cleanup, and monitoring

TABLE VII-1: PLANNING IMPLEMENTATION STAGES (Continued)

Planning Implementation Stage	Approximate Time for Implementation	Planning Document	CEQA/NEPA Compliance	Other Environmental Compliance	Access	New Facilities	Other Considerations
Long-term Access	~5-10 years	State Park General Plan and BLM Resource Management Plan Amendment (Long-term Plan)	Environmental Impact Report and Environmental Impact Statement	▪ Potential partial rezoning - LCP and County General Plan Amendment ▪ Consultation with Resource Agencies as appropriate	All other access for the Property and required trail upgrades	All other Plan-related facilities (e.g., visitor facility, picnic areas, etc…)	▪ Deed restrictions and Vision Statement ▪ Goals and Standards ▪ Management Zone Prescriptions ▪ Adaptive Management Program ▪ Comprehensive Trails Plan

a future trail network. As a planning exercise and to provide the public with a possible preview of how the trail network may be developed, this information is included as *Conceptual Long-Term Trails* in the text describing the Long-term Access Stage.

Immediate Access Stage

Shortly after the Coast Dairies Property is conveyed to BLM and the California Department of Parks and Recreation (the Department), and until the Interim Access Plan is prepared and approved by the agencies (see following section), the Property will be managed according to the following tenets:

- Deed restrictions, including the provisions of the *Assignment of Stock Option, Escrow Account and Stock Option Deposit* will be in force.
- There will be a continuation of historic access. For the public, this is limited to historic access to beaches.
- The agencies will comply with existing federal, state, and local laws and regulations, including but not limited to the federal and state Endangered Species Acts; local land use, air quality, noise, and nuisance ordinances and standards; water quality regulations and water-rights laws; the Surface Mining and Reclamation Act; and the Coastal Act.
- There will be a continuation of existing mining and agricultural leases and other leases that survive transfer of ownership.
- Public health and safety services, including police protection and fire protection, will be provided by local service agencies, supported by the Department and BLM to the extent possible.

BLM and the Department will implement their respective guidelines for basic services, including refuse collection, cleanup, and patrol.

These provisions allow the land stewards to maintain Coast Dairies as it has always been and avoid delays to basic administration of the Property. These post-conveyance management provisions are crafted to permit the prevailing uses of Coast Dairies to persist without visible change.

The Immediate Access Stage will continue until the BLM and the Department are able to adopt an Interim Access Plan, which will be based on the description of the Interim Access Stage that follows.

Interim Access Stage

At this stage, BLM and the Department will initiate carefully considered actions to broaden the allowable uses of the Property.[1] Because this will inevitably result in some impacts to the land – for example, establishing parking at a trailhead – a planning document will be required, along with all the associated analyses, permits, consultations and public involvement. The Department and BLM will add specific project detail and refinements during Interim Plan development, of course, but these elements were thoroughly discussed by the Steering Committee during the preparation of this document, and those discussions formed the basis of the "Management Emphasis" and related sections in this chapter. The Interim Access Plan will likely be subject to environmental review at a lower level of review than the Long-term Plan. The assumption is that the provisions of the Interim Access Plan will be designed to avoid the potential for significant environmental impacts, and will be reviewed under appropriate environmental regulations. This review may lead to a County General Plan Amendment (e.g., partial rezoning) and may involve consultation with other agencies as appropriate.

Management Emphasis for the Interim Access Stage

During the Interim Access Stage when the Interim Access Plan is in effect, the main emphases for management of the Property will be as follows:

- Deed restrictions and Vision Statement
- Protection of threatened and endangered species;
- Recreational use of the Property will be consistent with the ability of the Department, BLM, and other agencies to provide services and infrastructure necessary to ensure public health and safety and the protection of threatened and endangered species;
- Continuation of existing economic uses of the Property, including agriculture, grazing, and mining, consistent with legal and regulatory requirements and the protection of threatened and endangered species[2]; and
- Collaboration with community groups regarding strategies for management of the Property, and provision of services such as patrol, cleanup, and monitoring.[3]

Interim Protection of Threatened and Endangered Species

During the Interim Access Stage, the primary management emphasis for both the Department and BLM will be protection of threatened and endangered species and their critical habitat. The Natural Resource Goals and Standards will be used as general guiding principles. Specifically, Department and BLM management of the Property will be aimed to achieve the following:

- Protection of snowy plover nesting and rearing habitat on Coast Dairies beaches;
- Protection of spawning and rearing habitat for steelhead and coho salmon in Coast Dairies streams, consistent with the results of consultations with the National Marine Fisheries Service;
- Protection of California red-legged frog breeding habitat, consistent with the results of consultations with the U.S. Fish and Wildlife Service;
- Protection of other sensitive, rare, threatened, and endangered species.

1 BLM and the Department may pursue the development and approval for this Stage under different timelines.

2 During the Interim Access Stage, terms of leases may be re-evaluated and lapsed leases made available.

3 Community group activities which assist Property management can be proposed at any time. During the Interim Stage, community participation would be actively solicited.

The Interim Access Plan will specify operations standards, use restrictions, enhancement actions, and monitoring activities required to achieve protection of threatened and endangered species that will be in effect during the Interim Access Stage.

Interim Recreational Access to the Coast Dairies Property

There will be recreational access to beaches, coastal bluffs, and the interior of the Property during the Interim Access Stage. Access to beaches will continue consistent with the existing North Coast Beaches Master Plan (Santa Cruz County Planning Department, 1991). Access along the coastal bluffs will be on existing farm roads that will eventually be joined to form a portion of the Coastal Trail, which is planned to extend the entire length of the California coast. Access to the interior of the Property will probably be limited to several existing, stable farm and ranch roads. Further detail is provided below.

Beaches

The Interim Access Plan developed by the Department will provide for access to Coast Dairies beaches during the Interim Access Stage. Beach access during the Interim Access Stage will be consistent with the North Coast Beaches Master Plan.

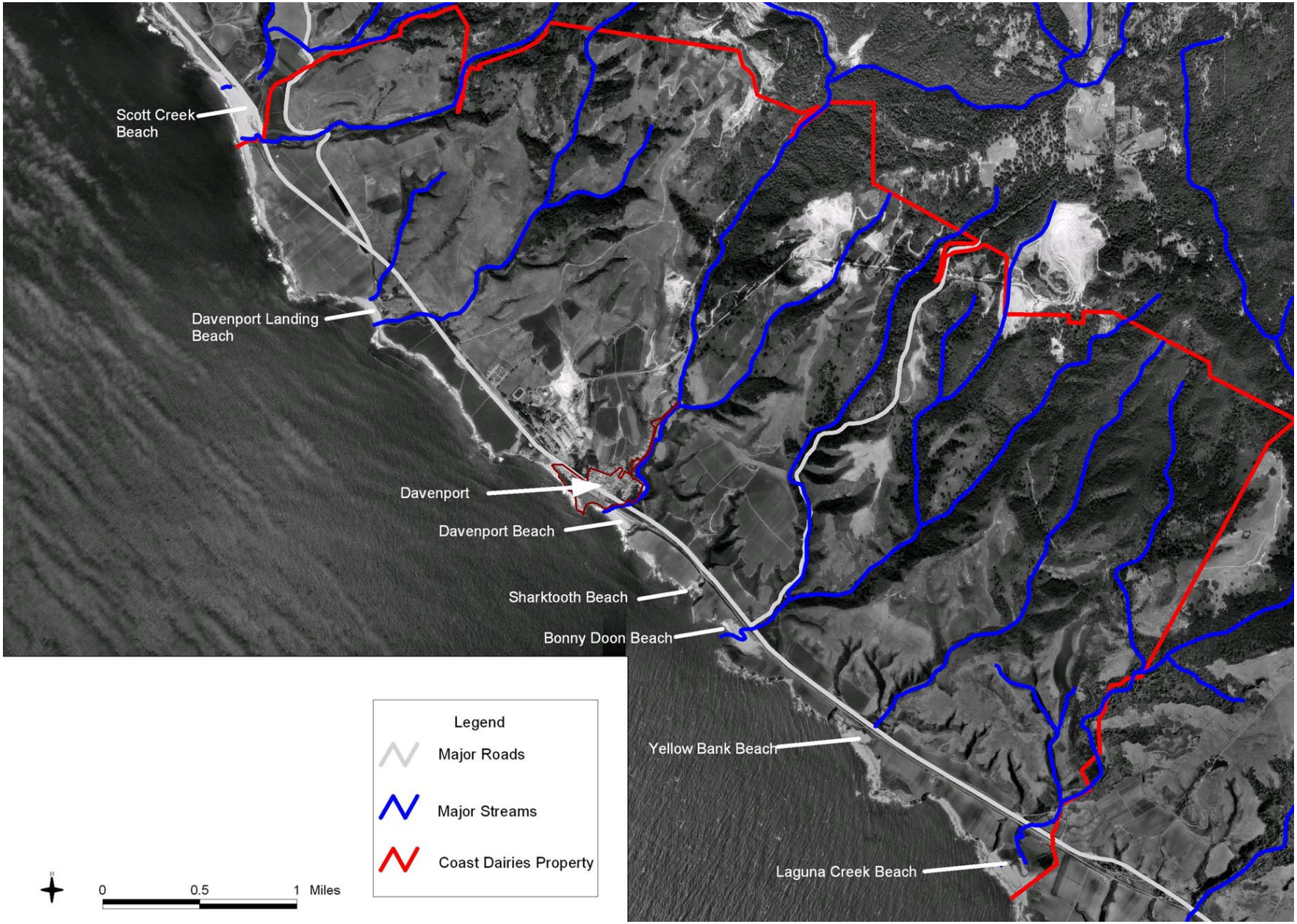
The North Coast Beaches Master Plan, adopted by the Board of Supervisors in 1991, is the culmination of a planning effort that began in 1983. It responds to Coastal Act requirements to provide public access to the coastline. The focus of the master plan is to provide public access while preserving the coastline's environment. The following beaches covered by the Master Plan are located on or have access across the Coast Dairies Property (Figure VII-1 and Figure I-2 in Chapter I): Scotts Creek Beach (the southern portion of this beach is on the Property), Davenport Landing Beach, Davenport Beach, Sharktooth, Bonny Doon Beach, Yellow Bank Beach, and Laguna Creek Beach.[4] For all of these beaches, the Master Plan describes improvements in access (e.g., vehicle parking, bus stops, trails to the beach), restroom and trash facilities, and signage and interpretation. Existing access facilities and uses of these beaches are described in the Existing Conditions Report (ECR), Section 5.4. Many of the proposed improvements contained in the master plan are in the Highway 1 right-of-way and would be designed and implemented by the California Department of Transportation (Caltrans).

Existing access to the beaches described in the North Coast Beaches Master Plan will continue. Access may be restricted to protect sensitive resources. This applies particularly to Laguna Creek Beach, and portions of Scotts Creek Beach, which may be closed seasonally to protect nesting western snow plover. Improvements described in the North Coast Beaches Master Plan, whether implemented by Caltrans or the Department, may be implemented during the Interim Access Stage.

Coastal Bluffs

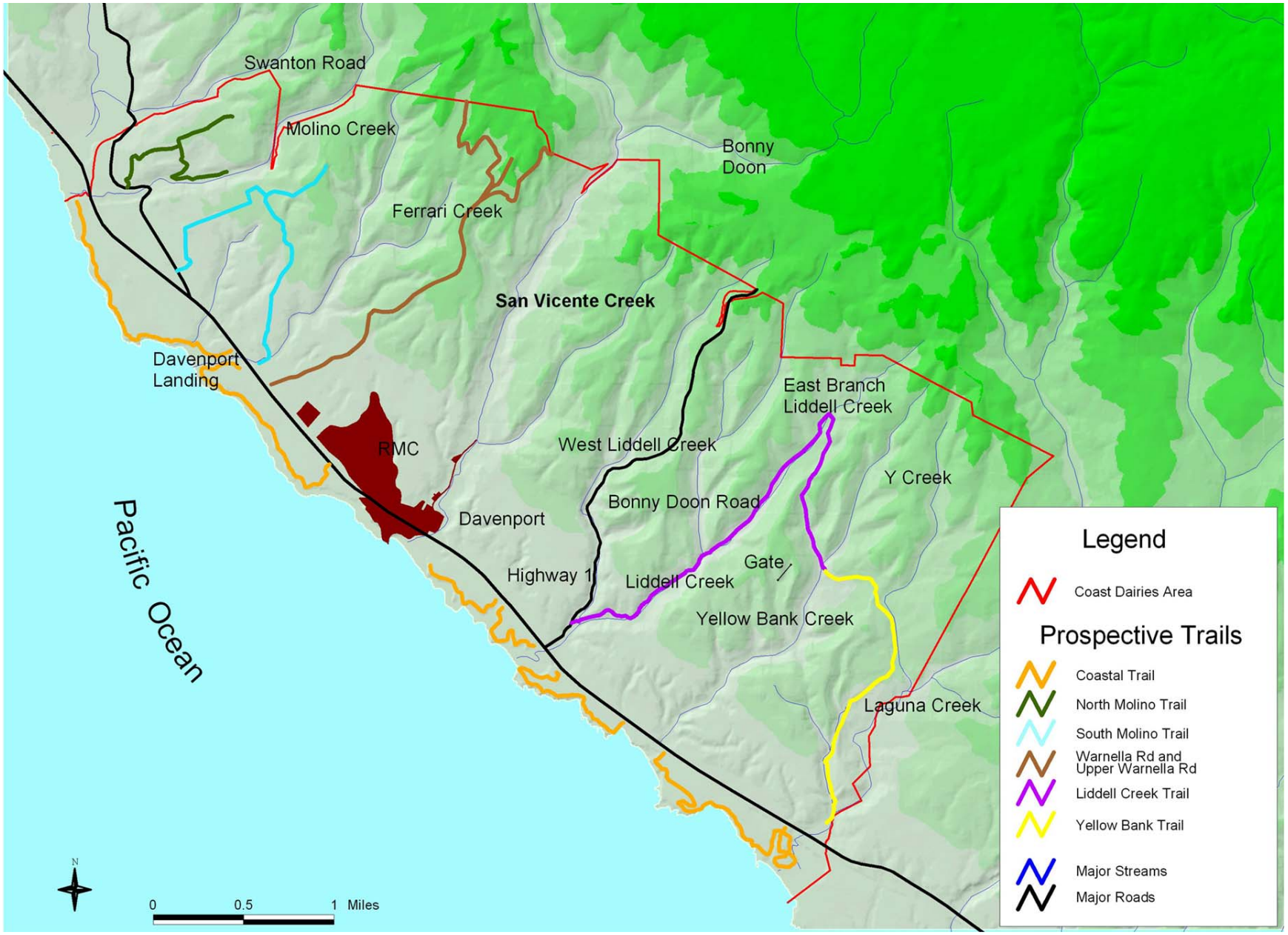
During the Interim Access Stage, the Department may develop a trail along the coastal terrace seaward of Highway 1. At first, it is anticipated that only those segments of the Coastal Trail that currently exist as farm roads will be open for interim public use. These include existing beach access trails and farm roads along the edge of the coastal bluffs (Figure VII-2). These segments do not form a continuous trail corridor along the entire length of the Coast Dairies Property, as they are interrupted by ravines and by the RMC Pacific Materials inholding at Davenport. To complete the trail, it will be necessary to plan, design, and implement the connecting trail segments, and to obtain easements across inholdings. The Department will work toward final planning of the Coastal Trail along the entire length of the Property during the Interim Access Stage, although it may not be implemented until the Long-term Plan is

[4] There is confusion regarding the names of several of these beaches: both Sharktooth and Yellowbank beaches are sometimes referred to as Panther Beach; Sharktooth is also sometimes called Davenport Cove, Cabbage or Sawtooth. This document uses the most commonly used names for these beaches.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, USGS

Figure VII-1
Beaches on the Coast Dairies Property



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Figure VII-2
Prospective Interim Stage Trails
for the Coast Dairies Property

approved and in effect. General planning standards for the Coastal Trail are described in the *Standards and Recommendations for Accessway Location and Development* (California Coastal Commission and California Coastal Conservancy).

Interior

Several existing ranch and farm roads will likely be designated for public access by the Interim Access Plan. Access to trails may be limited to foot traffic only. These roads are shown in Figure VII-2. The Interim Access Plan developed by the Department and BLM will specify provisions, such as signage, physical barriers, and other measures, to help ensure that these trails are used in the manner intended. As with the Coastal Trail, decisions about future uses will be made in accordance with Social Resource Goal 4 (see Chapter V). Warnella Road, a paved road, may be open to bicycles and vehicles carrying disabled persons.

The roads listed in Table VII-2 and shown in Figure VII-2 are designated for the possible use in the Interim Access Stage because they have been found to be stable; their continued use will have minimal environmental impact (ECR, Table 4.2-3 and Section 4.2.8.2); they offer opportunities for safe, varied, and enjoyable visitor experiences; and they will result in minimal conflict with neighbors and with economic uses of the Property. Most of these trails do not traverse areas with particularly sensitive biological resources. Where these trails do enter such areas, they may be closed seasonally to protect sensitive resources.

TABLE VII-2: POSSIBLE INTERIM ACCESS STAGE TRAILS

Trail Name (per Figure VII-2)	ECR Figure 4.2-4 and Table 4.2-3	Notes
North Molino Trail	Molino 1, Molino 2	
Molino Reservoir Trail	Portion of Molino 2, Molino Reservoir Road	Road closed at washed out Molino Creek crossing (ECR Figure 4.2-4a, Road Site 1)
South Molino Trail	Molino 6	
Ferrari Creek Trail	Molino 5	Forms a loop with South Molino Trail
Warnella Road	Warnella Road, Warnella 4	Paved road could be open to bicycles and disabled persons' vehicles
Upper Warnella Road	Warnella 1, Warnella Road Extension	Paved or rocked road should be open to bicycles and disabled persons' vehicles
Yellow Bank Trail	Laguna Loop Road, Y Creek Road, Liddell Pipeline Road	
Liddell Creek Trail	Liddell Creek Road, East Branch Liddell Creek Road	Crossing at confluence of Liddell Creek and E. Branch Liddell Creek is washed out, but passable by foot traffic in dry season

Interim Economic Uses of the Property

Agriculture

Any agricultural leases in effect as of the preparation and adoption of the Interim Access Plan by the Department and BLM will continue in the Interim Access Stage. In addition, any lands in agricultural use at the time of Property acquisition by the Trust for Public Land in 1998 may be leased for agricultural purposes. Agricultural uses may include research, training, and agricultural enterprises, as discussed in Section 5.2.6 of the ECR. Water use must be in accordance with the outcome of any consultations or agreements with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service, and with Natural Resource Goal 2 and Social Resource Goal 1. Lessees or other parties may seek to develop appropriative water permits or develop other water resources, as long as these activities are consistent with the applicable Goals and Standards.

Mining

Operations by RMC Pacific Materials will continue under the terms of the existing lease. However, conditions reported in the ECR suggest that current operations have ongoing adverse impacts to both Liddell

and San Vicente Creeks. During the Interim Access Stage, BLM will work with RMC to aggressively implement Social Resource Standard 2.1, including implementing plans to remediate problems identified in the ECR, such as water diversions, fish passage problems, and sediment delivery to streams associated with roads and faulty sediment basins.

Grazing

Grazing will continue under existing grazing leases. However, during the Interim Access Stage, the current Conservation Grazing Plan will be replaced in accordance with Adaptive Management Protocol 5.

Interim Safety and Service Provisions

The Interim Access Plan developed by the Department and BLM will include specific provisions for visitor services to protect public health and safety. These provisions will address staffing levels, cooperative agreements with agencies and citizens groups, and operational standards for provision of the following facilities and services:

- Refuse collection and sanitary facilities for beach and trailheads;
- Signage, boundary markings, and public information;
- Cleanup of litter and illegally dumped materials;
- Fire, search, and rescue services;
- Police services;
- Park patrols; and
- Permits for special events and large gatherings.

The Interim Access Plan will remain in effect until the following conditions are met:

- The California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes are completed for the *Coast Dairies Long-term Resource Protection and Access Plan*;
- A comprehensive Trail Plan is written and CEQA/NEPA review completed, if prepared separately from the Long-term Plan;
- Adequate funding has been secured for implementation of Goals and Standards;
- Adaptive Management Protocols are finalized and in place; and
- Adequate infrastructure has been provided to ensure public health and safety and a high quality of visitor experience.

Long-term Access

Within the first decade after conveyance, the Property stewards will adopt a Plan similar to, and with the same degree of specificity as, the recommended provisions of the *Coast Dairies Long-term Resource Protection and Access Plan* presented in previous chapters of this document. That is, it will contain the following:

- Goals and Standards
- Management Zone Prescriptions
- An Adaptive Management Program

The kinds of use and access envisioned and the sensitivity of both the natural resources and the local community strongly suggest that the environmental analysis will be an Environmental Impact Report (CEQA) for the Department and an Environmental Impact Statement (EIS) for BLM.

In addition to the components listed above, the plan will contain (at least by reference) a Comprehensive Trails Plan. Preliminary concepts for the Trails Plan are summarized below.

Conceptual Long-term Trails

Coastal Bluffs

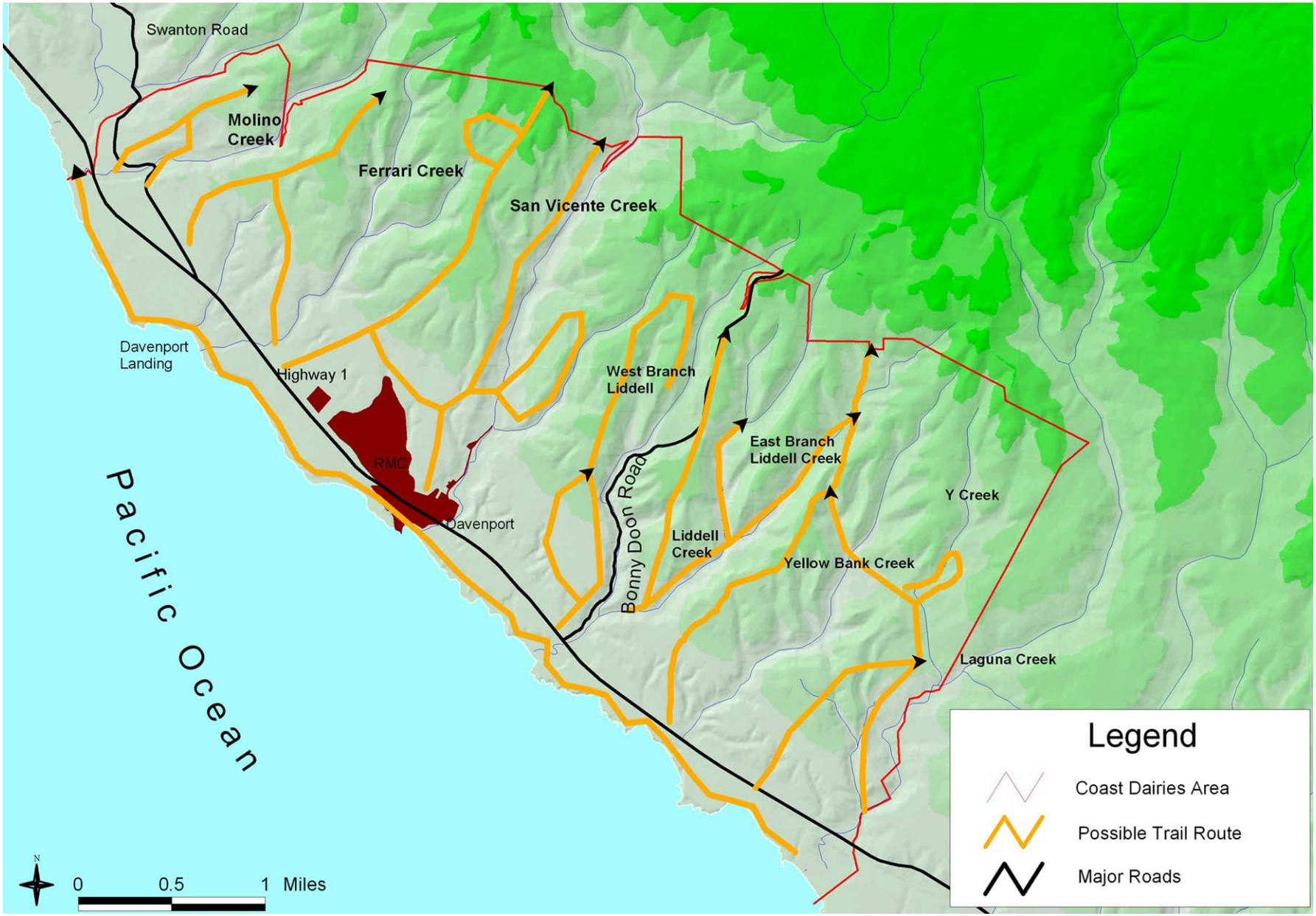
The Department will work with the California Coastal Conservancy to complete the Coastal Trail, forming a continuous trail along the coastal bluffs for the entire length of the Property. Eventually, the Coastal Trail will connect with other trail segments to the north and south of the Property. In accordance with the standards for the Coastal Trail, the trail will accommodate a variety of non-motorized modes of transportation.

Interior

BLM and the Department will collaboratively produce a Trails Plan for the Property, in accordance with Social Resource Standard 4.2, or its equivalent in the final approved Long-term Plan. The Trails Plan will provide for a more extensive trail network on the Property than is described for the Interim Access Stage. It is likely that most of the trails specified in the Trails Plan will use the alignments of existing farm, ranch, and mining roads. However, not all of the existing roads on the Property are appropriate or desirable as recreational trails, and some trail alignments may use new routes or the alignments of old, abandoned roads.

The Trails Plan will include trail alignments, allowable uses for each trail, and targeted use levels. The Trails Plan will seek to balance the goal of allowing recreational access to the interior of the property with the goal of resource protection by specifying appropriate trail densities, uses, and design standards.

Figure VII-3 shows a preliminary, conceptual set of possible trail routes (not alignments). Most of these routes could be accessed using existing farm, ranch, and mining roads. These routes are intended to be preliminary only; routes and alignments will be further refined in the Trails Plan.



SOURCE: Environmental Science Associates, Pacific Meridian Resources, Landsmiths, USGS

Figure VII-3
Conceptual Trail System
for the Coast Dairies Property

ADAPTIVE MANAGEMENT PROGRAM

Adaptive Management Program

Introduction

The Coast Dairies mission statement says, in part:

> Adaptive management – continual monitoring of the Property's resources as the basis for decisions related to the land's use – will allow for responsive stewardship of the natural and economic resources of the property. It will also create valuable opportunities for education in the field of integrating traditional economic and recreational activities, including sustainable coastal agriculture, with programs designed to protect native biodiversity and other natural landscape values.

Adaptive management is a process that allows the development and implementation of a land management plan in the face of some degree of biological and socioeconomic uncertainty. It embraces two basic tenets:

1. A commitment to a continual learning process, a reiterative evaluation of goals and approaches, and redirection based on an increased information base and changing public expectations (Baskerville, 1985; Jensen et al., 1996); and

2. Explicit hypotheses about natural (and social) system structure and function, and about anticipated ecosystem response (Holling, 1978; Walters, 1986).

Implementing policies as experiments is an innovation in resource management. Like any method, the adaptive approach implies revised ends as well as novel means: as its name implies, adaptive management gives learning a high priority in the stewardship of land (Lee, 1999). The Coast Dairies Plan sets out management principles for certain areas (i.e., Management Zones) to meet the goals of protecting native biodiversity, cultural resources, and natural landscape values, while providing compatible human uses. Under adaptive management, selected standards are used to determine whether those management principles are adequate.

The three key elements of adaptive management include: (1) selection of indicators and criteria that reflect the desired conditions[1]; (2) monitoring of the indicators and criteria; and (3) implementation of management action when the desired conditions are violated or when conditions are deteriorating and preventive measures are available. Together, these elements will help Property Managers make decisions about visitor use and resource protection.

Adaptive management is a decision-making *framework*, but does not diminish management's role in decision-making; in fact, management would have to make crucial decisions in determining desired conditions, assessing the causal relationship between information gathered and management (some changes on the ground can be unrelated to management, such as the effects of fire or flood), and choosing appropriate action.

Adaptive management, as described in this chapter, has two components, one dealing primarily with natural resources and the other with visitor experience and economic use. These components can be quite different in how they are constituted and carried out, but both share a common intent: to satisfy the needs of a healthy natural environment for productivity and diversity, and the needs of society for use of and appreciation of public lands. The linkage is shown in Table VIII-1, below.

[1] Essentially, the hypothesis to be tested might be stated as "Management actions are obtaining or maintaining desired conditions."

TABLE VIII-1: RELATIONSHIP BETWEEN VALUE TYPES AND BIOLOGICAL CONSIDERATIONS

Purpose of Open Space	Biological Considerations
Existence values (the simple knowledge that the land exists in its current state and will continue to exist free of development)	Requires consideration of large-scale effects and processes, including: ■ Maintenance of the existing landscape matrix and its associated species; and thus ■ Maintenance of existing nutrient and energy flows, and overall population dynamics.
Visitor experience values (includes scenic value and value for recreation, including nature viewing, hiking, etc.)	Requires more specific monitoring and management, including: ■ Maintenance of viewsheds; ■ Maintenance of current population levels of popular and legally sensitive species; ■ Monitoring of the effects of new uses (e.g., increased stream sediment, and effects on wildlife); and ■ Monitoring of vegetation and other changes (e.g., erosion rate) in sensitive areas such as grasslands.

Adaptive Management

Adaptive Management Intensity and the Role of Funding

The natural and social indicators in the Adaptive Management Program are designed to work within the "real world" of public land management. Typically, information gathered is qualitative, and when quantitative data are gathered they may not be in sufficient sampling sizes to allow statistical comparison between sampling periods.

The adaptive monitoring approach taken herein accepts that it may be necessary to take management actions on the basis of imperfect knowledge (Ringold et al., 1996). There are two basic problems: it is difficult to define a "trend" precisely, and sampling designed to evaluate population trends over time must balance monitoring costs against the necessity of achieving sufficient statistical power to allow the detection of these trends (Gibbs et al., 1998). Trends are often defined as long-term changes in the mean, but even if an agreement is reached on what constitutes "long term," it can be difficult to separate such a trend from other temporal variations, including within-year variation and erratic fluctuations.

The compromise is to gather information on a regular basis that may *suggest* trends and would be sensitive enough to detect adverse change of a degree requiring immediate action. However, it must be stressed that even the most simple and straightforward program is completely subject to available funding. The Adaptive Management Program, like the Goals and Standards, is a statement of intent. The Program is presented to provide general guidance only. Program specifics should emerge as the Plan is implemented and will be determined by the land managers responsible for Coast Dairies.

Lastly, some of the actions in the program are presented as examples, especially where listed species are the indicator. Final monitoring will be determined through consultations between the U.S. Department of the Interior, Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS).

What the Adaptive Management Program Is Not

It is worth noting what the Adaptive Management Program will not do.

- The Adaptive Management Program does not specify the total number of visitors that the Property, as a whole, can accommodate at one time. Such an aggregate figure would mask problems at "hot spots" and would not provide managers with useful guidance for addressing use-related problems.

- As a framework for addressing carrying capacity, the Adaptive Management Program is not driven by the capacity of existing infrastructure. Expanding or constructing facilities does not necessarily mitigate visitor-use impacts to visitor experience or resources.
- The Adaptive Management Program addresses impacts that result directly from visitor or lessee (agricultural, mining, and grazing) use. Impacts from park operations and management activities (some of these, e.g., fire suppression, are not discretionary), natural variability (e.g., flooding), and development (e.g., construction, demolition) are managed through other adaptive management standards or mitigation measures derived during NEPA/CEQA review or agency consultation.
- The Adaptive Management Program is not static. Resource conditions, visitor-use patterns, and desired visitor experiences change with time. The Adaptive Management Program is an iterative process of monitoring, evaluation, and adjustment.

Management Actions in Response to Changes in Indicators or Standards

If monitoring revealed that a standard associated with an indicator were being exceeded, then desired conditions (sometimes called "proper functioning conditions'") would not be realized, and management action would be initiated. Management action could determine that exceeding the standard was caused by natural variation (see discussion on causal linkage, below) *and* that the standard needed to be adjusted or a new indicator and standard selected to better reflect desired conditions. Actions to manage or limit visitor use or the conduct of agriculture, mining or grazing use would be implemented when the standard was exceeded due to impacts associated with use. Management actions could include the following:

- Site management (e.g., restoration and remediation, facility design, barriers, site hardening, area or facility closure, redirection of visitors to suitable sites)
- Regulation (e.g., the number of people, the location or time of visits, permitted activities, or allowable equipment)
- Enforcement of regulations (e.g., patrols, notification, citations)
- Education (e.g., information signs and exhibits, interpretive programs, visitor center exhibits, brochures and fliers, public meetings, meetings with user groups)
- Altering access (e.g., parking in proximity to sensitive resources, bike access, etc.)

Management action would comply with the state and federal environmental requirements and other applicable legislation.

Adaptive Management and Implementation Stage

As presented in the previous chapter, Coast Dairies will be opened to public use in several. An interim use program will allow the public to access beaches and certain agricultural roads that have not been planned as trails, but which are stable and can sustain visitor use without improvement. Interim use also includes activities that are under current lease administration and that will continue under the authority of the Department, Agri-Culture and/or BLM (i.e., mining, grazing, and agriculture). The second access stage will follow the development of other possibly access proposals, such as the Trail Plan discussed in Social Resource Goal 4 (Chapter V). The Adaptive Management Program is organized to reflect these stages.

Adaptive Management for Natural Resources

Indicators

Indicators act, in a sense, as proxies for the actual attributes of interest. The purpose of using indicators, rather than measuring the attributes of a system directly, is to lower the effort to an achievable level. For Coast Dairies, an achievable level means using a small number of indicators, quite likely sacrificing an overall monitoring effort for one that tracks the alterations identified as the most probable and important as onsite land uses change.

The problem is analogous to that of modeling: a deliberate simplification of reality must be made by relying on a subset of the possible information, and by assuming the information subset properly represents the entire set and thus adequately reflects change due to past management actions or prevailing policy. In adaptive management, the danger that the technique will yield nonrepresentative results can be minimized by an associated process that employs human judgment to determine “causal linkage.” This is an important part of the program and is described in detail in the final section of this chapter.

Choice of Indicators

Indicators should correspond to elements or attributes of the system, population, or area to be managed that “managers – and society generally – find valuable” (Thornburgh et al., 2000). It is sometimes held that there should be indicators to represent all identified biotic elements of the system (Davis, 1989), but a commonsense approach is to develop indicators corresponding to “trends of interest” (Thornburgh et al., 2000).

Noss (1990, cited in Thornburgh et al., 2000) states that indicators should be selected on the basis of:

- A validated relationship between the indicator and the phenomenon of interest;
- Convenience and cost effectiveness of the indicator for convenient measurement; and
- The ability of the indicator to provide an early warning of change or trouble ahead.

To be useful, the chosen indicators must be able to be studied without excessive time and effort. This means that the program must be able to use techniques that:

- Are robust to observer variability;
- Employ standard analytical techniques; and
- Can be reported in formats that both archive and clearly communicate immediate findings (Davis, 1989).

Types of Indicators

Although indicators are usually thought of as biotic, they might be either biotic or abiotic. Examples of abiotic indicators include sediment in streams, water temperature or acidity, erosion rates, and pesticide levels. These indicators can be valuable in determining whether general ecological conditions are within desired boundaries (e.g., Is the water depth suitable for breeding red-legged frogs?), and may

have the advantage of being quicker and cheaper to determine by sampling than equivalent biotic measurements. A possible disadvantage is that abiotic indicators might be more indirect measures of, and therefore correspond less accurately to, the attributes of interest than biotic measurements. A determination of reproductive and offspring survival rates in red-legged frogs, for example, would be a better indicator of population viability than simply measuring water conditions, since it comes closer to directly measuring the population attribute in question. Obviously, however, the former would require far more time and effort.

The suggested indicators at Coast Dairies grew out of the issues discussions in the Existing Conditions Report and the Opportunities and Constraints Analysis (OCA) together with public comments during the OCA process.

Natural Resource Adaptive Management Protocols

For purposes of clarity, this Plan uses the term "Protocol" instead of "indicator" or "standard," because those terms are used in other contexts in the Plan. "Protocol" also implies the necessary application of management analysis and action that are associated with the periodic assessments.

Protocols to be Applied in Stage I (Interim Access)

1. Snowy Plover. A Protocol should assess the condition of nesting sites identified in Chapter III. All snowy plover nesting areas shall be managed according to the results of consultation with the USFWS and consistent with the draft recovery plan for the species. The monitoring may proceed, for example, by comparing fledging success at Coast Dairies with other nesting sites in Santa Cruz County. The Protocol and management of the habitat shall be consistent with the *Western Snowy Plover Systemwide Management Guidelines* (California Department of Parks and Recreation, 2002), and the local snowy plover management plan currently under development.

2. Anadromous Fish. A Protocol should assess the flows and habitat conditions for coho salmon and steelhead by measuring stream-specific bypass flows and ensuring that water withdrawals, either directly for use or for off-stream storage, adhere to stream- specific maximum diversion rates. These flows and rates shall be established for each stream on the Property, according to the results of consultation with the NMFS. A Protocol should periodically assess the quality of spawning and rearing habitat (and/or spawner and out-migrant surveys) for all streams on the Property that support salmonids.

3. Red-legged Frog. A Protocol should assess the condition of California red-legged frogs and their habitat, especially at ponds occupied by frogs but created for agriculture or mining. The Protocol shall be based on the results of consultation with the USFWS. The periodic assessment might, for example, monitor a minimum number of the 27 red-legged frog locations in any given year to establish occupancy and/or reproduction.

4. Non-native Species. Within two years of conveyance, a survey shall be performed to document the locations of major non-native plant infestations. A Protocol should use periodic sampling of these locations to suggest trends and identify any new species or problems. A Protocol should also assess the status of wild pig populations.

5. Grasslands. A Protocol should assess the ecological health and stability of Coast Dairies remnant native grasslands. An evaluation of the grazing program shall be conducted for Coast Dairies upon transfer of title to evaluate appropriate season-of-use, class of livestock, and/or the continuation of grazing. The evaluation may produce a new Protocol but, in the interim, BLM's *Standards for Rangeland Health* (BLM, 2000) shall be used.

Protocols to be Applied in Stage II (Full Plan Implementation)

6. Water Quality and Watershed Stability. When the Plan is implemented to include trails, campgrounds, visitor contact facilities, vehicle parking, etc., a Protocol should address water quality. The Protocol should provide two kinds of data: one physical (e.g., turbidity or sedimentation) and the other chemical/biological (e.g., dissolved oxygen, ammonia, nitrate, fecal coliform, heavy metals). Indirect methods may be used to indicate changes in physical conditions (e.g., photo-monitoring of roads and trails for the emergence of ruts and gullies as a prime source of stream sediment).

Water chemistry analyses were conducted for the Existing Conditions Report (ECR) according to methodologies described in the *Standard Methods for the Examination of Water and Wastewater* (Eaton et al., 1995), and these may be used as baseline information. Data gathered and interpretation of results may also be refined after consultation with NMFS.

Protocols Considered but Dropped due to Scientific Uncertainty

In the OCA, a Protocol was proposed that would employ periodic sampling of wintering raptors in the Molino watershed, and of riparian-dependent birds. Management and Operational Goal 7 encourages joint research, and the Department and BLM will facilitate such programs as the Point Reyes Bird Observatory's monitoring of riparian-dependent birds. However, problems of sampling design (for example, indices do not always reflect population size [Gibbs et al., 1998]), do not warrant adopting such protocols at this time.

Adaptive Management for Visitor Experience

Land managers are constantly grappling with the carrying capacity mandate. After the largely unsuccessful attempt at static and unresponsive multiple-use and conservation planning of the 1970s and 1980s, land management agencies have moved away from "hard numbers" and toward adaptive management to address visitor experience and sustainable use. Adaptive management in this sense is a tool to address user capacities.[2]

User capacity, in turn, can be regarded as a unit reflecting the ability of the land to support use without degradation or the ability of the land to provide the kind of experience that visitors seek. Resource issues are addressed by Protocols 1 through 6; for example, user capacity on Coast Dairies beaches may be determined by the failure of snowy plover chicks to fledge. Protocol 7, therefore, is intended to address the nature of and satisfaction with the experience of visiting Coast Dairies.

Protocols to be Applied in Stage II (Full Plan Implementation)

7. The Pastoral Experience. Social Resource Goal 7 and Management and Operational Goal 3 (see Chapter V) seek to maintain the visual character and visitor experience of the "pastoral landscape," which combines aspects of a working landscape with dramatic vistas and biologically productive habitats. This landscape is not "parklike," nor is it wilderness; it shows people living within an ecosystem rather than on the outside, looking in. Both the experience itself and its measurement are highly subjective. Nevertheless, it is reasonable to periodically ask if people are finding Coast Dairies different from other parks; if they are finding solitude when they look for it, and a sense of interest in watching how the land is used. Therefore, a Protocol should assess the reactions of visitors over time, their expectations, and satisfaction, perhaps incorporating a system such as the Recreation Opportunity Spectrum (ROS), developed by the USDA Forest Service in the 1980's and widely used in National Park Planning.

[2] User capacity is generally defined as: "The type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purposes of the park units and their management objectives." Adaptive management addresses user capacity by prescribing desired conditions, not by prescribing maximum visitor use (e.g., numbers of people). Monitoring of the desired conditions replaces the monitoring of maximum visitor use.

Desired Conditions and Management Response

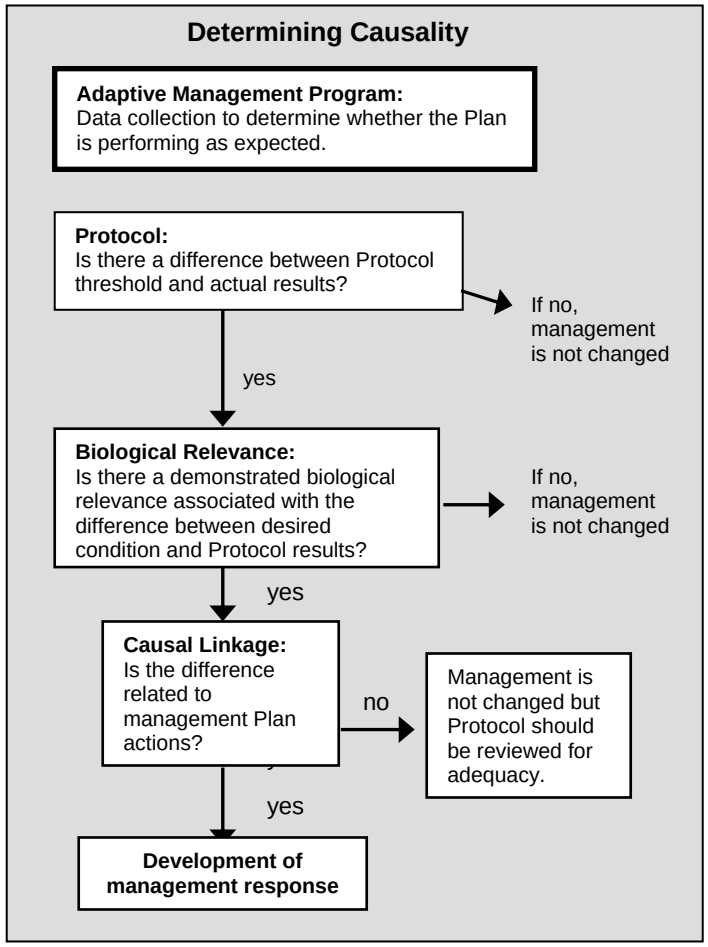
Adaptive management relies on the concept of desired conditions, which would be set for each of the Protocols. An example would be BLM's "Proper Functioning Condition" (BLM, 1998 and 1999b) assessments applied to stream reaches.

The limits of acceptable change in water quality, the number of ponds supporting red-legged frogs, the acres of non-native star thistle, even the percentage of visitors who have a satisfactory experience at Coast Dairies can all be expressed as the desired conditions for the Protocols. Deviation from desired conditions by a prescribed amount (usually a threshold value or values not attained for a set amount of time) is cause to re-evaluate how the land is managed.

Determining Causality

Information that a desired condition threshold has been breached should not be viewed as a "trigger." Even in Adaptive Management Programs that gather data that can be statistically tested (which is not proposed for Coast Dairies), an intermediate step is required that imposes human judgment on what, if anything, needs to be done.

A Technical Advisory Group including BLM and Department staff, and representatives of the USFWS, NMFS, and the California Department of Fish and Game, should annually review the Protocols and any information gathered to reach a consensus as to whether a change in desired condition is causally linked to land management, or is due to changed or unforeseen circumstances not under management control. The Group may then recommend actions to be taken to the Department/BLM. These recommendations may be of the kinds listed under the heading Management Actions in Response to Changes in Indicators or Standards, above, and may include suggestions to amend the Plan itself, in accordance with Management and Operational Goal 10.



APPENDIX A: PLANNING INFLUENCES AND APPLICABLE REGULATIONS

Planning Influences and Applicable Regulations

This appendix describes the key regulations and policies that form the legal context for the Coast Dairies Property and the *Coast Dairies Long-term Resource Protection and Access Plan* (Coast Dairies Plan or the Plan).

Agency Reviews and Approvals

Table A-1 identifies agency review and approvals necessary for full implementation of the Coast Dairies Plan.

TABLE A-1: AGENCY REVIEW AND APPROVALS FOR THE COAST DAIRIES PLAN

Agency	Required Approval
Bureau of Land Management	Record of Decision
California Department of Parks and Recreation	Notice of Determination
California Coastal Commission	Local Coastal Program amendment
Santa Cruz County	General Plan and Local Coastal Program map and text amendments

Bureau of Land Management Federal Land Policy and Management Act of 1976. The Federal Land Policy and Management Act[1] (FLPMA) of 1976 requires the Bureau of Land Management (BLM) to prepare land use plans to provide management direction for public lands. The Coast Dairies Plan will serve as an Amendment to the Hollister Resource Management Plan and will become the overall guiding document for federal planning for portions of the Property under BLM jurisdiction. The Coast Dairies Plan will derive direct authority from the FLPMA. The BLM will fulfill its requirement to prepare a land management plan for the Property when the Record of Decision on the final plan is signed by the California state director of BLM. In addition to the FLPMA, BLM must also comply with a variety of internal policies (e.g., timber harvest, noxious weeds, etc.).

California Department of Parks and Recreation Public Resources Code Section 5002.2. In accordance with California Public Resources Code (PRC) Section 5002.2, long-term management of state park units is directed through a general plan. The general plan is the primary management document for a unit of the State Park System, establishing its purpose and a management direction for the future by providing a defined framework for a unit's development, ongoing management, and public use. Thereafter, this framework assists in guiding daily decision-making and serves as the basis for developing more detailed management and site-specific project plans. The Coast Dairies Plan will serve as a state park general plan and will become the overall guiding document for planning on lands under the jurisdiction of the state. The Department will fulfill its requirement to prepare a general plan for the Property when the Notice of Determination on the final plan is signed by the state director for the California Department of Parks and Recreation (Department).

Santa Cruz County General Plan and Local Coastal Program. In accordance with Section 13.10.355 (Special Standards and Conditions) of the Santa Cruz County General Plan and Local Coastal Program, the Coast Dairies Plan serves as a master site plan for the County's Level V approval. Required elements of a master site plan and how they are addressed by the Coast Dairies Plan would be addressed in the applicable environmental compliance documentation. Table A-2 provides a summary of how the Coast Dairies Plan currently satisfies

[1] The Federal Land Policy and Management Act of 1976 declared it the policy of the United States that: "....the public lands be retained in Federal ownership, unless as a result of the land use planning procedure provided in this Act, it is determined that disposal of a particular parcel will serve the national interest..." Through FLPMA, Congress made it clear that the public lands should be held in public ownership and managed for "multiple use," defined as: "...the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs for the American people..."

TABLE A-2: COAST DAIRIES MASTER SITE PLAN COMPONENTS

Requirement	How the Coast Dairies Plan meets the Requirement
Description of proposed uses	The Goals and Standards, Management Zone, Trails and Access Program and Adaptive Management Program include a description of the proposed uses.
Proposed immediate and future phases of construction	None anticipated at this time. The Coast Dairies Plan is a programmatic plan that does not describe specific actions or projects. Potential future specific projects would be planned and subject to review and applicable environmental compliance.
Anticipated future boundary expansions	None anticipated
Access and public services	Access is described in the Goals and Standards, Management Zones, and Trails and Access Program. Construction of new access is not included in this plan. Public services are described in the Goals and Standards.
Management Plan for the conservation and use of the open space resources	The Coast Dairies Plan, in total, is a Management Plan directing the conservation and use of the Property.

these requirements. This requirement will be fulfilled when approved by the Santa Cruz County Planning Commission and the California Coastal Commission.

As described in Chapter III, the bulk of the Property is designated and zoned for uses other than parks, open space or recreation. A majority of the property is designated and zoned for agriculture. To allow for future uses proposed in the Plan, some portions of the Property would require land use designation changes and underlying zone changes. Those areas of the Property in agriculture would not be involved in these land use or zoning changes. To accommodate future park uses (such as trails) certain portions of the Property with the following Land Use Map Designations could be changed to Open Space-Resource Conservation (O-C).

- Agriculture (AG) (*outside row crop areas*)
- Mountain Residential (R-M)
- Quarry/Mining (Q)

Underlying zoning as follows would be changed to Parks, Recreation and Open Space (PR).

- Commercial Agriculture (CA) (*outside row crop areas*)
- Residential Agriculture (RA) (*outside row crop areas*)
- Heavy Industrial (M-2)
- Special Use (SU)
- Timber Production (TP)
- Single Family Residential (R-1-6)

The Santa Cruz County Planning Commission would hold at least one public hearing when and if proposed land use and zone changes are required and may approve, modify, or disapprove the proposals. The Coastal Commission will hold one or more hearings on the proposed Local Coastal Program amendments that would ensue. The Commission will review the amendments to assure consistency with the Coastal Act, assure that proposed implementation measures are consistent with the Land Use Plan, and affirm the internal consistency of the Local Coastal Program. Commission staff have indicated that the Commission will first determine whether the proposed Local Coastal Program policy and zoning amendments that change the use, intensity, and pattern of development are consistent with the Coastal Act, and then determine whether the specific plan development itself meets those standards, as the Commission interprets them.

North Coast Beaches Master Plan. The Coast Dairies Plan is consistent with the North Coast Beaches Master Plan, adopted by the Santa Cruz County Board of Supervisors in 1991. The focus of the master plan is to provide public access while preserving the coastline's fragile environment. The following beaches covered by the master plan have access across the Property: Davenport Landing, Panther, Bonny Doon, Yellow Bank, and Laguna Creek. For each of these beaches, the

master plan describes improvements in access (e.g., vehicle parking, bus stops, trails to the beach), restroom and trash facilities, and signage and interpretation. Many of the proposed improvements are located within the Highway 1 right-of-way and would be implemented by the California Department of Transportation (Caltrans).

Coastal Development Permits. Developments within the Coastal Zone must obtain a coastal development permit in addition to any other approvals or permits required. Implementation of the Coast Dairies Plan will not result in any actions that require a coastal development permit. Future applicable implementation actions tiered from the Coast Dairies Plan will be required to obtain coastal development permits.

General Legislation and Regulations

California Environmental Quality Act Section 21092.2 of the California Public Resources Code, Sections 15082(a), 15103, and 15375 of the California Administrative Code. The California Environmental Quality Act (CEQA) process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. The CEQA process guides the overall planning process for the Department.

Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 Code of Federal Regulations [CFR] Parts 1500–1508). The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) establishes the process by which federal agencies fulfill their obligations under the act. The Council on Environmental Quality regulations set forth the requirements for environmental impact statements and environmental assessments. The Council on Environmental Quality regulations also define such key terms as "cumulative impact," "mitigation" and "significant" to ensure consistent application of these terms in environmental documents.

Fish and Wildlife Coordination Act. The objective of the Fish and Wildlife Coordination Act is to ensure that wildlife conservation receive equal consideration and be coordinated with other features or water resources development programs. Sections 1 and 2 of the act mandate that fish and wildlife receive equal consideration with water resources development programs throughout planning, development, operation, and maintenance. Whenever a federal agency proposes to impound, divert, channelize, or otherwise alter or modify any stream, river, or other body of water for any purpose, the agency must first consult and coordinate its actions and projects with the U.S. Fish and Wildlife Service (USFWS). This consultation and coordination process addresses ways to conserve wildlife resources by preventing loss of and damage to such resources, as well as to further develop and improve these resources.

National Environmental Policy Act of 1970. Public Law (PL) 91-190, 83 Statute 852, 42 United States Code (USC) Section 4341 et seq. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. Regulations implementing NEPA are set forth by the Council on Environmental Quality. The NEPA process guides the overall planning process for the BLM.

Natural Resources Legislation

Bald Eagle Protection Act. No person within the United States or any place subject to the jurisdiction thereof, shall possess, sell, purchase, barter, offer to sell, transport, export, or import at any time or in any manner any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof. The Secretary of the Interior can permit the taking, possession, and transportation of specimens thereof for scientific or exhibition purposes or for the religious purposes of American Indian tribes if the action is determined to be compatible with the preservation of the bald eagle or golden eagle.

Federal Clean Air Act, as amended, PL Chapter 360, 69 Statute 322, 42 USC Section 7401 et seq. Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations. The Property Managers work in conjunction with the local air pollution control district to ensure that all construction activities meet requirements.

The federal Clean Air Act, as amended in 1990, requires the U.S. Environmental Protection Agency to identify national ambient air quality standards to protect public health and welfare. Standards have been set for six criteria pollutants: particulate matter less than 10 microns in diameter, carbon monoxide, nitrogen oxides, sulfur dioxide, ozone, and lead. An area where a standard is exceeded more than three times in three years can be considered a nonattainment area, subject to planning and pollution control requirements that are more stringent than for areas that meet the standards.

Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) of 1977 (33 USC Section 1251 et seq.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the act prohibits the discharge of fill material into navigable waters of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. The placement of fill in wetlands should be avoided if there are practicable alternatives.

California Endangered Species Act. The California Endangered Species Act expanded upon the original plant protection act and enhanced legal protection for plants and wildlife. The California Endangered Species Act parallels the policies of the Federal Endangered Species Act. The state legislation was written to protect state endangered and threatened plant and animal species whose continued existence in California is in jeopardy. The California Endangered Species Act and Sections 2050 and 2097 of the Fish and Game Code prohibit "take" of plant and animal species designated by the California Fish and Game Commission as either endangered or threatened.

California Fish and Game Code. Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code designate certain species as "fully protected." Fully protected species, or parts thereof, may not be taken or possessed at any time without permission by the California Department of Fish and Game (CDFG). Section 3503 of the California Fish and Game Code affords protection to bird nests and birds of prey (orders Falconiformes or Strigiformes).

California Native Plant Protection Act. State listing of plant species began in 1977 with the passage of the Native Plant Protection Act. The act directed the CDFG to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The act gave the California Fish and Game Commission the power to designate native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants. When the California Endangered Species Act was passed, it expanded upon the Native Plant Protection Act and enhanced legal protection for plants. To align with federal regulations, the California Endangered Species Act adopted the categories "threatened" and "endangered" species. It grandfathered all "rare" animals into the act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

California Clean Air Act. The 1989 amendments to the California Clean Air Act established a statewide air pollution control program. The California Clean Air Act requirements include annual emission reductions, increased development and use of low emission vehicles, and submittal of air quality attainment plans by regional air districts. The California Air Resources Board has set ambient air quality standards to protect public health and welfare that are stricter than the national standards. Under the 1988 California Clean Air Act, air basins were designated as attainment, nonattainment, or unclassified for the state standards. The amendments to the California Clean Air Act require air pollution control districts to achieve the state standards by the earliest practicable date. The Property Managers work in

conjunction with the local air pollution control district to ensure that all construction activities and development projects meet requirements.

Clean Water Act Amendments of 1987. The 1987 amendments to the act required that the Environmental Protection Agency establish regulations for the issuance of municipal and industrial stormwater discharge permits as part of the National Pollutant Discharge Elimination System. The final Environmental Protection Agency regulations were published in November 1990. These regulations apply to any construction activities that disturb more than five acres of land. (This threshold was reduced to one acre when Phase II regulations went into effect in December 2002). A Notice of Intent to comply with the state's General Construction Activity Stormwater Permit will be submitted to the State Water Resources Control Board (SWRCB), and a stormwater pollution prevention plan will be developed and approved for proposed construction projects that affect more than five acres (or for projects proposed after December 2002 that affect more than one acre).

Comprehensive Environmental Response, Compensation and Liability Act, PL 96-510, 94 Stat. 2767, 42 USC Section 9601 et seq. Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (commonly referred to as CERCLA or the Superfund Act) to address growing concerns about the need to clean up uncontrolled, abandoned hazardous waste sites and to address future releases of hazardous substances into the environment.

Endangered Species Act of 1973, as amended, PL 93-205, 87 Stat. 884, 16 USC Section 1531 et seq. The Endangered Species Act protects threatened and endangered species, as listed by the USFWS, from unauthorized take, and directs federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the act defines federal agency responsibilities for consultation with the USFWS and/or National Marine Fisheries Service, as applicable, and requires preparation of a biological assessment to identify any threatened or endangered species that is likely to be affected by the proposed action. The federal permitting mechanism for the Department would be a habitat conservation plan; the "take" authorization is provided in a Section 10(a)(1)(B) permit.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act regulates or prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50 CFR Section 10.13. This act implements several international treaties for the conservation and management of bird species that may migrate through more than one country and is enforced in the United States by the USFWS. Hunting of specific migratory game birds is permitted under the regulations listed in Title 50 CFR 20. The act was amended in 1972 to include protection for migratory birds of prey (raptors).

Porter-Cologne Water Quality Control Act (California Water Code, Section 13020). Under the authority of the Porter-Cologne Act and federal Clean Water Act, Regional Water Quality Control Boards act as regional agencies for the SWRCB and are responsible for regional enforcement of water quality laws and coordination of water quality control activities.

Resource Conservation and Recovery Act (RCRA), as amended, PL 94-580, 30 Stat. 1148, 42 USC Section 6901 et seq. This act establishes a regulatory structure for the management of solid and hazardous waste from the point of generation to disposal. In particular, applicable provisions include those that address underground storage tanks and sites contaminated with elements identified under federal and state Resource Conservation and Recovery Act regulations.

Cultural Resources Legislation

Antiquities Act of 1906, PL 59-209, 34 Stat. 225, 16 USC Section 432 and 43 CFR 3. This act provides for the protection of historic or prehistoric remains, "or any antiquity," on federal lands. It protects historic monuments and ruins on public lands.

Archeological Resources Protection Act of 1979, PL 96--95, 93 Stat. 712, 16 USC Section 470aa et seq. and 43 CFR 7, subparts A and B, 36 CFR. This act secures the protection of archeological resources on public or Indian lands and fosters increased cooperation and exchange of information between the private, government, and professional communities in order to facilitate the enforcement and education of present and future generations. It regulates excavation and collection on public and Indian lands. It requires notification of Indian tribes who may consider a site of religious or cultural importance prior to issuing a permit. The act was amended in 1988 to require the development of plans for surveying public lands for archeological resources and systems for reporting incidents of suspected violations.

National Historic Preservation Act of 1966, as amended, PL 89-665, 80 Stat. 915, 16 USC Section 470 et seq., and 36 CFR 18, 60, 61, 63, 68, 79, 800. The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historic Places. The Advisory Council on Historic Preservation has developed implementing regulations (36 CFR 800), which allow agencies to develop agreements for consideration of these historic properties.

Native American Grave Protection and Repatriation Act, PL 101-601, 104 Stat. 3049, 25 USC Sections 3001–3013. This act assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands to lineal descendants or culturally affiliated Native American groups.

Federal Executive Orders

The following federal executive orders apply to federal lands.

Executive Order 11593: Protection and Enhancement of the Cultural Environment. This executive order instructs all federal agencies to support the preservation of cultural properties. It directs them to identify and nominate cultural properties under their jurisdiction to the National Register of Historic Places and to "exercise caution… to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered."

Executive Order 11988: Floodplain Management. This executive order requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains, and to avoid development in floodplains whenever there is a practical alternative. If a proposed action is found to be in the applicable regulatory floodplain, the agency shall prepare a floodplain assessment, known as a Statement of Findings.

Executive Order 11990: Protection of Wetlands. This executive order established the protection of wetlands and riparian systems as the official policy of the federal government. It requires all federal agencies to consider wetland protection as an important part of their policies; take action to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands.

Executive Order 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition. This executive order requires that federal agencies increase the procurement of environmentally preferable or recovered materials. Agencies are directed to set annual goals to maximize the number of recycled products purchased relative to nonrecycled alternatives. In addition, each agency is to establish a program for promoting cost-effective waste prevention and recycling at each of its facilities.

Executive Order No. 13112: Invasive Species. This executive order prevents the introduction of invasive species and directs federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species.

Water-Rights Law

California water rights can be complex and confusing. Basically, this body of law recognizes two very different types of rights: riparian and appropriative. Other types of rights exist in California as well, such as reserved rights (water set aside by the federal government for the public domain) and pueblo rights (a right based on Spanish and Mexican law). California water law also allows an overlying landowner to pump groundwater, a right governed by an altogether different set of rules.

Surface Water Rights

Riparian Rights. Riparian water rights are derived from ownership of land that is adjacent to a source of water. A riparian right entitles the landowner to use a correlative share of the water flowing past his or her property. A riparian right owner does not need a permit from the SWRCB, or any other type of governmental approval. Riparian rights apply only to water that would naturally flow in the stream and do not entitle a water user to divert water to storage for use at some other time (unless storage is less than 30 days) or on land outside of the watershed. Riparian rights remain with the property when it changes hands, although the right may be lost if the parcel is severed from the adjacent water source. Riparian rights have a higher priority than appropriative rights (see below). Among riparian right holders, however, priority is equal and all share the shortage of water during low flows. Hence, riparian rights are characterized as "correlative" rights.

Appropriative Rights. Appropriative rights derive from making a claim to divert water from the river or stream. An appropriative right allows storage of the water and reasonable and beneficial use of the water on land outside of the watershed. The dual water system created by recognition of both riparian rights and appropriative rights, and the inherent contradictions, prompted numerous legal disputes over many years and resulted in a California constitutional amendment that requires all use of water to be "reasonable and beneficial." California Constitution Article X, Section 2, states that "Beneficial uses commonly include municipal and industrial use, irrigation, hydroelectric generation, livestock watering, recreational use, and fish and wildlife protection."

Pre-1914 Rights. Prior to 1914, there was no formal permitting system with which appropriators had to comply. At that time, appropriators (mostly miners and nonriparian farmers) took control of and used whatever water they desired. These rights are recognized today and have priority over post-1914 rights. All appropriative rights are subject to the rule "first in time, first in right." For instance, a pre-1914 right holder may be junior to another pre-1914 right holder, and both pre-1914 right holders would be senior to any post-1914 right holder.

Post-1914 Rights. The Water Commission Act of 1914 established the current permit system for the appropriation of water. Today, provisions governing the appropriation permit system are set forth in the California Water Code, and the SWRCB has been granted the authority to administer permits and licenses for California's surface water.

Post-1914 appropriative rights are governed by the hierarchy of priorities, and in times of shortage the most recent right holder is the first to be required to discontinue use. The date the permit application was filed with the SWRCB determines the priority of right. Post-1914 rights are subject to much greater scrutiny and regulation by the SWRCB than pre-1914 rights.

Groundwater Rights

California does not have a permit process that regulates groundwater use. In several areas, however, groundwater is subject to regulation in accordance with court decrees adjudicating the rights within groundwater basins. The "reasonable use" doctrine also applies to groundwater use. Overlying landowners may extract groundwater and put it to beneficial use. The rights of others with land overlying the

same aquifer must be taken into consideration, and thus the right is a correlative right. Groundwater may be used outside the groundwater basin, although such use is subordinate to use by those with overlying rights.

A key issue relating to groundwater is whether water being pumped is so closely interconnected with a surface stream or lake that it could be considered pumping of surface water. Groundwater / surface water interconnection issues are not addressed in this section.

List of Laws, Ordinances, Regulations, and Standards

Table A-3 describes a wide range of requirements that must be met to achieve compliance with laws, ordinances, regulations, and standards imposed by federal, state, and local entities with authority over the Property or some portion of it. Means of complying with each requirement are discussed in the appropriate sections of the report, but the table summarizes them for all subject areas. Very few of the entries in Table A-3 present a challenge for the planning process, but the Plan must be evaluated for compliance with all of them.[2]

[2] The list includes numerous Santa Cruz County ordinances, not because they apply in the strict sense, but because federal and state agencies usually take local regulations into account in their planning processes.

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Biological Resources				
BLM Department	Federal	Endangered Species Act of 1973, as amended; 16 USC § 1531 et seq.; 50 CFR parts 17 and 222	U.S. Fish and Wildlife Service (USFWS); National Marine Fisheries Service	Protect and manage federally-listed species
BLM Department	Federal	Migratory Bird Treaty Act	USFWS	Protect migratory birds and their nests
BLM Department	Federal	Clean Water Act of 1977; 33 USC § 1344; 30 CFR § 330.5(a)(26)	U.S. Army Corps of Engineers	Protect waters of the U.S.
BLM (coordination through the Fish and wildlife Coordination Act) Department	State	California Species Preservation Act of 1970; California Wildlife Preservation Act of 1990; California Fish and Game Code §§ 900 – 903	California Department of Fish and Game (CDFG)	Protect and enhance the birds, mammals, fish, amphibians, and reptiles of California
BLM (coordination through the Fish and wildlife Coordination Act) Department	State	Native Plant Protection Act of 1977	CDFG	Protect rare and endangered plants
BLM (coordination through the Fish and wildlife Coordination Act) Department	State	California Endangered Species Act of 1984, California Fish and Game Code §§ 2050 - 2098	CDFG	Protect state-listed plants and animals
BLM (coordination through the Fish and wildlife Coordination Act) Department	State	California Fish and Game Code §§ 3511, 4700, 5050, and 5515	CDFG	No taking of fully-protected birds, mammals, reptiles, amphibians, or fishes
BLM (consistency) Department	Local	Santa Cruz County Code § 16.32 (Sensitive Habitat Protection)	Santa Cruz County Planning Department	Comply with requirements to protect sensitive habitats (also part of the LCP)
BLM (consistency) Department	Local	Santa Cruz County Code § 16.34 (Significant Trees Protection)	Santa Cruz County Planning Department	Comply with requirements to protect significant trees (also part of the LCP)
BLM (consistency) Department	Local	Santa Cruz County Code § 16.30 (Riparian Corridor and Wetlands Protection)	Santa Cruz County Planning Department	Comply with requirements to protect riparian corridors (also part of the LCP)

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Water Quality				
BLM Department	Federal	Clean Water Act § 402; 33 USC § 1342; 40 CFR parts 122 – 136	RWQCB, EPA Region IX	As necessary, obtain NPDES permits for stormwater discharge and prepare SWPPPs for construction projects
BLM Department	Federal	Clean Water Act § 311; 33 USC § 1321; 40 CFR parts 110, 112, 116, and 117	RWQCB, EPA Region IX, and California Office of Emergency Services	Report any prohibited discharge of oil or hazardous substances
BLM Department	State	California Water Code § 13271 – 13272; 23 CCR 2250 – 2260	RWQCB and California Office of Emergency Services	Report releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products
Department	State/Local	California Public Resources Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part (1)	CEQA Lead Agency	Provide information concerning proposed water resources and water quality protection
BLM (consistency) Department	Local	Santa Cruz County Code §§ 7.38 (Sewage Disposal) and 7.78 (Preservation of Monterey Bay and Coastal Water Quality)	Santa Cruz County Planning Department	Comply with regulations for protecting water quality (also part of the LCP)
BLM (consistency) Department	Local	Santa Cruz County Code § 7.73 (Individual Water Systems)	Santa Cruz County Planning Department	Comply with regulations for protecting water resources (also part of the Local Coastal Program)
BLM (consistency) Department	Local	City of Santa Cruz ##	City of Santa Cruz ##	Comply with requirements for use of hazardous materials on public land
Geology and Soils				
BLM (consistency) Department	State/Local	Alquist-Priolo Fault Zone Act; Santa Cruz County Code § 16.10	Santa Cruz County Planning Department	Meet requirements for protection from seismic and other geologic hazards
BLM (consistency) Department	Local	Santa Cruz County Code § 16.10 (Geologic Hazards)	Santa Cruz County Planning Department	Comply with requirements to mitigate for geologic hazards (also part of the LCP)
BLM Department	Federal	Clean Water Act	RWQCB: Central Coast Region under the direction of the Water Resources Control Board	Meet discharge requirements relative to sediment
BLM Department	Federal	Soil Conservation Service *National Engineering Handbook* (1983)	Natural Resources Conservation Service	Implement standards for soil conservation
Department	State	California Public Resources Code § 25523(a); CCR §§ 1752, 1752.5, 2300 - 2309, and Chapter 2, Subchapter 5, Article1, Appendix B, part (I)	CEQA lead agency	Submit information about potential environmental impacts

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Department	State	Guidelines for Implementation of CEQA, Appendix G; 14 CCR § 15000-15387	CEQA lead agency	Evaluate erosion and sediment deposition; evaluate conversion of agricultural lands
Department	State	Porter-Cologne Water Quality Control Act of 1972; California Water Code §13260 – 13269; 23 CCR Chapter 9	CEQA lead agency, RWQCB and Water Resources Control Board	Provide adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls; meet waste discharge requirements concerning potential surface water pollution from runoff
Department	State	Williamson Act	Department of Conservation, Office of Land Conservation	Comply with provisions of Williamson Act contracts
BLM (consistency) Department	Local	Santa Cruz County Code §§ 16.20 (Grading Regulations) and 16.22 (Erosion Control)	Santa Cruz County Planning Department	Comply with regulations for grading and erosion control (also part of the LCP)
Cultural and Paleontological Resources				
BLM Department	Federal	National Historic Preservation Act, as amended; 16 USC § 470 et seq. and § 106; 36 CFR 800	Lead Federal Agency and State Historic Preservation Officer (SHPO)	Obtain formal finding by the lead Federal agency for cultural resources in consultation with the SHPO and the Advisory Council on Historic Preservation; implement procedures for dealing with cultural resources discovered during surface-disturbing activities
BLM Department	Federal	National Environmental Policy Act (NEPA); 42 USC § 4321 – 4327; 40 CFR § 1502.25	Lead Federal Agency	Include analysis of potential environmental impacts on federal lands
BLM Department	Federal	1978 Memorandum from the Associate Director of the BLM	Lead Federal Agency	Implement significance criteria for paleontological resources
	Federal	Federal Antiquities Act of 1906; 16 USC § 432, 433	Lead Federal Agency	Comply with basic legislation for preservation of cultural properties on Federal lands
BLM	Federal	Executive Order 11593	Lead Federal Agency	Directs Federal agencies to inventory and nominate properties to the National Register of Historic Places and protect cultural resources
BLM Department	Federal	Archaeological and Historic Preservation Act of 1976; 16 USC § 469	Secretary of the Interior and Lead Federal Agency	Provides for coordination with the Secretary when a Federally licensed undertaking may cause irreparable damage to significant cultural resources
BLM Department	Federal	Archaeological Resources Protection Act of 1979; 16 USC § 470a et seq.	Secretary of the Interior and Lead Federal Agency	Provides for felony-level penalties for destruction, damage, or removal of cultural resources on Federal lands

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
BLM Department	Federal	American Indian Religious Freedom Act of 1979; 42 USC § 1996	Lead Federal Agency	Established US Government policy to protect and preserve traditional religious beliefs and practices
BLM Department	Federal	Native American Graves Protection and Repatriation Act of 1990; 25 USC § 3001	Lead Federal Agency	Established mechanism for Native Americans to claim ownership of human remains and certain cultural items
BLM	Federal	Secretary of the Interior's Standards and Guidelines, September 29, 1983	Secretary of the Interior and Lead Federal Agency	Establishes standards for the gathering and treatment of data related to cultural resources
Department	State	California Environmental Quality Act (CEQA) § 15064.5; California Public Resources code § 5024, 5024.5, and 21083.2; Title 14 CCR § 15126	Lead State Agency	Directs the State Lead Agency to determine significance of project-related effects on important cultural resources and unique paleontological resources to develop appropriate mitigation measures
Department	State	California Public Resources Code § 21083.2	Lead State Agency	Directs the State Lead Agency to provide special consideration of unique historical, archaeological, and cultural sites as defined under CEQA
Department	State	California Health and Safety Code § 7050.5	County Coroner (Medical Examiner)	Determination of origin of human remains and coordination with NAHC
Department	State	California Public Resources Code § 5024.1	State Historical Resources Commission	Establishes the California Register of Historical Resources and procedures for nominating sites to the Register
BLM (consistency) Department	Local	California Public Resources Code § 5097.5	Santa Cruz County Planning Department	Prevent unauthorized removal of archaeological resources or paleontological remains on public lands
BLM (consistency) Department	Local	Santa Cruz County Code §§ 16.40. (Native American Cultural Sites), 16.42 (Historic Preservation), and 16.44 ({Paleontological Resource Protection)	Santa Cruz County Planning Department	Comply with requirements to protect cultural and paleontological resources (also part of the LCP)
Land Use				
BLM	Federal	Bureau of Land Management (BLM) *Land Use Planning Handbook*	Lead Federal Agency	Ensure consistency with proposed actions and BLM land use policies
BLM (consistency) Department	Federal/State/ Local	Federal Coastal Zone Act/Coastal Conservation Act of 1976 (California Public Resources Code § 30000 et seq.)	Coastal Commission and Santa Cruz County	Comply with regulations for Coastal Zone
Department	State	Department of Parks and Recreation (DPR) Draft *Planning Handbook*	Department of Parks and Recreation	Ensure consistency with proposed actions and DPR land use policies

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Department	State	CEQA Appendix G	State Lead Agency	Evaluate significance of conflicts with adopted community plans or conflicts with established recreational, educational, religious, or scientific uses of the area
Department	State	CEQA Appendix G	State Lead Agency	Evaluate the significance of project impacts on prime agricultural land
Department	State	California Land Conservation Act (Williamson Act)	Santa Cruz County Planning Department	Comply with regulations for Coastal Zone
Department	State	California Streets and Highway Code § 670	Caltrans	Encroachment permits
BLM (consistency) Department	Local	Santa Cruz County General Plan and LCP	Santa Cruz County Planning Department	Comply with provisions of General Plan
BLM (consistency) Department	Local	Santa Cruz County Zoning Code and LCP	Santa Cruz County Planning Department	Adjust zoning to be consistent with proposed land use
BLM (consistency) Department	Local	Santa Cruz County North Coast Beaches Master Plan	Santa Cruz County Planning Department	Maintain consistency with Plan
BLM (consistency) Department	Local	Santa Cruz County Code, §§ 12.01 Building Permit Regulations, 12.06 Demolition of Habitable Residential Structures Suitable for Relocation, 13.03 LCP Administration, 13.10 Zoning Regulations, 13.11 Site, Architectural and Landscape Design Review Ordinance, 13.14 Rural Residential, 13.20 Coastal Zone Permits, 13.36 Development Agreements, 14.02 Condominium Conversion Regulations,	Santa Cruz County	Comply with regulations for Coastal Zone
Aesthetic/Visual Resources				
BLM	Federal	BLM Planning Handbook	BLM	Evaluate impacts
Department	State	CEQA Appendices G and I	State Lead Agency	Evaluate impacts using significance criteria
BLM (consistency) Department	Local	Santa Cruz County guidelines for implementation of CEQA	Santa Cruz County Planning Department	Comment on EIR
Noise				
BLM	Federal	BLM Planning Handbook	BLM	Evaluate impacts
Department	State	CEQA Appendix G	State Lead Agency	Ensure that project activities do not substantially increase ambient noise in adjacent areas

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
Air Quality				
BLM	Federal	BLM Planning Handbook	BLM	Evaluate impacts
Department	State/Local	CEQA Appendix G	State Lead Agency	Evaluate project compliance with ambient air quality standards, substantial contributions to an existing or projected air quality violation, or exposure of sensitive receptors to substantial pollutant concentrations
Health and Safety				
BLM	Federal	BLM Planning Handbook	BLM	Evaluate impacts
Department	State	California Health and Safety Code §§ 25500 – 25541; 19 CCR §§ 270 – 2734	Santa Cruz County Office of Emergency Services and Rural Fire Protection District	Comply with inventory, reporting, and area planning requirements with respect to hazardous materials
BLM (consistency) Department	Local	CBC and National Fire Code	Santa Cruz County Department of Public Works and Planning Department	Obtain building and grading permits as needed
BLM (consistency) Department	Local	Santa Cruz County Code § 16.10 (Geologic Hazards)	Santa Cruz County Planning Department	Comply with requirements to mitigate for geologic hazards (also part of the LCP)
Water Supply				
BLM (consistency) Department	State	California Water Code § 1602	SWRCB	File for permits for water diversions
BLM (consistency) Department	Local	Santa Cruz County Code § 7.70 (Water Well Control)	Santa Cruz County Planning Department	Comply with requirements to protect water resources (also part of the LCP)
Timber Resources				
BLM	Federal	Federal Land Management Policy Act	Bureau of Land Management	Comply with federal requirements for timber harvest and management as appropriate
BLM (consistency) Department	State	Z'Berg-Njedly Forest Practice Act of 1973	Department of Forestry, North Coast Region	Comply with requirements for timber harvesting plans and timberland conversion permits as appropriate
BLM (consistency) Department	Local	Santa Cruz County Code § 16.52 (Timber Harvesting Regulations)	Santa Cruz County	Comply with requirements for timber harvesting (also part of the LCP)
Mining				
BLM	Federal	Federal land management Policy Act	Bureau of Land Management	Comply with federal requirements for mining and reclamation as appropriate

TABLE A-3: APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (Continued)

Agency Application	Jurisdiction	Citation	Administering Agency	Requirements/Compliance
BLM (consistency) Department	State/Local	Surface Mining and Reclamation Act (SMARA)	Division of Mines and Geology/Santa Cruz County	Implement provisions of SMARA
BLM (consistency) Department	Local	Santa Cruz County Code § 16.54 (Mining Regulations)	Santa Cruz County	Comply with requirements for mining (also part of the LCP)
Transportation				
BLM (consistency) Department	State	California Streets and Highway Code § 670	Caltrans	Encroachment permits
BLM (consistency) Department	Local	Santa Cruz County Transportation Plan	Santa Cruz County Department of Public Works	

APPENDIX B: LIST OF PREPARERS

The following individuals contributed to the preparation of the *Coast Dairies Long-term Resource Protection and Access Plan*.

TABLE B-1: LIST OF PREPARERS

Name	Name
Coast Dairies Steering Committee	***Other Contractors***
Reed Holderman, The Trust for Public Land	Bill Mott, Agland Investment Services
Catherine Elliott, The Trust for Public Land	Clinton Blount, Albion Environmental, Inc.
Liza Riddle, The Trust for Public Land	Jack Barclay, Albion Environmental, Inc.
Steve Addington, Bureau of Land Management	David Laabs, Biosearch Wildlife Surveys
Bob Beehler, Bureau of Land Management	Dr. Sandy Lydon, Cabrillo College
Julia Ann Delgado, Bureau of Land Management	David Dornbusch, Dornbusch Associates
Rick Hanks, Bureau of Land Management	Anne Schneider, Ellison, Schneider & Harris
Patsy Heasly, California Coastal Conservancy	Cordy Hill, Royston Hanamoto Alley & Abey ASLA
Prentiss Williams, California Coastal Conservancy	Bern Smith, Landsmiths
Laura Perry, Land Trust of Santa Cruz County	Chad Hendrix, Space Imaging
Kate Anderton, Save-the-Redwoods League	Sandy Guldman, Toyon Environmental Consultants
Ruskin Hartley, Save-the-Redwoods League	Dr. Stephen Gliessman, University of California at Santa Cruz
Victor Roth, State of California Department of Parks and Recreation	Loralie Froman, Eagle Eye Editing
Dave Vincent, State of California Department of Parks and Recreation	
Environmental Science Associates Team	
Tom Roberts	
Nancy Barbic	
Tina Ogawa	
Darcey Rosenblatt	
Dan Sicular	
Nik Carlson	
Peter Hudson	
Austin Kerr	
Martha Lowe	
Yolanda Molette	
Mike Podlech	

APPENDIX C: BIBLIOGRAPHY

References

Aldenhuysen, Robert, Environmental Supervisor, RMC Pacific Materials
2001a Telephone Conversation, May 16.
2001b Personal Communication with D. Alley, Fisheries Biologist.

Alt, D., and D. Hyndman, editors
1975 *Roadside Geology of Northern California* (14th Printing 1992). Missoula: Mountain Press Publishing Company.

Amme, D.
1999 *Range Survey and Conservation Grazing Program for Coast Dairies and Land Company*. Prepared for Coast Dairies and Land Company.

Arvelas, P.
2000 Personal Communication, Livestock Permittee.

Association of Monterey Bay Area Governments
1997 *Regional Population and Employment Forecast for Monterey, San Benito and Santa Cruz Counties*.

Association of Monterrey Bay Area Governments
2001 Personal Communication with Bryndie Beach, March and April.

Baber, D.W.
1985 *Ecology of Feral Pigs on Santa Catalina Island.* Ph.D. Thesis, Oregon State University.

Bargetto, S.
2001 Personal Communication.

Baskerville, G.
1985 Adaptive Management - Wood Availability and Habitat Availability. The Forestry Chronicle 61(2):171-175.

Bates, R.L., and J. Jackson.
1980 *Glossary of Geology*. Falls Church, VA: American Geological Institute.

Beier, P.
1995 Dispersal of Juvenile Cougars in Fragmented Habitat. *The Journal of Wildlife Management* 59:238-237.

Bender, D. J., T. A. Contreras and L. Fahrig
1998 Habitat loss and population decline: a meta-analysis of the patch size effect. *Ecology* 79:517-533.

Beven, Keith, and Paul Carling
1989 *Floods: Hydrological, Sedimentological and Geomorphic Implications,* New York, NY: John Wiley and Sons.

Big Creek Lumber
2000 Personal Communication with L. McCrary, November.
2001 Personal Communication with Bud McCrary, March 29.

Biosearch Wildlife Surveys
1996a *Red-legged frog survey, Liddell Spring Quarry Expansion, Santa Cruz County, California*. Santa Cruz, CA. Submitted to RMC Lonestar.
1996b *Stream Quality Monitoring, Bonny Doon Quarry Expansion Project, Fourth Month*. Submitted to RMC Lonestar.
1996c *Report regarding filling of Settlement Pond 2 at the Bonny Doon Limestone Quarry, Santa Cruz County, California*. Letter to RMC Lonestar.
1996d *Liddell Creek mitigation pond construction monitoring, Bonny Doon Limestone Quarry Expansion Project*. Submitted to RMC Lonestar.
2001 *Annual Monitoring Report (2000) for Incidental Take Permit TE844722-0 and Habitat Conservation Plan, Bonny Doon Quarries Sediment Ponds, Santa Cruz County, CA*.

Bolton, H. E., (ed.)
1966 *Historical Memoirs of New California.* New York, NY: Russell & Russell.

Bonnot, P.
1940 California Abalones. *California Fish and Game* 26(3): 203-204.

Bontadelli, S.
2001 Personal Communication, Lessee.

Bosakowski, T. and D. G. Smith.
1997 *Distribution and species richness of a forest raptor community in relation to urbanization*. *Journal of Raptor Research* 31:26-33.

Bosso, R.
2000 Personal Communication, Attorney.
2001 Personal Communication, Attorney.

Bowman and Williams
1989 *Map of Areas West of Santa Cruz*.

Brabb, E.E.
1989 Geologic Map of Santa Cruz County, California*. U.S. Geological Survey, Miscellaneous Investigative Series*, Map I-1905, 1:62,500.

Brabb, E.E., and E.H. Pampeyan
1989 Geologic Map of Santa Mateo County California. *U.S. Geological Survey, Miscellaneous Investigative Series,* Map I-1257, 1:62,500.

Brabb, E.E., J.C. Clark, and C.B. Throckmorton
1997 Measured Sections of Paleogene Rocks from the California Coast Range. *U.S. Geological Survey, Open File Report* 77-714.

Bradley, W.C.
1998 Origin of Marine Terrace Deposits in the Santa Cruz Area, California. *Bulletin of the Geological Society of America* 68: 421-444. Reprinted from 1983 edition.

Brady/LSA.
1999 *Fitzgerald Marine Reserve Master Plan.* Prepared for the San Mateo County Division of Parks and Recreation. August.

Branciforte.
1815 *Letter from Governor Pablo Vicente de Sola.* Special Collections, University of California, Santa Cruz. September 14.

Brown and Caldwell Engineering
1956 *Investigation of Water Supply Project: City of Santa Cruz Water System, Santa Cruz, California*.

Browning, P., editor
1992 *The Discovery of San Francisco Bay: The Portolá Expedition.* Lafayette, CA: Great West.

Bulger, J.B.
1999 *Terrestrial Activity and Conservation of California Red-Legged Frogs (*Rana Aurora Draytonii*) on Forested Habitats of Santa Cruz County, California*. Prepared for Land Trust of Santa Cruz County.
2001 Interview, Environmental Consultant.

Bureau of Economic Analysis, U.S. Department of Commerce.
2000 *Regional Economic Profile, Santa Cruz-Watsonville (PMSA)*.

Bureau of Land Management (BLM), U.S. Department of the Interior
1984 *Resource Management Plan: Hollister Resource Area.*
1986 Visual Resource Inventory, *BLM Manual Handbook* 8410-1.
1998 A User Guide to Assess Proper Functioning Condition And Support Science for Lotic Areas. Technical Reference 1731.15.
1999a *Land Use Planning Handbook.* BLM H-1600-1.
1999b A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas. Technical Reference 1731.16.
2000a *Central California Standards for Rangeland Health*. Prepared June, 1999; Record of Decision signed July, 2000.
2000b *Draft Strategic Plan Fiscal Years 2000-2006,* July 22.
2000c Personal Communication with R. Hanks.

Bureau of Statistics, U.S. Department of Labor
2001 *Consumer Price Index Data*.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino
1996 *Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California*. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-NWFSC-27, August.

California Cement Promotion Council
2001 Personal Communication with Dave Holman, Executive Director, April 5.

California Coastal Commission (CCC)
1987 *The California Coastal Resource Guide*. November.

California Coastal Conservancy
2000 *California Coast & Ocean*. Autumn.
1997 *Irrevocable Offer to Dedicate*.

California Department of Finance
2000a *California Statistical Abstract*, October.
2000b *Santa Cruz County Profile*, February.

California Department of Fish and Game (CDFG)
1992 *June-July 1992 stream survey report of lower Scott Creek, Santa Cruz County*. Prepared by D. Marston. December 1.
1995 *The relationship between instream flow and coho salmon and steelhead habitat availability in Scotts Creek, Santa Cruz County, California*. Sacramento, CA: Stream Flow and Habitat Evaluation Program. Snider, B., K. A. F. Urquhart, and D. Marston April.
1996 *Stream Inventory Report – San Vicente Creek*.
1998a *California Salmonid Stream Habitat Restoration Manual, Third Edition*. Inland Fisheries Division. Prepared by G. Flosi, S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. Sacramento, CA, January.
1998b *Draft Strategic Plan for Restoration of the Endangered Coho Salmon South of San Francisco Bay,* September.
2000a *California Natural Diversity Data Base for 7.5 minute topographic quadrangles* (Davenport, Santa Cruz). (Information accessed March 2001).
2000b *California Natural Diversity Database for 7.5 minute topographic quadrangles* (Davenport, Santa Cruz), Special Status Species / Community Location Full Report. Sacramento, CA. December.
2000c Personal Communication with P. Anderson, Fisheries Biologist.
2000d Personal Communication with D. Baldwin, Lieutenant.

2001a Email from W. Jones, Retired Fisheries Biologist, Region 3, May 10.
2001b Personal Communication with P. Anderson, Fisheries Biologist.
2001c Personal Communication with Hydrologist M. Whitman.

California Department of Forestry
2001 Personal Communication with Steve Wert, March 28.

California Department of Parks and Recreation
1985 *Restoration Research: Santa Cruz Mission Adobe, Santa Cruz Mission State Historic Park*. Prepared by E.E. Kimbro, M. E. Ryan, R.H. Jackson, R.T. Milliken, and N. Neuerburg.
1998a Public Opinions and Attitudes on Outdoor Recreation in California 1997, March.
1998b *Team Report and Planning Handbook* (Preliminary Draft by the General Plan Improvement Team, January 12).
2000 *FY 1999/2000 Total Visitor Attendance Report*.
2001a *Visitor Attendance Report.*
2001b Personal Communication with V. Roth, Supervisor of Wilder Ranch State Park, April.
2001c Interview of J. Buchanan, Supervising Ranger, April.

California Department of Transportation (Caltrans)
2001 Telephone communication with Lloyd Zambo, May 14.

California Division of Mines and Geology (CDMG), California Department of Conservation
1983 Aggregate Materials in the San Francisco – Monterey Bay Area. *Special Report 146, Aggregate Land Classification:*
1989 Davenport Cement Plant, Santa Cruz County, California. *California Geology* 42 (May): 99-107.
1992 Landslides and Other Geologic Features in the Santa Cruz Mountains, California, Resulting from the Loma Prieta Earthquake of October 17, 1989. *Open File Report* 91-05.
1995 Soil candidate Listing for Prime farmland and Farmland of Statewide Importance, Santa Cruz County*, Farmland mapping and Monitoring Program*.
1996 *Probabilistic Seismic Hazard Assessment for the State of California.* CDMG Open File Report 96-08, USGS Open-File Report 96-706. Prepared by M. Peterson, W. Bryant, T. Cao, C. Cramer, and M. Reichle in cooperation with A.D. Frankel, J.J. Leinkaemper, P.A. McCrory, and D.P. Schwartz of the U.S. Geological Survey.
1999 Seismic Shaking Hazard Maps of California Map Sheet 48. Prepared by M. Peterson, D. Beeby, W. Bryant, C. Cao, C. Cramer, J. Davis, M. Reichle, G Saucedo, S. Tan, G. Taylor, T. Toppozada, J. Treiman, and C. Wills.
2000 Epicenters of and Areas Damaged by M>5 California Earthquakes, 1800 – 1999. *Seismic Shaking Hazard Maps of California* Map Sheets 48-49. Prepared by T. Toppozada, D. Branum, M. Peterson, C. Hallstrom, C. Cramer, and M. Reichle.

California Division of Oil and Gas
undated *Santa Cruz County Regional Wildcat Map.*

California Division of Tourism
2001 Personal Communication with Eileen Hook, April 5.

California Employment Development Department
2000a *County Snapshot*.
2000b *Employment by Industry Data*.
2000c *Labor Market Projections by Industry, 1997- 2004*, Santa Cruz County.

California Native Plant Society
1999 *CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California for 7.5 minute topographic quadrangles* (Davenport, Santa Cruz). Version 1.5.1; January 1, 1999. Accessed March 2001.
2001 Interview with staff, February.

California Regional Water Quality Control Board – Central Coast Region
2001 Telephone Interview with Bill Arkfeld, May 4.

California State Board of Equalization
2000 *Timber Harvest by County*.

California Trade and Commerce Agency
2000a *1999 Travel Domestic Report*.

2000b *California County Travel Report 1999*, August.
2000c *Fast Facts 2000 Statewide and Regional Tourism Facts and Figures.*
2000d *Travel Profile: Singles, Couples, Parents and Roommates*.

Call, M.W.
1978 *Nest Surveys*. Technical Notes-316 prepared for the Bureau of Land Management.

Carter, A.
1971 *CA-SCR57 Site Record.* On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Carter, F.C.
1940 Duhaut-Cilly's Account of California in the Years 1827-1828*. California Historical Society Quarterly* XIV: 131-256.

Cartier, R.
1980 *CA-SCR-227 Site Record.* On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
1993 *The Scott's Valley Site: CA-SCR-177*. Santa Cruz Archaeological Society Monograph I.
2001 Personal Communication.

City of Santa Cruz Water Department
2001 Personal Communication with Jim Bentley, May 28.

Chang, Howard H.
1988 *Fluvial Processes in River Engineering.* New York, NY: John Wiley & Sons.

Clark, D.T.
1986 *Santa Cruz County Place Names.* Santa Cruz, CA: Santa Cruz Historical Society.

Clark, J.C.
1981 *Stratigraphy, Paleontology, and Geology of the Central Santa Cruz Mountains, California Coast Ranges*. U.S. Geological Survey Professional Paper 1168.

Coast Dairies and Land Company
1999 *Deed of Agricultural Conservation Easement and Development Rights*, May.
2001a Letter to Charles A. Rich, State Water Resources Control Board. Re:363:CAR:262.0(44-14-01) and Statement of Water Diversion and Use dated January 16, 2001. February 16.
2001b Personal Communication with Darcy Rosenblatt, February 13, 15, and May 1.

Coast Dairies and Land Company and City of Santa Cruz
1913 Agreement, March 22.
1916 Agreement, December 18.
1953 Agreement, April 14.
1964 Agreement, July 1.
1968 Agreement, December 2.

Coast Dairies and Land Company and RMC Lonestar
1996 License, January 1.

Coast Dairies and Land Company and Santa Cruz Portland Cement Company
1905 Memorandum of Agreement, August 15.

Coast Dairies and Land Company and Swanton Berry Farms, Inc.
2000 Agricultural Lease for Organic Purposes, June 30.

Construction Industry Research Board
2001 *Press Release: California Construction Forecast to Increases 3.3% in 2001*, January.

Conte, F.
2001 Personal Communication. Aquaculture Extension Specialist, University of California, March 16.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe
1979 *Classification of Wetlands and Deepwater Habitats of the United States.* Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service.

Craig, R.B. and F.R. Drysdale
1971 *A report on the biotic communities of the Davenport area.* Prepared for Eckbo, Dean, Austin & Williams Landscape Architects.

Creegan & D'Angelo
1984 *Watershed Analysis: San Vicente Creek, Mill Creek, Liddell Creek, East Branch Liddell Creek*. Prepared for Lone Star Industries, March.

Davenport Community Action Board
2001 Personal Communication with Gregg Pallin, January 11.

Davenport Community Action Board
2001 Personal Communication with member M. Wennberg, April 6.

Davenport Oral History Project
2001 Personal Communication with staff, February.

Davenport Resource Center.
2000 Personal Communication with member M. Wennberg.

Davenport Town Meeting
2001 Meeting Notes, April 19.

David Boyes Knives
2001 Personal Communication with David Larstein, January 11.

David Chavez and Associates
1989 *Cultural Resources Investigations for the Santa Cruz County North Coast Beaches General Plan EIR*, Mill Valley, CA.

*Davis, G.E.
1989 Design of a long-term ecological monitoring program for Channel Islands National Park, California. Natural Areas Journal 9:80-89.

Dietz, S.A., W. Hildebrandt, and T. Jones.
1988 Archaeological Investigations at Elkhorn Slough: CA-MNT-229 a Middle Period Site on the Central Coast. *Papers in Northern California Anthropology*, Number 3, Berkeley.

Dunne, Thomas and Luna Leopold
1978 *Water in Environmental Planning*. San Francisco, CA: W.H. Freeman and Company.

Dupras, Don
1989 "Cement Production at the Davenport Cement Plant, Santa Cruz County, California." *California Geology*. California Department of Conservation, Division of Mines and Geology, May.

Earth Science Associates
1971 *Proposed Davenport Power Plant Site Study*, Prepared for Pacific Gas and Electric, Appendix D to H of Davenport Planning Study Geotechnical Reports, prepared by Eckbo, Dean, Anstin and Williams. January.

East Bay Regional Parks
2000 Personal Communication with T. Mikkelsen, Assistant General Manager.

Edwards, R.
1978 *Report on the Assemblage from CA-SCR-18, Lundberg Foundation Salvage, Davenport, California*. Prepared by Archaeology field class, University of California, Santa Cruz. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.
2000 Personal Communication.

Elliott, W.
1879 *Santa Cruz County, California.* San Francisco, CA: Wallace W. Elliott.

Environmental Science Associates (ESA)
1997 *Bombay Draft Environmental Impact Report.* December.

Evans, A.S.
1873 *Alta California*. San Francisco, CA: Bancroft Publishing.

Fambrini Farms
2000 Personal Communication with J. Fambrini, Lessee.

Farr, S., Congressman
2000 Personal Communication.

Federal Register
1994 Determination of Endangered Status for the Tidewater Goby: Final Rule. February 4.
1999 *Designated Critical Habitat: Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon*. Vol. 64, No. 86, May 5.
2000 *Designated Critical Habitat: Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California – Final Rule*. Vol. 65, No. 32, February 16.
2001 *Endangered and Threatened Wildlife and Plants; Reopening of the Comment Period on the Proposed Rule to Remove the Northern Populations of the Tidewater Goby from the List of Endangered and Threatened Wildlife*. Vol. 66, No. 2, January 3.

Fish and Wildlife Service, U.S. Department of the Interior, and National Marine Fisheries Service, U.S. Department of Commerce
1996 *Habitat Conservation Planning Handbook.*

Fitzgerald, R.T. and A. Ruby
1997 *Archaeological Test Excavations at CA-SCR-117, the Davenport Landing Site.* Report prepared for U.S. Abalone, Inc. Davenport, CA. Report on file at the NWIC at Sonoma State University (California).

Fletcher, R. J.,Jr., S. T. McKinney, and C. E. Bock
1999 Effects of recreational trails on wintering diurnal raptors along riparian corridors in a Colorado grassland. Journal of Raptor Research 33:233-239.

George, D.
1993 Unpublished data regarding Nesting of snowy plovers at Laguna and Scott Creek Beaches in Santa Cruz County.

Gibbs, J.P., S. Droege, and P. Eagle
1998 Monitoring populations of plants and animals. *BioScience* 48:935-940.

Gill, R. E., Jr., C.M. Handel, and G. W. Page.
1995 *Western North American Shorebirds*. Pages 60-65 in E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. Department of the Interior, National Biological Service, Washington, D.C.

Gleissman, S.
2001 Personal Communication.

Golden Gate Audubon Society
2001 Personal Communication with Staff, February.

Greenlee, J.M.
1983 *Vegetation, Fire History, and Fire Potential of Big Basin Redwoods State Park, California.* Ph. D. Dissertation, University of California Santa Cruz.

Griggs and Weber
1990 *Field Trip Guide: Coastal Geologic Hazards and Coastal Tectonics: Northern Monterey Bay and Santa Cruz/San Mateo County Coastlines.* University of California Santa Cruz.

Griggs, G.
1974 The Evolution of the Coastline. In Wayburn, C. and P. Scott, Editors. *In the Ocean Wind: The Santa Cruz North Coast*. Glenwood Publishers, Felton, California.

Grinnell, J. and A.H. Miller
1944 The Distribution of the Birds of California. *Pacific Coast Avifauna* No. 27.

Grossi, H.
2000 Personal Communication to Sandy Lydon.

Habitat Restoration Group (HRG)
1994 *Coast Dairies and Land Company Biotic Assessment and Preliminary Wetland Delineation*. Prepared by Greenlee, J.M.
1997 *Fisheries Resources of the Lower Pajaro River and its Tributaries*. September.

Hamer, T.E. & S.K. Nelson
1995 *Characteristics of Marbled Murrelet Nest Trees and Nesting Stands*. Pp. 69-82 in USDA Forest Service General Technical Report, PSW-152.

Hamman R.
1980 *California Central Coast Railways.* Boulder, CO: Pruett Publishing.

Hapke, C.
2000 *Geology and Coastal Hazards of the Northern Monterey Bay, California – Field Trip Guidebook.* U.S. Geological Survey, Open File Report 00-439.

Hart, E.W., and W. Bryant
1997 (revised) *Fault-Rupture Hazard Zones in California.* Special Publication 42. Sacramento, CA: *California State Department of Conservation, Division of Mines and Geology.*

Harvey & Stanley Associates and John Gilchrist & Associates
1982 *Fish Habitat Assessments for Santa Cruz County Streams.* Prepared for Santa Cruz County Planning Department, File #139-01, June.

Henderson, H.B. and L.E. Rushton
1914 *Investigation and Design of Proposed Hydro-Electric Improvement at Big Creek, Santa Cruz County, California for Coast Counties Gas and Electric Company*. Thesis for B.S. Degree in Electrical Engineering, University of California Berkeley.

Hickman, J.C., editor
1993 *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.

Holland, R.F.
1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: Department of Fish and Game.

Holling, C.S., editor
1978 Adaptive Environmental Assessment and Management. John Wiley & Sons., New York.

Howell, J.T.
1970 *Marin Flora.* Berkeley, CA: University of California Press.

Hylkema, M.G.
1991 *Prehistoric Native American Adaptations Along the Central California Coast of San Mateo and Santa Cruz Counties*. Master's thesis, San Jose State University.

Jackson, T.
1996 *Archaeological Survey for the Proposed Coast Dairies and Land Company Reservoirs Near Davenport, Santa Cruz County, California*.

Jahns, Richard H. and Douglas Hamilton
1971 *Geology of the Davenport Coastal Area and the Proposed Davenport Power Plant Site Area.* Prepared for the Pacific Gas and Electric Company. November.

Jameson, E.W. and H.J. Peeters
1988 *California Mammals*. Berkeley, CA: University of California Press.

Jennings, C.W.
1994 Activity Map of California and Adjacent Areas. *Geologic Data Map* No. 6, 1:62,500. Sacramento, CA: California Department of Conservation, Division of Mines and Geology.

Jensen, M.E., Bourgeron. P., Everett, R. and I. Goodman
1996 Ecosystem Management: A Landscape Ecology Perspective. Water Resources Bulletin. Vol. 32 (2), pp. 203-216.

Jones
1999 Santa Cruz County: A Century. *Sentinel,* Santa Cruz.

Jones, D. and W. Hildebrandt
1990 *Archaeological Excavation at Sand Hill Bluff: Portions of Prehistoric Site CA-SCR-7, Santa Cruz County, California*. Far Western Anthropological Research Group, Inc, Davis, California.
1994 *Archaeological Investigations at Sites CA-SCR-10, CA-SCR-17, CA-SCR-304, and CA-SCR-38/123 for the North Coast Treated Water Main Project, Santa Cruz County, California*. Davis, CA: Far Western Anthropological Research Group, Inc.

Josselyn M.A, S. Chamberlain; and B.W. White
1994 *Biological Assessment for the Coast Dairies and Land Company Property*. Prepared for California Coastal Conservancy.

Krober, A.L.
1925 *Handbook of the Indians of North America*. New York, NY: Dover Publications, Inc.

Kuchler, A.W.
1997 Natural Vegetation of California (Map). *In Terrestrial Vegetation of California.* M.G. Barbour and J. Major editors. John Wiley and Sons, New York.

La Cabana Taqueria
2001 Personal Communication with Benjamin Landeros, January 11.

Landsmiths Land Management
2000a Personal Communication with Bern Smith, Coast Dairies Land Manager. November 13.
2000b Personal Communication with Bern Smith, Coast Dairies Land Manager. December 14.
2001a Telephone interview with Bern Smith, Coast Dairies Land Manager. January 23.
2001b Telephone interview with Bern Smith, Coast Dairies Land Manager. March 21.
2001c Telephone interview with Bern Smith, Coast Dairies Land Manager. April 25.
2001d Email communication from Bern Smith, Coast Dairies Land Manager. May 2.
2001e Email communication from Bern Smith, Coast Dairies Land Manager. May 3.
2001f Email communication from Bern Smith, Coast Dairies Land Manager. May 9.

Le Boeuf, B. and S. Kaza
1980 *The Natural History of Año Nuevo*. Pacific Grove, CA: Boxwood Press.

Lee, K. N
1999 Appraising adaptive management. Conservation Ecology 3(2): 3.

Legislative Analyst's Office
1998 *Transportation Equity Act for the 21st Century*.

Leonard Charles and Associates (LCA).
1987 *Feral Pig Study: Marin County, California*. Prepared for Marin Municipal Water District. July.

Leopold, Luna B.
1994 *A View of the River.* Cambridge, MA: Harvard University Press.

Leopold, Luna B., M. Gordon Wolman, and John P. Miller
1964 *Fluvial Processes in Geomorphology.* New York, NY: Dover Publications.

Levy, R.
1977 Costanoan. In *Handbook of North American Indians:* Vol. 8, California. R. Heizer, editor. Washington, D.C.: Smithsonian Institution.

Lone Star Industries
1981 *Offer to Dedicate Public Access*

Lundberg Glass Studios
2001 Personal Communication with Rachel Lundberg, January 11.

Lydon, Rocky
2000 Farm Advisor Emeritus. Personal Communication.

Lydon, Sandy
1984 *Mankind and Monterey Bay*. Monterey, CA: Monterey Bay Aquarium.
1985 *Chinese Gold: The Chinese in the Monterey Bay Region*. Capitola, CA: Capitola Book Co.
1997 *The Japanese in the Monterey Bay Region: A Brief History* Capitola, CA: Capitola Book Co.
1999 "A Very Close Call*." Point Lobos Natural History Association Newsletter* 21-5:4-5.

Madrone Landscape Group
1992 *Material conveyor line reclamation study: RMC Lonestar Cement Plant, Davenport, California.* Prepared for RMC Lonestar Cement Plant.
2001 *RMC Pacific Materials Inc. Reclamation Plan: Bonny Doon Quarries*, October 1996, revised February 2001.

Magnusson, R.
1971 *CA-SCR-55 Site Record*. Document on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Marin Municipal Water District (MMWD)
1994 *A Literature Review of the Recreational and Physical Impacts of Mountain Bicycle Use.* May.

Marsh, D.
1970 *CA-SCR-56 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Mayer, K.E. and W.F. Laudenslayer, editors.
1988 *A Guide to Wildlife Habitats of California*. Sacramento, CA: California Department of Fish and Game. 166 pp.

McBride, S. and F.S. Conte
1996 *California Abalone Aquaculture.* ASAQ-A10. California Aquaculture. Available from World Wide Web: (http://aqua.ucdavis.edu/).

McGinnis, S. M.
1991 *An Evaluation of the Anadromous Fish Spawning and Parr Rearing Habitats of the Liddell and San Vicente Creek Systems, Santa Cruz County, California*. Prepared for RMC Pacific Materials, October 25.

McKaig, K.
2001 Personal Communication.

McLean, H.
2000 Personal Communication. November.

McPherson, F., D. Johnston, R. Morgan, S. Singer, and T. Corelli
1995 *Ecosystems of the Santa Cruz Mountains.* Available from World Wide Web: (http://www.cruzio.com/~slriver/scmb/ecosyst/ecosyst.html)

Meighan, C.
1951 *CA-SCR-36 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Menzies, A.
1924 Archibald Menzies' Journal of the Vancouver Expedition. *California Historical Society Quarterly* II-4 (January).

Miller, D.
2001 Informal count of users at Forest of Nisene Marks. Personal Communication. April.

Miller, K.J., Willy, A. Larsen, and S. Morey.
1996 Determination of Threatened Status for the California Red-legged Frog: Final Rule. *Federal Register* 61 (101): 25813-25833.

Miller, S.
undated *The Economic Benefits of Open Space*. Executive Director. Website article for Isleboro Islands Trust.
2001 Personal Communication, Outdoor Educator, Worked with Westphal and Seymour during road-kill study.

Milliken, R.
1993 *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810.* Menlo Park, CA: Ballena Press.

Mine Safety and Health Administration, U.S. Department of Labor
2001 Available from World Wide Web: (http://www.msha.gov)

Mondo, R.
2001 Personal Communication. Lessee, Seaside Ranch.

Monterey Bay Properties
2001 Personal Communication with Michael Caress, Realtor, March 20.

Moore, L.J.
1998 *Quantitative Shoreline Change Assessment and Identification or Erosion Hotspots in Santa Cruz County, California.* Ph.D. Thesis submitted to the Department of Earth Sciences, University of California, Santa Cruz. March.

Morgan, R.
2001 Personal Communication. Botanist

Mori, B.
2001 Wildlife Biologist. Personal Communication.

Mount, Jeffery F.
1977 *The Erosion Hazard Potential of the San Lorenzo River Watershed.* Prepared for the Santa Cruz County Office of Watershed Management.

MRC Consulting
1994 *Archaeological Presence/Absence Testing and Preliminary Resource Evaluation of a Portion of Site CA-SCR-117 on the Young Property, 275 Davenport Landing, Santa Cruz County*. El Granada, CA.
1996 *Archaeological Monitoring at a Portion of Site CA-SCR-117 on the Young Property, 275 Davenport Landing Road, Santa Cruz County*. El Granada, CA.

Mountain Bikers of Santa Cruz
2001 Personal Communication with staff, February.

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayake
1995 *Fish Species of Special Concern in California, Second Edition.* Prepared for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.

National Agriculture Statistics Service, U.S. Department of Agriculture (USDOA)
1997 *1997 Census of Agriculture*.

National Audubon Society
2001 Personal Communication with staff, February.

National Marine Fisheries Service (NMFS)
1997 *Fish Screening Criteria for Anadromous Salmonids*. Southwest Region, Santa Rosa, CA, January.
2000a *Guidelines for Salmonid Passage at Stream Crossings – Final Draft*. Southwest Region, Santa Rosa, CA, May.
2000b Letter by S. Edmondson, Fisheries Biologist, Southwest Region, addressed to William Trush, McBain and Trush of Arcata, CA, March 31.
2000c Personal Communication with B. Hearn, Southwest Region, Santa Rosa, CA.

National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce
1995 *Cooperative Summary of the Day, Volume 2, California, Period of Record through 1993, NOAA,* CD-ROM. Prepared by the National Climatic Data Center.

National Park Service, U.S. Department of the Interior
2001 *Merced Wild and Scenic River Comprehensive Management Plan.* Yosemite National Park, February.

Natural Resources Conservation Service, U.S. Department of Agriculture
1980 *Soil Survey for Santa Cruz County*, *California.* August.
2000 Personal Communication with R. Casale.

Nelson\Nygaard Consulting Associates
1998 *Yosemite Area Regional Transportation Strategy Draft Working Paper #3-3: Year Round Data Collection Summary Report*, November.

Neter, John, William Wasserman, and Michael Kutner
1985 *Applied Linear Statistical Models*, second edition. Homewood IL: Richard D. Irwin, Inc.

New Davenport Cash Store
2001 Personal Communication with Marsha McDougal, Owner, April 6.

Nicholas Berman Environmental Planning
1989 *General plan for the North Coast Beaches; Draft Environmental Impact Report.* Prepared for the County of Santa Cruz.

Norris, M.R., and R. Webb
1990 *Geology of California* Second Edition. New York, NY: John Wiley and Sons, Inc.

Oakeshott, G.B.
1978 *California's Changing Landscapes, A Guide to the Geology of the State*. New York, NY: McGraw-Hill Publishing Company.

Organic Farming Research Foundation
2000 Personal Communication with R. Scowcroft, Director.
2001 Personal Communication with R. Scowcroft, Director.

Orlando, A.
2000 Personal Communication. November.

Pacific Gas & Electric Co.
2001a Personal Communication with John Ferrara, May 3.
2001b Personal Communication with Orlando Chavez, May 8.

Pacific Institute for Studies in Development, Environment, and Security
1997 *A Glimpse of Watsonville Today*, Part I, October.

Page, G.W., J.C. Warriner, D. George, K. Neuman, C. Eyster, L. Hankel, L.E. Stenzel, and D. Dixon.
2001 *Nesting of the Snowy Plover in Monterey Bay and on the Beaches of Northern Santa Cruz County, California, in 2000.* Stinson Beach, CA: Point Reyes Bird Observatory, January.

Pampeyan, E.H.
1994a *Geologic Map of the Montara Mountain and San Mateo 7-1/2' Quadrangles, San Mateo County, California.* U.S. Geological Survey, Miscellaneous Investigations Series Map I-2390, 1:24,000.
1994b *Geologic Map of the Palo Alto and Part of the Redwood Point 7-1/2' Quadrangles, San Mateo County, California.* U.S. Geological Survey, Miscellaneous Investigations Series Map I-2371. 1:24,000.

Pastorino, G.
2000 Personal Communication. Livestock Lessee.

Phelps. A.
1873 *Alta California: 1840-1842.* Glendale, CA

Point Reyes Bird Observatory
1994 *On Behalf of Songbirds*. Pointe Reyes, CA: California Partners in Flight.
2000 Eyster, C., ornithologist. Contacted regularly throughout 2000 nesting season regarding snowy plovers. Provided data summarizing nesting success at Scotts and Laguna beaches.

Priestly, H.I.
1937 *A historical, political, and natural Description of California by Pedro Fages, Soldier of Spain*. Berkeley, CA: University of California Berkeley.

Rails-To-Trails Conservancy
2000 *Successful Strategies for Trail Development*, December 9.

Ramirez, J.
2000 Personal Communication. Livestock Lessee.

Regional Metropolitan Commission
2001 Personal Communication with Rachel Moriconi, April.

Resource Information Systems
2000 *Timber Review,* April.

Respini, Jeremiah, and City of Santa Cruz
1889 Indenture, May 6.

Rick, J.
1970a *CA-SCR-45 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1970b *CA-SCR-46 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1970c *CA-SCR-47 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1970d *CA-SCR-48 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1970e *CA-SCR-49 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1970f *CA-SCR-50 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Ricker, John and Jeffery Mount
1979 *San Lorenzo River Watershed Management Plan: Physiographic-Geology and Erosion and Sediment Transport Technical Sections*. Prepared for the County of Santa Cruz. November.

Ricketts, E., Calvin, J. and J. Hedgpath.
1968 *Between Pacific Tides*. Fifth Edition. Palo Alto, CA: Stanford University Press.

*Ringold, P.L., J. Alegria, R.L. Czaplewski, B.S. Mulder, T. Tolle, and K. Burnett
1996 Adaptive monitoring design for ecosystem management. *Ecological Applications* 6:745-747.

Riparian Habitat Joint Venture (RHJV).
2000 *The Riparian Bird Conservation Plan: a Strategy for Reversing the Decline of Riparian Associated Birds in California*. California Partners in Flight. August.

Risk Management Associates (RMA).
2000 *Annual Statement Studies 2000/2001*.

RMC Lonestar
1933 Negative Albums numbered 1-3 dated 1933-1934.
1998 *Memorandum of Understanding Maintenance and Monitoring Plan Liddell Creek Mitigation Areas Bonny Doon Quarry Davenport, CA.,* November.

RMC Pacific Materials
2001a *Bonny Doon Quarries, 2000 Annual Report to the County of Santa Cruz*. March 13.
2001b Personal Communication with Harry Reppert, Environmental Director, February 23 and May 3.
2001c Personal Communication with Robert Walker, Quarry Manager at the Davenport Limestone Quarry. March 8 and April 30.
2001d Telephone interview with Jim Sheidenberger, Property Lease Manager. February 13 and May 22.
2001e Telephone interview with Satish Sheth, Vice President, Cement Operations. January 10, March 8, and April 26.
2001f Telephone interview with Luis Shipper. May 3.

Roop, W.
1976a *Adaptation on Ben Lomond Mountain: Excavation at CA-CSR-20*. Master's thesis at San Francisco State University.
1976b *Archaeological Impact Evaluation, Davenport Fish Release Station, Silverking Oceanic Farms, Davenport Landing, Santa Cruz County, California*. Prepared for Silverking Oceanic Farms, Davenport. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Rundel, P.W., and S.B. Stuner.
1998 Native Plant Diversity in Riparian Communities of the Santa Monica Mountains, California. *Madrono* 45(2), 93-100.

Santa Cruz Birding Club
2001 Personal Communication with J. Davis, February.

Santa Cruz Chamber of Commerce
2001a Personal Communication with Michael Schmidt, CEO, April 5.
2001b Interview with staff, February 2001.

Santa Cruz County
1979 *San Lorenzo River Watershed Management Plan*.
1999 *Agreement for the Sale and Effluent between Davenport Sanitation District and Coast Dairies and Land Company*, October.
2000a *Park and Recreation Areas in the Vicinity of Coast Dairies*
2000b Personal Communication with Susan Pearlman, Economic Development Coordinator, December 8.
2000c Community Assessment Project, Year 6.
2001 Personal Communication with Bill Coats, Santa Cruz County Extension Agent, April 5.

Santa Cruz County Agricultural Commissioner
1996 *Santa Cruz County 1995 Crop Report*.
1997 *Santa Cruz County 1996 Crop Report*.
1998 *Santa Cruz County 1996 Crop Report*.
1999 *Santa Cruz County 1996 Crop Report*.
2000 *A Report on Apples and On Other Crops for 1999*.

Santa Cruz County Assessor's Office
2001a County Assessor's Database. May.
2001b Personal Communication with Tod Connor, March 15.

Santa Cruz County Department of Economic Development
1997 *Economic Profile*
1999 *County of Santa Cruz Profile Information*.

Santa Cruz County Department of Parks, Open Space and Cultural Services
2001 Interview with Barry Samuel, February and March.

Santa Cruz County Department of Public Works and Sanitation
2001 Personal Communication with Steve Jesberg, May 21.

Santa Cruz County Farm Bureau
2000 Personal Communication with J. Brown.
2001 *County Information*.

Santa Cruz County Housing Authority
2001 Personal Communication with Frank Brunings, April.

Santa Cruz County Land Trust
2001 Personal Communication with Laura Perry, May 18.

Santa Cruz County Planning Department
1991 County of Santa Cruz, *North Coast Beaches Master Plan*.
1994 *Santa Cruz County General Plan and Local Coastal Plan*.
1997 *Mining Certificate of Compliance for Use Permit #3236-U, Parts III and IV, Bonny Doon Limestone and Shale Quarries*, July 25
2001a Personal Communication with Mark Deming, Planner, April 4.
2001b Personal Communication with Matt Baldzikowski, April 4.

Santa Cruz County Port District
2001 Personal Communication with Kembra Eldridge, April.

Santa Cruz County Sheriff-Coroner's Office
2001 Interview with staff, February.

Santa Cruz County Parks
2001 Personal Communication with Marge Smith, March 15.

Santa Cruz Hostel Society, Inc.
2001 Personal Communication with Peter Pethoe, February.

Santa Cruz Museum of Art and History
2001 *Coastal Voices, 100 Years of North Coast History, February 10 through May 27*.

Santa Cruz Predatory Bird Research Group, University of California, Santa Cruz
2001 Personal Communication with J. Linthicum

Santa Cruz Public Library
2001 Interview with Reference Desk staff, February.

Santa Cruz Sentinel – Library Department
2001 Interview with staff, February.

Santos, R.L.
1995 *Azoreans to California: A History of Migration and Settlement*. Denair: Alley-Cass Publishing.

Swanton Berry Farm
2000 Personal Communication with J. Cochran, Lessee.

Sawyer, J.O., and T. Keeler-Wolf
1995 *A Manual of California Vegetation.* Sacramento, CA: California Native Plant Society.

Saxe, A.W.
1875 Observations of a Shell mound at Laguna Creek, Six Miles North of Santa Cruz. *Proceeding of the California Academy of Sciences* 5: 157.

Schauss, M.E.
1980 *Population Dynamics and Movements of Wild Pigs in Grant Park*. Master's Thesis submitted to the Faculty of the Department of Biological Sciences, San Jose State University, May.

Schmidt, Erik.
1997 *Resource Management Planning for the Coast Dairies Property: Analysis of Existing Research and Data Resources*. Santa Cruz, CA: Land Trust of Santa Cruz County.

Scholar, D.C.
1998 *Pocket Beaches and Longshore Sediment Transport: Yellow Bank Beach, Santa Cruz County, California*. Master Thesis in Earth Science, Univ. Calif. Santa Cruz. 1998.

Scoggin, S.
2001 Personal Communication, April.

Scott, P. and C, Wayburn, editors
1974 *In the Ocean Wind: The Santa Cruz North Coast*. Glenwood Publishers, Felton, California.

Scott, C.
1997 *Santa Cruz North Coast Threatened*. Ventana, Sep/Oct. Reprinted with permission from the newsletter of the Environmental Council of Santa Cruz County.

Sedlock, R.L.
1997 *Tests of Alternate Hypotheses of Dextral Slip Rate on the san Gregorio Fault Zone.* San Jose, CA: Department of Geology, San Jose State University.

Sequoia Audubon Society
2001 Interview with staff, February.

Shasta County Department of Resource Management
1998 *County General Plan*, April.

Siebert, J. and V. Pradham
2000 *An Overview of California Agriculture Trends and Issues*.

Simonds, Vicky
2001 E-mail communication. Attorney consultant to Coast Dairies and Land Company. May 15.

Singer, S. W.; D. L. Suddjian,, S.A. Singer, and R. Norden
1992 Fledging of a marbled murrelet from a redwood tree nest. *Pacific Seabird Group Bulletin*; 19(1):54.

Smith, J.J.
1999 Personal Communication. Fisheries biologist, San Jose State University.
2001 Distribution and Abundance of Juvenile Coho and Steelhead in Scotts Creek in 2000. *Up A Creek: Scotts Creek Watershed Council Quarterly Newsletter* 3(1). April.

Snyder, N.F.R. and H. Snyder
1975 *Raptors in Range Habitat. Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds*. General Technical Report WO-1. Washington D.C.: USDA Forest Service, U.S Department of Agriculture.

Sprugel, D.G.
1991 Disturbance, equilibrium, and environmental variability: what is natural vegetation in a changing environment? *Biological Conservation* 58:1-118.

Stafford, J.
1975 *CA-SCR-117 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977 *Preliminary Archaeological Reconnaissance of the Coast Transmission Mains Expansion Project, Santa Cruz County*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1978a *CA-SCR-194H Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1978b *CA-SCR-169 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1978c *CA-SCR-197 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

State Water Resources Control Board (SWRCB)
2000a *Order Rejecting and Canceling Application 30203*, June 20.
2000b *Request for Extension of Time for Pending Application 30203 of Coast Dairies and Land Company – Scott and Molino Creeks in Santa Cruz County*, March 31.
2001 *Assessing Site Specific and Cumulative Impacts on Anadromous Fishery Resources in Coastal Watersheds in Northern California.* Staff Report, Division of Water Rights, January 23.

Stebbins, R.C.
1985 *Field Guide to Reptiles and Amphibians.* Boston, MA: Houghton Mifflin Company.

Stoffer, P.
2001 *Field Trip Guide to the Santa Cruz Mountains and Coast Santa Clara, Santa Cruz, and San Mateo Counties, California.* U.S. Geological Survey.

Suddjian, D.L.
1999 *Checklist of the Birds of Santa Cruz County*. Santa Cruz Bird Club. January.
2001 Personal Communication. Ornithologist/wildlife biologist.

Sullivan, K., D. J. Martin, R. D. Cardwell, J. E. Toll and S. Duke
2000 *An Analysis of the Effects of Temperature on Salmonids of the Pacific Northwest with Implications for Selecting Temperature Criteria*. Portland, OR: Sustainable Ecosystem Institute, October.

Takaki, R.*A.*
1993 *Different Mirror: A History of Multicultural America*. Boston, MA: Little, Brown.

Taylor, D.W.
1999 *Endangered Plant Survey Burns Lonestar 60 kV Hazard Tree Removal, Davenport-Bonny Doon Area*.

Terres, J.K.
1991 *The Audubon Society Encyclopedia of North American Birds*. Avenal, NJ: Wings Books.

Thomas Reid Associates
1996 *RMC Lonestar Bonny Doon Quarries Certificate of Compliance and Reclamation Plan, Draft Environmental Impact Report*. State Clearinghouse #90030038. Prepared for the County of Santa Cruz. April.

Thomas, J.H.
1961 *Flora of the Santa Cruz Mountains of California.* Stanford, CA: Stanford University Press.

Thornburgh, D.A., R.F. Noss, D.P. Angelides, C.M. Olson, F. Euphrat, and H.H. Welsh Jr.
2000 Managing redwoods. Chapter 8 in R.F. Noss (ed.). *The Redwood Forest: History, Ecology, and Conservation of the Coast Redwoods*. Island Press, Washington, D.C.

Tjvold, Steve
2001 Personal Communication, Santa Cruz County Extension Agent, March 30.

Tort, L.
2000 Personal Communication, Agricultural Economist.

Travel Industry Association
1999 *TravelScope Survey*.

Trush, William
2001 Personal Communication with Adjunct Fisheries Lecturer at Humboldt State University, Arcata, CA. March 31.

U.S. Census Bureau, U.S. Department of Commerce
1860 *Manuscript census, Monterey County*.
1870 *Manuscript census, Santa Cruz County*.
1880 *Manuscript census, Santa Cruz County*.
1890 *Manuscript census, Santa Cruz County*.
1900 *Manuscript census, Santa Cruz County*.
1910 *Manuscript census, Santa Cruz County*.
1920 *Manuscript census, Santa Cruz County*.
1990a *United States Census, Database C90STF3A*.
1990b *United States Census, Database C90STF3B*.
1992 *1992 Economic Census.*
1997 *1997 Economic Census.*

U.S. Fish and Wildlife Service (USFWS), U.S. Department of the Interior
1996a *Biological Opinion for the filling of Settlement Pond 2 at the Bonny Doon Limestone Quarry, Davenport, Santa Cruz County, California* (1-8-97-F-1).
1996b. *Biological and Conference for the Federal Aid Project at Scotts Creek Beach, Santa Cruz County, California* (1-8-96-F/C-59).

U.S. Geological Survey
2000 *U.S. Geological Survey Minerals Yearbook – 1999.*

University of California Archaeological Survey
1950a *CA-SCR-13 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950b *CA-SCR-14 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950c *CA-SCR-15 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950d *CA-SCR-16 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950e *CA-SCR-17 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950f *CA-SCR-18 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1950g *CA-SCR-19 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

University of California, Davis
1996a *California Aquaculture*, June.
1996b *Sierra Nevada Ecosystem Project, Final Report to Congress - Vol. I: Assessment Summaries and Management Strategies*.

Vallier, M.
1977a *CA-SCR-13 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977b *CA-SCR-14 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977c *CA-SCR-15 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977d *CA-SCR-16 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977e *CA-SCR-17 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.
1977f *CA-SCR-58 Site Record*. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Veytia, J.
1975 *Journey to Alta California*, *1849-1850*. Guadalajara, Mexico: unpublished typescript.

Von der Muhll, C.
1974 Planning the Coast. In Wayburn, C. and P. Scott, Editors. *In the Ocean Wind: The Santa Cruz North Coast*. Glenwood Publishers, Felton, California.

Wagner, H.R.
1929 *Spanish Voyages to the Northwest coat of America in the Sixteen Century*: San Francisco, CA: California Historical Society.

Wagner, J.R.
1974 *The Last Whistle: Ocean Shore Railroad*. Howell-North Books, Berkeley, CA.

Waithman, J. D.; R.A. Sweitzer, D. Van Vuren, J.D. Drew, A. Brinkhaus, I.A. Gardner, and W.M. Boyce
1999 Range expansion, population sizes, and management of wild pigs in California. *Journal of Wildlife Management* 63:298-308.

Walters, C.
1986 *Adaptive Management of Renewable Resources*. Macmillan, New York.

Watkins, R.C.
1925 *History of Monterey, Santa Cruz and San Benito Counties, California*. Chicago, IL: S.J. Clarke Publishing.

Watson, A.E., D.R. William, and J.J. Daigle.
1991 Sources of Conflict between Hikers and Mountain Bike Riders in the Rattlesnake NRA. *Journal of Park and Recreation Administration* 9(3): 59-71.

Weaver, W., and D. Hagans
1994 *Handbook for Forest and Ranch Roads.* Prepared by Pacific Watershed Associates for the Mendocino County Resource Conservation District. Ukiah, CA: Mendocino County Resource Conservation District.

Weisberg, Sanford
1980 *Applied Linear Regression.* New York, NY: John Wiley & Sons.

Weitcamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope and R. S. Waples
1995 *Status Review of Coho Salmon from Washington, Oregon, and California*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memo. NMFS-NWFSC-24, September.

Weldon, M.
1986 Swiss Dairies. *Farm Focus* V(3).

Wennberg, M.
1998 *Coast Dairies and Land, Part II*. Davenport Resource Service Center FOCUS: August.

Wennberg, M., and S. Sotelo
1999 *The Davenport/North Coast Farm Labor Camp Survey*.

Western Regional Aquaculture Center
1999 *Western Regional Aquaculture Industry Situation and Outlook Report* Volume 5 (through 1997), August.

Western Wood Products Association
1999 "Western Lumber Hits Seven-Year Production High in 1999" (News Release, September.
2000 *1999 Statistical Yearbook of the Western Lumber Industry*.
2001 "Association Forecasts Slow Start, Better Second Half for Western Mills" (News Release, March.

Westphal, M. and R. Seymour
2000 Wildlife surveys for road-killed red-legged frogs throughout coastal Santa Cruz and San Mateo counties between 1990 and 2000. Results presented at Annual Meeting of American Society of Ichthyologists and Herpetologists.

Willis, L.
2001 Personal Communication. April.

Wolman, M.G. and J.P. Miller
1960 Magnitude and frequency of forces in geomorphic processes. *Journal of Geology* 68:54-74

Yesawich, Pepperdine and Brown
1999 *1999 Portrait of Family Travel*.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer
1988 *California's Wildlife*, Vol. 1-111. Sacramento, CA: California Department of Fish and Game.

APPENDIX D: PUBLIC COMMENTS RECEIVED ON DRAFT FINAL COAST DAIRIES PLAN (JUNE 26, 2003)

This Appendix includes public comments received on the "Draft Final" Coast Dairies Plan which was released at the end of June, 2003. Beyond some updates and a few small errors of fact and lapses of clarity, which have been corrected, this Plan has not been substantially changed from the June 2003 Draft. Many of the public comments received express support for certain specific policies. For the most part the wide range of requested actions would be allowed under the Plan, but public comments have called for policy decisions that are more specific than the general level of policy represented by the Plan. So that the public input that was received can guide the agencies as specific policy decisions are made in the future, the Planning Team decided that it was preferable to retain all these comments as literally as possible. As an appendix, maintained in the project record, the land stewards can exercise their own judgment on these comments when they consider the Plan afresh, as part of their CEQA and NEPA deliberations.

ESA Environmental Science Associates

M E E T I N G N O T E S

Project: Coast Dairies Long-term Resource Protection and Access Plan (200071)

Date: July 31, 2003 *Time:* 7:30 to 9:30 p.m.

Subject: Community Advisory Group Meeting in which the Trust for Public Land received public comment on the Draft Final Coast Dairies Long-term Resource Protection and Access Plan dated June 26, 2003

This meeting was taped by Community Television and will be televised locally. Video tapes can be requested from Community Television at (831) 425-8848.

Welcome, Introductions, and Purpose of Meeting

The Trust for Public Land (TPL) welcomed the Community Advisory Group (CAG) to the meeting. The meeting was translated for Spanish-speaking guests. TPL requested that speakers speak slowly to facilitate translation.

The purpose of the meeting was to listen to CAG comments on the Draft Final Coast Dairies Long-term Resource Protection and Access Plan (dated June 26, 2003) and update the CAG on future plans for transferring the Coast Dairies Property (Property).

Liza Riddle (TPL) indicated that it is important to TPL, the Bureau of Land Management (BLM), the California Department of Parks and Recreation (the Department), and Santa Cruz County (County) to hear all of the community's comments. TPL has scheduled a 2-hour meeting that will continue until 9:30 pm. Contact information sheets are available to the CAG should they wish to contact TPL, BLM, or the Department subsequent to the meeting. TPL encouraged the CAG to be sure to sign the sign-in sheet so that TPL can stay in contact with interested individuals.

Ms. Riddle introduced Dave Vincent (the Department), Bob Beehler (BLM), Reed Holderman (TPL), and Catherine Elliott (TPL).

Brief Updates

Mr. Holderman welcomed CAG to the meeting. In 1988, TPL purchased Coast Dairies and Land Company and its sole asset, the 7,000 acres Coast Dairies Property.

TPL purchased the Property to protect it forever and to prevent the building of 139 luxury residential homes.

The purchase came with several use restrictions, which were passed on to TPL through the assignment of the stock option agreement. TPL gladly accepted these restrictions, as has the public agency partners, and the restrictions will be passed on to BLM and the Department when the Property is conveyed.

These restrictions include:

--That Coast Diaries will forever remain in open space

--That agriculture will continue on the Property to the maximum extent feasible

--That commercial logging of redwood will never happen

--That BLM and the Department will maximize opportunities for public access and recreation, but not at the expense of the current lessees or the Property's natural resources.

In addition, as a good faith gesture to the community, BLM has voluntary agreed to:

--Accept a deed restriction that requires the restoration of endangered species habitat as a priority management objective

--Accept a deed restriction that prohibits off-road vehicle use and commercial logging of any kind.

--Both agencies acknowledge that TPL will retain the mineral rights to the Property outside RMC Pacific's current lease area and any new mining will be prohibited.

When the CAG last met on March 8 (which TPL thought was a very important and productive meeting, and TPL thanked the CAG for its constructive comments), TPL made four basic points:

1) TPL would prepare a three-part plan for the Property that would include immediate public use (i.e., status quo), an interim plan, and a long-term plan for the Property, which would be available for public review and comment this summer. Tonight is the CAG's first opportunity to comment on that plan and TPL will be accepting comments until August 31.

2) TPL plans to convey Coast Dairies to BLM and the Department this fall. BLM will take the inland side of Highway 1 and the Department will accept the seaward side of Highway 1.

3) BLM and the Department shall prepare the necessary CEQA and NEPA documents in order to implement any of the interim and long-range plan projects after conveyance.

4) BLM and the Department have agreed to accept all of the restrictions contained in the stock option assignment and TPL's retention of all mineral rights. BLM also agreed to accept additional deed restrictions on logging and off-highway vehicle use.

These things are still true, but there have been four new developments TPL brought to the CAG's attention at the meeting.

First, despite TPL's best efforts to convey Coast Dairies to BLM and the Department by this fall, it looks like December 31, 2003 is a more realistic date.

Second, TPL is working closely with Supervisor Mardi Wormhoudt to sign a memorandum of understanding (MOU), which would memorialize the commitments TPL made in a letter to the Supervisor on March 4, 2003. TPL hopes to schedule a meeting before the Santa Cruz Board of Supervisors on this document sometime this fall.

Third, the draft final plan in front of the CAG does contain some areas needing further clarification and, in some cases, correction. Two items TPL addressed include Table A-3, in Appendix A, which

erroneously recommends that the County should amend its general plan, Local Coastal Plan, and zoning ordinances to change land uses designated for Agricultural to open space-resource. This was a mistake and no such land use or zoning request is contemplated or requested. Land uses and zoning for agriculture should stay that way and the plan will be revised to reflect that change. (Note: The intent of this edit is to clarify that agricultural land will remain zoned as agricultural land.)

The other change is in the "Goals and Standards" section of the plan, section 5, on page V-9, under agricultural leases. The draft plan says under Social Resource Goal 1, "water supply infrastructure capital improvements to meet these standards shall be provided by the lessee or other appropriate parties. Property managers shall not be responsible for such infrastructure."

Since TPL will not be the Property managers and do not know what the Property managers may or may not wish to do, TPL is recommending that this section be changed from "shall" to "may" in order to give Property managers the flexibility to participate in such infrastructure if they chose to do so.

Fourth, BLM recently advised TPL that they do not wish to accept the irrigated agricultural or residential leases inland of Highway 1 for a variety of reasons, on which Bob Beehler will elaborate. TPL is working with Supervisor Wormhoudt and others to identify a suitable manger of these lands and buildings.

The Department remains committed to taking all lands and buildings seaward of Highway 1.

With those corrections and remarks, TPL introduced Bob Beehler from BLM to address some of the recent changes in BLM's thinking and to reiterate their commitment to the Plan and use restrictions.

The CAG requested a copy of the changes that Reed reviewed. (Note: Please see Mr. Holderman's remarks, above.)

Mr. Beehler wanted to focus on the main change that recently developed for BLM. He indicated that BLM is not able to take over the agricultural leases and agricultural worker housing leases. BLM does not have the regulatory authority to administer the agriculture and agricultural worker housing leases and there is no support in Washington to modify the regulations. This changes BLM's access strategy with respect to its desire to get the public on public land. BLM is waiting to get GIS data to further analyze public access, and is requiring surveys to see how the leases and parcels lay out to determine where public access can occur. BLM is in contact with the Community of Davenport. BLM will host a workshop in Davenport in September to go over the interim access strategy for the Property to get the public on the land, address private property issues, and deal with interconnected issues.

Mr. Vincent referenced philosopher Herrick Kleides' quote "All is Change" and its relevance to the Coast Dairies planning process. He indicated that at the start of the planning process, the Department had ample resources. Today a lot has changed. The State budget has been greatly reduced. The Department staffing has been downsized and offices have been relocated. Unnecessary repairs in state parks are not being made. The State is in fiscally tough shape. For the Coast Dairies Property, the Department expects to maintain status quo in the short-term. The Department's commitment to stewardship of resources will not change, including snowy plover, coho salmon, and red-legged frog. The Department will continue its commitment to public safety. There will be no initial staffing to manage the Department's portion of Property. The Department will continue to allow as much public access to beaches as possible. They have no plans to change existing access. The Department will look at opportunities to make the coastal trail come about. Things will remain much as the CAG sees them currently. The Department is looking forward to managing this marvelous property and will be relying on the public to get through the next several years.

Planning Process Summary

TPL thanked Tom Roberts, Nancy Barbic, Dan Sicular, Tina Ogawa, Darcey Rosenblatt, and Beth Pototo with Environmental Science Associates (ESA) for their hard work over the past several years.

Tom Roberts (ESA) provided an overview of the planning process referencing posted boards.

Board 1

Purpose of the Plan

- To assess the value of natural, cultural, and social resources
- To develop sustainable management strategies to help the Department and BLM balance uses and protect those values

Goals

Seven goals lay the foundation for the management of the Property:

- Conserve and enhance the biological open space values
- Create new and diverse recreational and educational opportunities
- Maintain and enhance sustainable agriculture
- Restore key natural resources
- Protect natural forested areas from commercial harvest
- Allow for other sustainable economic uses of the land
- Use adaptive management as a tool to achieve sound long-term stewardship of the Property

TPL has reviewed the purpose of the plan already. The mission statement, deed restrictions, etc., were compiled into 7 goals as noted above.

Board 2

TPL will transfer the Property with deed restrictions.

- The Property will be preserved and used in perpetuity as open space.
- The land currently in agricultural row crop production will be managed in such a way that continued agricultural use is feasible to the maximum extent possible, unless and until it is determined that conversion to other uses to enhance the Property's natural resource and biodiversity values would be desirable, feasible and beneficial.
- The redwood trees will not be harvested from the Property.
- Opportunities for public access for recreation and enjoyment will be maximized to the extent consistent with protection and preservation of the natural resources, agricultural uses and the rights and interest of the Property's current lessees or their successors in interest.
- The BLM transfer will prohibit off-road vehicle use.

- TPL will retain the mineral rights to the property outside of RMC Pacific's current lease area.

TPL will transfer the Property with deed restrictions as noted above and as summarized previously by Mr. Holderman. The deed restrictions are the most basic guiding principles of the plan.

Board 3

Components of the Plan

- Executive Summary
- Introduction
- Project History
- Affected Environment – This section presents a summary of the existing conditions on the Property as presented in the Existing Conditions Report.
- Opportunities and Constraints – This section summarizes the results of the Opportunities and Constraints Analysis prepared for the Property.
- Goals and Standards – This section presents the Goals and Standards that are intended to guide future management of the Property.
- Management Zone Prescriptions – This section provides guidance on how each watershed should be managed.
- Plan Implementation and Public Access – The access plan includes what will occur on day of conveyance, the interim access stage, and a long-term access program that describes the overall vision for ultimate access to the Property.
- Adaptive Management Program – The Adaptive Management Program includes measures and monitoring.
- Appendices

The plan is available in a digital format on TPL's website (www.tpl.org). Hard copies are in local libraries and also available for purchase. It includes a project history on the evolution of the plan development.

The affected environment represents a year of field work of all the natural and cultural resources of the Plan. ESA completed the Existing Conditions Report (ECR) in 2001, which was published as a separate document. The ECR will be available on a separate CD in a hard copy version of the plan.

The Opportunities and Constraints Analysis (OCA) chapter was developed through an exercise in which some of the CAG participated where the planning team looked at all of the different areas of the Property and attempted to determine the most and least appropriate land use for that particular area of the Property. The planning team gave a presentation of this analysis in December 2001. The OCA took ECR information and articulated the general management principles for the Property as a whole and specific direction for particular areas of the Property. The meeting was repeated (because the prior meeting had technical equipment difficulties). ESA produced a separate response to comments document based on the well-articulated comments from the CAG on the OCA.

The Goals and Standards were constructed as general goals (e.g., sustain agriculture, protect special-status species) with standards, which are expressions of the goals in much more specific terms. All of the Goals and Standards are intended to apply to the entire Property.

The Management Zone Prescriptions provide more detailed information on how the different areas of the Property should be managed. Not every type of use can or should be allowed on every part of the Property. Based on the OCA, ESA identified that certain watersheds could withstand a higher level of use without harming sensitive resources, such as soil and water. The planning team applied management zoning to individual watersheds because the watersheds are sufficiently distinct to support such a management approach. In addition, the planning team created an agricultural zone, mining zone, and beach zone in recognition of the distinct types of uses on the Property. Management zoning provides expectations for how the zone would be managed, what the zone would look like in the future, and encouraged and discouraged activities.

Plan Implementation and Public Access will be addressed on the next several boards.

The adaptive management program describes how the plan will change through time in response to monitoring and measuring management prescriptions, such as monitoring red-legged frogs. This will keep the plan current through the years.

Board 4

Plan Implementation Stages - Immediate Access Stage.

Begins on Day of Conveyance and primarily represents a continuation of historic access.

- Deed restrictions, as discussed, will be in force.
- A continuation of historic public access, including access to beaches.
- Agencies will comply with existing federal, state, and local laws and regulations.
- A continuation of existing mining and agricultural leases and other leases that survive transfer of ownership.
- Public health and safety services, including police protection and fire protection, will be provided by local service agencies, supported by the Department and BLM.

Board 5

Plan Implementation Stages - Interim Access Stage.

0-5 years after conveyance, BLM and the Department will carefully broaden the allowable uses of the Property. Main emphases for management of the Property will be:

- Protection of threatened and endangered species;
- Limited recreational use of the Property;
- Continuation of existing economic uses of the Property; and
- Collaboration with community groups regarding strategies for management of the Property, and provision of services such as patrol, cleanup, and monitoring.

Board 6

Plan Implementation Stages - Long-term Access Stage.

Incorporates the remainder of the Coast Dairies Plan and would be codified in the BLM and Department general planning processes. Includes implementation of the:

- Goals and Standards;
- Management Zone Prescriptions;

- Long-Term Trails and Access Program; and
- Adaptive Management Program.

The planning implementation stages were developed given concerns about agency funding to operate the Property. The implementation of the plan follows three phases.

The immediate access stage was developed to allow more gradual introduction of stewards to the Property. It is envisioned that not much will change initially. This stage will maintain public access as it occurs now in accordance with the County's Local Coastal Plan.

In the first few years, BLM and the Department will take cautious steps in introducing additional public access and management responsibilities. There will probably be an environmental document that will state what increased uses are intended and what the impacts would be. During the interim access stage, when limited use is encouraged in areas where the public has not been allowed previously, there would be some trail facilities that would take advantage of existing roads and trails on the Property where the agencies can guarantee public health and safety and protection of resources. At some point after the interim access is evaluated, the new stewards would go into the plan implementation stage.

The last stage would be implementing the plan that has been written. The plan would have to be adopted and put through a compliance process by the new stewards. The plan currently before the CAG is a best guess as to what the ultimate plan will contain. The CAG can expect some evolution of the document it sees today and the plan that will be implemented by the Property managers.

Public Comment

TPL took public comment on the draft plan moderated by Liza Riddle.

TPL's completed project will be the draft management plan. TPL will incorporate comments into the plan and will be transferring the plan and comments to the agencies. As the agencies move forward, they will be incorporating public comment into the future planning effort. The notes from this meeting will be made available to the public.

TPL thanked Supervisor Wormhoudt for attending the meeting.

Supervisor Wormhoudt thanked TPL for their arduous process in agreeing to hold the land while the plan was developed and agencies were established to take the Property. She is sure that TPL did not envision the difficult 5-year process that would ensue. The county appreciates their efforts and stated that the community has much to look at in a very positive way. Superintendent Wormhoudt thinks that this is a good plan. The County's concerns are largely minor. Their two main concerns have been satisfied at the meeting in making certain that agricultural land would remain zoned as agricultural land and that the agencies would not be prohibited from doing the water planning necessary to maintain agriculture on the Property. TPL is working with the County in developing an MOU in which she hopes the Board could serve as the voice of the community in determining the parameters of use on the Property and the types of use that will be prohibited for all time.

The Supervisor is profoundly dismayed by the new information that BLM is not willing to take the agricultural leases and agricultural housing on the portion of the land to be deeded to them. It has not been a secret that there have been public concerns about BLM taking the Property. The community has had concerns about BLM's management reputation in other parts of the country. The County was pleased by BLM's remarks at the March 2003 meeting and their willingness to work with the community and their commitment to community values, agriculture, open space, and the preservation of this Property. Tonight hearing that the BLM cannot take responsibility for the agricultural leases

presents a deep difficulty at this time. This has been one of the seven goals for the Property. All of the public believed that maintaining the traditional uses of the land was a major part of the value of the land being preserved, including the traditional wild beaches, forests, and agriculture. When TPL took over the Property, there were about 700 acres in agricultural use. Over time, due to agency (USFWS, NMFS) problems etc., there are now about 100 acres in agricultural use. The Supervisor wants a commitment to work on water rights issues and ensure that 700 acres of agricultural land be restored on the Property. The community cannot do this if a major holder of the Property cannot and will not make a commitment to agriculture. (Note: Today, there are approximately 100 acres leased for irrigated agriculture inland of Highway One, and approximately 150 acres leased for irrigated agriculture on the coastside of the highway.)

TPL talks of trying to work this issue out through a possible third party land holder. Seamless management was a difficult enough issue for two agencies. If one separates an area within the land held by BLM, the Supervisor is not convinced that this will work. One of the Supervisor's major concerns has been selecting agencies before the plan has been written, and whether the agencies would accept the goals of the plan. The community was assured that unless the goals of the plan were acceptable to the agencies, then the agencies themselves would not be acceptable. Now BLM is not able to accept a major function that is among the prime goals for the Property. The County is far less sanguine about BLM being a recipient of the Property.

Another speaker stated that he knows of instances where BLM has leased land in the past and is encouraging the planning team to look at this, particularly during times of war. The RMC operation includes an existing permit from the County. Once the Property is transferred to BLM, what will happen to the County permit? If the County permit will still be in existence, it should be an appendix to the plan. Some of the RMC operations extend outside the leasehold. The plan should clarify the terms of the permit and lease. What happens after the County permit and lease expire? What if RMC goes bankrupt or transfers ownership to another corporation? The summary of the permit and lease conditions should be clarified within the plan.

Is BLM always and forever prohibited from accepting land with agricultural leases?

Mr. Beehler responded that in 1976 Congress passed Federal Land Policy Management Act, and modified all previous regulations. BLM lost all abilities to take on special land use permits. BLM thought that it could manage the Property under a deed title transfer. BLM is interested in perhaps talking further about this. BLM is committed to maintaining coastal agriculture. BLM does not have the legal authority to do this. Mr. Beehler believes BLM should continue to look at this. The BLM State Director has been told, however, that this is something that BLM cannot do.

With respect to mining, this is controlled under SMARA. BLM will initiate an MOU with the County as the lead. This would be a partnership between the County and BLM with the County in the lead working through the State authority.

Celia Scott with the Friends of the North Coast stated that the new information is of great concern regarding the appropriate recipient of the inland portion of the Property. She supports several major policy proposals in the plan, including the prohibition of exploration for mining, forest products, and off-highway vehicle use on the Property. Under BLM jurisdiction, Ms. Scott is pleased to see that the Property would become an Area of Critical Environmental Concern. She is not clear how this document will bind the agencies to the terms of the plan beyond the deed restrictions. The plan calls for the development of an ongoing citizen support group. She requested clarification for the process for citizen involvement.

Ms. Scott expressed concerns about the three-stage approach. Interim access is proposed to defer compliance with CEQA and NEPA, and this is considered to be piece-mealing and segmentation by dividing up the plan. She suggested that the interim access phase will impact the Property such that the environmental baseline will be changed and altered for as long as five years. The interim access stage will require environmental compliance. It would be wasteful of public money to prepare two environmental documents. It makes more sense to adopt a long-term plan first, rather than an interim plan.

Management zones proposed for trail use would permit use by hikers, bikers, and equestrians. The plan would defer until the long-term planning effort the question of separate trail use. Separate trail use should be a consideration from the outset.

Under CEQA, acquisition of the Property by a public agency requires environmental compliance documentation. Ms. Scott is not sure how the requirements of CEQA are being met if the State proposes to take over the Property without first conducting CEQA.

Ms. Scott expressed the hope that the Property would remain in the public domain never to be exchanged, and that it be used as open space into perpetuity.

Ben Harmen, a member of the Rural Bonny Doon Association and the North Coast Beaches Advisory Committee, commended the planning team on the work that has been done thus far. He commented that it is a wonderful plan.

As a member of the Rural Bonny Doon Association, he sent a letter to BLM in Washington D.C. asking the national office to back up the efforts of the local BLM. His main concerns are regarding whether the agencies are capable of carrying out the intent of plan. He indicated that there will be potential use conflicts, and resolution of such conflicts requires budgetary resources. Mr. Harmen is not certain that there will be such resources. Additionally, he is concerned about agency accountability. He mentioned three issues. First he expressed concern about the proximity between the coastal trail and conventional agricultural use along the bluffs. He is concerned about the amount of pesticide use on the Property and the public health issues associated with the proximity of people to these chemicals. Second, the beaches have not historically had access because of private property issues and agricultural activities. The beaches are also sanctuaries for marine life. He would like to see efforts to preserve beaches similar to Wilder Beach. Third, he has concerns about opening trails on the Property before the agencies fully understand the impacts of opening trails to use. He is worried that the area will be riddled with social trails, and wildlife (such as mountain lions) will be adversely affected.

Ramon Rios commented as a member of the Committee of Agricultural Workers of the North Coast. He thanked the planning team for their cooperation and hard work in assuring that the Property maintains a system of agricultural use and public access for all people in the North Coast so that the community can live a better life. Mr. Rios noted however that the plan needs more work, particularly with respect to the future of the agricultural workers who live and work on the Coast Dairies Property. The needs of the agricultural workers and their families have not been adequately addressed in the plan. The Committee of Agricultural Workers of the North Coast urges the planning team to modify the plan as follows:

- Housing should continue to be rented to the families who presently live there. The agencies should look for ways to improve living conditions without additional cost to the agricultural workers so that there is not a rent increase to the tenants. This should be adopted in the final plan.

- Priority should be given in the plan so that families who work on the Property can rent the land so that they can establish cooperatives and allow families of farm workers opportunities to work the land in conformity with the plan.

- Priority should be given to farmers who have compatible interests with and are willing to work cooperatively with agricultural workers. The agricultural workers are willing and organized to work with the State of California and any other agencies so that they can achieve these goals.

Grey Hayes, local biologist, thanked TPL for their efforts in starting the process. The donors have given the land as open space, but it is not enough to just provide the land. He encouraged the agencies to move in the correct direction in appropriate management of the Property. The baseline biological information is not sufficient to know what is adequate with respect to the protection and preservation of resources at Coast Dairies. Enforcement of the deed restriction is unclear because the environmental baseline information is not sufficient. He hopes that the agencies can establish threshold limits for resource change. The adaptive management plan lacks an adequate baseline. Who will be overseeing implementation of adaptive management? Will TPL be sitting on this adaptive management board? There is a list of legal requirements for this process in the plan, and the public resources code requiring a carrying capacity analysis is missing from the plan. The Department must conduct a carrying capacity analysis as part of the planning process. The carrying capacity analysis requires good biological data. When will the carrying capacity analysis be done? Mr. Hayes also expressed concerns about protecting marine mammals.

Andy Shiffren, with Supervisor Wormhoudt's office, expressed interest in finding ways to provide water storage on the Coast Dairies Property to both protect special-status species and allow the return of traditional agriculture on the Property. He expressed frustration that the agencies have stated that they are committed to coastal agriculture, but their actions do not support this. In practical terms, how are the agencies committed to coastal agriculture? The plan has been undermined because BLM will not take the land that is currently leased for agriculture or occupied by agricultural housing. Mr. Shiffren is concerned that BLM will take the lands that have historically been in agricultural use, but will not take the agricultural leases. He is concerned that the lands traditionally in agricultural use will not be returned to such use. In addition, some of the reservoirs are on non-agricultural land. How will these reservoirs be used for agricultural purposes? When BLM agreed to participate in the planning process, BLM knew about the agricultural commitments of the Coast Dairies Property. Now BLM has stated that they cannot accept the agricultural leases on the Property, which substantially undermines the plan before the CAG. Mr. Shiffren hopes that BLM will reconsider their position. If BLM should back out of their commitments at this point, the planning process will only be made that much more difficult.

Richard Nutter, an agricultural consultant with the Santa Cruz Farm Bureau, quoted the deed restriction stating that "the land currently in agricultural row crop production will be managed in such a way that continued agricultural use is feasible to the maximum extent possible, unless and until it is determined that conversion to other uses to enhance the Property's natural resource and biodiversity values would be desirable, feasible and beneficial." Does this statement mean that as soon as the agencies find out that they cannot farm it that they will convert it to something else? Is BLM's position that they cannot take the land or that they do not want to take it? Doesn't BLM manage agricultural leases on other lands that they lease to farmers, such as grazing leases?

BLM stated that it does have authority for grazing leases under the Taylor Grazing Act, but this does not include authority to take row crop agriculture leases. There are exceptions such that BLM previously thought they could accept the agricultural leases under the deed restrictions, but their legal staff have said that BLM cannot take the leases. BLM still wants to be involved and does not have all of the answers at this time.

Mark Davidson, president-elect of Mountain Bikers of Santa Cruz, complimented the detail and thoroughness of the plan and appreciated the shared-use trail access provided in the plan. He offered support and labor in providing trail building, maintenance, mapping and GIS monitoring, and patrolling the Property because he understands the budgetary constraints of the agencies. He offered a willing and enthusiastic labor pool as provided through www.trailworkers.com and indicated that this group has worked successfully with the Department in other parks.

Francisco Serna, Director for the Davenport Community Resource Center, indicated that he is dismayed that BLM is pulling out of this plan. He advocated on behalf of the agricultural workers and their families working on the Coast Dairies Property. He lives in a unique community in Santa Cruz. He developed a metaphor between the efforts of the steelhead in their survival and the struggles of the agricultural workers who have walked many miles and overcome many barriers to harvest the crops and maintain their livelihoods. He stated that the deeds of the agricultural workers are noble. He thanked Bern Smith for his accessibility to the community. He also thanked the planning team for their hard work in maintaining an agricultural presence on the Property as demonstrated in the plan.

Mr. Serna believes that the plan is deficient in addressing the needs of agricultural workers and their families. He advocated for opportunities for agricultural workers and their families. Regarding agricultural worker housing, TPL needs to maintain or replace existing agricultural worker housing to allow agricultural workers a convenient and affordable place to live, and to support the need for preservation of all low-income housing in the County. He called for a stronger statement in the plan to emphasize the importance of maintaining or replicating all existing agricultural worker housing, and prioritizing leasing of the housing to those farmers who commit themselves to maintaining the housing, as evidenced by past example. He wants to maintain the existing rental rate structure, and wants to codify this in the leases. Local farm workers with current affiliations with the Property should be given priority for opportunities to farm the Property consistent with the plan as farming cooperatives or as family farmers. The plan should allow area farmers to work the land and retain their housing. Agricultural workers should be assisted toward self-employment. If these policies are incorporated, Mr. Serna is committed to work with the agencies to achieve the policies.

Jonathan Whittwer expressed concerns about agricultural provisions in the plan and problems with BLM backing out of the agricultural leases and related housing leases. The language of the plan is framed in a negative way with respect to maintaining agriculture on the Property. The plan does not go far enough to support agriculture. The plan states that should agricultural production cease for five consecutive years, the Property managers may elect to revise the management zoning from agriculture to the underlying management zone. Mr. Whittwer considers five years to be too short a time to make this transition. The plan needs to specify in a positive way that every effort will be made to keep land in agricultural use. The plan states that the Property managers will not be responsible for agricultural infrastructure. This language should be deleted. Mr. Whittwer requested that these specific changes be made to the plan.

Mr. Whittwer is concerned about what will happen to the plan if BLM cannot take the agricultural leases, and this raises a lot of uncertainty regarding the Property. An existing MOU states that the Steering Committee will exercise final authority to approve the plan. He hopes the MOU will continue to be observed. The Steering Committee should have final authority to approve the plan, and public meetings should be held in Santa Cruz. Mr. Whittwer wants to ensure that the intentions of the community are included in the final plan. The Steering Committee and the Board of Supervisors could benefit from each other's wisdom and the wisdom of the community. He would like to see a process that will work for everyone and that is inclusive of the community. The deed restrictions should be circulated from BLM, TPL, and the Department so that the community can review and respond to them. The original MOU stated that BLM and the Department would be selected as stewards provided

that a mutually acceptable plan is developed and that the restrictions consistent with the plan could be agreed upon.

Bill Freberling, a representative of the county bicycle committee, raised a question regarding Dave Vincent's statement that the Department may focus on the development of a coastal trail. The plan does not mention a coastal trail. He is interested in the Department's view at this point in time about whether there will be a coastal trail and what it will look like.

Mr. Vincent stated that one of the Department's practices in managing trails close to agricultural lands is that they require a setback of 50 to 75 feet from agricultural uses. Once this buffer is established, then the Department can consider the beginnings of a trail. He doesn't envision any major improvements, but just that there be a buffer space between the agricultural operations and the edge of the bluff. This will be as much as the Department can commit to at this point. There are complications tied to the topography of the site. The Department will not be able to connect the trails, but rather will provide coastal trail segments on which the public could enjoy sunsets, etc.

Joeben Bivert was born and raised on the North Coast of Santa Cruz. He thanked TPL and the agencies for preserving this beautiful place for the community. The BLM website provided a news release that said that BLM is willing to take the Property but is not willing to accept the deed restrictions. BLM stated that this is incorrect; BLM is willing to accept the deed restrictions. Mr. Bivert asked if there is funding remaining to continue to work through these challenges, and if there are opportunities to raise more money to see this process to its fruition.

Ms. Elliott stated that five years ago TPL thought that it would hold the Property for one year, and that the leases would cover the operational costs of the Property. TPL has paid approximately $150,000 to protect the steelhead and coho and to reduce the cost of the farmers' leases. TPL has requested additional money from funders, but the funders have tightened budgets as well. TPL requested that if the CAG has ideas for funding to please pursue them and inform TPL.

Mr. Bivert asked about the status of the agricultural easement lands and whether there is an intention to put buildings on the agricultural easement lands.

Ms. Riddle stated that it may be useful to clarify the agricultural easement lands in the plan. The agricultural easement covers 160 acres of the Property and allows for agriculture and buildings associated with agriculture. It has 2 farm worker houses, 2 barns, and 10 acres that are being dry farmed. This area is not being more extensively farmed because of the lack of water. There is no intention to construct additional buildings under TPL's ownership.

Who can the public contact with specific questions about the Property boundaries and if there are disputes about roads or structures?

The CAG was encouraged to contact Catherine Elliott with TPL. The CAG was directed to the contact sheet, which has been distributed at the meeting. (Note: Please contact Catherine at 415.495.5660 ext. 382 or at Catherine.Elliott@tpl.org.)

TPL recognized Bern Smith's excellent work on the Property.

Heath Maddox would like to see agricultural use continue on the Coast Dairies Property. He was encouraged by language in the plan that addressed maintaining and enhancing sustainable agriculture. He is aware that there are traditional agricultural practices that are not sustainable. He would like additional attention to be given to sustainable practices that address issues associated with pesticide use, agricultural run-off, etc.

Bruce Kasonovic, resident of Davenport, expressed concerns about the conceptual trail system map. He stated that there is a spur trail shown on the map that begins in the community of Davenport. He would like that trail to be removed. He is familiar with the road that the trail is based upon and such a trail would have a major adverse impact on the road and parking in the community of Davenport.

Marilyn Hummel lives in Bonny Doon and is concerned about preserving the natural values of the Property. She said that preserving such values would be dependent on frequent monitoring of the Property as the trails are used. She knows that the agencies do not have the money to conduct such monitoring. She stated that the trails should be closed to mountain biking and horses until the agencies can commit to adequate resource protection monitoring. She has seen off-trail mountain bike riding destroy other state parks. When there are not sufficient funds to monitor trail use, the only effective management tool is closing the trail to damaging trail uses.

Gray Hayes asked that one question be answered regarding the coastal trail. He asked if the Department will do a carrying capacity analysis tied to the general plan or the coastal plan.

Mr. Vincent stated that the Department's intent is to not open the Property to any new uses, and therefore the Department is not triggering a new use or a requirement for an environmental assessment. He envisions allowing the public to use the beaches similar to current use, and establishing agricultural setbacks to allow the previously discussed coastal trail segments. Further analysis will not be done for quite some time. The Department has hired consultants to work on the larger carrying capacity analysis issue. In the referenced public resource code, carrying capacity is not specifically defined. This is a difficult issue that land managers have been addressing for many decades. The Department is making an effort to establish a clear definition of carrying capacity. When the Department goes forward with the General Plan for the Property, it will incorporate appropriate language addressing carrying capacity.

Ms. Scott asked what the next steps would be and how the CAG would be kept informed. TPL is not certain what it will do from this point forward with respect to future meetings. TPL cannot make any commitments at this point. TPL encouraged folks to sign the mailing list so that TPL can continue to keep in contact with the community.

Steve Addington (BLM) announced that BLM will have a public meeting on the initial access plan in Davenport during the third week in September. BLM will use TPL's mailing list to notify the public. They will host a workshop with opportunities to meet with BLM staff one-on-one to make BLM aware of the community's questions and concerns.

TPL is very interested in receiving comments from the public, and promised to keep the public informed as it works through these recent developments and the final decision on the Property disposition.

TPL thanked the public for coming to the meeting.

APPENDIX E: 2002-2003 STREAM GAUGING REPORT

This appendix, which includes a report produced by Dennis Jackson, Hydrologist, and ESA, presents the results of a stream gauging effort on four of the Coast Dairies streams: Molino Creek, Ferrari Creek, San Vicente Creek, and Liddell Creek. The report provides complete records of stream flow for these creeks between late summer, 2002, and early summer 2003. This information may be useful in determining the amount of water available for agricultural use without doing harm to salmonids.

Coast Dairies Property
2002-2003 Stream Gauging Report

January, 2004

Prepared by:
Dennis Jackson
708 – 14th Avenue
Santa Cruz, CA 95062
(831) 464-7580

For:
Environmental Science Associates
225 Bush Street, Suite 1700
San Francisco, CA 94104

COAST DAIRIES PROPERTY

2002-2003 STREAM GAUGING REPORT

PROJECT PURPOSE

Under direction from the National Oceanic and Atmospheric Administration – Fisheries (NOAA-Fisheries), Coast Dairies & Land Company (CDLC) agreed to gage four of the Coast Dairies streams from late summer, 2002, until early summer, 2003. These streams are those from which Coast Dairies tenants have diverted water for agricultural and domestic use in recent years, and which support or could support runs of anadromous salmonids (steelhead and/or coho salmon): Molino Creek, Ferrari Creek, San Vicente Creek, and Liddell Creek. Yellow Bank Creek, which has also been subject to diversions in the recent past, was excluded from the gauging effort because of the lack of a suitable gage location downstream of the former point of diversion. The sixth stream on the Property, Laguna Creek, was excluded from the directive because Coast Dairies tenants only divert a small quantity of water from this stream, under relatively clearly held rights.

The purpose of the gauging effort was twofold: to provide information for determining whether streamflow downstream of the diversion points is sufficient to support salmonids; and to provide data that may be used as a basis for determining the amount of water that would be available for diversion if permits to appropriate water were obtained. It is assumed that any future appropriative permits granted by the State Water Resources Control Board would follow the recommendations for water diversions presented in *Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Stream,* jointly issued by the California Department of Fish and Game and NOAA-Fisheries (CDFG and NOAA, 2002). The Guidelines recommend that for diversions on streams with steelhead and/or salmon:

- the diversion period is limited to December 15 through March 31;
- the minimum bypass flow is set equal to the long-term unimpaired February median discharge;
- the cumulative maximum rate of diversion is 15% of the winter 20% exceedence discharge.

The results of the streamflow monitoring project may contribute to an understanding of the long-term February median discharge and winter 20% exceedence discharge for each gauged stream. Previously, we completed a set of calculations based on regional streamflow records that estimates water availability in the Coast Dairies streams (Jackson, 2001). These calculations could be refined using the results of the current effort. However, additional monitoring in future

years would be required to obtain a record of sufficient length to provide a reliable estimate of Coast Dairies streams' long-term discharge patterns.

STREAM GAUGE INSTALLATION

The Coast Dairies Property covers about 7,000 acres, and surrounds the community of Davenport. The Property is roughly bounded by Laguna Creek on the southeast and Molino Creek on the northwest. The Property is about seven miles long and about one and one-half mile wide. The terrain is rugged and marked by a series of coastal terraces.

Several streams cross the Property. In general, they flow from the northeast to the southwest. Stream gauging stations were installed in August 2002 on Molino Creek, Ferrari Creek, San Vicente Creek and Liddell Creek to monitor stream flow for a period of about one-year. The location of each stream gauge is shown on Maps 1 and 2, and described below:

- The Molino Creek stream gauge is located about 50 feet downstream of the point of diversion between Swanton Road and Highway 1.

- The Ferrari Creek stream gauge is located directly west side of Highway 1.

- The San Vicente stream gauge is located at the old Coast Road crossing, approximately 1,100 feet upstream of the present Highway 1 crossing. It is about 100 feet downstream of the point of diversion into San Vicente Pond.

- The Liddell Creek stream gauge is about 50 feet downstream of the point of diversion, several hundred feet upstream of Highway 1.

The water level recorder for each station is housed in a vertical perforated 2-inch black ABS pipe. The 2-inch pipe is centered in a perforated 4-inch black ABS pipe. The nested pipes provide a stilling well, the purpose of which is to reduce wave action in high flow events, which would affect the accuracy of the readings. A horizontal 2-inch perforated black ABS pipe is used to connect the stilling well to the water in the creek, when needed. Pictures of the stilling wells and staff gauges are shown in Figures 3-6 of Appendix B.

STREAM GAUGING PROCEDURE

Each stream gauge consists of a Global Water® model WL-15 pressure transducer type water level recorder, a staff gauge, and a location to measure streamflow. The water level recorder reads the depth of water above its sensor to the nearest 0.01 foot, and can be set to record the water level at a user-specified time interval. All four water level recorders installed were set to record a reading every 15 minutes, which gives 96 readings per day. The hydrologist reads the staff gauge each time the station is visited. The relationship between the water level recorded by the WL-15 and the value read by the hydrologist is noted. Any change in the relationship indicates a potential problem with the station.

A total of 58 discharge measurements were made during this study. To test the accuracy and reproducibility of discharge measurements, three pairs of duplicate measurements were made at Ferrari Creek and two pairs were made at Molino Creek. Duplicate measurements were made when the flow was very low and the relative measurement error was expected to be highest.

A total of 12 to 14 independent discharge measurements were made at each of the four gauging stations. Each discharge measurement was made at the best available site for a flow measurement, within a short distance of the staff gauge. The staff gauge was read before and after each discharge measurement. A statistical relationship, called a "rating curve" or "rating table" was developed between the staff gauge readings and the discharge measurements for each gauging station. The rating curve allows the water levels recorded by the WL-15 recorder to be converted into estimates of streamflow. The daily average streamflow can be computed by averaging the 96 readings recorded for each day.

All the discharge measurements discussed in this report were made with either a pygmy meter or a Price® Model AA meter using the 0.6 method. The 0.6 method refers to making the velocity measurements at 0.6 of the water depth. The United Stated Geological Survey (USGS) recommends the use of the pygmy meter when the stream depth is between 0.3 feet and 1.5 feet and the water velocity is between 0.2 feet per second and 2.5 feet per second. The USGS points out that when the water depth is less than 0.75 feet, the pygmy meter will be less than 0.3 feet from the streambed and so it will probably under-register the velocity (USGS Data Policy Statement 2.6.85, February 12, 1985). The average depth was less than 0.75 feet for 55 of the 58 discharge measurements. Therefore, most of the discharge measurements made on the Coast Dairies Property, for this study, probably underestimate the true discharge by some unknown amount.

A summary of all discharge measurements taken at each station is given in Appendix A.

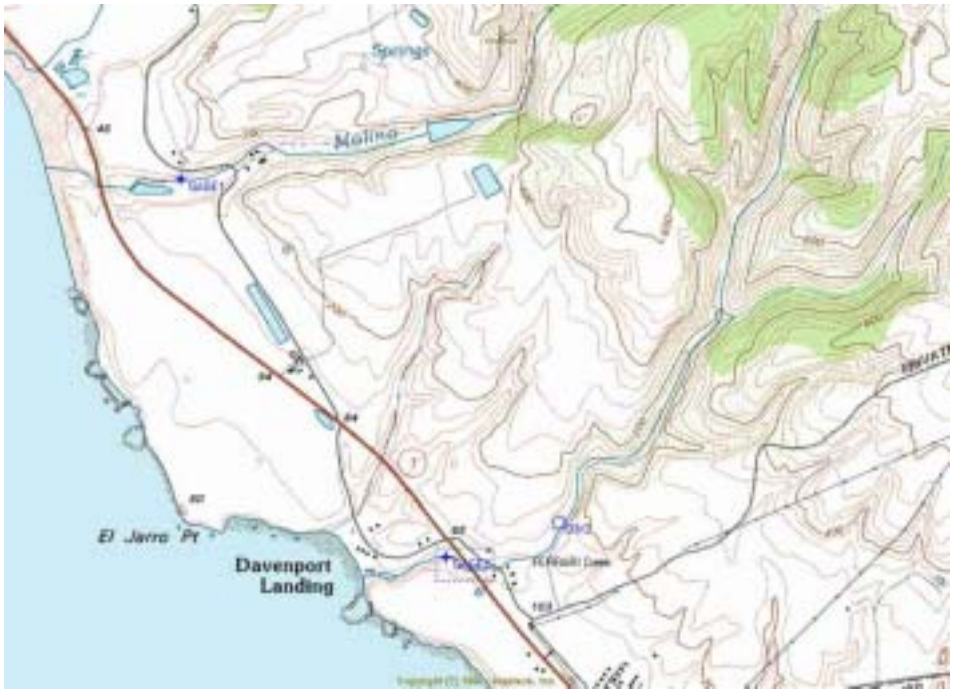
RATING CURVES

The logarithmic method was used to develop all of the rating curves. The stage-discharge relationship is assumed to be given by an equation of the form:

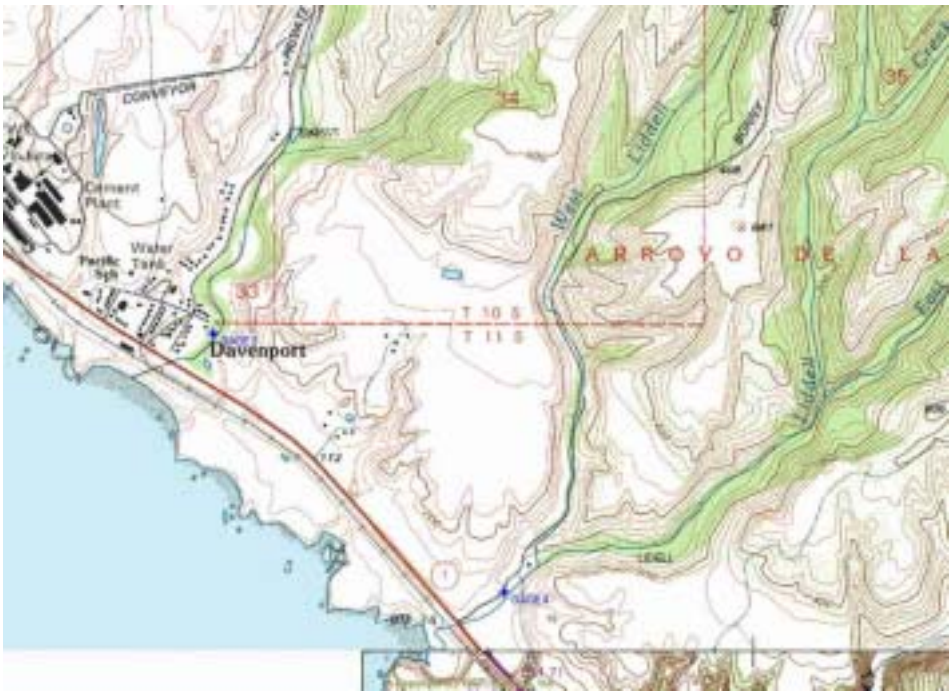
$$Q = C(h + a)^n \qquad \text{Eq. 1}$$

Where *Q* is the discharge, *h* is the stage, *C* and *n* are constants determined by linear regression and *a* is the datum correction, that is, the stage associated with zero discharge.

In Equation 1, *h* is the stage as read on the staff plate. The datalogger, at each station, collected the water-surface elevation above the sensor every 15-minutes. The water-surface elevation above the sensor is not the stage as read on the staff required for Equation 1. However, a correction factor was determined by reading the stage and the datalogger values each time the station was visited.



Map 1. Gage 1 is the Molino Creek stream gauge. It is located about 50 feet downstream of the diversion on Molino Creek. Gage 2 is the Ferrari Creek stream gauge. It is located on the west side of Highway 1 and about 1,800 feet downstream of the Coast Dairies diversion.



Map 2. Gage-3 is the San Vicente stream gauge. It is located at the old Coast Road crossing, approximately 1,100 feet upstream of the present Highway 1 crossing. The San Vicente stream gauge is about 100 feet downstream of the Coast Dairies diversion. Gage-4 is the Liddell Creek stream gauge. The Liddell Creek gauge is about 50 feet downstream of the diversion.

The datum correction *a* in Equation 1 was determined numerically. The datum correction for each station was a negative number since the bottom of the staff plate was set below the streambed.

CHANNEL CHANGES

The geology of Molino, Ferrari and Liddell Creeks is dominated by mudstone. The rocks that are derived from the mudstone are of low density and so are easily transported by the streams. Deposition in the channel in late January during a high flow event altered the streambeds in each stream to the point that a new rating curve was required for each station.

MOLINO CREEK

A total of 15 discharge measurements were made at the Molino Creek gauge on 13 different days. The summary of the discharge measurements is in Appendix A. Back-to-back discharge measurements were made on September 17 and on October 13. The duplicate measurements made on September 17 differ by 2.2%. The duplicate measurements made on October 13 differ by 4.3%. Therefore, even though the depth is less than 0.75 feet, the paired measurements show that the use of the pygmy meter with the 0.6 method provides reproducible results.

Figure 1 shows the daily average stage for all four Coast Dairies stream gauges and the rainfall record from UC Santa Cruz. Figure 2 shows the daily range in stage for the four Coast Dairies stream gauging stations. Figure 3 shows the graph of the stage record collected every 15-minutes and the computed daily average stage. Figure 4 shows the discharge estimated from the 15-minute stage record. Figure 4 also shows the actual discharge measurements.

The estimated daily average discharge is given in tabular form in Appendix A.

On January 23, 2003, sediment deposition was noted around the staff gauge. The staff gauge was installed in a deep hole with the zero mark at the bottom of the hole. The sediment noted on January 23 buried the bottom of the staff gauge to a level of 1.1 feet.

The sediment deposition altered the streambed to the point that a new rating curve was required to obtain reliable estimates of streamflow. Table 1 shows the parameters for the two rating curves developed for Molino Creek. Note the change in the datum correction (stage for zero discharge) shows that about 0.25 feet of material was deposited on the gauging pool control. In addition, the water surface of the pool downstream rose enough to drown the intervening riffle.

The Molino staff gauge and water surface level recorder are located downstream of the diversion ditch. However, the culvert leading to the diversion ditch is blocked and the bank between the stream and diversion ditch is higher than any of the flood levels experienced during the 2003 water-year. Therefore, the diversion ditch should have had no impact on the gauging record.

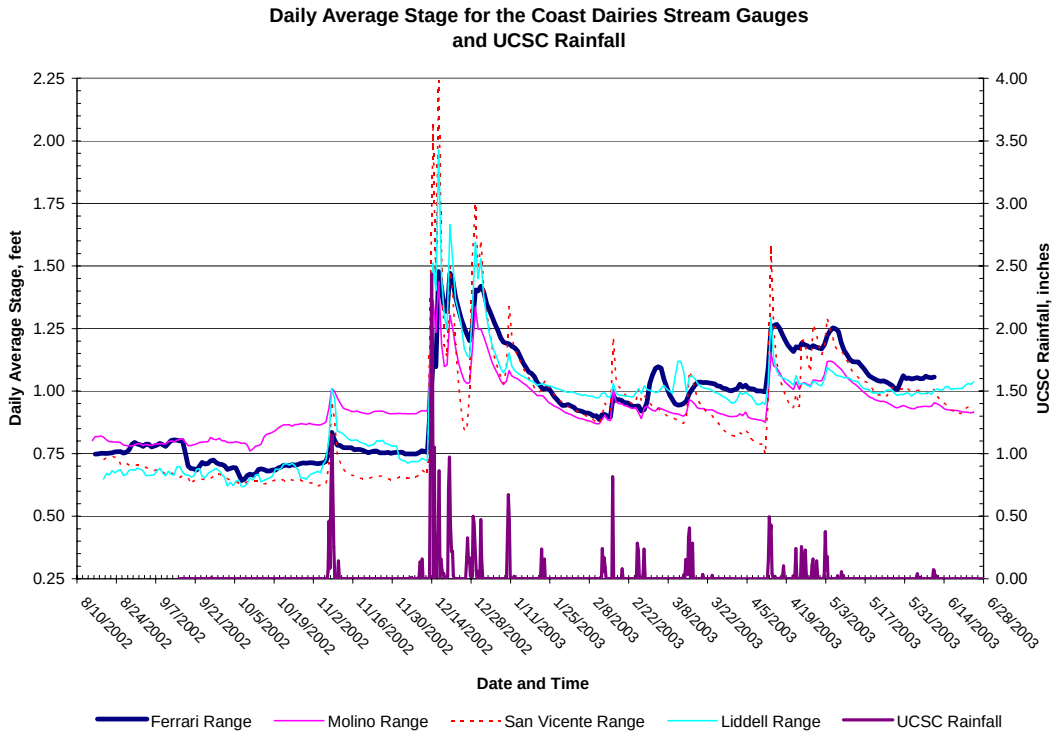


Figure 1. The daily average stage for the four stream gauges are shown in the graph along with the rainfall recorded at UCSC.

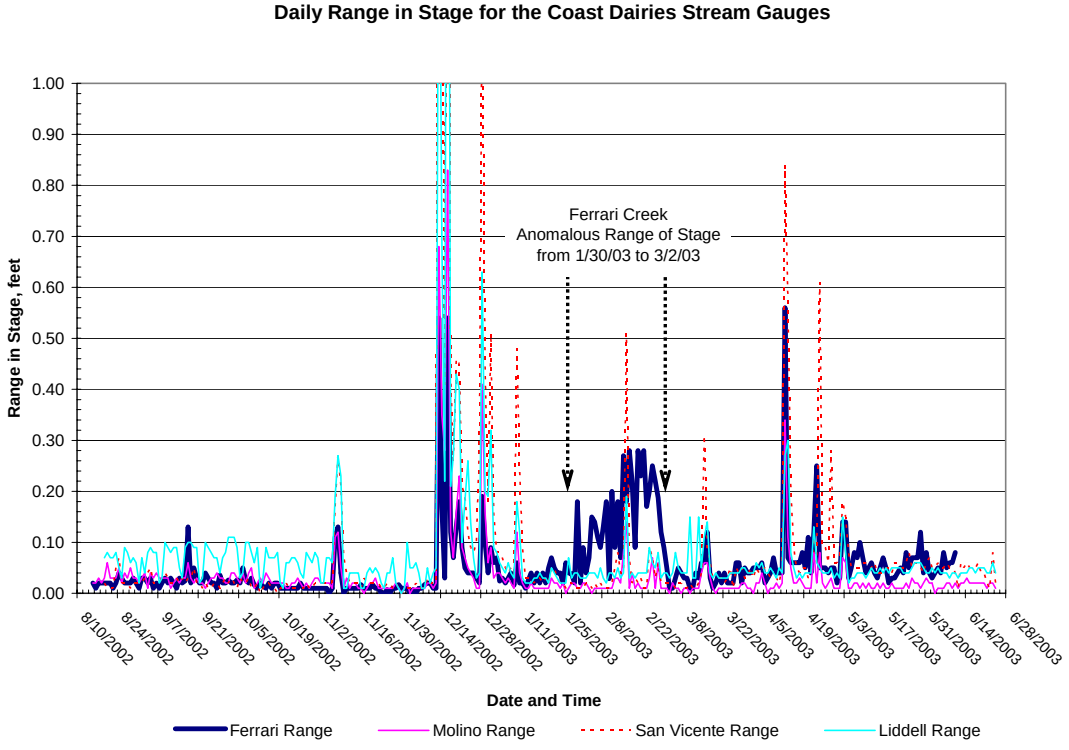


Figure 2. The daily range in stage is shown for each stream gauge. Note that the Ferrari Creek gauge appears to have had anomalous fluctuations in stage between 1/30/03 and 3/2/03.

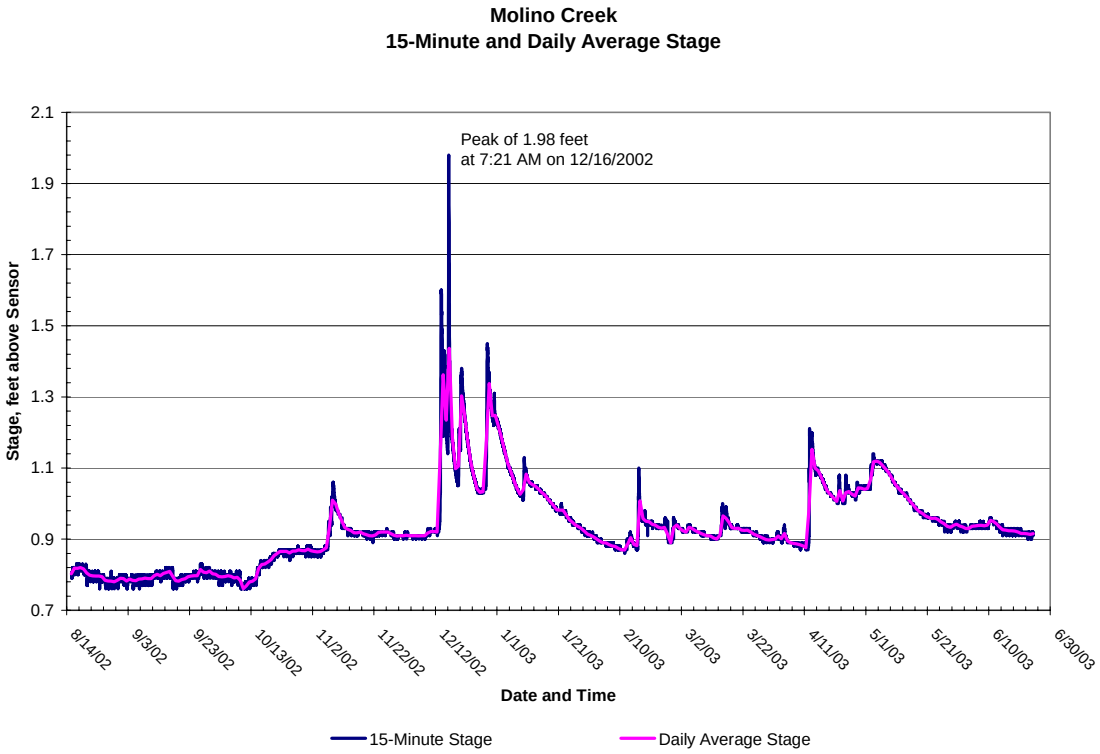


Figure 3. The graph of the 15-minute stage and daily average stage for Molino Creek are shown.

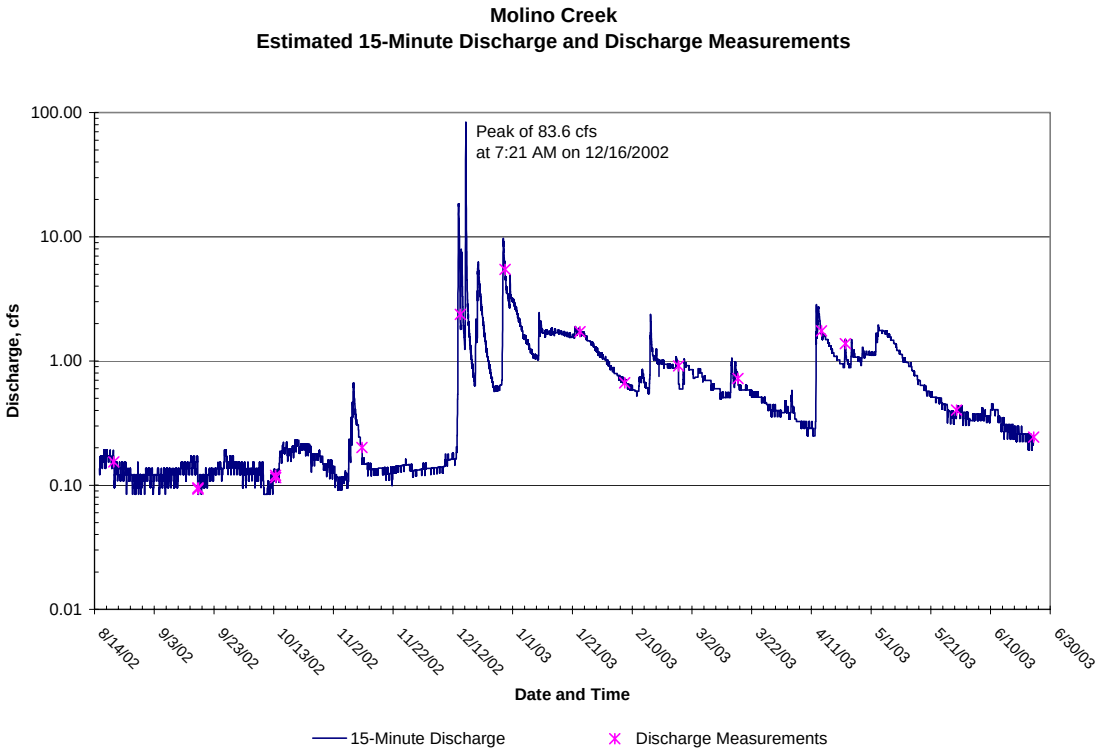


Figure 4. The graph shows the discharge measurements and the estimated 15-minute discharge.

The parameters for the two rating curves developed for Molino Creek are shown in Table 1. The change in the datum correction (stage for zero Q) indicates that about 0.25 feet of material was deposited on the gauging pool control.

TABLE 1
MOLINO CREEK RATING CURVE PARAMETERS

	2002 Measurements	2003 Measurements
Stage for Zero Q	-0.91	-1.16
Exponent	5.317	1.931
Coefficient	8.534	12.023
R-Square	0.9999	0.9991
Std Error	0.0091	0.0096
Count	8	7

FERRARI CREEK

Discharge measurements for Ferrari Creek were made just downstream of the former dam site, west of Highway 1. A total of 16 discharge measurements have been made at Ferrari Creek on fourteen different days. Duplicate discharge measurements were made on August 20 and September 16 when the flow was very low. Sandbags were used to adjust the width and depth of the measuring section during low flow measurements. The duplicate measurements made on August 20 differ by about 3.7%. The duplicate measurements made on September 16 differ by about 6.6%, indicating that the low flow measurements are reproducible.

The diversion from Ferrari Creek is through a small pipe located about 1,000 feet upstream of the gauging station. The diversion pipe has a limited capacity, such that diversions that occur during high flow events should have no impact on the flow record. Diversion events during low flows do have the potential to affect the discharge record.

The control for Ferrari Creek gauging pool is difficult to maintain. The staff gauge and water-level recorder sit in a small pool on the ocean side of Highway 1. From the upstream end of the pool, to a point approximately 40 feet downstream, there is no canopy over the stream. As a result, a thick mat of aquatic plants grows in the open channel. As these plants grow, they backup water in the pool, raising the level of the water in the pool.

The channel immediately downstream of the gauging pool was a dam site. The dam was removed prior to the installation of the gauge. Willows have been planted along both banks of the stream at the former road crossing. The bottom of the streambed is very flat and wide.

Several other locations for stream gauges on Ferrari Creek were investigated. The creek above the diversion did not have a good place to make streamflow measurements. The creek between

the diversion and the cattle corral lacked a canopy and was full of aquatic plants. The creek between the cattle corral and the frontage road is relatively steep and lacks a good gauging pool.

Figure 5 shows the 15-minute and daily average stage for Ferrari Creek. Figure 6 shows the 15-minute discharge for Ferrari Creek.

Significant deposition of fine sediment in the upper portion of the gauging pool was noted on January 23, 2003. By February 25, a wall of sediment about 0.6 feet high had extended about 1.5 feet past the staff gauge. Even though the stage for zero discharge changed only a little, subsequent discharge measurements showed that channel hydraulics changed enough to warrant a new rating curve. Aquatic plants were cleared from the channel several times during the gauging period. The plants continued to grow even in winter. To facilitate low-flow readings, we installed a sandbag weir with a low-flow notch on April 23, 2003. The weir, which was only two sandbags high, was located at the downstream end of the gauging pool.

The parameters for the two rating curves developed for Ferrari Creek are shown in Table 2. The change in the datum correction (stage for zero Q) indicates that very little material was deposited on the gauging pool control.

TABLE 2
FERRARI CREEK RATING CURVE PARAMETERS

	2002 Measurements	2003 Measurements	Weir Measurements
Stage for Zero Q	-0.079	-0.094	-0.7315
Exponent	3.8002	1.2512	0.6057
Coefficient	2.3287	0.9755	1.3593
RSQ	0.9998	0.9999	1.0000
Std Error	0.0086	0.0002	N/A
Count	9	5	3

On July 1, 2003, the water-level record was found to be faulty. Negative water level values began appearing in mid-June. Inspection of the datalogger and sensor revealed that the duct tape holding the sensor in place had slipped and the had become buried in the mud. On June 11, the water-level record showed an increase of about 0.2 feet over a seven day period. This rise was considered anomalous since none of the other stations showed a similar event.

Note that in Figure 2 the daily range in stage for the Ferrari Creek was relatively high between January 30 and March 2, 2003 compared to the other three stations. There was a rainfall event of 0.81 inches on February 16. Four other rainfall events during the period January 30 through March 2, each of 0.25 inches or less, would not be expected to generate much of a response in streamflow.

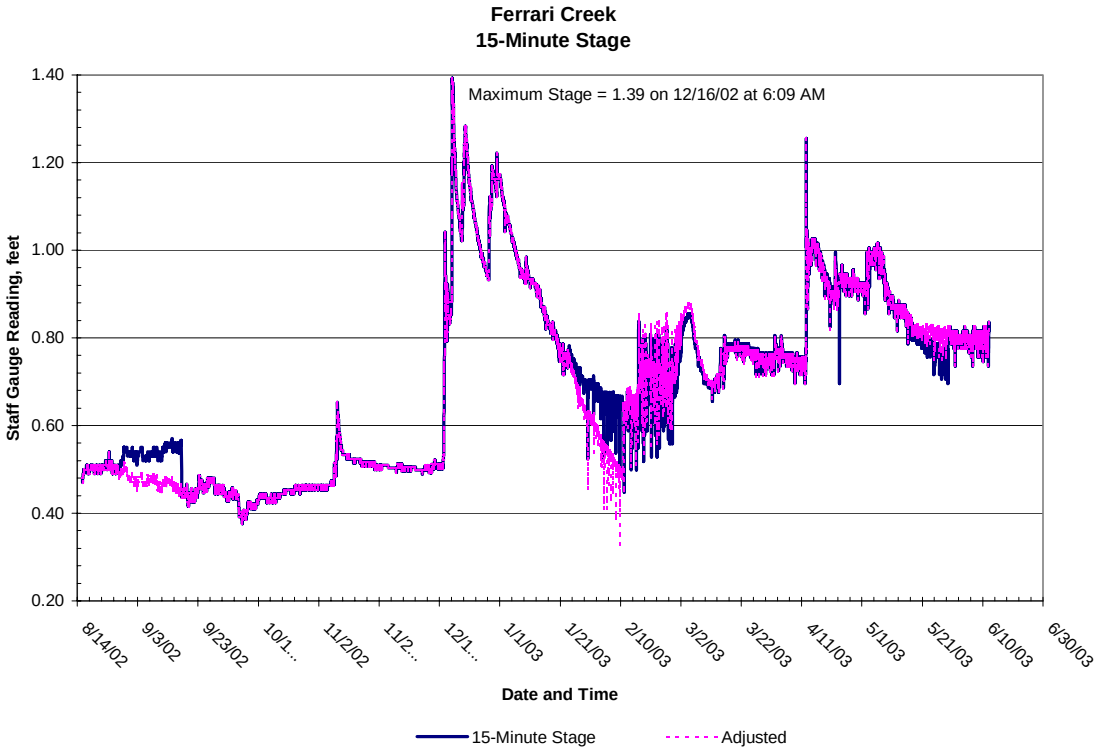


Figure 5. The Ferrari Creek record of stage for the 2003 water-year is shown in the above graph.

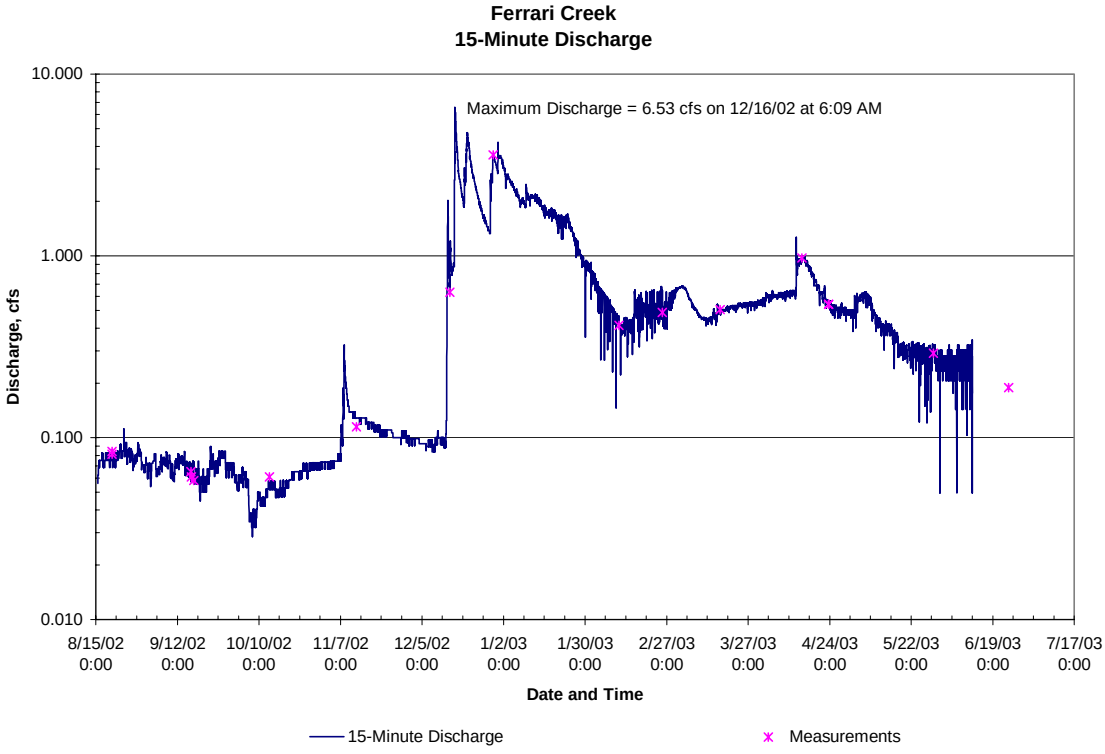


Figure 6. The record of discharge for the 2003 water-year is shown in the above graph. The maximum discharge of 6.53 cfs occurred on 12/16/02.

This period of anomalous range in stage indicates that either Ferrari Creek was behaving differently from the other three gauges or that there was an equipment malfunction. Since the range in stage of Ferrari Creek appears to be of approximately the same magnitude as the other three stations after March 2, it seems unlikely that the period of anomalous range in stage was caused by faulty equipment. The most likely explanation for the period of anomalous range in stage is that the diversion was being used more frequently in February 2003. Another related explanation is that cattle were using the creek adjacent to the corral, upstream of the gauging station.

It is also possible that the extensive growth of aquatic plants at the stream gauge and above the cattle corral were affecting the streamflow. Plants in the channel increase the resistance to flow and so slow down the water velocity; the extensive growth of aquatic plants may have acted like a dam or valve, resulting in an extension of the duration of high flow events, and a reduction in the magnitude of flood peaks. This could explain why the Ferrari Creek stage record in Figure 1 seems to respond less, and more slowly, to rainfall events than the other stations.

SAN VICENTE CREEK

The staff gauge and water-level recorder for San Vicente Creek were attached to an old bridge abutment. The intake to the water-level recorder extends out into the upper end of a pool where the two low-flow channels rejoin. In May 2003, the water level in the pool had dropped enough that the location of the water-level recorder intake was transformed from the upper portion of a pool to the bottom of a riffle.

The diversion ditch is upstream of the staff gauge and water-level recorder. Water flows down the diversion ditch and through a pond before returning to San Vicente Creek. The opening of the diversion ditch is covered by a bundle of logs, which act as a trash rack, and also help divert the main force of high flows down San Vicente Creek instead of down the diversion ditch.

Water was kept flowing down the diversion ditch to the pond all year to help ensure the survival of juvenile salmonids that were found in the pond. The flow in the diversion ditch was never measured. However, the effect of the diversion ditch on the discharge record is probably more pronounced during periods of low flow than during high flows. It is possible that in future high flows the log trash rack could fail and a greater flow might go down the diversion ditch.

A total of 12 discharge measurements were made near the San Vicente Creek gauge. The measurements made in May and June were not used to develop the rating curve because the pool containing the staff gauge and water-level recorder became isolated from the main pool. A shift of about -0.12 is adequate to correct for the problem.

Figure 7 shows the 15-minute and daily average stage for San Vicente Creek. Figure 8 shows the 15-minute discharge for San Vicente Creek.

Table 5 shows the parameters for the two rating curves developed for San Vicente Creek. Note the change in the datum correction (stage for zero discharge) shows that about 0.4 feet of material

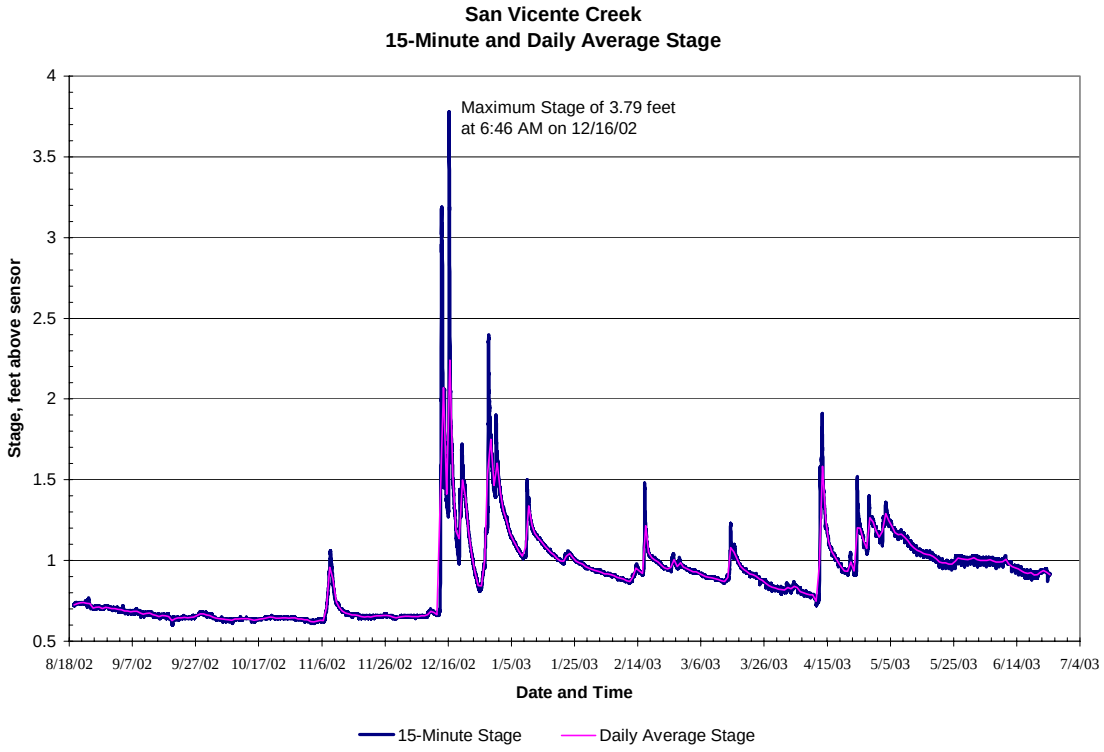


Figure 7. The San Vicente Creek record of stage for the 2003 water-year is shown in the above graph.

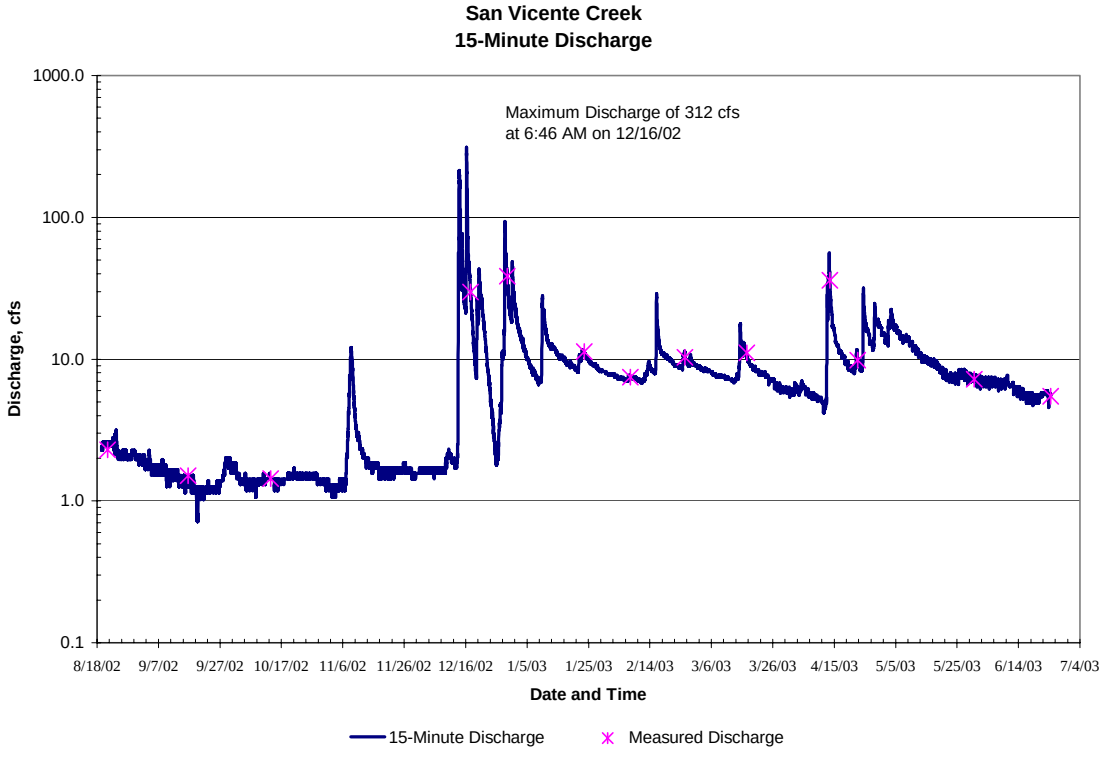


Figure 8. The San Vicente Creek record of discharge for the 2003 water-year is shown in the above graph.

was eroded from the gauging pool control. This is consistent with the observation that the water surface of the pool downstream declined enough to change the location of the water-level recorder intake from a pool to a riffle.

The parameters for the two rating curves developed for San Vicente Creek are shown in the following table (Table 3). The change in the datum correction (stage for zero Q) indicates that about 0.4 feet of material was deposited on the gauging pool control.

TABLE 3

	2002 Measurements	2003 Measurements
Stage for Zero Q	-0.4387	-0.0257
Exponent	1.9475	2.5329
Coefficient	29.5602	11.8011
RSQ	0.9999	0.9992
Std Error	0.0045	0.0089
Count	4	5

SAN VICENTE TEMPERATURE RECORD

In August 2002, a HoboTemp® recording thermometer (manufactured by Onset Corporation) was placed in the outlet channel of San Vicente pond, and another was placed in the air about four feet above the outlet channel's water surface. A third HoboTemp® was placed in the San Vicente Creek gauging pool. These devices were placed in an attempt to document any significant pumping events from the pond. The temperature record from the HoboTemps® is shown in Figures 9 and 10.

Figure 10 shows that there are two periods of anomalously low water temperatures on August 24 and 25. The initial low outlet water temperature of 51.1 degrees F occurred at about 10 PM on August 24. The outlet water temperature then rose to 59.4 degrees F at about 2:30 am and then dropped to 48.3 degrees F at about 8 am on August 25. The air temperature followed a similar pattern indicating that the HoboTemp® in the outlet channel was probably exposed to air. These readings could be explained by pumping events that caused the pond's water level to drop below the elevation of the pond's outlet, resulting in a temporary dewatering of the outlet channel.

Figure 10 shows the approximate expected minimum pond outlet temperature. The outlet HoboTemp® probably became exposed about the time that its temperature dipped below the line of approximate minimum pond outlet water temperature. Similarly, the outlet HoboTemp® probably became submerged about the time that its temperature rose above the line of approximate minimum pond outlet water temperature. In summary, the pond outlet HoboTemp® was exposed from about 8 PM on August 24 to about midnight. It was again exposed from about

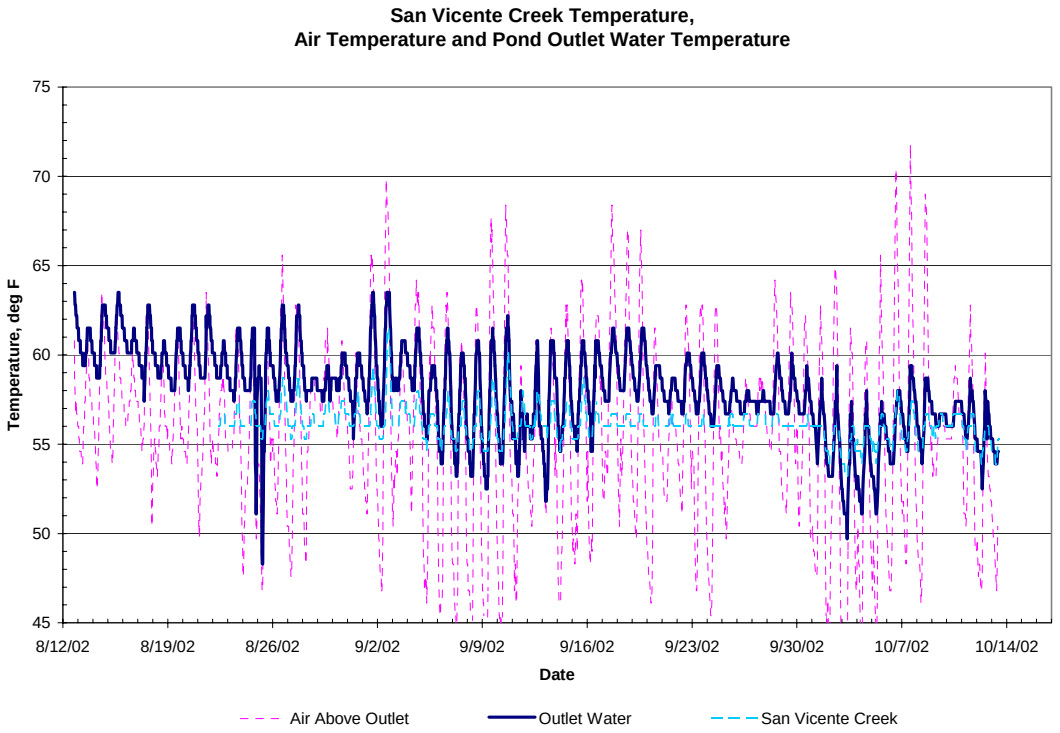


Figure 9. The above graph shows the water temperature of the outlet from San Vicente pond, the air temperature about 4 feet above the water surface, and in San Vicente Creek. The outlet has a thick canopy so the air temperature sensor is well shaded. There are anomalous dips in the outlet water temperature on August 24 and 25.

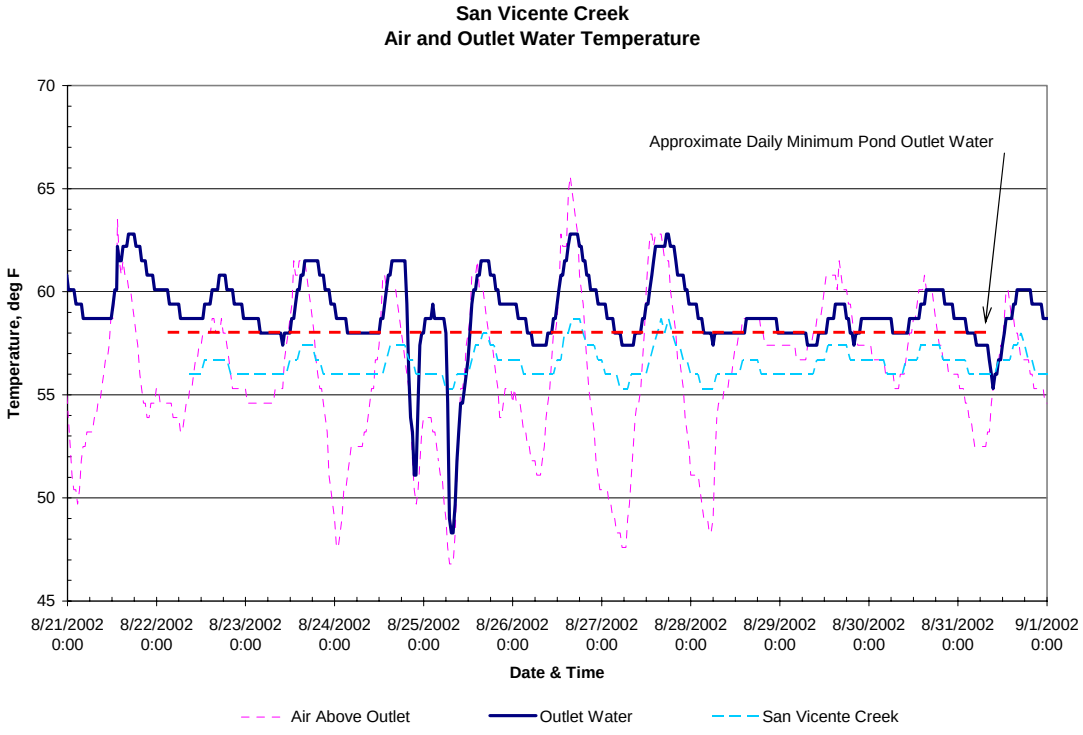


Figure 10. A detailed version of Figure 9 showing the variation in temperature over six hour periods.

6:00 AM until about noon on August 25. The outlet appears to have stopped flowing for a total of about ten hours on August 24 and 25. The actual pumping events were somewhat longer.

LIDDELL CREEK

The staff gauge and water-level recorder were installed downstream of the diversion ditch. The gauging pool was a small pool at the foot of a riffle. On January 27, 2003 the gauging pool was found to be filled in. A portion of the filled-in pool was dug out to provide a suitable gauging pool.

Discharge measurements were made upstream of the diversion ditch near the end of a long flat reach. Sandbags were used to narrow the measuring section for low flow measurements. A total of fourteen discharge measurements were made at the Liddell Creek gauge.

The diversion ditch was sandbagged closed. However, during floods the sandbags were overtopped and water flowed down the diversion ditch. On the afternoon of December 17, 2002, evidence was observed that suggested that the sandbags were overtopped when the water surface was about 1.5 feet higher, which roughly corresponds to about 3.3 feet on the staff gauge. The record from the water-level recorder indicates that the water level in the creek was high enough to overtop the sandbags at the diversion ditch from 5:53 AM until 8:08 AM on December 16, 2002. The estimated discharge during this time ranged from about 51 cfs to 105 cfs. Since the diversion ditch captured a portion of the flood flow, the actual peak discharge was higher than the 105 cfs estimated from the gauge height record.

The City of Santa Cruz and RMC Pacific both divert water from springs that feed Liddell Creek. The stage record for Liddell Creek shows a 7-day cycle from the start of the record on August 20 until December 8, 2002. A graph of the daily range (Figure 2) in stage (the range is the difference between the maximum and the minimum) makes the 7-day cycle more distinct. Minimums in the range of daily stage occur on every Sunday up to December 8, 2002. The 7-day cycle is not visible in the stage data after December 8, 2002. For the August 20 through December 8 period there was also a daily cycle in stage with the maximum stage between early morning and about 2 PM. The minimum stage tended to occur between 4 PM and midnight.

The parameters for the two rating curves developed for Liddell Creek are shown in the following Table 4. The change in the datum correction (stage for zero Q) indicates that about 0.4 feet of material was deposited on the gauging pool control.

CONCLUSIONS AND RECOMMENDATIONS

Two of the four gauges, those on San Vicente Creek and Molino Creek, produced reasonably consistent results without major anomalies. These records should be considered reliable. The other two gauges, however, on Ferrari Creek and Liddell Creek, both experienced problems associated with the gauge location and probably also with manipulation of streamflow by upstream diverters. Any future gauging of these streams should be conducted in different locations than were used for this study. Furthermore, it would be useful to obtain information on the Liddell Springs diversions by the City of Santa Cruz and RMC Pacific Materials, and on any

TABLE 4

	2002 Measurements	2003 Measurements
Stage for Zero Q	-0.71	-1.11
Exponent	2.1526	1.7781
Coefficient	6.4598	14.9133
RSQ	0.9997	0.9995
Std Error	0.0102	0.0084
Count	7	7

other upstream diversions, in order to ascertain whether the anomalous readings may correlate with upstream diversion events.

While no gauging location on Yellow Bank Creek could be located that met with the directive from NOAA-Fisheries (downstream of the point of diversion), it would be useful to gauge this creek upstream from the former reservoir site, where suitable gauging sites exist. This would provide useful data for a future water rights application.

In order to determine with a reasonably high level of confidence the two parameters necessary for calculating maximum diversion and minimum bypass – the median February discharge and the 20 percent winter exceedence discharge, it may be necessary to conduct several years of stream gauging on each stream. While it is possible to perform statistical extrapolations of short-term gauging records by comparing them with nearby streams with long-term records, such extrapolations are subject to considerable uncertainty. Each additional year of data will add to our ability to determine accurately the long-term flow regime in these creeks.

Part of the purpose of this project was to determine the effects of diversions on flows downstream of the points of diversion. During the study, however, the Molino Creek diversion and the Liddell Creek diversion at Fambrini Farm were not used. While water flowed through the San Vicente diversion ditches into and out of San Vicente pond, there were apparently only two pumping events from San Vicente pond, both of which occurred in late August, 2002, and which were indicated in the temperature gauging record. However, neither of these events had an effect on the flow record, since the pond water level does not affect the stream water level just below the point of diversion. Both the Ferrari Creek gauge and the Liddell Creek gauge seem to have recorded diversions occurring well upstream of the gauges. These would probably include diversions from the City of Santa Cruz and RMC Pacific Materials.

In the future, if stream gauging is to be used to obtain a record of stream diversions and pumping events, the location and design of the gauge should be carefully considered. It may, for example, be necessary to install two gauges where a diversion ditch is used only to fill a pond, as used to occur at the Molino Creek diversion. One gauge would be placed in the stream downstream of the point of diversion, the other in the diversion ditch itself. This would provide a more reliable record of diversions.

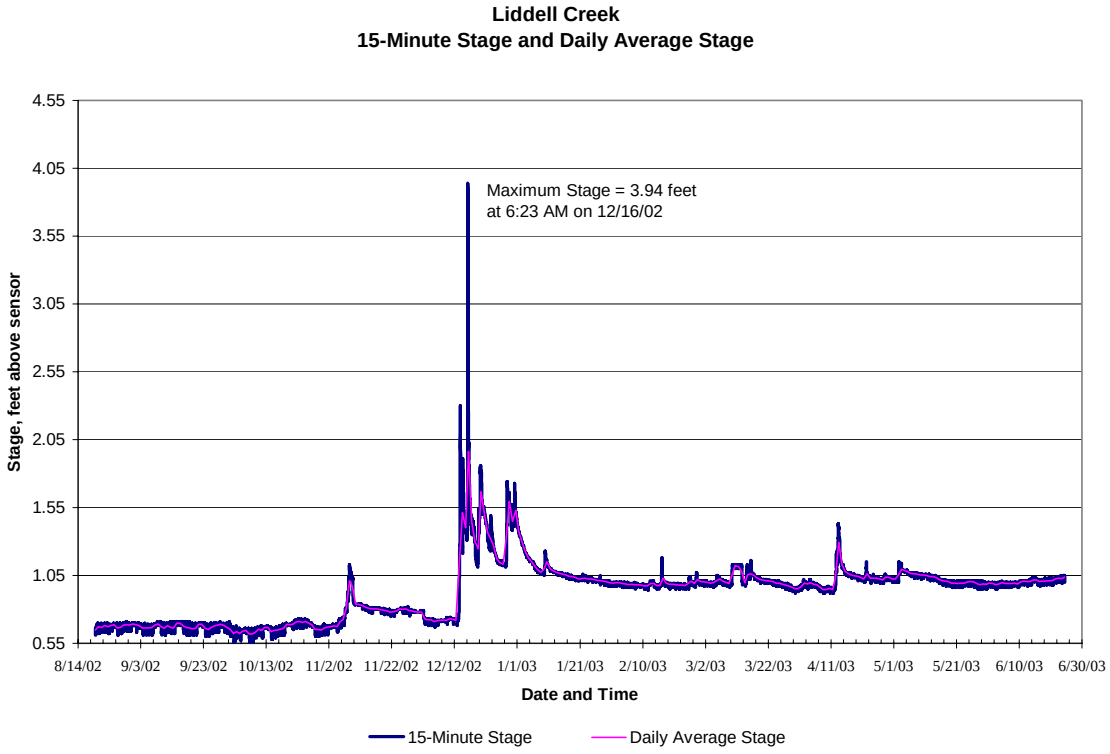


Figure 11. The Liddell Creek record of stage for the 2003 water-year is shown in the above graph.

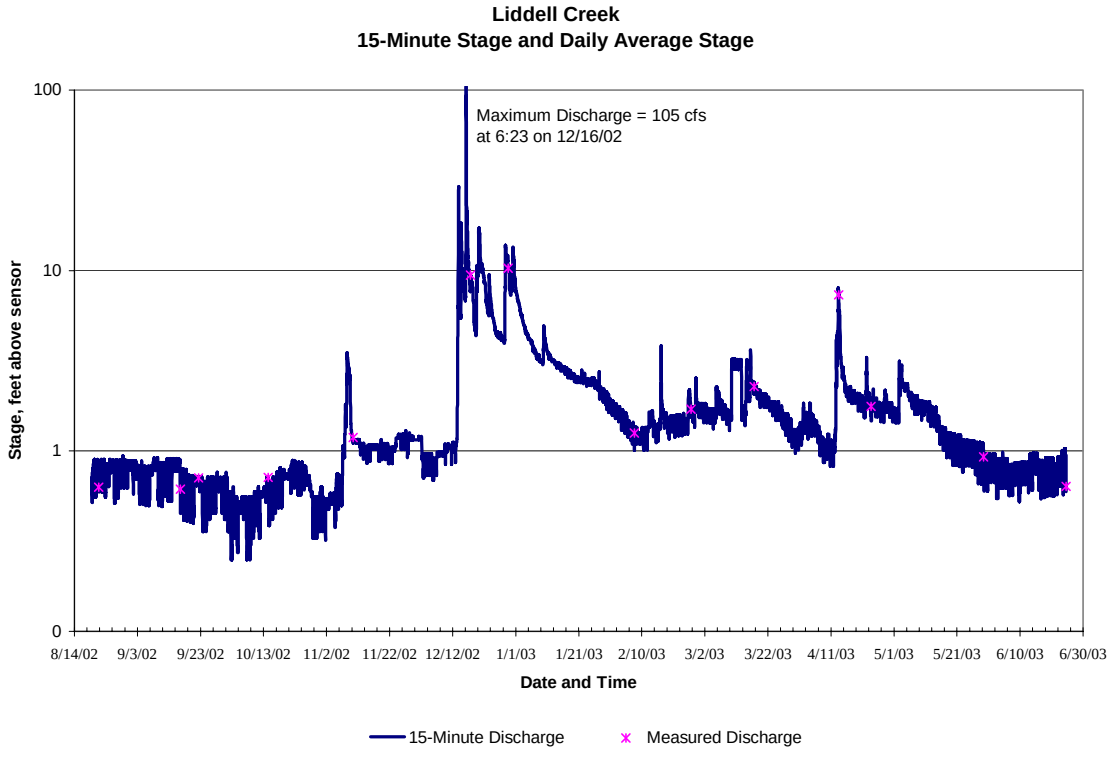


Figure 12. The record of discharge for the 2003 water-year is shown in the above graph. The maximum discharge of 6.53 cfs occurred on 12/16/02.

REFERENCES

Herschy, Reginald W., *Streamflow Measurement*, second edition, 1995, E & FN SPON. Library of Congress Catalog Number: 94-79764.

Jackson, Dennis, *Determination of the Minimum Bypass flow for the Coast Dairies Property*. Prepared for Environmental Science Associates and the Coast Dairies & Land Co., September, 2001.

California Department of Fish and Game and National Marine Fisheries Service, *Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams*, June 17, 2002.

APPENDIX A

SUMMARY OF DISCHARGE MEASUREMENTS

MOLINO CREEK DISCHARGE MEASUREMENT SUMMARY

Date & Time	Staff Reading	Width feet	Average Depth feet	Area sq-ft	Velocity ft/sec	Discharge cfs
8/20/2002 11:05	1.41	2.70	0.25	0.68	0.23	0.154
9/17/2002 14:45	1.34	2.70	0.18	0.49	0.20	0.095
9/17/2002 15:16	1.34	2.05	0.22	0.45	0.21	0.093
10/13/2002 15:03	1.36	1.80	0.25	0.44	0.27	0.120
10/13/2002 15:40	1.36	1.95	0.25	0.48	0.24	0.115
11/11/2002 13:28	1.45	2.10	0.30	0.64	0.32	0.201
12/14/2002 11:28	1.72	7.50	0.33	2.51	0.94	2.369
12/29/2002 11:50	1.83	7.65	0.54	4.11	1.33	5.467
2/7/2003 12:11	1.35	6.90	0.28	1.97	0.34	0.668
2/25/2003 13:38	1.40	5.50	0.31	1.71	0.54	0.915
3/17/2003 09:58	1.39	5.70	0.31	1.75	0.41	0.723
4/14/2003 10:03	1.52	5.85	0.40	2.31	0.75	1.745
4/22/2003 10:26	1.49	5.80	0.36	2.10	0.66	1.382
5/29/2003 14:25	1.35	4.45	0.26	1.15	0.35	0.403
6/24/2003 09:54	1.32	4.40	0.25	1.11	0.22	0.244

DAILY AVERAGE STREAMFLOW (CFS) FOR MOLINO CREEK FROM AUGUST 2002 THROUGH JUNE 2003

Day	August	September	October	November	December	January	February	March	April	May	June	July
1		0.12	0.14	0.14	0.13	2.92	0.99	0.85	0.38	1.13	0.36	
2		0.11	0.13	0.12	0.14	2.44	0.92	0.78	0.42	1.32	0.34	
3		0.12	0.13	0.11	0.14	2.01	0.85	0.74	0.39	1.74	0.33	
4		0.11	0.13	0.11	0.14	1.66	0.79	0.83	0.46	1.76	0.36	
5		0.11	0.13	0.12	0.14	1.49	0.76	0.77	0.36	1.71	0.36	
6		0.12	0.13	0.11	0.14	1.32	0.70	0.72	0.33	1.63	0.37	
7		0.12	0.12	0.20	0.14	1.17	0.65	0.70	0.32	1.52	0.37	
8		0.12	0.13	0.44	0.14	1.09	0.65	0.64	0.31	1.44	0.35	
9		0.12	0.12	0.37	0.15	1.33	0.60	0.61	0.30	1.30	0.36	
10		0.12	0.09	0.27	0.16	1.87	0.58	0.60	0.29	1.18	0.42	
11		0.13	0.09	0.19	0.16	1.67	0.57	0.56	0.27	1.09	0.41	
12		0.14	0.11	0.15	0.16	1.69	0.66	0.53	0.97	1.01	0.38	
13		0.13	0.12	0.14	3.94	1.73	0.75	0.51	2.23	0.95	0.33	
14		0.14	0.13	0.14	6.15	1.72	0.64	0.54	1.66	0.88	0.30	
15	0.14	0.15	0.18	0.13	2.76	1.71	0.61	0.83	1.59	0.80	0.29	
16	0.17	0.15	0.20	0.13	14.57	1.71	1.51	0.79	1.44	0.74	0.28	
17	0.17	0.13	0.19	0.14	1.75	1.68	1.08	0.71	1.28	0.67	0.28	
18	0.17	0.11	0.19	0.13	0.94	1.65	1.03	0.60	1.13	0.62	0.27	
19	0.16	0.11	0.19	0.13	1.08	1.61	1.00	0.58	1.06	0.58	0.26	
20	0.15	0.12	0.22	0.12	4.29	1.58	0.96	0.59	0.99	0.55	0.25	
21	0.13	0.12	0.21	0.12	2.89	1.66	0.94	0.56	0.93	0.52	0.25	
22	0.13	0.13	0.20	0.13	1.74	1.75	0.90	0.54	1.15	0.50	0.24	
23	0.13	0.13	0.20	0.14	1.14	1.69	0.88	0.54	0.93	0.50	0.24	
24	0.13	0.13	0.20	0.14	0.84	1.66	0.90	0.51	1.10	0.48	0.23	
25	0.13	0.13	0.17	0.14	0.63	1.56	0.74	0.48	1.10	0.44		
26	0.11	0.16	0.17	0.15	0.58	1.46	0.60	0.46	1.05	0.42		
27	0.11	0.15	0.17	0.14	0.60	1.38	0.85	0.43	1.00	0.38		
28	0.11	0.15	0.17	0.13	2.83	1.30	0.92	0.41	1.17	0.36		
29	0.11	0.15	0.15	0.13	5.39	1.20		0.40	1.15	0.38		
30	0.11	0.14	0.14	0.13	3.20	1.11		0.39	1.12	0.40		
31	0.12		0.14		3.39	1.05		0.39		0.38		
Count	17	30	31	30	31	31	28	31	30	31	24	
Maximum	0.17	0.16	0.22	0.44	14.57	2.92	1.51	0.85	2.23	1.76	0.42	
Average	0.14	0.13	0.16	0.16	1.95	1.61	0.82	0.60	0.90	0.88	0.32	
Median	0.13	0.13	0.14	0.13	0.84	1.66	**0.82**	0.58	0.99	0.74	0.33	
Minimum	0.11	0.11	0.09	0.11	0.13	1.05	0.57	0.39	0.27	0.36	0.23	

FERRARI CREEK DISCHARGE MEASUREMENT SUMMARY

Date & Time	Staff Reading	Width feet	Average Depth ft	Area sq ft	Velocity ft/sec	Discharge
8/20/2002 12:37	0.51	1.55	0.18	0.28	0.29	0.081
8/20/2002 12:52	0.51	1.55	0.19	0.29	0.29	0.084
9/16/2002 17:03	0.55	1.60	0.19	0.31	0.21	0.065
9/16/2002 17:25	0.55	1.6	0.19	0.31	0.20	0.061
9/17/2002 15:57	0.44	1.40	0.19	0.26	0.22	0.058
10/13/2002 13:30	0.45	1.45	0.18	0.26	0.23	0.061
11/12/2002 12:30	0.51	1.45	0.23	0.33	0.35	0.115
12/14/2002 12:32	0.79	3.10	0.33	1.01	0.62	0.630
12/29/2002 10:37	1.19	5.80	0.55	3.19	1.13	3.602
2/10/2003 16:33	0.65	4.50	0.35	1.57	0.27	0.415
2/25/2003 12:15	0.68	4.10	0.34	1.38	0.35	0.488
3/17/2003 11:16	0.78	4.20	0.33	1.40	0.36	0.506
4/14/2003 11:29	1.01	4.65	0.37	1.72	0.57	0.973
4/23/2003 14:00	0.92	4.30	0.32	1.38	0.39	0.541
4/23/2003 16:00	0.95	4.30	0.32	1.38	0.39	0.541
5/29/2003 15:33	0.81	4.10	0.30	1.25	0.23	0.291
6/24/2003 11:23	0.77	3.60	0.27	0.96	0.20	0.189

DAILY AVERAGE STREAMFLOW (CFS) FOR FERRARI CREEK FROM AUGUST 2002 THROUGH JUNE 2003

Day	August	September	October	November	December	January	February	March	April	May	June	July
1		0.07	0.06	0.07	0.10	3.32	0.82	0.59	0.53	0.49	0.27	
2		0.07	0.06	0.07	0.10	2.89	0.77	0.62	0.55	0.52	0.26	
3		0.07	0.06	0.07	0.10	2.73	0.68	0.65	0.54	0.57	0.27	
4		0.07	0.06	0.07	0.09	2.53	0.64	0.65	0.55	0.60	0.28	
5		0.07	0.06	0.07	0.09	2.39	0.59	0.63	0.54	0.62	0.27	
6		0.07	0.05	0.08	0.09	2.23	0.55	0.59	0.54	0.61	0.27	
7		0.07	0.03	0.11	0.09	2.05	0.51	0.55	0.54	0.60	0.29	
8		0.08	0.04	0.21	0.09	2.01	0.47	0.51	0.54	0.53	0.28	
9		0.07	0.04	0.16	0.09	2.02	0.42	0.49	0.54	0.48	0.27	
10		0.06	0.05	0.14	0.10	2.08	0.42	0.46	0.54	0.46	0.28	
11		0.07	0.04	0.14	0.10	2.08	0.40	0.46	0.54	0.42		
12		0.08	0.05	0.13	0.09	2.08	0.42	0.45	0.65	0.41		
13		0.07	0.05	0.13	0.57	2.07	0.42	0.45	0.83	0.40		
14		0.07	0.06	0.13	0.98	1.95	0.41	0.46	0.91	0.40		
15	0.06	0.07	0.05	0.13	0.85	1.82	0.41	0.49	0.96	0.38		
16	0.07	0.07	0.05	0.12	4.32	1.78	0.50	0.50	0.90	0.36		
17	0.07	0.06	0.05	0.12	3.12	1.70	0.48	0.51	0.83	0.34		
18	0.08	0.06	0.05	0.12	2.32	1.71	0.48	0.52	0.76	0.32		
19	0.08	0.06	0.05	0.11	2.25	1.70	0.48	0.52	0.69	0.31		
20	0.08	0.06	0.06	0.11	3.94	1.59	0.47	0.52	0.64	0.30		
21	0.08	0.05	0.06	0.10	3.54	1.58	0.47	0.53	0.59	0.30		
22	0.08	0.06	0.06	0.11	2.80	1.54	0.46	0.53	0.57	0.30		
23	0.08	0.07	0.06	0.11	2.38	1.63	0.45	0.53	0.54	0.31		
24	0.08	0.07	0.06	0.11	2.04	1.68	0.45	0.53	0.53	0.31		
25	0.09	0.07	0.07	0.10	1.77	1.52	0.48	0.52	0.52	0.30		
26	0.08	0.08	0.07	0.10	1.59	1.33	0.48	0.52	0.51	0.30		
27	0.08	0.08	0.07	0.10	1.44	1.21	0.49	0.52	0.50	0.28		
28	0.08	0.07	0.07	0.10	1.87	1.08	0.51	0.52	0.51	0.28		
29	0.08	0.07	0.07	0.10	3.19	0.99		0.51	0.50	0.30		
30	0.08	0.07	0.07	0.10	3.14	0.93		0.51	0.50	0.29		
31	0.07		0.07		3.51	0.90		0.52		0.27		
Count	17	30	31	30	31	31	28	31	30	31	10	
Maximum	0.09	0.08	0.07	0.21	4.32	3.32	0.82	0.65	0.96	0.62	0.29	
Average	0.08	0.07	0.06	0.11	1.51	1.84	0.50	0.53	0.61	0.40	0.27	
Median	0.08	0.07	0.06	0.11	1.44	1.78	**0.48**	0.52	0.54	0.36	0.27	
Minimum	0.06	0.05	0.03	0.07	0.09	0.90	0.40	0.45	0.50	0.27	0.26	

SAN VICENTE CREEK DISCHARGE MEASUREMENT SUMMARY

Date & Time	Staff Reading	Width feet	Average Depth ft	Area sq ft	Velocity ft/sec	Discharge
8/21/2002 12:28	0.71	10.85	0.39	4.28	0.54	2.300
9/16/2002 16:05	0.655	10.55	0.35	3.65	0.41	1.506
10/13/2002 12:15	0.65	9.90	0.35	3.50	0.41	1.439
12/17/2002 14:33	1.44	15.00	0.99	14.90	1.99	29.690
12/29/2002 13:42	1.72	15.90	1.10	17.51	2.19	38.329
2/7/2003 13:58	0.86	15.20	0.47	7.16	1.04	7.480
2/25/2003 10:42	0.98	15.60	0.57	8.95	1.15	10.288
3/17/2003 12:51	0.99	15.30	0.60	9.17	1.21	11.064
4/13/2003 15:10	1.58	16.10	1.03	16.51	2.18	36.050
4/22/2003 16:50	0.96	15.50	0.55	8.59	1.14	9.818
5/30/2003 14:37	0.98	12.10	0.49	5.95	1.21	7.228
6/24/2003 12:52	0.87	11.50	0.48	5.47	1.00	5.482

DAILY AVERAGE STREAMFLOW (CFS) FOR SAN VICENTE CREEK FROM AUGUST 2002 THROUGH JUNE 2003

Day	August	September	October	November	December	January	February	March	April	May	June	July
1		2.01	1.72	1.33	1.61	19.80	8.44	8.90	5.94	14.18	7.12	
2		1.94	1.56	1.21	1.64	14.89	8.32	8.65	6.26	15.40	7.01	
3		1.89	1.47	1.17	1.65	12.35	8.13	8.43	6.09	19.60	7.04	
4		1.79	1.43	1.24	1.62	9.73	8.11	8.39	6.41	17.38	7.04	
5		1.75	1.41	1.32	1.60	8.30	7.97	8.17	6.22	16.10	7.13	
6		1.69	1.35	1.28	1.59	7.17	7.79	7.95	5.75	14.78	6.97	
7		1.74	1.34	2.58	1.66	6.18	7.56	7.72	5.59	14.00	6.80	
8		1.74	1.31	8.77	1.66	5.47	7.45	7.61	5.44	14.04	6.83	
9		1.61	1.40	6.54	1.79	7.46	7.33	7.55	5.37	13.41	6.85	
10		1.51	1.40	3.16	2.09	16.07	7.11	7.41	5.37	12.47	7.11	
11		1.57	1.42	2.56	1.95	11.24	7.02	7.31	4.65	11.73	6.43	
12		1.58	1.43	2.15	1.78	9.51	7.65	7.12	11.28	11.08	6.06	
13		1.47	1.43	1.94	47.62	8.68	8.99	7.02	35.22	10.40	5.89	
14		1.40	1.38	1.85	84.08	7.92	8.51	7.58	18.78	10.16	5.77	
15		1.31	1.29	1.76	28.81	7.17	8.19	12.73	13.75	9.84	5.54	
16		1.41	1.33	1.73	105.57	6.59	17.56	11.75	11.79	9.47	5.33	
17		1.35	1.42	1.71	33.85	6.02	11.64	10.45	10.78	9.38	5.26	
18		1.31	1.43	1.59	15.52	5.62	10.71	9.32	9.86	9.14	5.32	
19	2.37	0.99	1.49	1.58	14.08	5.08	10.32	8.77	9.13	8.48	5.06	
20	2.51	1.16	1.56	1.59	31.85	4.74	9.94	8.45	8.54	8.02	5.10	
21	2.55	1.19	1.55	1.58	24.89	4.67	9.41	8.11	8.49	7.88	5.39	
22	2.60	1.21	1.47	1.63	15.52	5.45	9.01	7.96	10.09	7.64	5.74	
23	2.53	1.24	1.48	1.68	9.85	11.04	8.83	7.76	8.94	7.47	5.60	
24	2.49	1.21	1.51	1.68	6.48	10.22	9.14	7.36	18.52	7.46	5.58	
25	2.04	1.24	1.50	1.71	4.42	9.49	10.38	7.17	16.87	7.65		
26	2.11	1.27	1.47	1.72	4.37	9.14	9.22	6.82	14.22	8.12		
27	2.14	1.39	1.50	1.66	9.09	7.95	9.82	6.50	12.59	7.98		
28	2.01	1.71	1.48	1.56	39.30	9.18	9.18	6.30	19.03	7.68		
29	2.11	1.85	1.39	1.51	38.92	8.98		6.20	17.83	7.66		
30	2.06	1.74	1.40	1.57	21.92	8.79		6.05	15.87	7.45		
31	2.00		1.35		29.66	8.59		6.00		7.42		
Count	13	30	31	30	31	31	28	31	30	31	24	
Maximum	2.60	2.01	1.72	8.77	105.57	19.80	17.56	12.73	35.22	19.60	7.13	
Average	2.27	1.51	1.44	2.11	18.92	8.82	9.06	7.98	11.16	10.76	6.17	
Median	2.14	1.49	1.43	1.67	9.09	8.59	**8.67**	7.72	9.49	9.47	5.98	
Minimum	2.00	0.99	1.29	1.17	1.59	4.67	7.02	6.00	4.65	7.42	5.06	

LIDDELL CREEK DISCHARGE MEASUREMENT SUMMARY

Date & Time	Staff Reading	Width feet	Average Depth ft	Area sq ft	Velocity ft/sec	Discharge
8/21/2002 15:18	1.05	5.80	0.236	1.367	0.460	0.629
9/16/2002 13:59	1.05	5.40	0.24	1.28	0.48	0.613
9/22/2002 09:38	1.09	4.70	0.26	1.21	0.59	0.710
10/14/2002 10:22	1.06	4.30	0.28	1.20	0.59	0.713
11/10/2002 10:00	1.26	5.00	0.33	1.63	0.73	1.19
12/17/2002 16:09	1.89	8.50	0.65	5.54	1.70	9.41
12/29/2002 14:13	1.97	8.60	0.63	5.44	1.90	10.31
2/7/2003 16:54	1.37	7.50	0.32	2.38	0.53	1.26
2/25/2003 15:06	1.41	7.60	0.35	2.69	0.63	1.70
3/17/2003 14:27	1.45	8.05	0.35	2.81	0.81	2.27
4/13/2003 11:02	1.78	8.25	0.62	5.11	1.43	7.31
4/23/2003 16:49	1.40	7.50	0.37	2.80	0.63	1.76
5/29/2003 11:26	1.34	7.40	0.31	2.29	0.41	0.93
6/24/2003 14:42	1.28	7.40	0.28	2.05	0.31	0.64

DAILY AVERAGE STREAMFLOW (CFS) FOR LIDDELL CREEK FROM AUGUST 2002 THROUGH JUNE 2003

Day	August	September	October	November	December	January	February	March	April	May	June	July
1		0.82	0.55	0.51	1.15	7.19	1.79	1.75	1.31	1.64	0.90	
2		0.79	0.44	0.52	0.90	6.02	1.71	1.72	1.57	1.95	0.76	
3		0.71	0.48	0.54	0.93	5.08	1.59	1.66	1.51	2.44	0.82	
4		0.72	0.43	0.52	0.92	4.51	1.50	1.68	1.57	2.31	0.89	
5		0.71	0.49	0.66	0.88	4.16	1.40	1.84	1.44	2.19	0.84	
6		0.72	0.50	0.67	0.90	3.79	1.37	1.94	1.37	2.03	0.77	
7		0.79	0.42	1.08	0.98	3.45	1.27	1.78	1.23	1.92	0.78	
8		0.83	0.42	2.47	0.98	3.26	1.27	1.70	1.08	1.89	0.81	
9		0.75	0.46	2.16	0.99	3.44	1.24	1.60	1.04	1.82	0.75	
10		0.70	0.54	1.16	1.05	4.01	1.20	2.37	1.11	1.83	0.82	
11		0.77	0.51	1.14	1.02	3.42	1.30	3.11	1.03	1.78	0.86	
12		0.72	0.58	1.10	1.07	3.23	1.46	3.04	1.97	1.68	0.83	
13		0.71	0.58	1.04	6.71	3.12	1.49	2.63	5.47	1.66	0.80	
14		0.85	0.59	0.99	10.35	3.01	1.35	1.63	2.93	1.56	0.88	
15		0.85	0.61	1.03	8.18	2.93	1.36	2.29	2.34	1.37	0.88	
16		0.72	0.63	1.05	22.96	2.86	1.93	2.36	2.16	1.27	0.79	
17		0.62	0.65	1.04	9.19	2.76	1.55	2.26	2.08	1.23	0.76	
18		0.61	0.68	1.00	6.92	2.70	1.48	2.18	2.02	1.21	0.77	
19	0.67	0.57	0.74	1.06	6.19	2.62	1.50	2.06	2.02	1.09	0.78	
20	0.77	0.57	0.73	1.05	13.10	2.52	1.47	1.99	1.92	1.10	0.77	
21	0.74	0.68	0.75	1.00	10.06	2.51	1.48	1.96	1.79	1.06	0.80	
22	0.81	0.67	0.83	1.01	7.57	2.51	1.47	1.87	2.19	1.04	0.85	
23	0.78	0.57	0.78	1.04	6.86	2.47	1.48	1.83	1.85	1.01	0.83	
24	0.81	0.54	0.76	1.19	6.03	2.41	1.63	1.72	1.88	1.09	0.92	
25	0.83	0.60	0.79	1.18	4.78	2.52	1.85	1.69	1.85	1.09		
26	0.72	0.63	0.73	1.20	4.40	2.39	1.65	1.60	1.77	1.07		
27	0.74	0.66	0.67	1.13	4.25	2.27	1.98	1.49	1.70	0.96		
28	0.81	0.68	0.50	1.20	7.00	2.17	1.80	1.43	1.92	0.90		
29	0.82	0.64	0.50	1.16	10.94	2.05		1.34	1.78	0.89		
30	0.81	0.59	0.48	1.15	8.39	1.93		1.25	1.69	0.85		
31	0.84		0.53		9.69	1.83		1.21		0.91		
Count	13	30	31	30	31	31	28	31	30	31	24	
Maximum	0.84	0.85	0.83	2.47	22.96	7.19	1.98	3.11	5.47	2.44	0.92	
Average	0.78	0.69	0.59	1.07	5.66	3.20	1.52	1.90	1.85	1.45	0.82	
Median	0.81	0.70	0.58	1.05	6.03	2.86	**1.48**	1.78	1.79	1.27	0.82	
Minimum	0.67	0.54	0.42	0.51	0.88	1.83	1.20	1.21	1.03	0.85	0.75	

APPENDIX B

REPORT OF STREAM GAUGE INSTALLATION

Report of Stream Gauge Installation

Coast Dairies Property

August 28, 2002

Prepared for:

Coast Dairies and Land Company
116 New Montgomery Street
San Francisco, CA 94105

8950 Cal Center Drive, Bldg 3, Suite 300
Sacramento, California 95826
(916) 564-4500

436 14th Street, Suite 600
Oakland, California 94612
(510) 839-5066

225 Bush Street, Suite 1700
San Francisco, California 94104
(415) 896-5900

4221 Wilshire Boulevard, Suite 480
Los Angeles, California 90010
(323) 933-6111

2685 Ulmerton Road, Suite 102
Clearwater, Florida 33762
(727) 572-5226

700 Fifth Avenue, Suite 4120
Seattle, Washington 98104
(206) 442-0900

1751 Old Pecos Trail, Suite O
Santa Fe, New Mexico 87505
(505) 992-8860

ESA Environmental Science Associates

202560

REPORT OF STREAM GAUGE INSTALLATION

COAST DAIRIES PROPERTY

BACKGROUND AND SCOPE

Coast Dairies and Land Company retained Environmental Science Associates (ESA) to gauge and monitor flows in four of the streams that flow through the Coast Dairies Property. The purposes of the project are twofold: first, to monitor the effects of existing agricultural water diversions on streamflows; and second, to gauge the potential for future water diversions under the recently promulgated National Marine Fisheries Service guidelines for coastal California streams.

The Coast Dairies property covers about 7,000 acres around the community of Davenport, CA. The property is roughly bounded by Laguna Creek on the southeast and Molino Creek on the northwest. The property is about seven miles long and about one and one-half mile wide. The terrain is rough and marked by a series of coastal terraces.

Several streams cross the property, in general flowing from the northeast to the southwest. Our scope of work includes gauging and monitoring flows for a period of one year in four streams: Molino Creek, Ferrari Creek, San Vicente Creek, and Liddell Creek. Laguna Creek, Y Creek, and Yellow Bank Creek, the other perennial creeks on the property, are not being gauged or monitored at this time.

This report describes the installation of the stream gauges, and presents the first few days of data recorded for each stream. Future reports will include more data on stream stage (water level) and flow. This report was prepared by Dennis Jackson, Hydrologist, for ESA and Coast Dairies and Land Company.

STREAM GAUGE INSTALLATION

Stream gauging stations were designed and installed in August 2002 by Dennis Jackson, Hydrologist, with the assistance of ESA staff members Scott Bruce and Dan Sicular, and Coast Dairies' land manager, Bern Smith. The location of each stream gauge is shown in Figures 1 and 2.

Gage 1 (Figures 1 and 3) is the Molino Creek stream gauge. It is located about 50 feet downstream of the diversion on Molino Creek. Gage 2 (Figures 1 and 4) is the Ferrari Creek stream gauge. It is located on the west side of Highway 1 and about 1,800 feet downstream of the Coast Dairies' diversion.

Figure 1. Gage 1 is the Molino Creek stream gauge. It is located about 50 feet downstream of the diversion on Molino Creek. Gage 2 is the Ferrari Creek stream gauge. It is located on the west side of Highway 1 and about 1,800 feet downstream of the Coast Dairies' diversion.

Figure 2. Gage 3 is the San Vicente stream gauge. It is located at the old Coast Road crossing, approximately 1,100 feet upstream of the present Highway 1 crossing. The San Vicente stream gauge is about 100 feet downstream of the Coast Dairies' diversion. Gage 4 is the Liddell Creek stream gauge. The Liddell Creek gauge is about 50 feet downstream of the diversion.

Figure 3. The Molino Creek staff gauge and stilling well for the water level recorder are located about 50 feet downstream of the diversion.

Gage 3 (Figures 2 and 6) is the San Vicente stream gauge. It is located at the old Coast Road crossing, approximately 1,100 feet upstream of the present Highway 1 crossing. The San Vicente stream gauge is about 100 feet downstream of the Coast Dairies' diversion. Gage 4 (Figures 2 and 5) is the Liddell Creek stream gauge. The Liddell Creek gauge is about 50 feet downstream of the diversion.

The water level recorder for each station was installed according to the manufacturer's specifications. Each recorder is housed in a vertical perforated 2-inch black ABS plastic pipe. The 2-inch pipe is centered in a perforated 4-inch black ABS pipe. The nested pipes provide a "stilling well," the purpose of which is to reduce wave action in high flow events. A horizontal 2-inch perforated black ABS pipe connects the stilling well to the water in the creek, when needed (i.e., at lower flows), enabling the water level in the stilling well to equalize with the water level in the creek. Photographs of the stilling wells and staff gauges are shown in Figures 3-6.

Figure 4. The Ferrari Creek staff gauge and stilling well are located to the west of Highway 1 in the location of the recently removed dam.

STREAM GAUGING PROCEDURE

Each stream gauge consists of a *Global Water* WL-15 water level recorder, a staff gauge and a location to measure streamflow. The water level recorders were purchased new just prior to installation, and are factory calibrated. The water level recorders can read the depth of water above their sensor to the nearest 0.01 foot (1/100 of a foot, or about 1/8 inch). They are programmed to record the water level above the sensor every 15 minutes, which gives 96 readings per day.

The staff gauges consist of metal plates with graduated markings printed on them, enabling readings of water level to 0.01 foot. The plates are attached to 2x4 wooden members set into the stream bed. The hydrologist reads the staff gauge each time the station is visited. The relationship between the water level recorded by the WL-15 and the value read by the hydrologist is noted. Any change in the relationship indicates a potential problem with the station.

Figure 5. The Liddell Creek staff and stilling well are located about fifty feet downstream of the diversion. The staff plate is located on the side of the 2x4 facing the stilling well. The stilling well is about 12' from the edge of the low flow channel.

Each month, the hydrologist will take at least one discharge measurement at each gauging station. The discharge measurement will be made at the best available site for a flow measurement within a short distance of the staff gauge. The staff gauge is read before and after each discharge measurement. After several discharge measurements have been made, a statistical relationship will be developed between the staff gauge readings and the discharge measurements. This statistical relationship is called a rating curve or rating table. The rating curve allows the water levels recorded by the WL-15 recorder to be converted into estimates of streamflow. After the individual water level readings have been converted into estimates of streamflow, the daily average streamflow can be computed by averaging the 96 readings recorded for each day.

CHANNEL SURVEY

The final step of the installation of each stream gauging station is to survey the stream channel at each station. The survey will include a cross section at the riffle-crest that controls the flow out of the pool with the staff gauge and water level recording sensor. A longitudinal profile of the channel will also be surveyed. The longitudinal survey will include measurements of the water surface slope, thalweg and bankfull.

The data from the survey will be used to estimate discharge for flood flows that would be unsafe to wade or for high flows that were not measured. An attempt will be made to measure at least one high flow event at each of the four gauging stations. The channel survey will be repeated if high winter flows alter the channel and significantly change the rating curve for a station.

Figure 6. The San Vicente stilling well and staff gauge are located about 100 feet downstream of the diversion.

DISCHARGE MEASUREMENTS

Discharge (stream flow) measurements are made using a pygmy meter constructed to the design specifications of the US Geological Survey (USGS). Water velocities are measured at 0.6 of the water depth, as per the standard USGS method. Water velocities are measured in at least twenty locations, when practicable, across the stream channel. However, the low flows of late summer and early fall can make this standard unobtainable.

Discharge measurements were made for Molino and Ferrari Creek on August 20, 2002 and on August 21, 20002 for San Vicente and Liddell Creek. The discharge measurements are summarized in Table 1. The flow in Molino Creek was 0.15 cfs and the flow in Ferrari Creek was 0.8 cfs. These low flows required that the channel be lined with sandbags to narrow the flow so

Table 1. The discharge measurements for August 2002 are summarized in the table. Two measurements were taken at Ferrari Creek to confirm the streamflow. The two measurements for Ferrari Creek differ by less than 4%.

Stream	Date	Number of Sections	Width feet	Average Depth ft	Area sq. ft	Average Velocity ft/sec	Discharge cfs
Molino Creek	8/20/02	14	2.70	0.25	0.68	0.22	0.15
Ferrari Creek	8/20/02	9	1.55	0.18	0.28	0.29	0.081
Ferrari Creek	8/20/02	9	1.55	0.19	0.29	0.29	0.084
Liddell Creek	8/21/02	20	5.80	0.24	1.36	0.46	0.63
San Vicente Creek	8/21/02	23	10.85	0.39	4.28	0.54	2.30

that it would be deep enough to submerge the velocity meter. The resulting width was too narrow to provide 20 locations to measure the water velocity. The flow in Ferrari Creek was so low that two streamflow measurements were taken to confirm the readings. The two measurements differed by less than 4%. The USGS method is expected to achieve 5% accuracy (repeatability) in normal conditions. Therefore, the Ferrari Creek measurements show good repeatability. In Table 1, the average velocity is computed by dividing the discharge by the area. The average depth is computed by dividing the area by the width.

WATER LEVEL RECORD

To date, only one discharge measurement has been taken at each gauging station, which is not enough to convert the recorded water levels to discharge. Therefore, only the recorded water level or stage is shown for each station in the graphs shown in Figures 7 – 10.

DIVERSIONS

Both the Molino Creek and Liddell Creek diversions are sandbagged shut. The Ferrari Creek diversion is a small domestic diversion. Livestock also use water in Ferrari Creek. Water is presently entering the San Vicente Creek diversion. The diverted water is routed to a pond where the diversion pump is located. When the pump is not operating the pond spills water into the outlet channel, which enters San Vicente Creek downstream of the stream gauge. Significant pumping events completely de-water the pond outlet channel.

A HoboTemp temperature datalogger was placed in the San Vicente pond outlet channel and another was placed in the air above the outlet channel. Both HoboTemps were set to record the temperature every half-hour. Significant pumping events are known to de-water the outlet channel, which should alter the recorded temperature of the HoboTemp in the outlet channel. Figure 11 shows the recorded water and air temperature in the outlet channel. The temperature does not suggest that a significant pumping event de-watered the outlet channel during the eight days of record. Note that the air temperature sensor is in a well-shaded location about three to four feet above the outlet channel water surface.

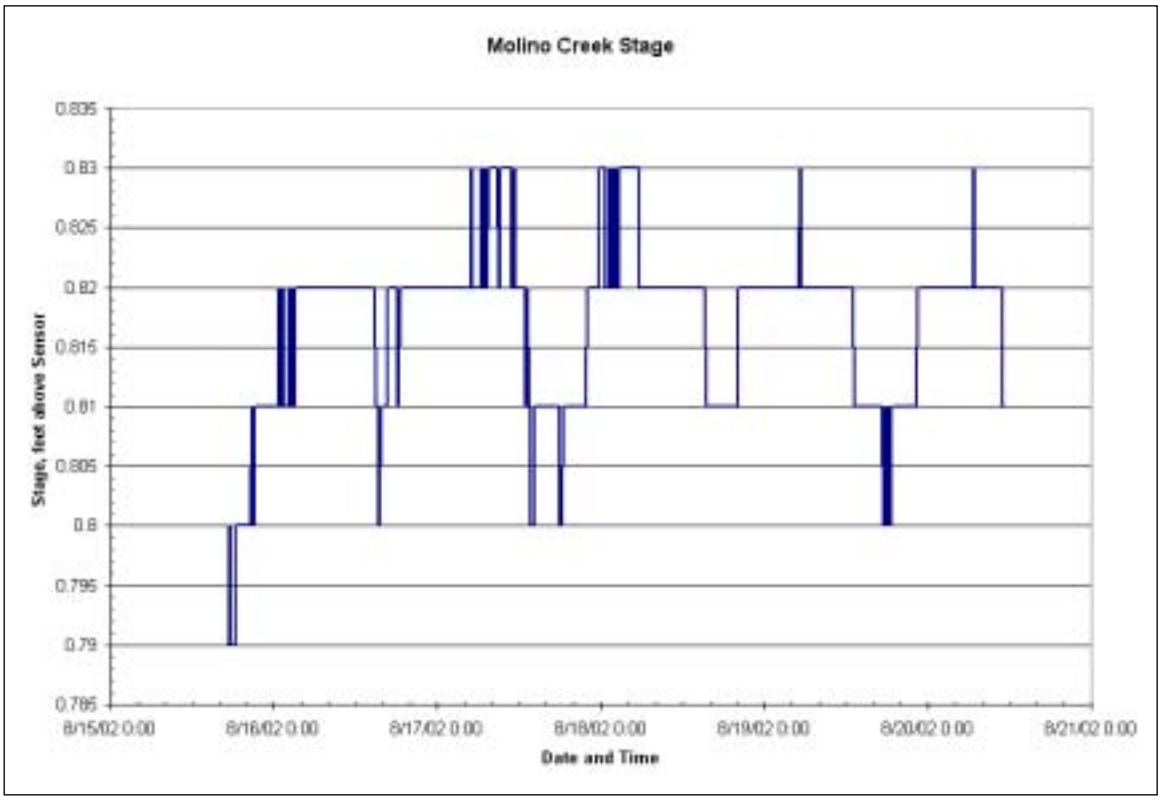


Figure 7. The Molino Creek stage varied by 0.04 feet for the approximately 5 days of record. The Coast Dairies diversion is about 50 feet upstream but is sandbagged shut.

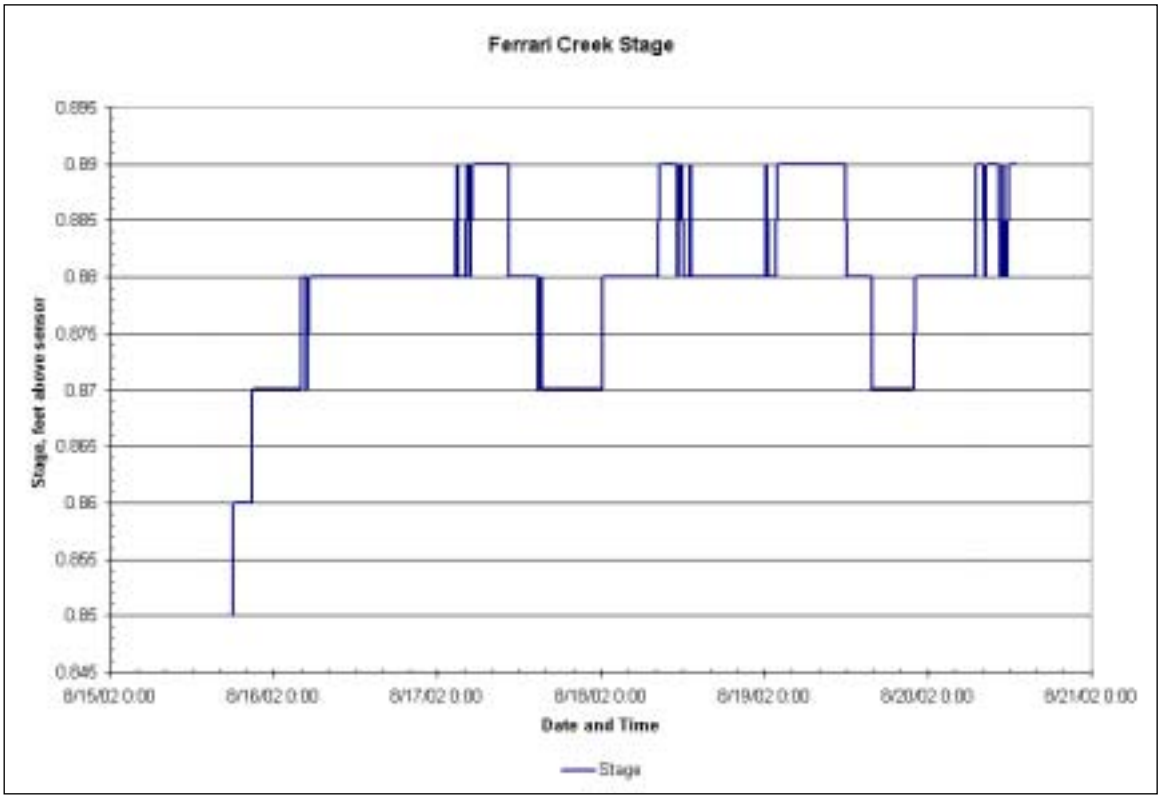


Figure 8. The Ferrari Creek stage varied 0.04 feet over the approximate five days of record.

Figure 9. The Liddell Creek stage varied 0.09 feet over the approximate two days of record. The Coast Dairies diversion is about 50 feet upstream but is sandbagged shut.

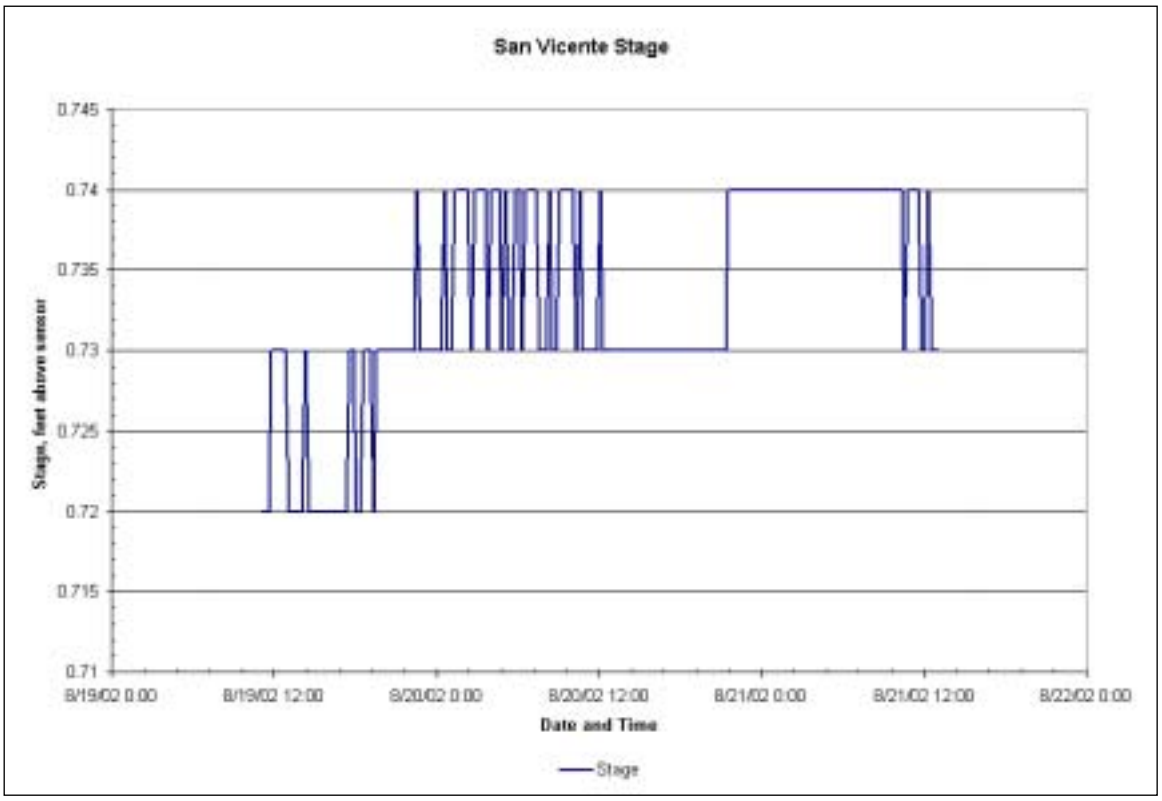


Figure 10. The San Vicente stage varied 0.02 feet over the approximately two days of record. The Coast Dairies diversion is about 100 feet upstream. The diversion routes a small percentage of streamflow through a pond and returns it to San Vicente Creek downstream of the stream gauge. A HoboTemp temperature recorder was placed in the pond outlet channel and another was placed in the air to detect any dewatering of the pond outlet channel.

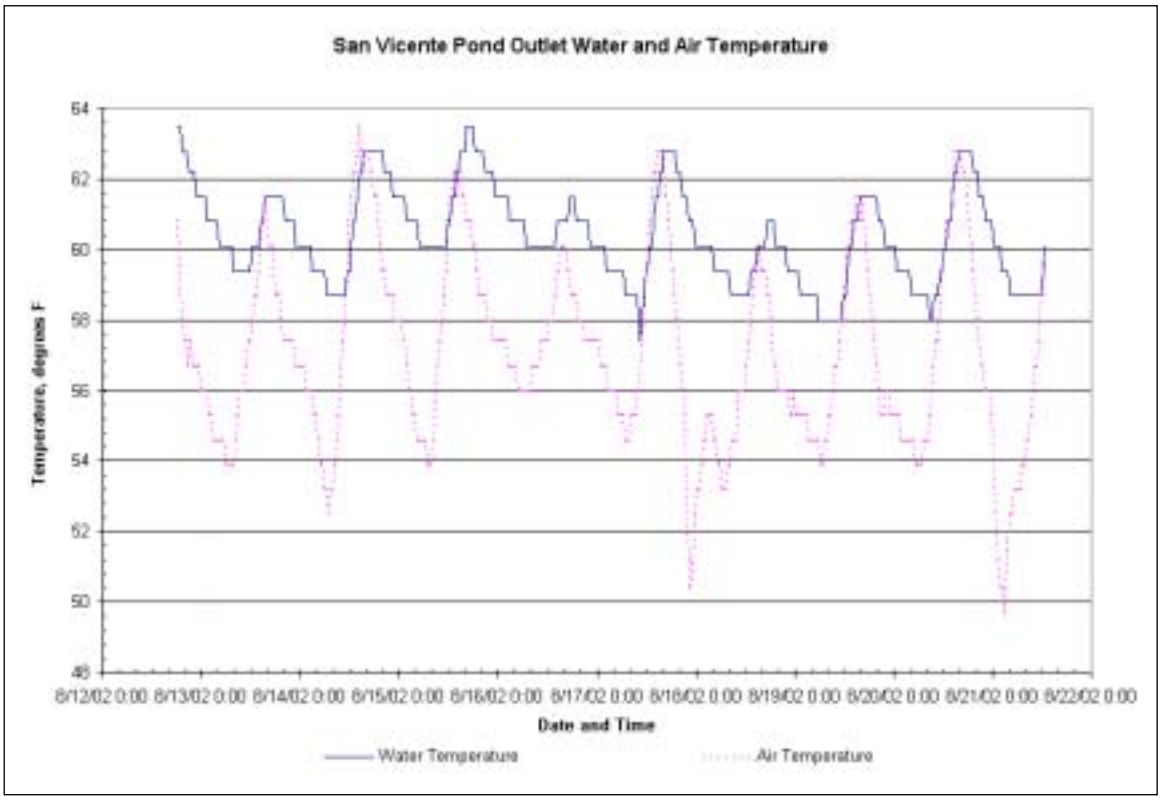


Figure 11. The San Vicente pond outlet water temperature and the air temperature above the water do not show any periods when the outlet channel was totally dewatered.

APPENDIX F: SAN VICENTE POND AND CREEK SMOLT OUTMIGRATION STUDY, SPRING 2003

Appendix F includes a report of a study conducted by ESA on behalf of CDLC to determine the population and physical conditions of coho salmon and steelhead trout emigrating from San Vicente Pond, and compare them to fish in the main channel of San Vicente Creek. The study provides important information on the ecology of the pond and its effects on the overall salmonid population of San Vicente Creek.

San Vicente Pond and Creek Smolt Outmigrant Study, Spring 2003

Summary Report

December 11, 2003

Prepared for
National Marine Fisheries Service
on behalf of
Coast Dairies & Land Company

ESA Environmental Science Associates

San Vicente Pond and Creek Smolt Outmigrant Study, Spring 2003

Summary Report

December 11, 2003

Prepared for
National Marine Fisheries Service
on behalf of
Coast Dairies & Land Company

8950 Cal Center Drive, Bldg 3, Suite 300
Sacramento, California 95826
(916) 564-4500

436 14th Street, Suite 600
Oakland, California 94612
(510) 839-5066

225 Bush Street, Suite 1700
San Francisco, California 94104
(415) 896-5900

4221 Wilshire Boulevard, Suite 480
Los Angeles, California 90010
(323) 933-6111

2685 Ulmerton Road, Suite 102
Clearwater, Florida 33762
(727) 572-5226

700 Fifth Avenue, Suite 4120
Seattle, Washington 98104
(206) 442-0900

ESA Environmental Science Associates

202560

EXECUTIVE SUMMARY

Following a survey and fish relocation effort conducted by the National Marine Fisheries Services (NMFS) in September 2002, it became apparent that hundreds of federally listed coho salmon (*Oncorhynchus kisutch*) and steelhead (*O. mykiss*) were present in a small off-channel agricultural diversion pond on San Vicente Creek in northern Santa Cruz County, California. Due to concerns that these fish may be trapped in the pond and may be harmed by continued water diversions, NMFS requested that Coast Dairies & Land Company (CDLC), the owner of the Coast Dairies property, discontinue water diversions from the pond, implement a water quality monitoring program, assess and possibly improve fish passage conditions in the pond's outlet channel, and conduct a smolt outmigration study. This report summarizes and discusses the findings of the San Vicente Pond and Creek Smolt Outmigrant Study conducted from March 8, 2003 through June 15, 2003.

The average forklengths and average wet weights of both coho salmon and steelhead smolts exiting the pond during spring 2003 were significantly higher than those of smolts that had reared in the main channel of San Vicente Creek. In fact, coho smolts from the pond were so much larger than creek coho that the possibility that at least some of the coho from that site were actually 2-year old fish had to be considered. Although a definitive determination of coho ages could not be made, qualitative scale analyses suggest that coho captured from the pond were in fact 1-year olds.

Fish passage through the outlet channel appeared to be unimpaired following some minor channel clearing and the installation of a notched weir. However, fish were also documented migrating through the outlet channel prior to weir installation, suggesting that smolts may have frequently, if not always, had the opportunity to exit the pond during its half-century existence.

Coho salmon dominated the species distribution in the pond while steelhead were more abundant in the main channel. Although the San Vicente Creek watershed as a whole (*i.e.*, main channel and pond combined) currently supports far more juvenile steelhead than juvenile coho, coho smolts migrating to the ocean in 2003 were found to be approximately twice as abundant as steelhead smolts.

Water quality monitoring indicated that although dissolved oxygen levels in the vicinity of the pond's bottom may at times drop below 5 mg/l, areas with adequate oxygen levels were always present. Measured water temperatures never exceeded 18˚C, but it is likely that the top layer of the water column may at times become somewhat warmer than that.

Based on the results of this study, we conclude that San Vicente Pond offers important rearing habitat for juvenile coho salmon and recommend that it be managed as such.

TABLE OF CONTENTS

San Vicente Pond and Creek Smolt Outmigration Study, Spring 2003)

APPENDICES

LSIT OF TABLES

Page

LIST OF FIGURES

1. BACKGROUND

San Vicente Creek is located in Davenport, northern Santa Cruz County, and represents one of six coastal streams located on the Coast Dairies property. The property is managed by the Coast Dairies & Land Company (CDLC). CDLC is in the process of preparing a long-term management plan for the 7,000 acre property in preparation for the eventual transfer of the property to the California Department of Parks and Recreation (DPR), the Bureau of Land Management (BLM), and a third organization which will own and manage the agricultural land inland of Highway One. This transfer is scheduled to occur in the spring of 2004. CDLC's mission statement for the management of the property includes their commitment to supporting sustainable coastal agriculture. Although the currently farmed portion of the property represents a large decrease from the total agricultural acreage prior to the acquisition of the land, several small-scale operations continue to farm portions of the coastal terraces. The six creeks traversing the property have traditionally been the source of irrigation water for the farms, and this practice continued on the property until the National Marine Fisheries Service (NMFS) advised CDLC of potential Federal Endangered Species Act (FESA) "take" violation issues related to the water diversions. In response, CDLC informed their tenants in 2002 that all diversions have to be stopped until water rights and listed species protection issues are resolved.

San Vicente Creek is one of the streams from which water was diverted until September 2002. The creek has been identified as one of only a few coastal streams south of San Francisco Bay that continue to support precariously low coho salmon (*Oncorhynchus kisutch*) populations. Data cited in the California Department of Fish and Game's *Draft Strategic Plan for Restoration of the Endangered Coho Salmon South of San Francisco Bay* (CDFG, 1998) and NMFS's *Status Review Update for Coho Salmon from the Central California Coast* (NMFS, 2001) suggest that only one coho brood year lineage (1996…1999…2002) remains in this creek. The same brood year also appears to be the only viable one remaining in Scotts Creek and Waddell Creek (NMFS, 2001), two coho-supporting streams located approximately 3.0 and 7.5 miles, respectively, north of San Vicente Creek. Although steelhead (*O. mykiss*) appear to be more abundant than coho in San Vicente Creek, the NMFS *Status Review of West Coast Steelhead* (1996) estimates the total steelhead run size for this stream at only 50. Electrofishing surveys conducted by CDFG at seven sites in 1996 resulted in the capture of 228 steelhead and only 3 coho salmon (CDFG, 1996).

The San Vicente Creek diversion site (hereafter referred to as San Vicente Pond) consists of an off-channel storage pond fed by San Vicente Creek via a manmade inlet channel. Overflow of the pond returns to San Vicente Creek via a manmade outlet channel. Since diversions have been halted, the water level in the pond has reached equilibrium, with continuously flowing water present in both the inlet and outlet channels. Prior to the cessation of water diversions from San Vicente Pond, the inlet and outlet channels, as well as the diversion pump itself, were screened according to NMFS screening criteria (NMFS, 1997). The pond's inlet channel was first screened in August 2001. However, the screen had become undercut by December 2001. Although exact information as to when the screen was repaired is not available (it is likely that the screen was removed entirely during high winter flows), a fully functioning screen was in place again by August 2002. Clearly, young-of-the-year coho salmon as well as all steelhead age classes had access to the pond during at least a portion of spring 2002.

In early September 2002, NMFS and CDFG staff conducted a fish rescue operation in an attempt to relocate presumably trapped salmonids from the pond and inlet/outlet channels to the main channel of San Vicente Creek. Both the inlet and outlet channels were surveyed using electrofishing equipment. A total of 181 salmonids (23 coho and 158 steelhead) were captured in the inlet channel and released in the main channel. No salmonids were captured in the outlet

channel. Initial attempts to rescue fish from the pond resulted in the capture of more fish than NMFS had expected; 117 coho and 16 steelhead were captured on one single seine haul covering approximately 10% of the pond's surface area. Due to concerns that continuing the rescue operation may result in an over-population of the San Vicente Creek reach where rescued fish were being released, NMFS decided to abort the effort and instead focus on assuring the survival and ultimate emigration of the trapped fish. Following the fish relocation effort, the outlet channel was also screened even though no salmonids were found in that channel (this screen was removed in March 2003 to allow for outmigration).

The realization that large numbers of salmonids, particularly coho salmon, were present in the pond raised questions about whether fish were involuntarily trapped in the pond or whether they were in fact intentionally taking advantage of suitable habitat. The habitat preference of coho for deep pools with reduced water velocities has been well documented (Kruzic and Scarnecchia, 2001; Bell *et al.*, 2001a; Roni, 2002). Pool habitats known as alcoves, which are very similar to the physical characteristics of San Vicente Pond with the exception that they do not have outlet channels, have been found to exhibit higher fidelity and survival of coho salmon during high winter streamflows than main channel habitats (Bell *et al.*, 2001a). Also, Peterson (1982) found that a total of over 9,500 juvenile coho migrated *into* two riverine ponds of the Clearwater River during fall and winter rainfall events. The fact that during the September 2002 relocation efforts far more coho were found in San Vicente Pond than in the stream-like inlet channel, and that the opposite was true for steelhead, seemed to suggest that inter-specific differences in habitat selection and natural segregation may have played at least a partial role in the use of the diversion system by coho and steelhead. Similar species distributions have been observed in two off-channel ponds in British Columbia (Swales *et al.*, 1986).

Following the September 2002 relocation efforts, NMFS formally requested CDLC to monitor water quality (primarily dissolved oxygen levels and water temperatures) in the pond, to asses and, if necessary, improve the physical channel characteristics of the outlet channel to improve fish passage, and to conduct a smolt outmigration study during spring 2003. Thus, the primary motivation behind the San Vicente Pond and Creek Smolt Outmigration Study was to accurately quantify the numbers of steelhead and coho salmon potentially trapped in San Vicente Pond. However, in order to also assess the relative conditions ("health") of the pond fish compared to fish rearing in San Vicente Creek, it was decided to simultaneously conduct outmigrant trapping in the main channel. The overall goal of the study was therefore to compare relative population sizes and physical conditions of smolts from both the pond and the main channel and thus to try to resolve questions about the effect the pond has on the overall salmonid population of the San Vicente Creek watershed.

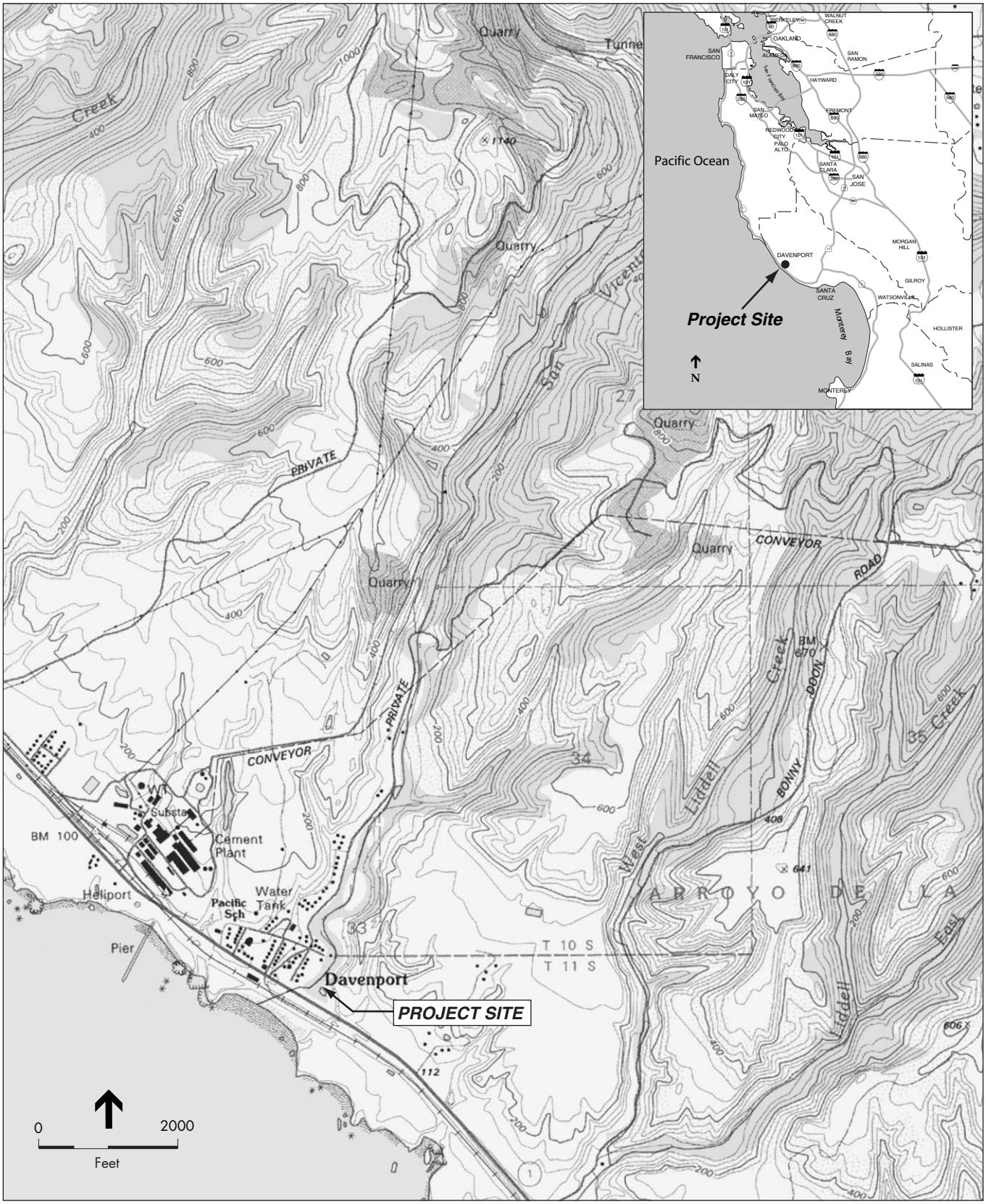
2. STUDY SITE

San Vicente Creek is a small, third order coastal stream in northern Santa Cruz County, California (Figure 1). Its headwaters are located at an elevation of approximately 2,600 feet and its main stem flows for about 9.3 miles before emptying into the Pacific Ocean at 37°00'33"N 122°11'39"W, just south of the town of Davenport. The 11.1 square mile watershed also includes 11.3 miles of tributary streams, the most significant of which is Mill Creek (CDFG, 1998). San Vicente Creek does not have a lagoon because the mouth of the creek was diverted through a 245-foot long manmade bedrock tunnel when railroad tracks were constructed over the creek in 1906 (ESA, 2001) and the lagoon was presumably filled in by the railroad grade. Approximately 65 feet upstream of the bedrock bore, the creek passes through a 142-foot long box culvert underneath Highway 1. Depending on tidal elevation, the creek exits the tunnel either on the north side of San Vicente Beach or directly into the Pacific Ocean. Due to the lack of a sandbar, coho and steelhead migration is never blocked at the mouth of the creek. However, a defunct mining tunnel at stream mile 3.4 presents a permanent barrier to fish migration and thus marks the upstream extent of available main stem salmonid habitat. Water diversion dams located at stream miles 0.5 and 0.75 on Mill Creek prevent fish from utilizing the upper watershed of that tributary (CDFG, 1998).

Although redwood forest dominates the watershed, the lower reaches of the creek support a narrow riparian zone of primarily alders (*Alnus* spp.) and willows (*Salix* spp.). Timber harvesting, open pit mining, water diversions, and rural residential development occur in the upper watershed. Cattle grazing and agricultural water diversions occurred in the lower watershed prior to TPL's acquisition of the property, but had gradually been phased out by the spring of 2003. In addition to coho and steelhead, San Vicente Creek supports populations of prickly sculpin (*Cottus asper*), coastrange sculpin (*C. aleuticus*), and three-spined stickleback (*Gasterosteus aculeatus*). A single green sunfish (*Lepomis cyanellus*) was captured in the main stem during the outmigrant study. The green sunfish is a non-native species whose aggressive and territorial nature often results in the displacement of native fishes (McGinnis, 1984).

San Vicente Pond is located just south of the lower portion of the main channel. The pond's inlet channel branches off the main channel at 37°00'39"N 122°11'25", approximately 660 feet upstream of the Highway 1 culvert, and extends approximately 390 feet before flowing into the pond at 37°00'36"N 122°11'28". Although manmade, the inlet channel contains a natural substrate bottom including gravel and cobble, as well as other physical features (small pools, undercut banks, woody debris, dense riparian cover) that create fish habitat qualities similar to those of small natural streams. Overflow from the pond enters the outlet channel at 37°00'35"N 122°11'28" and flows for approximately 155 feet before rejoining San Vicente Creek at 37°00'36"N 122°11'29". The outlet channel, also manmade, contains a far more silty bottom than the inlet channel and also lacks significant fish habitat. The difference between habitat availability in the inlet in outlet channels is reflected by the results of the fish relocation efforts described above.

Prior to the installation of a weir at the upstream end of the outlet channel in March 2003, the depth of the pond averaged 4.0 feet (4.2 ft. to 3.8 feet). The shape of the pond is more or less an oval with an approximate length of 130 feet and an approximate width of 90 feet. The volume of the pond prior to weir installation was therefore estimated at approximately 1.0 acre-foot. The weir raised the water level in the pond by about 1.0 foot. Since the majority of the pond's banks are very steep, the surface area of open water did not change appreciably with the raised water level. Thus, we estimated that the 25% increase in depth resulted in a 25% increase in volume to



SOURCE: USGS

San Vicente Pond / 202560 ■

Figure 1
Study Site Location Map

1.25 acre-feet. Vegetation around the perimeter of San Vicente Pond includes willow, alder, California blackberry, and a mix of native and non-native herbaceous species. Bulrush occurs in relatively small patches in the vicinity of the inlet and outlet channels. Lesser pondweed (*Potamegeton pusillus* var. *pusillus*) is by far the dominant aquatic plant species in San Vicente Pond. Lesser pondweed is a perennial species that may die off during freezing winter temperatures. In milder climates, however, winter die-offs are typically less extensive (Lowe, unpublished memorandum, Appendix A) and no appreciable reduction of pondweed was noticed during the 2002/2003 winter. Pondweed typically covers about 40% of the surface of San Vicente Pond. The percent cover below the water surface is considerably higher, probably about 60%, and appears to provide fish with considerable shelter availability. Furthermore, samples of pondweed collected from the center of the pond contained a high number of aquatic invertebrates (e.g., chironomid midge larvae, aquatic snails, etc.) as well as amphibian eggs masses, presumably those of Pacific tree frogs. In addition to these aquatic food supplies, coho and steelhead inhabiting the pond can frequently be seen jumping out of the water to catch aerial insects flying above the surface of the pond.

Prior to the initiation of the outmigrant study, the inlet channel had been screened since at least the summer of 2002 and a screen had also been installed on the outlet channel just upstream of its confluence with San Vicente Creek in the fall of 2002. Although the intention was to keep both screens in place throughout the winter and spring of 2002/2003, a large storm in the middle of December 2002 resulted in the inlet screen being blown out. While the outlet screen remained intact, high tides and high surf coupled with the storm flows resulted in San Vicente Creek becoming backed-up and the water level in the outlet channel rising to up to approximately 1 foot above the top of the outlet screen. Upon consultation with NMFS regarding the conditions of the screens, the inlet screen was not reinstalled until March 1, 2003, the assumed beginning of salmonid fry emergence from spawning gravels. A large, 2-inch mesh net was also installed immediately downstream of the outlet channel screen on December 30, 2002 to prevent adult salmonids from entering the channel or pond during high water.

3. METHODS

Outmigrant Trapping

A 2-foot high, 4-foot wide batter board weir with a 6-inch deep and 12-inch wide notch was installed at the upstream end of the outlet channel on March 26, 2003. The weir is intended to concentrate outflows and thus increase the velocity of attraction flows (*i.e.*, increase the likelihood of smolts in the pond finding the outlet channel), and to create an upstream migration barrier so as to prevent smolts from reentering the pond. A smaller, secondary weir downstream of the main one was installed to create a pool for outmigrants. The vertical drop at the main weir was maintained at a minimum of 10-inches throughout the duration of the study.

Downstream migrants were trapped in two locations from March 8 through June 15, 2003. During the majority of the study period (March 26 through June 15), fish exiting San Vicente Pond were trapped approximately 5 feet downstream of the main weir (37°00'35"N 122°11'28") within the pool created by the secondary weir. However, prior to the installation of the weir, the pond trap was operated in the lower portion of the outlet channel, immediately upstream of its confluence with San Vicente Creek, from March 8 through March 27. This was the only location along the outlet channel where a deep enough pool existed to allow for sufficient trap inundation. Salmonids in San Vicente Creek were trapped approximately 165 feet upstream (37°00'38"N 122°11'28") of the outlet channel's confluence with San Vicente Creek . The confluence is located approximately 930 feet upstream of the Pacific Ocean. Thus, the lower-most 1,095 feet of San Vicente Creek were not included in the study.

The two traps consisted of 2-foot diameter, 7-ring, 2-chamber hoop nets with 0.25-inch mesh size. Seine wings attached to both sides of the trap opening were used in an attempt to block the entire wetted width of the channels to achieve 100% trapping efficiency. During the first week of the study, 1-inch mesh squares were sown into the trap between the two chambers to allow smaller salmonids to escape bigger predatory fish, particularly large sculpins. However, rapid debris accumulation at the 1-inch mesh resulted in access to the second chamber becoming blocked for even the smallest fish, thus *increasing* both the fish densities and predation potential within the first chamber of the traps. The mesh was then removed from both traps for remainder of the study.

High water flows in San Vicente Creek during storm events occasionally resulted in minor bypasses around one of the seine wings at the creek trap. In addition, the creek trap had to be entirely removed on three occasions (March 16 and 17, April 14 through 16, and April 25 through 27) (Figure 5) to protect the fish, the trap, and the surveyors from excessive water velocities. The following simple arithmetic calculation was used to estimate the number of fish that would have been captured during each weekly interval if the trap had remained in place for the full 7 days:

$$\text{Estimated \# of weekly smolts/presmolts} = \left(\frac{\text{\# of smolts/presmolts captured during weekly interval}}{\text{\# of actual trapping days during weekly interval}} \right) \times 7$$

This estimate calculation assumes that daily migration numbers were constant over a given 7-day period. Considering the observed fluctuations in daily migration numbers, this assumption is likely to be fairly inaccurate, but nevertheless offers a rough estimate of the total sizes of the coho and steelhead downmigrations. However, the results and discussions presented in this report are based only on actual catches rather than estimated totals.

San Vicente Pond acts as an effective buffer against high water velocities and thus even during storms events, water velocities in the outlet channel were always low enough to allow the pond trap to remain in place for the entire 100-day study period.

Both traps were checked daily. Trapped fish were transferred into 5-gallon or 20-gallon holding buckets filled with stream water. All non-salmonids, primarily sculpins and crayfish, were returned to the stream. Coho and steelhead were anesthetized in a short (approx. 30 seconds) bath containing 0.5 milliliters of clove oil, 5 milliliters of 70% ethanol, and 1.5 gallons of stream water. Forklengths (FL) of juvenile salmonids were recorded to the nearest millimeter using standard plastic rulers. Wet weights (W) were measured to the nearest 0.1 grams using an Ohaus Scout II electronic scale with a 400-gram capacity. Evidence of fish diseases (e.g., black spot disease) and other noteworthy observations were also recorded. Measured and weighed fish were placed into another holding bucket containing stream water and allowed to recover from the anesthesia for approximately 10-20 minutes. All recovered fish, including those from the pond trap, were released in calm pool areas in San Vicente Creek downstream of the creek trap.

No direct mortalities of coho or steelhead occurred during the handling of the fish. However, it is unclear whether any fish succumbed to the stress of handling after having been released. All observed mortalities occurred in the traps and appeared to be the result of high stream velocities inside the traps or sculpin attacks, or a combination of both. With the exception of one coho from the creek trap, of which only half of the body was recovered, all mortalities were treated in the same manner as live fish, *i.e.*, measured, weighed, and counted.

The statistical significance of observed differences in forklengths and weights between the pond and the creek were evaluated using a two-sample t-test assuming equal variance. For all statistical comparisons, a significance value of 0.05 was used.

A total of 77 caudal fin clippings (17 pond steelhead, 20 pond coho, 20 creek steelhead, and 20 creek coho) were collected for DNA analysis. Samples were dried on blotter paper, stored in paper envelopes, and submitted to the NOAA/NMFS Southwest Fisheries Science Center, Santa Cruz, California. The results of the DNA analyses were not yet available at the time of report preparation.

Due to the relatively strict one-year freshwater residence of coho salmon, all juvenile coho captured during this study were classified as smolts, even though 10 coho captured in the main channel during the early part of the study (*i.e.*, March) had not yet developed any visual signs of smoltification. However, in an attempt to verify the actual age of migrating coho, particularly those exiting the pond, scale samples were collected from 14 pond coho and 16 creek coho.

No scale samples were collected from steelhead. Instead, age classes of steelhead were determined by segregating modal groups of forklength frequencies. Using this method of aging, the San Vicente age classes were found to be identical to those determined by Shapovalov and Taft (1954) on Waddell Creek for the same time of year (*i.e.*, March through mid-June). Captured steelhead with forklengths ranging from 50 mm to 69 mm were classified as age +, those measuring 70 mm to 129 mm as age 1, and those measuring more than 130 mm as age 2 and 3. As described by Shapovalov and Taft (1954), age 2 and 3 fish typically form unimodal length groups and are therefore grouped together. Furthermore, trapped steelhead were classified into three categories based on visual evidence of smoltification: non-smolts were those fish that contained typical freshwater coloration, including reddish sides; presmolts were those fish that had clearly begun to lose freshwater coloration but had not yet attained the truly silver coloration

typically associated with fully smoltified fish; smolts were those fish that were almost or entirely silver.

Water Quality

Following the September 2002 salmonid rescue/relocation effort, a water quality monitoring program was established in order to provide a warning system in case water temperatures in San Vicente Pond should get too high (*i.e.*, >18°C) or dissolved oxygen concentrations should get too low (*i.e.*, <5.0 mg/l) for the well-being of salmonids rearing in the pond. Two water quality monitoring sites were established in the pond (one at the site of a pump previously used for water diversions and one adjacent to a small beach on the northern shore of the pond). An additional site was established in the inlet channel to assess the quality of the water entering the pond, and a control site was set up on San Vicente Creek immediately upstream of the outlet channel confluence.

Water and air temperatures, dissolved oxygen concentration and saturation, standard and specific conductivity, and salinity were measured with a YSI Model 85 multipurpose probe at least once a week from September 17, 2002 through June 12, 2003 at the two San Vicente Pond sites and from October 24, 2002 through June 12 at the inlet channel and at San Vicente Creek. At the diversion pump site of the pond, measurements were collected at the water surface, and at 1-foot intervals down to a depth of 3 feet. At the beach site of the pond, measurements were taken at the surface and at 1-foot depth. Measurements in the inlet channel and in San Vicente Creek were collected at mid-channel, mid-depth.

A fountain-type aerator was installed in the pond on October 31, 2002 to allow for emergency water aeration in case dissolved oxygen levels dropped to dangerous levels. Other than for occasional testing, the aerator was never turned on. Aeration was never required during the monitoring period.

In addition to the described water quality monitoring, streamflows in San Vicente Creek were gauged using a Global Water WL-15 water level recorder with a 0.01 foot resolution and 15-minute recording intervals. Channel surveys and monthly discharge measurements were conducted to relate recorded water elevations to actual streamflows, thus enabling the generation of a continuous streamflow record for the entire trapping period.

4. RESULTS

Coho

A total of 319 coho were captured in the pond trap between March 8 and June 15 while a total of 703 coho were captured in the main channel during the same period. The total *estimated* number of coho salmon smolts in San Vicente Creek (*i.e.*, including estimates for days during which the trap was not operated) was 737. The total number of coho smolts exiting the watershed (*i.e.*, the combined total for the pond and the creek) was 1,022 actually trapped and 1,056 estimated.

A total of 4 coho from the creek trap and 2 coho from the pond trap were found dead upon arrival at the traps. While the mortalities in the creek most likely resulted from high water velocities within the trap during storm events, one fish from the pond trap exhibited a vast amount of blackspot disease and the other one from the same location was recovered from the stomach of a large sculpin.

The average forklength of pond coho was 121 mm (standard deviation, SD, ± 7 mm) and the average length of creek coho was 99 mm (SD ± 10 mm) (Table 1). The difference in average coho forklengths at the two sites was found to be statistically significant (P<0.0001). A total of 271 (85.2%) of the coho captured from the pond measured 115 mm or more, while only 38 (5.5%) coho from the main channel equaled or exceeded 115 mm (Figure 2).

Table 1
Summary of Physical Data Collected at Two Trapping Sites,
8 March – 15 June, 2003

	San Vicente Pond	San Vicente Creek
Coho		
Total # trapped (estimated)	319	703 (737)
Average forklength, mm (± SD)	121 (7)	99 (10)
Average wet weight, g (± SD)	18.2 (2.8)	10.1 (2.8)
Average condition factor, *k* (± SD)	1.02 (0.05)	1.02 (0.06)
Steelhead (all juveniles combined)		
Total # trapped	97	1,957
Average forklength, mm (± SD)	115 (41)	109 (32)
Average wet weight, g (± SD)	20.4 (21.0)	16.4 (16.5)
Average condition factor, *k* (± SD)	1.04 (0.13)	1.04 (0.10)
Steelhead (smolts/presmolts only)		
Total # trapped (estimated)	34	542 (598)
Average forklength, mm (± SD)	163 (24)	152 (21)
Average wet weight, g (± SD)	42.5 (21.8)	34.3 (15.2)
Average condition factor, *k* (± SD)	0.92 (0.10)	0.93 (0.07)

Note: Condition factor, $k = (100{,}000 \times \text{wet weight}) / \text{length}^3$

Similarly, the average weight of pond coho was significantly higher (P<0.0001) at 18.2 g (SD ± 2.8 g) than the average creek coho weight of 10.1 g (SD ± 2.8 g) (Table 1). A total of 257 (80.6%) coho from San Vicente Pond weighed 16.0 g or more while only 26 (3.7%) of coho from San Vicente Creek fell into that category.

The condition factor (k = 100,000 wet weight / length ^{3}) is frequently used by fisheries biologists as an indicator of the health of a fish population, with high k values (*i.e.*, > 1.0) indicative of adequate food supplies (Moyle and Cech, 1988). The average condition factors for coho salmon trapped at the two sites were identical (1.02) (Table 1).

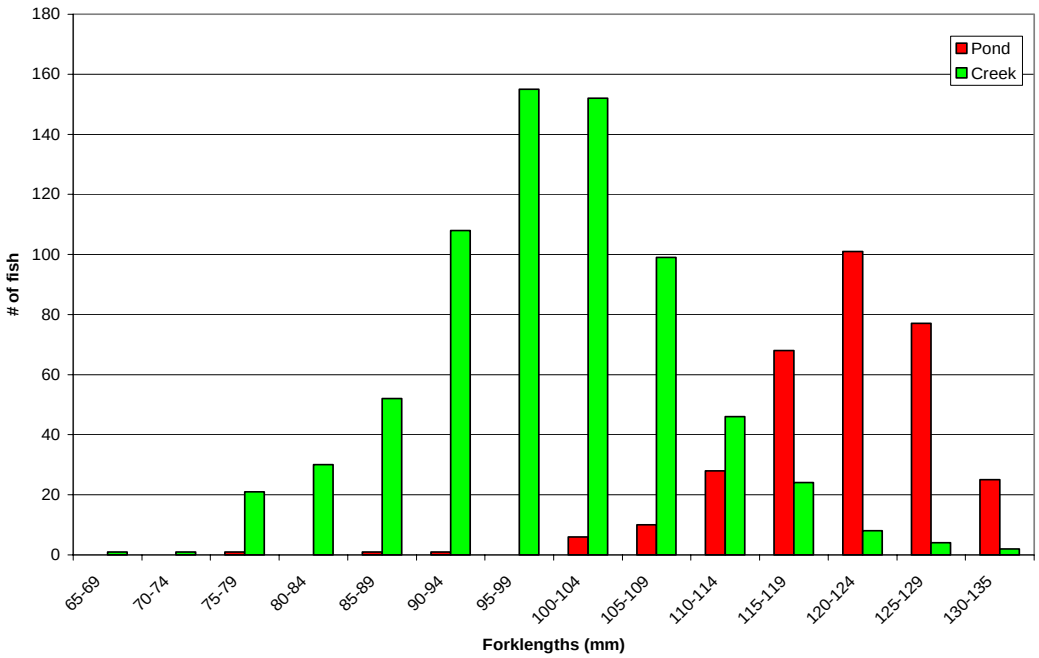


Figure 2. Coho salmon forklengths at two trapping sites, March 8 – June 15, 2003

Exponential regression analysis of forklengths and wet weights of coho smolts from the two sites (Figure 3) suggests that pond coho measuring *less than* 115 millimeters in length were generally slightly heavier than creek coho of the same size. This trend was reversed for fish *exceeding* 115 millimeters with the larger pond coho generally weighing less than creek coho of the same size.

The limited number of coho scale samples collected from the pond and creek did not allow for a definitive determination of age. A qualitative comparison of a small subsample of scales collected from similarly sized fish captured at the two locations revealed that scales from pond coho typically had higher circuli counts (21-28) than those of creek coho (14-17). Furthermore circuli on pond fish were generally more closely and more evenly spaced. However, all scales from both sites only revealed one discernable annulus, strongly suggesting that all captured coho were age 1+ fish.

Coho smolt migration timing along the central California coast has been studied in some detail. The results of a 9-year coho salmon and steelhead study on Waddell Creek show that the great majority of coho smolts enter the ocean during the months of April and May, with over 95% of the migration occurring during the 9-week period of April 8 through June 9 (Shapovalov and Taft, 1954). At San Vicente Pond, 99% of all coho smolts were captured between April 5 and June 6, 2003 (Figure 4) while in San Vicente Creek, 95% of all captured smolts were collected during the same period (Figure 5). Shapovalov and Taft (1954) also noted that larger coho salmon smolts move downstream toward the ocean during the earlier part of the outmigration

season while smaller smolts are typically observed during the later dates. At San Vicente Pond and Creek, however, average coho forklengths increased during the early part of the study and decreased slightly during the second half of the trapping period (Figure 6).

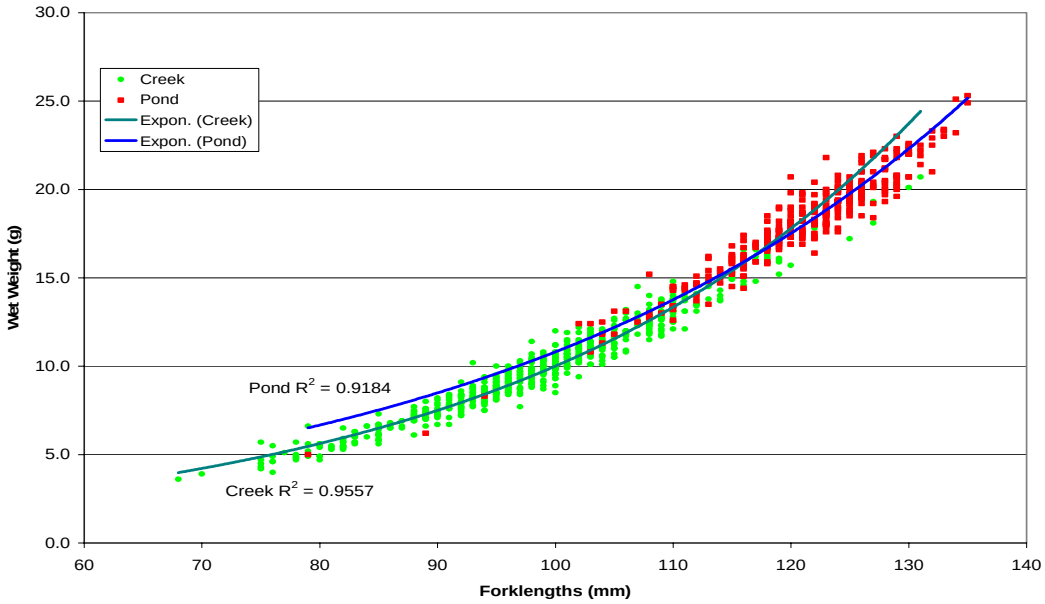


Figure 3. Coho salmon forklengths and wet weight at two trapping sites, March 8 – June 15, 2003

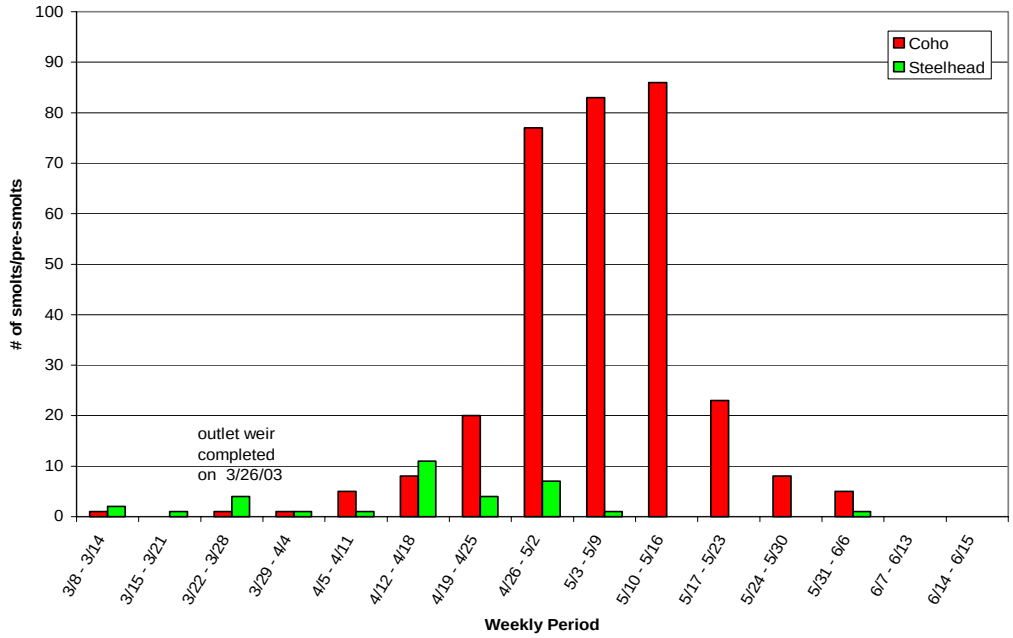


Figure 4. Coho salmon and steelhead smolt/presmolt migration timing, San Vicente Pond, March 8 –June 15, 2003

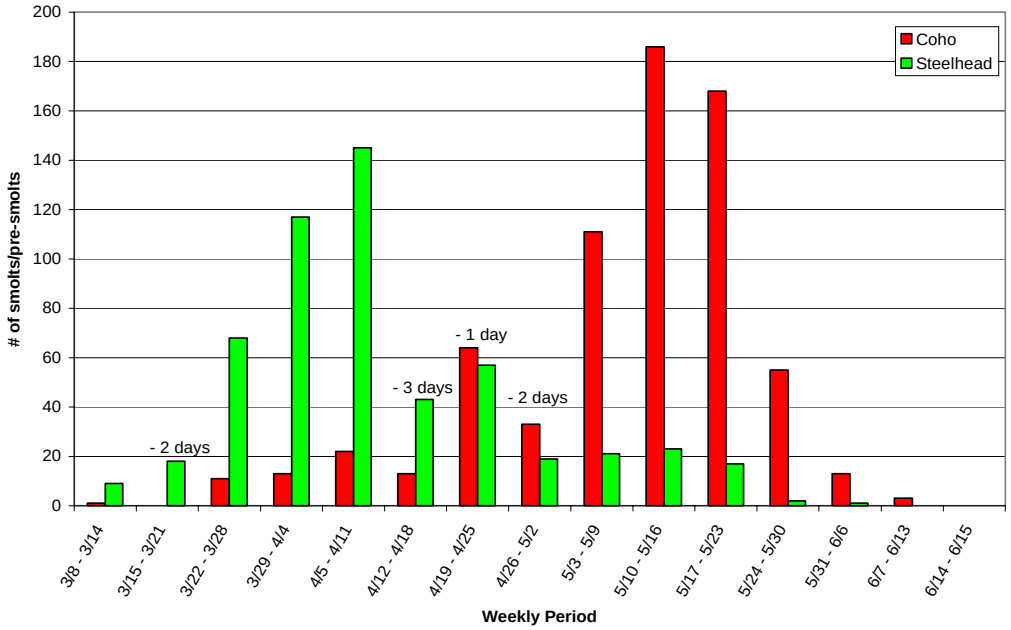


Figure 5. Coho salmon and steelhead smolt/presmolt migration timing, San Vicente Creek, March 8 –June 15, 2003. Negative day counts above bars indicate the number of days the trap was removed from the channel due to high flow conditions during a given 7-day period.

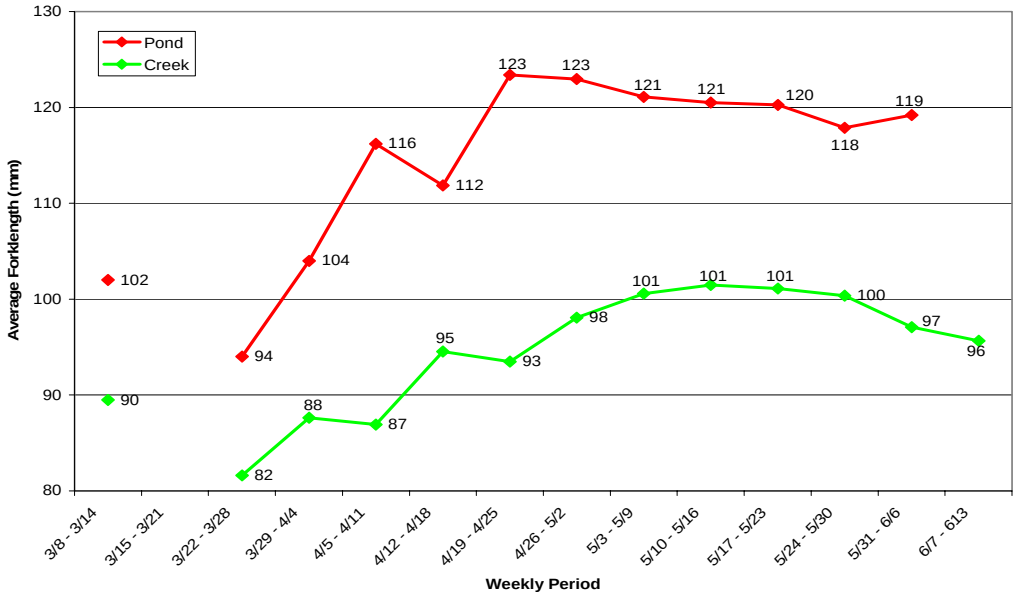


Figure 6. Average coho salmon forklengths by trapping location and weekly period, March 8 –June 13, 2003

Steelhead

Steelhead were found to be far more abundant in San Vicente Creek than in San Vicente Pond. A total of 1,957 juvenile steelhead were captured in the creek trap while only 97 exited the pond during the 14-week study. Captured smolts and presmolts accounted for 542 (27.7%) of the total creek catch while 34 (35.1%) of the pond steelhead were identified as outmigrating smolts. The total size of the *estimated* steelhead smolt/presmolt population size (*i.e.*, including estimates for days during which the trap was not operated) in San Vicente Creek was 598 (Table 1). Non-smolt steelhead were not included in this estimate. The total steelhead smolt production for the watershed (*i.e.,* pond and creek combined) was 576 actually trapped and 632 estimated. Therefore, although overall steelhead population of the watershed was significantly larger than the coho salmon population, only about half as many steelhead smolts as coho smolts (1,022 trapped and 1,056 estimated) migrated to the ocean in spring 2003.

A total of 20 adult steelhead returning to sea were also taken in the creek trap, but none came out of the pond. Furthermore, a total of 7 fish captured in the main channel trap were identified as potential resident rainbow trout. These fish were generally large (average FL = 234 mm, average W = 152.9 g) and strikingly colored with orange fins and red sides. The behavioral differences and similarities between the resident and anadromous forms of *O. mykiss* are well known (e.g., Moyle, 2002) and will not be discussed here. Neither adult steelhead nor those identified as potential resident forms were included in the data analyses.

A total of 3 juvenile steelhead were found to be dead upon arrival at the creek trap. No steelhead mortalities were encountered in the pond trap. Steelhead mortalities appeared to be the result of high water velocities in the creek trap during storm events.

The average forklength of all pond steelhead was 115 mm (SD, ± 41 mm) and the average forklength of all creek steelhead was 109 mm (SD ± 32 mm). The observed difference in average forklengths was considerable, but not statistically significant ($P<0.0893$). However, considering steelhead smolts and presmolts alone, the average forklength was 163 mm (SD, ± 24 mm) for pond steelhead and 152 mm (SD, ± 21 mm) for creek steelhead (Table 1), a statistically significant ($P<0.0029$) difference.

The average wet weight of all steelhead captured from the pond was 20.4 grams (SD ± 21.0 g) while the average weight of creek steelhead was 16.4 grams (SD ± 16.5 g). The average weight for steelhead smolts and presmolts was 42.5 grams (SD ± 21.8 g) in the pond and 34.3 grams (SD ± 15.2 g) in the creek (Table 1). Observed differences in total average weight and smolt average weight between the two sites were found to be statistically significant ($P<0.0028$ and $P<0.0035$, respectively).

The average condition factor for steelhead from the pond and creek were identical (1.04) for all juveniles combined and very similar (0.92 and 0.93, respectively) for smolts and presmolts.

Exponential regression analysis of forklengths and wet weights of steelhead from the two sites reveals no discernable difference between steelhead rearing in the pond and the creek. Fish from both sites appeared to have similar weights for given forklengths and exponential regression lines for the sites have nearly identical shapes and R^2 values (Figure 7).

Of the steelhead captured at the pond site, 11 (11.6%) were determined to be of the age + class, 52 (54.7%) were age 1 fish, and 32 (33.7%) age 2 and 3 fish. In the creek, the age distribution

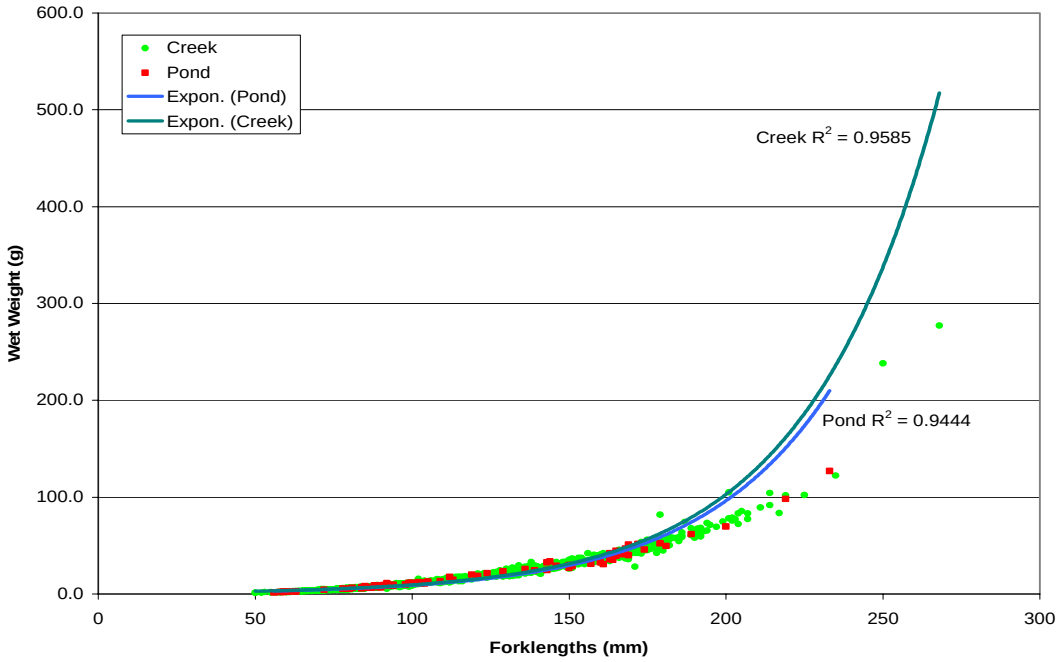


Figure 7. Steelhead forklengths and wet weight at two trapping sites, March 8 –June 15, 2003

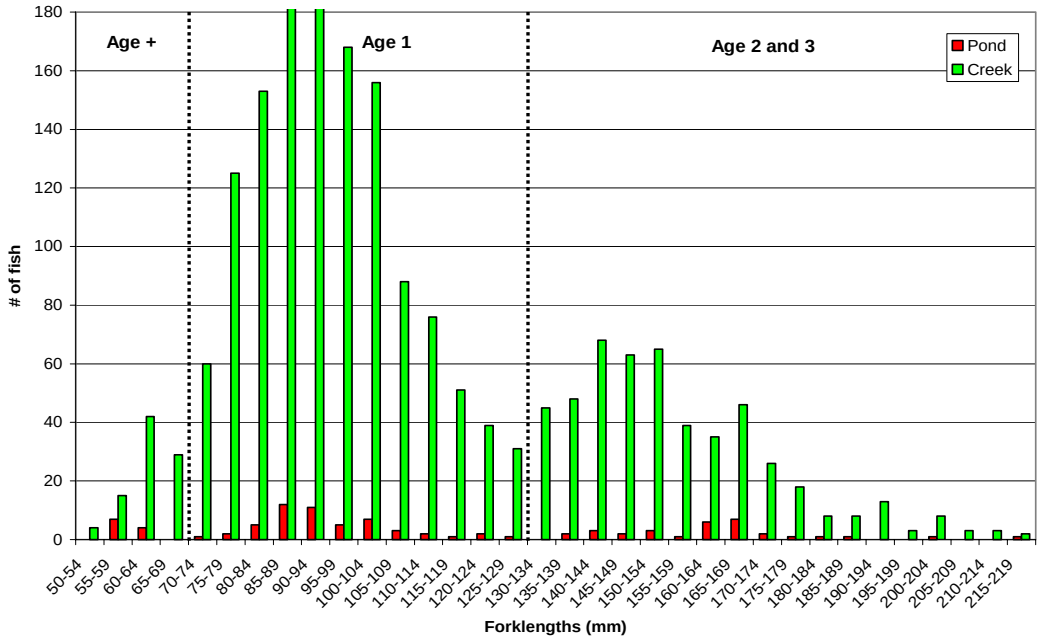


Figure 8. Steelhead forklengths and likely age classes at two trapping sites, March 8 – June 15, 2003

was more heavily weighted towards the age 1 class with 90 (4.6%) identified as age +, 1,358 (69.5%) as age 1, and 505 (25.9 %) as age 2 and 3 (Figure 8).

The peak of the steelhead downstream migration from both the pond and the creek occurred considerably earlier than that of coho (Figure 4). Although the numbers of migrating smolt and presmolt steelhead from the pond do not form a unimodal curve over the duration of the 2003 trapping season, the highest weekly total occurred from April 12 through April 18. The peak of the outmigration in the creek could not be accurately determined due to the fact that the creek trap had to be removed from the channel on several occasions for varying lengths of time. The highest observed total of steelhead smolts and presmolts in San Vicente Creek occurred from April 5 through April 11 (Figure 5). A total of 88% of all steelhead smolts/presmolts migrated from the pond during the 7-week period of March 22 through May 9 while 89% of all creek smolts/presmolts (based on observed numbers) migrated during the same period.

Shapovalov and Taft (1954) found that the spring downstream migrations of different steelhead age classes in Waddell Creek had distinctly separate peaks with most age 2 and 3 migrating first during April and May, and age 1 fish migrating later, primarily during May and June. Steelhead forklengths averaged over weekly intervals at San Vicente Creek also showed a gradual downward trend over the spring 2003 trapping season (Figure 9), although steelhead lengths spiked in late April/early May, presumably due to the increased streamflows resulting from late-season storm events (Figure 11). Average forklengths from San Vicente Pond, however, did not follow a discernable trend over time but rather were scattered throughout the trapping season (Figure 9).

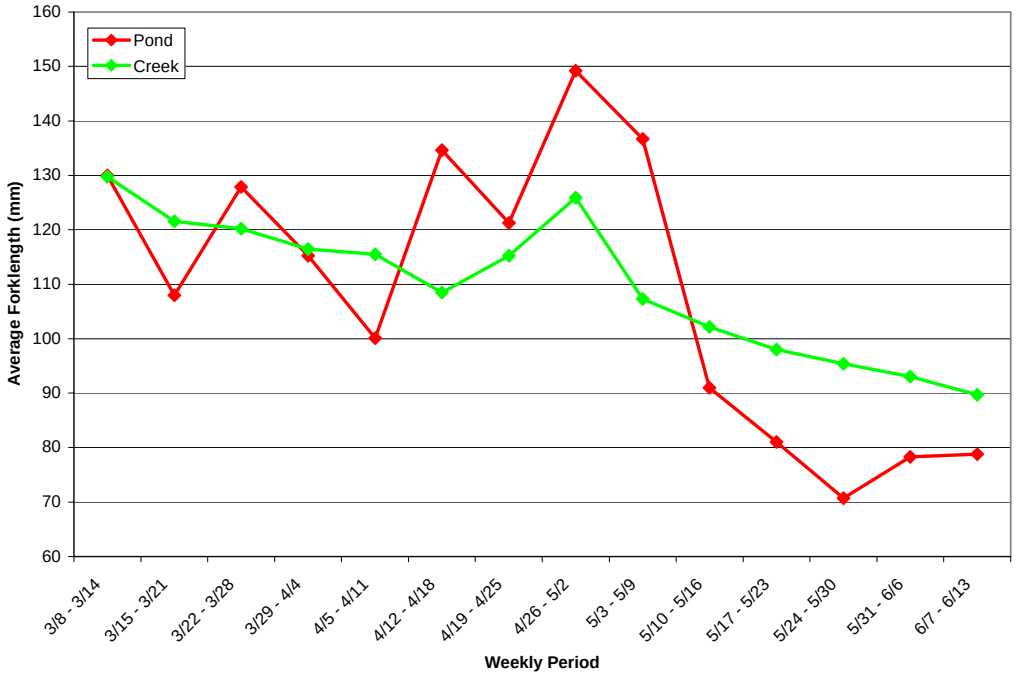


Figure 9. Average steelhead forklengths by trapping location and weekly period, March 8 –June 13, 2003

Site Comparison

A total of 416 juvenile salmonids were captured in the San Vicente Pond trap between March 8 and June 15, 2003. Coho salmon comprised 77% of the total catch in the pond trap while steelhead accounted for only 23% of the pond catch. At the San Vicente Creek trap, species distributions were essentially a mirror image of those in the pond. A total of 2,260 salmonids were captured, 26% of which were coho and 74% steelhead.

Similar species distributions were observed during the September 2002 fish rescue/relocation effort. During that survey, 117 coho (88%) and 16 steelhead (12%) were captured in San Vicente Pond while 23 coho (13%) and 158 steelhead (87%) were taken from the pond's inlet channel.

These observed species distributions support the extensively documented differences in the habitat preferences of the species (e.g., Moyle, 2002; Roni, 2002; Swales, *et al.*, 1988). Coho salmon are known to prefer deep pools and relatively slow water velocities while steelhead generally reside in the more shallow and fast-flowing areas of a channel.

Black-spot disease was considerably more prevalent in fish migrating from the pond than the creek. Among pond migrants, 43% of coho and 35% of steelhead exhibited some level of black-spot infection while only 14% of coho and 18% of steelhead in the creek were affected by the disease.

During the study an apparently different type of disease was noted, particularly among coho exiting the pond. Small bumps, approximately the same size as black-spot, were noted on the sides of fish. Unlike black-spot, however, these bumps appeared to be located underneath the scales of the fish, pushing outward to form tiny mounds. As this type of infection was only noted after the study had already begun, only limited quantitative data is available. For example, during the week of May 10 through May 16, 2003, a total of 86 coho were captured in the pond trap and 58 (67%) of those showed signs of this type of infection. Qualitative evidence (*i.e.*, non-recorded surveyor observations) suggests that the disease was far more prevalent in the pond and among coho. Although the disease did not appear to affect the fish in most cases, one dead coho salmon containing vast numbers of bumps was removed from the pond trap.

Water Quality

The following summary of water quality monitoring results (Table 2) does not include the complete data sets for all parameters at all sites. Only results pertinent to known salmonid water quality requirements are presented. The complete water quality monitoring data set is presented in Appendix B.

Water temperatures in San Vicente Pond never exceeded 18°C during weekly spot checks (Table 2, Figure 10, Appendix B), but dissolved oxygen concentrations at the pump site were lower than 5.00 mg/l on six sampling days (September 17 and 23, October 17 and 24, November 28, and December 9) (Figure 11, Appendix B). No other monitoring site contained inadequate oxygen levels. With the exception of October 17, on which oxygen levels were lower than 5.00 mg/l at depths of 2 feet (4.95 mg/l) and 3 feet (3.90 mg/l), all other occurrences of low-oxygen conditions were confined to the 3-foot depth at the pump site. At the pump monitoring site, water depth was close to 3 feet (prior to weir installation) and the oxygen probe's proximity to the pond's bottom, where decomposition typically consumes large amounts of oxygen, may have led to the depressed levels recorded at that depth. A rare event of tidal influence in the pond on December 9, 2002 may have resulted in the low oxygen level observed at the 3-foot depth on that day. After the

installation of the outlet channel weir was completed on March 26, 2003 and the water elevation of the pond rose by approximately 1 foot, low oxygen levels were no longer observed. The most likely explanation for this observation is that the 3-foot monitoring depth, measured from the surface of the water, was no longer close to the pond's bottom after that date.

Table 2
Summary of Water Quality Data Collected at Four Sampling Sites, September 17, 2002 –June 12, 2003

	Water Temperature (°C)			Dissolved Oxygen (mg/l)		
Monitoring Site	Min.	Max.	Ave.	Min.	Max.	Ave.
S.V. Pond, Pump Site*	8.4	15.7	11.6	3.90	11.88	8.54
S.V. Pond, Beach Site*	8.5	17.2	11.9	6.31	13.00	9.31
Inlet Channel	8.8	13.4	10.7	8.25	11.66	10.11
S.V. Creek	9.1	13.4	10.8	7.85	11.37	9.70

*Note: Listed values are based on measurements taken at four depths (0, 1, 2, 3 feet) at the S.V. Pond pump site and at two depths (0, 1 foot) at the S.V. Pond beach site.

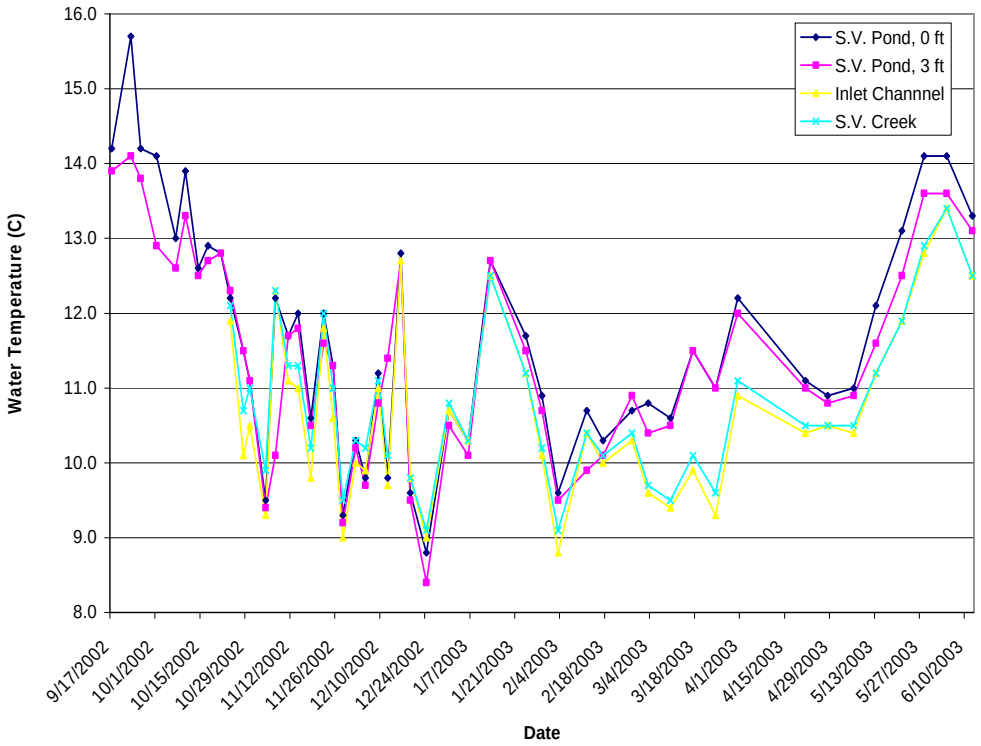


Figure 10. Water temperatures at four select monitoring locations on San Vicente Pond and Creek, September 17, 2002 –June 12, 2003

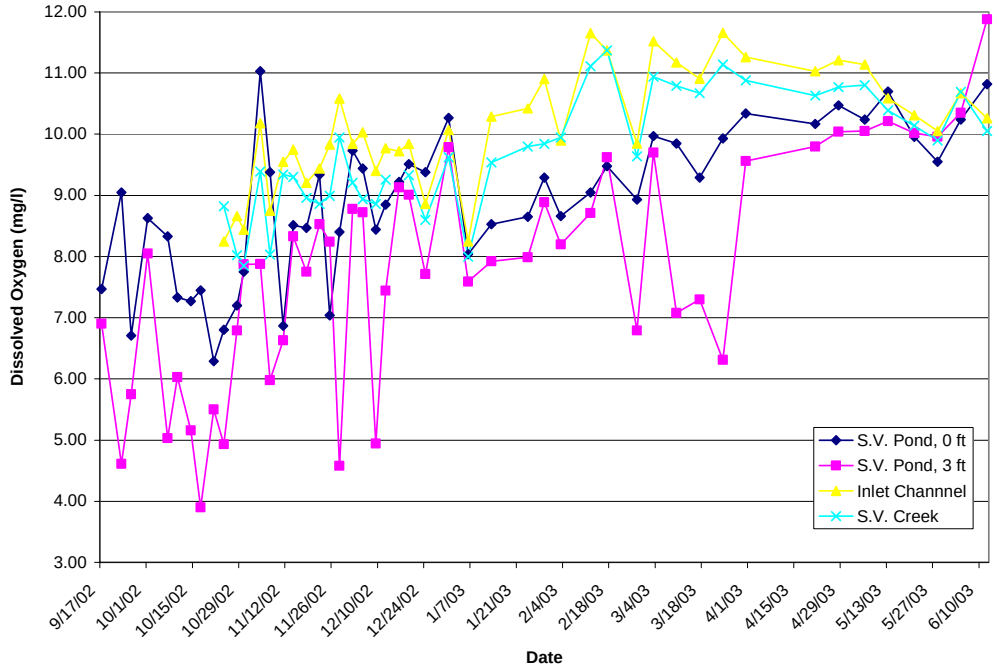


Figure 11. Dissolved oxygen concentrations at four select monitoring locations on San Vicente Pond and Creek, September 17, 2002 –June 12, 2003

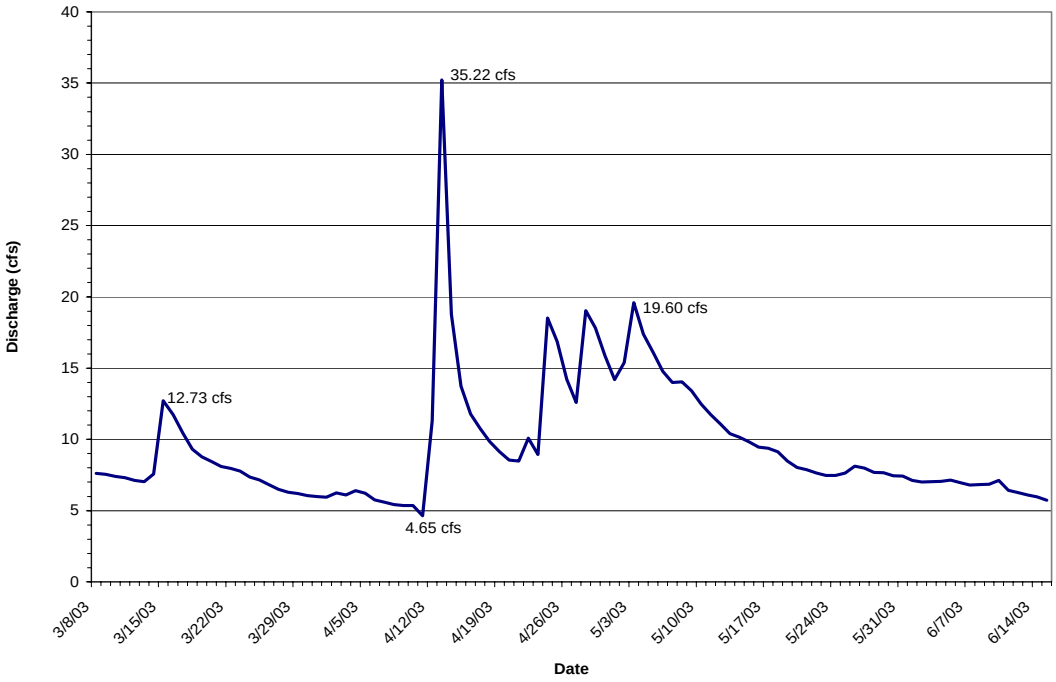


Figure 12. Average daily discharges (streamflows) in San Vicente Creek, March 8 –June 15, 2003

It may also be worth noting that the inlet channel typically contained higher oxygen levels and lower water temperatures than the main channel of San Vicente Creek (Table 2, Figures 10 and 11).

A combination of very high tides and high surf along the central California coast during the first half of December 2002 resulted in tidal influence reaching San Vicente Pond. Salinity levels of 0.7 parts per thousand (ppt) and 0.6 ppt were recorded at the 3-foot depth at the pump site on December 9 and 12, respectively (Appendix B).

The highest average daily discharge of 35.22 cubic feet per second (cfs) in San Vicente Creek during the March 8 through June 15, 2003 trapping period was recorded on April 13. This was preceded by the lowest recorded discharge of 4.65 cfs on April 11. Several late-season storms occurred during the spring of 2003, resulting in further peak discharges of 18.52 cfs on April 24, 19.03 cfs on April 28, and 19.60 cfs on May 3 (Figure 12).

5. DISCUSSION

The primary goal of the San Vicente Pond and Creek Smolt Outmigration Study, as requested by NMFS, was to quantify the total salmonid population size present in the pond and to verify whether smolts were able to migrate out of the pond during spring 2003. Furthermore, the study attempted to provide a quantitative comparison of the health and abundance of the salmonid populations rearing in San Vicente Pond versus those rearing in the main channel of San Vicente Creek.

In an effort to determine potential differences between coho salmon age classes in the pond and creek populations, qualitative scale analyses were added to the scope while the study was already in progress and considerable site-specific length and weight differences became apparent. The results of the scale analyses were also considered in an attempt to relate size differences among fish from the two trapping sites to potential differences in growth rates.

A water quality monitoring program and continuous stream stage measurements were conducted to provide important environmental background information for the study. The conclusions and inferences drawn from the various study results are discussed separately below.

Outmigration

Prior to the beginning of the trapping study, the outlet channel was cleared of some bulrush as well as one minor logjam to facilitate fish passage from the pond to San Vicente Creek and ultimately to the ocean. The intent of the weir constructed at the upstream end of the outlet channel was to further enhance fish passage by concentrating outflows into a 12-inch wide notch and to block fish that had committed to exiting the pond from returning to it. Although the results of the trapping study show that emigration from the pond was clearly possible after the weir was installed, data collected prior to its installation indicate that fish passage may have also been possible if the weir had not been in place (Figure 4). San Vicente Pond was constructed in the 1950's and, in the opinion of the author of this report, it is entirely conceivable that juvenile salmonids have reared in and emigrated from San Vicente Pond for decades, though perhaps with varying levels of success depending on conditions and use of the pond. Direct harm resulting from entrainment in the diversion pump is also likely to have occurred regularly.

Several large steelhead (age 2 and 3) were observed in the pond after the study was completed, suggesting that not all fish migrated out (although some may have outmigrated after the end of the study). However, considering the nearly identical migration timing patterns observed in both the pond and creek traps (Figures 4 and 5), including a substantial drop in smolt abundance in late May and early June, it is unlikely that any fish attempting to exit the pond was unable to do so due to physical barriers or insufficient attraction flow at the pond's outflow. Considering the known variations in the duration of freshwater rearing among steelhead, it is not surprising that some individuals of that species remained in the pond. It is also possible that the steelhead observed in the pond after the study were members of a resident rainbow trout population, as observed in San Vicente Creek during the trapping study.

Population Sizes

In all, 319 coho salmon and 97 steelhead migrated out of San Vicente Pond between March 8 and June 15, 2003. *Adding* the fish captured from the pond and inlet channel in September 2002 to those totals indicates that at least 459 coho and 271 steelhead were present in the pond during the summer and fall of 2002.

The San Vicente Creek trap yielded a total of 703 coho and 1,957 steelhead. *Deducting* fish captured from the pond and inlet channel in September 2002 from those totals suggests that 563 coho and 1,783 steelhead reared in the creek continuously.

It should be noted that while all coho salmon captured during the study were identified as ocean-bound smolts (or presmolts), the majority of captured steelhead (65% in the pond and 72% in the creek) were non-smolt juveniles, primarily age 0+. Thus, combining the pond and creek totals for smolts only, the San Vicente Creek watershed produced approximately twice as many coho smolts (1,022 actual catch; 1,056 estimated) as steelhead smolts (576 actual catch; 632 estimated) in the spring 2003 smolt outmigration season.

The most worrisome observation made during the study is that although steelhead young-of-the year (age 0+) became relatively abundant in the two traps toward the end of the study, no age 0+ coho were observed, suggesting that coho spawning and/or escapement were very low in 2003. Surveys conducted by CDFG during summer 2003 revealed approximately one juvenile coho from the 2000…2003 brood lineage per pool (Nelson, pers. comm.).

Of course, the above population estimates assume that movement of fish between the pond and the creek occurred only during the relocation effort. This assumption is very unlikely to be true since we know that at least during the months of January and February 2003, the inlet channel screen was out-of-service and inter-habitat movement was not only possible, but highly likely due to the known tendency of coho in particular to seek deep, low-velocity habitats, including off-channel ponds, during moderate to high streamflow events (Peterson, 1982; Bell *et al.*, 2001a).

Nevertheless, the data strongly suggest that in terms of overall extent of main channel habitat and pond habitat, a disproportionally high number of all coho present in the watershed reared in San Vicente Pond. Even if one is to assume that salmonids present in the pond during the summer and fall of 2002 were trapped and could not exit the pond at will, almost half the entire San Vicente coho population chose to *enter* the pond at one point or another during their one-year rearing cycle, while an almost negligible percentage of steelhead reared in the pond. These results are consistent with the findings of various other studies of off-channel ponds and similar habitats. For example, a study of two small (0.25 and 2.5 acres) off-channel ponds in British Columbia found a total of approximately 4,000 and 1,000 overwintering juvenile coho, respectively, while steelhead were far more abundant in the main channels (Swales *et al.*, 1986). A study of two small, shallow riverine lakes also found that coho salmon were far more abundant in the lakes than in the main river while steelhead catches in the pond were low (Swales *et al.*, 1988). Furthermore, Peterson (1982) trapped over 9,500 juvenile coho migrating *into* two riverine ponds during the late summer, fall, and early winter.

Past land management practices such as timber harvesting and road building are known to have contributed to the large-scale loss of pools throughout the Pacific Northwest and central California coast drainages and this habitat loss is believed to be at least partially responsible for the decline of coho salmon (Kuzic *et al.*, 2001; Brown *et al.*, 1994). Conversely, the use of deep pool habitat rather than shallow riffles by juvenile coho salmon has been shown to increase midsummer survival (Kuzic *et al.*, 2001), winter survival (Bell, 2001b), and total production of juvenile coho salmon (Bisson *et al.*, 1988a). It appears very likely that the San Vicente Creek watershed, which is severely lacking in significant pool habitat (CDFG, 1996; ESA, 2001), would be able to support a much smaller total coho population than that observed during the study if San Vicente Pond was not available to rearing juveniles. Several researchers (Peterson, 1982;

Nickelson *et al.*, 1992) have suggested that the presence of pond habitat may increase the natural production of wild coho salmon populations.

Habitat Comparison

When attempting to compare the habitat values of San Vicente Pond and San Vicente Creek, the results of the study suggest conflicting conclusions. On one hand, the average forklength and average wet weight were significantly higher among both coho and steelhead smolts rearing in the pond than those rearing in the main channel. In their 9-year study of Waddell Creek, Shapovalov and Taft (1954) found that 95% of all captured coho measured between 103 and 117 mm FL. The average coho FL in San Vicente Pond was 121 mm and the average coho FL in San Vicente Creek was 99 mm, suggesting that observed average pond coho lengths were on the high end of "normal" while creek coho lengths were on the low end. On the other hand, the species-specific average condition factors (*k*) were identical at both sites, suggesting similar "health" among fishes from the two habitats. While Moyle and Chech (1988) state that high *k* values (*i.e.*, > 1.0) are indicative of adequate food supplies, the condition factor has been shown to be a poor indicator of growth rates among largemouth bass and white crappies (Gutreuter and Childress, 1990). As such, the *k* values observed at the two sites may only be indicative of the fact that fish in both locations were "healthy" and had access to adequate food supplies, but their growth rates may have been very different, resulting in differently sized fish. Other studies also found that the growth rates of coho salmon in ponds and side channels appeared to be faster than in main channel habitats (Swales *et al.*, 1986) and that mean lengths of coho in lakes were greater than in tributary streams and main river reaches (Swales *et al.*, 1988).

One possible explanation for the larger coho salmon present in the pond may simply be related to the known habitat preferences of coho salmon. Many studies have shown that pools are essential for rearing juvenile coho salmon (e.g., Bisson *et al.*, 1988a; Kruzic *et al.*, 2001). One study found coho salmon to prefer pools with low average velocities of less than 20 cm/s (0.66 feet/sec) while very few were found in riffles with high current velocities (Bisson *et al.* 1988b). Steelhead, on the other hand, occurred in riffles and also utilized deep pools with relatively high velocities along the center of the channel (Bisson *et al.* 1988b). These differences in habitat preferences have even been linked to variation in the body shape and fin size among the two species. The observed variations generally fit the predicted morphologies that would be favored in different locations within the channel. Coho salmon possess a deep, laterally compressed body with large median and paired fins (Bisson *et al.* 1988b). These features are believed to facilitate rapid turns and quick but transient burst swimming. Steelhead, on the other hand, possess a more cylindrical body shape with short median fins and relatively large paired fins, attributes that appear well adapted to holding a position in swift water (Bisson *et al.* 1988b). It is entirely possible that rearing in San Vicente Pond, which generally provides habitat attributes that more closely resemble known coho habitat preferences and also requires less energy expenditure, resulted in higher growth rates, and thus larger and heavier coho smolts, than rearing in San Vicente Creek did.

Furthermore, it has been suggested that the higher water temperatures and more abundant food supplies (invertebrates associated with aquatic vegetation) characteristic of ponds may be the primary reason for the commonly observed increases in growth rates (Swales *et al.*, 1986). Winter water temperatures were generally only slightly higher in San Vicente Pond than in the San Vicente Creek, but that may be a reflection of the time (early morning) measurements were collected. Pond temperatures almost certainly increased during the day. With regards to food resources, our observations suggest that the pondweed, the dominant aquatic vegetation in the pond, supports large populations of invertebrates.

It is also very likely that inter-specific competition between coho salmon and steelhead was an important factor in the observed size differences among coho from the two trapping sites. Steelhead densities have been shown to negatively affect coho growth as measured in weight change. Harvey and Nakamoto (1996) showed that weight change in coho was positive among fish held in the absence of steelhead, neutral among coho held with natural steelhead densities, and negative among those held in twice the natural steelhead densities. The more aggressive coho salmon typically dominate interactions among similar-sized juvenile salmonids (Moyle, 2002). However, Moyle (2002) points out that "when habitat conditions in California streams favor juvenile steelhead so that their densities are higher than those of coho, growth of coho may be suppressed through competition for food in crowded pools, especially when flows are low, and through aggressive interactions with large 1- to 2-year-old steelhead". Considering that steelhead accounted for 74% of all salmonids trapped in San Vicente Creek and only 23% of the total San Vicente Pond catch, it appears likely that the greater steelhead densities in the creek may have resulted in the smaller relative sizes of coho rearing in the creek as compared to the pond.

Coho Age and Growth

The above discussion regarding possible reasons for the observed differences in average length and weight between juvenile salmonids from the pond and the creek, particularly coho salmon, is based on the assumption that all coho captured in both traps were of the same age class (*i.e.*, 1+). However, given the considerable size differences between the two sites, the possibility that at least some pond coho were age 2+ fish has to be considered.

A two-year freshwater life history is assumed to be rare among coho salmon (Moyle, 2002; Bell, 2001b). One of the only known occurrences of age 2+ coho in California has been documented in Prairie Creek, tributary to Redwood Creek in Humboldt County (Bell, 2001b). About 28% of outmigrant coho smolts caught in Prairie Creek during spring 2000 were age 2+. Their average FL was 102 mm as opposed to the average FL of 89 mm of the age 1+ migrants (Bell, 2001b). However, during their first winter in freshwater, fish that ultimately outmigrated at age 2+ were smaller than fish of the same age that outmigrated the following spring, suggesting that smaller fish are more likely to spend a second year in freshwater than larger fish (Bell, 2001b).

Qualitative analyses of scales collected from San Vicente Pond and Creek coho do not provide a definitive answer to the question of age. While pond coho typically had 21 or more circuli and creek coho of similar forklengths had between 14 – 17 circuli, all scales appeared to have only one discernable annulus. The rate of circuli formation has been found to be positively correlated to growth rates in similarly-sized coho held or caught in saltwater (Fisher and Pearcy, 1990), and the higher number of circuli in coho from San Vicente Pond may simply be a reflection of higher growth rates compared to coho from the main channel. The results of a recent salmonids scale study suggest that circulus spacing of juveniles decreases simply as circulus numbers increases (Fukowaka, 1998). This appears to explain the observation that circuli spacing in coho from San Vicente Pond was generally smaller (narrower) than that of coho from the main channel.

However, aging coho through scale analysis is very difficult. While age 2+ coho in Prairie Creek generally had 18 or more circuli, some age 1+ smolts were larger than age 2+ fish and exhibited a higher number of circuli (Bell, pers. comm.) The use of passive integrated transponder (PIT) tags was found to be the only method of determining coho age classes for certain in the Prairie Creek study (Bell, pers. comm.). The NMFS Science Center in Santa Cruz, California, is currently combining PIT-tagging and scale analyses in a multi-year coho and steelhead study on Scott Creek, located 0.5 miles north of San Vicente Creek. As preliminary results indicate the presence

of coho that will be age 2+ by the time they will presumably outmigrate in spring 2004 (Bond, pers. comm.), more information about the relationship between coho age and scale patterns may become available in the near future.

Water Quality

Weekly dissolved oxygen data collected in San Vicente Pond between September 17, 2002 and June 12, 2003 suggest that even during periods of depressed oxygen levels in the lower portions of the pond, the top 1 to 2 feet of the water column continue to provide salmonids with sufficiently oxygenated habitat. Since the installation of the weir and the concomitant increase in water depth and volume, it appears that a total of 3 vertical feet provide adequate oxygen supplies. Furthermore, oxygen levels near the beach site typically contained higher oxygen levels than the pump site. The likely reason for this is that the beach sampling site, located between the inlet and outlet channels, receives a higher degree of water circulation than the pump site, which is located near the opposite shore of the pond.

San Vicente Pond also contains a large amount of oxygen-producing, perennial aquatic vegetation. Aquatic vegetation actually *removes* oxygen from the water column through respiration during the dark period (night time), which causes oxygen levels to be at their lowest in the early morning. From then on, sunlight drives photosynthesis and oxygen levels steadily increase until the following evening. Since oxygen levels were typically measured during the early morning, and were found to be adequate in at least parts of the pond on all occasions, dangerously low oxygen levels (< 5 mg/l) are unlikely to occur throughout the entire pond or for extended period of time.

Measured water temperatures in San Vicente Pond never reached the preferred upper limit of 18°C. However, the majority of measurements were colleted in the morning since that is the time of day when oxygen levels in a lentic, vegetated body of water are typically lowest. The highest water temperature of 17.2°C was recorded at the beach site (0 ft depth) on September 23, 2002 in the early afternoon. The water temperature at a depth of 1 foot at the same site on the same day, however, was 2.1°C cooler. Given the pond's proximity to the Pacific Ocean and its cooling influences, it is unlikely that water temperatures throughout the water column would reach lethal temperatures, generally estimated at approximately 24°C, for juvenile salmonids. Deeper water, largely shaded areas near the pump site, and freshwater inflows near the beach site, are all likely to provide adequate thermal refugia even during hot days. To verify this, continuous water temperature monitors will be installed in the pond in the fall of 2003 and operated for an entire year.

6. CONCLUSIONS AND RECOMMENDATIONS

The importance of deep, low-velocity habitats such as off-channel pond, lakes, alcoves and beaver dam ponds to juvenile coho has been well established. Ponds and similar habitats have been shown to exhibit greater relative abundances (Swales *et al*., 1988; Swales *et al*., 1986; Nickelson *et al.*, 1992), greater growth rates (Swales *et al*., 1988; Swales *et al*., 1986), and greater winter survival (Bell, 2001b) when compared to main channel habitats. The importance of off-channel ponds may be all the greater in streams that are lacking significant pool habitat, as is the case in San Vicente Creek. The presence, and accessibility, of off-channel ponds may greatly increase the total juvenile coho carrying capacity of coastal watersheds in central California and may in fact present an important tool in efforts to restore exceedingly low stocks.

San Vicente Pond should be managed as juvenile coho salmon rearing habitat. The most urgent aspect of such management was the restoration of fish access to the pond. This was achieved in October 2003 when the inlet channel screen was removed following NMFS recommendations (the outlet channel screen was never reinstalled following its removal in the spring of 2003). Peterson (1982) found that the majority of juvenile coho migrating into ponds occurred during the first rainfall events of the season and the removal of the inlet channel screen occurred in time to allow for this seasonal migration.

Although the recent removal of the screens has reestablished fish access to the pond, exiting the pond during low flow periods may be problematic due to the presence of a half-buried in the inlet channel just upstream of the pond. The culvert appears to present more of an upstream migration barrier than a downstream barrier. Should water quality conditions in the pond become compromised due to a drop in dissolved oxygen levels or a rise in water temperatures, fish may not be able to escape those conditions by exiting the pond via the inlet channel. Escape through the outlet channel would be possible, but the geomorphology and habitat quality of that route are less favorable. Furthermore, if the pond contained excessively warm and/or oxygen-depleted water, the outlet channel would naturally convey water of similar quality.

In addition, the integrity of the primary and secondary weirs in the outlet channel should be monitored. Failure or blockage of either weir could result in adverse migration conditions.

Furthermore, coho use of the pond should continue to be monitored. Several aspects of that use are still uncertain. Among those are the need to determine summer survival in the pond, verifying whether some coho may rear in the pond for more than on year, and determining the relative importance of the pond during weak brood lineage years (*i.e.*, does the pond constitute preferred coho habitat even during years of low abundance or just secondary habitat during years of high abundance). It may also be important to accurately assess the geomorphologic dynamics of the pond. There has been at least once instance in the recent past were the pond required dredging following a large flood event (Smith, pers. comm.). Depending on the results of further studies of the pond's coho population, maintaining the physical integrity of the pond may be desirable.

7. REFERENCES

Bell, E., W. G. Duffy, and T. D. Roelofs. 2001a. *Fidelity and survival of juvenile coho salmon in response to a flood*. Transactions of the American Fisheries Society 130:450-458.

Bell, E. 2001b. *Survival, growth and movement of juvenile coho salmon (Oncorhynchus kisutch) over-wintering in alcoves, backwaters, and main channel pools in Prairie Creek, California*. Master's thesis, Humboldt State University.

Bell, Ethan. Fisheries Biologist, Stillwater Sciences, Arcata, CA. Personal email communication on June 17, 2003.

Bisson, P. A., J. L. Nielson, and J. W. Ward. 1988a. *Summer production of coho salmon stocked in Mount St. Helens streams 3-6 years after the 1980 eruption.* Transactions of the American Fisheries Society 117:322-335.

Bisson, P. A., K. Sullivan, and J. L. Nielson. 1988b. *Channel hydraulics, habitat use, and body form of juvenile coho salmon, steelhead, and cutthroat trout in streams.* Transactions of the American Fisheries Society 117:262-273.

Bond, Morgan. Field/Laboratory Technician, National Marine Fisheries Service (NMFS), Santa Cruz Laboratory, Santa Cruz, CA. Personal email communication on September 11, 2003.

Brown, L. R., P. B. Moyle, and R. M. Yoshiyama. 1994. *Historical decline and current status of coho salmon in California*. North American Journal of Fisheries Management 14:237-261.

California Department of Fish and Game (CDFG). 1998. *Draft Strategic Plan for Restoration of the Endangered Coho Salmon South of San Francisco Bay*.

California Department of Fish and Game (CDFG). 1996. *Stream Inventory Report: San Vicente Creek*, Central Coast Region, Monterey, CA.

Environmental Science Associates (ESA). 2001. *Coast Dairies Long-Term Resources Protection and Use Plan, Existing Conditions Report*, prepared for the Trust for Public Land.

Fisher, J. P. and W. G. Pearcy. 1990. *Scale circulus spacing in Oncorhynchus kisutch*. Fishery. Bulletin, U.S. 88:637-643.

Gutreuter, S. and W. M. Childress. 1990. *Evaluation of condition indices for estimation of growth of largemouth bass and white crappie*. North American Journal of Fisheries Management 10:434-441.

Harvey, B. C. and R. J. Nakamoto. 1996. *Effects of steelhead densities on growth of coho salmon in a small coastal California stream*. Transactions of the American Fisheries Society 125:237-243.

Kuzic, L. M., D. L. Scarnecchia, and B. B. Roper. 2001. *Comparison of midsummer survival and growth of age-0 hatchery coho salmon held in pools and riffles*. Transactions of the American Fisheries Society 130:147-154.

Lowe, Martha. Plant Ecologist, Environmental Science Associates (ESA), Oakland, CA. Unpublished memorandum entitled *Aquatic Vegetation of San Vicente Pond*, October 30, 2003. (see Appendix A)

McGinnis, S. M. 1984. *Freshwater Fishes of California*, University of California Press, Berkeley, CA.

Moyle, P.B. and J. J. Cech, Jr. 1988. *Fishes: An Introduction to Ichthyology*. Second Edition, Prentice-Hall, Inc., NJ.

Moyle, P. B. 2002. *Inland Fishes of California*. University of California Press, Berkeley and Los Angeles, CA.

National Marine Fisheries Service (NMFS). 2001. *Status Review Update for Coho Salmon from the Central California Coast*, Southwest Fisheries Science Center, Santa Cruz Laboratory, CA.

National Marine Fisheries Service (NMFS). 1997. *Fish Screening Criteria for Anadromous Salmonids*, Southwest Region, Santa Rosa, CA.

Nelson, Jennifer. Associate Fisheries Biologist, California Department of Fish and Game (CDFG), Monterey, CA. Personal email communication on September 17, 2003.

Nickelson, T. E., J. D. Rodgers, S. L. Johnson, and M. F. Solazzi. 1992. *Seasonal changes in habitat use by juvenile coho salmon (Oncorhynchus kisutch) in Oregon coastal streams*. Canadian Journal of Fisheries and Aquatic Sciences, 49:783-789.

Peterson, N. P. 1982. *Immigration of juvenile coho salmon (Oncorhynchus kisutch) into riverine ponds.* Canadian Journal of Fisheries and Aquatic Sciences 39:1308-1310.

Roni, P. 2002. *Habitat use by fishes and Pacific giant salamanders in small western Oregon and Washington streams*. Transactions of the American Fisheries Society 131:743–761.

Shapovalov, L. and A. C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout (Salmo gairdneri gairdneri) and Silver Salmon (Oncorhynchus kisutch) with Special Reference to Waddell Creek, California, and Recommendations Regarding Their Management*. State of California, Department of Fish and Game, Fish Bulletin No. 98.

Smith, Bern. Coast Dairies Land Manager, Landsmiths, El Granada, CA. Personal communication on various occasions.

Swales, S., F. Caron, J. R. Irvine, and C. D. Levings. 1988. *Overwintering habitats of coho salmon (Oncorhynchus kisutch) and other juvenile salmonids in the Keogh River system, British Columbia*. Canadian Journal of Zoology 66:254-261.

Swales, S., R. B. Lauzier, and C. D. Levings. 1986. *Winter habitat preferences of juvenile salmonids in two interior rivers in British Columbia*. Canadian Journal of Zoology 64:1506-1514.

8. REPORT PREPARATION AND CONTACTS

Report prepared by: Mike Podlech, Senior Aquatic Ecologist
Environmental Science Associates
436 14th Street, Suite 600
Oakland, CA 94612
mpodlech@esassoc.com

Dan Sicular, Project Manager
Environmental Science Associates
225 Bush Street, Suite 1700
San Francisco, CA 94104

Tom Roberts, Project Director
Environmental Science Associates
436 14th Street, Suite 600
Oakland, CA 94612

Agency Contacts: Jon Ambrose
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404

Linda Hanson
California Department of Fish and Game
7329 Silverado Trail
Napa, CA 94558

Coast Dairies & Land Company: Catherine Elliott
116 New Montgomery Street, 3rd Floor
San Francisco, CA 94105

Appendix A

Aquatic Vegetation of San Vicente Pond

ESA Environmental Science Associates

M E M O R A N D U M

TO • Dan Sicular, Project Manager, ESA

FROM • Martha Lowe, Watershed Ecologist, ESA Biological Services Group

DATE • 10/30/02

SUBJECT • Aquatic Vegetation of San Vicente Pond

On October 24, 2002, I surveyed aquatic vegetation occurring within, and around the margins of, San Vicente pond, which is located on the Coast Dairies property, Santa Cruz County, California. Table 1 presents the species observed, with estimated percent cover given for each species. In addition to the fully aquatic species present, vegetation around the perimeter of San Vicente pond includes willow, alder, California blackberry, and a mix of native and non-native herbaceous species.

Lesser pondweed (*Potamegeton pusillus* var. *pusillus*) was by far the dominant aquatic plant species, with approximately 40% cover observed at or near the surface of the pond, and percent cover estimated to be somewhat higher at greater depth. Lesser pondweed is a perennial plant, with linear leaves and slender, brittle stems, that grows almost entirely submerged beneath the water's surface. The species reproduces through seed and the formation of corm-like winter buds and is commonly found throughout the Northern hemisphere in ponds, lakes, irrigation ditches, and slow moving streams (Mason 1957) at elevations ranging from sea level to nearly 9,000 feet (Jepson 1992). The species is known from nearly every county in California (CalFlora 2002).

Perennial plants, whether aquatic or terrestrial, often undergo a period of dormancy as a strategy for coping with inhospitable environmental conditions. Perennials can become completely dormant, with all above ground plant parts dying back while energy is stored in underground parts, or they can undergo a partial dormancy, with parts of the plant dying back while others remain. Lesser pondweed has several characteristics that suggest the species may die back completely in the winter. The linear leaved pondweeds generally do die back in winter, when daylight hours are limited, due to the fact that they have a relatively small leaf area with which to photosynthesize (Hrusa, pers. com., 2002). In addition, lesser pondweed often, but not always, produces winter buds in the fall (Mason 1957).

These structures allow the plant to persist and reproduce, even when stems and leaves die back and their presence suggests a complete winter dieback (Hrusa, pers. com., 2002). However, the species distribution includes a wide range of elevations and climatic regimes and lesser pondweed does not always produce winter buds. It is possible that, where the species occurs in milder climates and is not normally subject to freezing temperatures, it does not need to employ this strategy. Under such conditions the species may not undergo complete dieback, although it is likely that some proportion, perhaps even the majority, of the plant would die. Samples taken from San Vicente pond showed seed production but no winter buds were found.

Table 1 Aquatic Plants of San Vicente Pond

Scientific name	Common name	Percent cover (visual estimate)
Zannichellia palustris	Horned-pondweed	<1%
Polygonum sp.	Smartweed	<1%
Rorippa nasturtium-aquaticum	Water cress	<1%
Oenanthe sarmentosa	Water parsley	<1%
Lemna sp.	Duckweed	<1%
Scirpus acutus	Tule	<5%
	Filamentous green algae	10%
Potamogeton pusillus var. *pusillus*	Lesser pondweed	40%

It was observed in the field that the San Vicente pondweed provides a substrate for large numbers of aquatic invertebrates, including snails and midge larvae. Several egg masses were found that may have been those of frogs or another amphibian were also observed. Under the dissecting scope, numerous eggs and egg masses were seen affixed to the pondweed stems and fruit, as well as numerous small unidentified invertebrates and midge larvae. Given the low percent cover of other plant species present, the abundance of pondweed dramatically increases the substrate available to aquatic invertebrates in San Vicente pond.

It would appear that the pondweed provides an important source of both cover and food for the fish population of San Vicente pond. I would, therefore, recommend against pondweed removal at this time since dissolved oxygen levels have been maintaining at levels suitable for salmonid survival up to this late point in the year. Removal of pondweed could result in increased fish mortality due to declines in food and cover availability, which could result in starvation and increased predation. In addition, on the date of the field survey a "Lake Rake" was used to experiment with clearing vegetation from the pond. Due to the brittle nature of pondweed stems, it was observed that stems broke off, rather than being uprooted, and that this procedure left a fair amount of loose plant material in the pond. Clearing pondweed by any such method would likely leave quite a bit of loose plant material in the water which would then add to the already considerable amount of decaying material in the pond.

I would suggest continued monitoring of dissolved oxygen in the pond, with the addition of two further monitoring tasks: 1) monitor the pondweed for dieback and 2) monitor the invertebrates using the pondweed as a substrate. As long as dissolved oxygen levels remain suitable for salmonids and most of the pondweed appears to be surviving and continues to support a substantial invertebrate population I would recommend the vegetation be left in place.

Martha E. Lowe

Watershed Ecologist
Environmental Science Associates
436 14th Street, Suite 600
Oakland, CA 94612
mlowe@esassoc. com
phone: (510) 839-5066
fax: (510) 839-5825

REFERENCES:

CalFlora: Information on California plants for education, research and conservation. [web application]. 2002. Berkeley, California: The CalFlora Database [a non-profit organization]. Available online at: http://www.calflora.org/. (Accessed: Wed Oct 30 2002).

Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. Berkeley, CA: University of California Press. 1400 p.

Hrusa, Fred. Senior Plant Systematist, California Department of Food and Agriculture. Personal communication [telephone conversation], October 29, 2002.

Mason, H.L. 1957. A Flora of the Marshes of California. Berkeley, CA: University of California Press.
878 p.

Appendix B

Water Quality Monitoring Data
for

San Vicente Pond
September 17, 2002 – June 12, 2003

and

San Vicente Pond Inlet Channel and San Vicente Creek
October 24, 2002 – June 12, 2003

Table A-1. Water Quality Monitoring Results – San Vicente Pond at Diversion Pump

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
9/17	1010	YSI 85	0	14.6	14.2	73.0	7.47	337	424	0.2	
			1		14.2	69.6	7.12	337	424	0.2	
			2		14.2	67.4	6.90	339	427	0.2	
			3		13.9	47.3	4.88	341	433	0.2	
9/23	1310	YSI 85	0	16.6	15.7	91.4	9.05	349	424	0.2	
			1		14.9	74.4	7.50	349	432	0.2	
			2		14.5	62.6	6.38	346	433	0.2	
			3		14.1	44.9	4.61	347	438	0.2	
9/26	0830	YSI 85	0	14.6	14.2	65.5	6.71	340	428	0.2	
			1		14.2	70.7	7.25	344	434	0.2	
			2		14.0	66.6	6.85	348	440	0.2	
			3		13.8	55.6	5.75	347	441	0.2	
10/1	1330	YSI 85	0	17.7	14.1	84.0	8.63	344	434	0.2	
			1		13.6	76.8	7.98	345	441	0.2	
			2		13.2	73.2	7.67	344	444	0.2	
			3		12.9	76.3	8.05	342	445	0.2	
10/7	0935	YSI 85	0	13.8	13.0	79.0	8.33	328	427	0.2	
			1		12.9	78.1	8.24	333	433	0.2	
			2		12.8	63.9	6.75	337	439	0.2	
			3		12.6	47.2	5.03	337	443	0.2	
10/10	0920	YSI 85	0	17.4	13.9	71.1	7.33	348	442	0.2	
			1		13.7	77.0	7.98	354	452	0.2	
			2		13.6	61.9	6.43	353	452	0.2	
			3		13.3	57.7	6.03	346	446	0.2	
10/14	0905	YSI 85	0	15.3	12.6	68.4	7.27	337	441	0.2	
			1		12.6	60.1	6.38	338	442	0.2	
			2		12.5	62.7	6.67	337	443	0.2	
			3		12.5	48.5	5.16	337	443	0.2	
10/17	0855	YSI 85	0	13.0	12.9	70.7	7.45	346	450	0.2	
			1		12.9	65.8	6.93	347	451	0.2	
			2		12.9	46.9	4.95	348	453	0.2	
			3		12.7	36.9	3.90	348	455	0.2	
10/21	0900	YSI 85	0	14.3	12.8	59.6	6.29	328	427	0.2	
			1		12.8	59.6	6.30	330	430	0.2	
			2		12.8	57.3	6.06	330	431	0.2	
			3		12.8	52.1	5.50	331	431	0.2	
10/24	0910	YSI 85	0	11.1	12.2	63.5	6.80	335	443	0.2	
			1		12.3	62.9	6.72	337	445	0.2	
			2		12.3	63.2	6.76	341	450	0.2	
			3		12.3	46.1	4.93	341	450	0.2	
10/28	0900	YSI 85	0	13.9	11.5	66.2	7.20	330	444	0.2	Time change
			1		11.5	66.4	7.22	330	444	0.2	
			2		11.6	65.0	7.07	329	444	0.2	
			3		11.5	62.4	6.79	329	444	0.2	
10/30	0920	YSI 85	0	14.4	11.1	70.7	7.75	327	444	0.2	pre-aeration test
			1		11.1	69.9	7.68	327	445	0.2	
			2		11.1	65.3	7.17	327	445	0.2	
			3		11.1	71.7	7.87	327	445	0.2	

Table A-1 (cont.). Water Quality Monitoring Results – San Vicente Pond at Diversion Pump

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
11/4	0920	YSI 85	0	15.3	9.5	96.7	11.03	312	444	0.2	post-aeration test
			1		9.5	88.2	10.07	316	449	0.2	
			2		9.3	92.9	10.63	314	448	0.2	
			3		9.4	68.8	7.88	314	448	0.2	
11/7	0915	YSI 85	0	16.0	12.2	87.7	9.38	339	448	0.2	light rain prior to
			1		12.1	86.8	9.32	339	450	0.2	measurements
			2		11.5	82.4	8.97	335	451	0.2	
			3		10.1	53.1	5.98	325	455	0.2	
11/11	0950	YSI 85	0	16.7	11.7	63.4	6.87	286	384	0.2	~5.5" rainfall since 11/4
			1		11.7	65.1	7.05	286	383	0.2	
			2		11.6	64.5	6.99	294	394	0.2	
			3		11.7	61.3	6.63	325	435	0.2	
11/14	0915	YSI 85	0	13.2	12.0	79.0	8.51	285	379	0.2	
			1		11.9	79.9	8.63	304	406	0.2	
			2		11.9	73.8	7.96	303	405	0.2	
			3		11.8	77.1	8.33	305	408	0.2	
11/18	0900	YSI 85	0	13.0	10.6	76.2	8.47	307	424	0.2	
			1		10.6	74.4	8.28	307	425	0.2	
			2		10.6	72.8	8.10	309	426	0.2	
			3		10.5	69.8	7.75	311	428	0.2	
11/22	1105	YSI 85	0	15.6	12.0	86.8	9.34	330	439	0.2	
			1		11.9	86.2	9.29	329	438	0.2	
			2		11.8	90.6	9.80	327	437	0.2	
			3		11.6	78.5	8.53	325	436	0.2	
11/25	0855	YSI 85	0	9.9	11.3	64.3	7.04	323	438	0.2	
			1		11.3	74.7	8.16	323	438	0.2	
			2		11.3	78.0	8.52	323	438	0.2	
			3		11.3	75.4	8.24	324	438	0.2	
11/28	0930	YSI 85	0	11.1	9.3	73.3	8.40	306	437	0.2	
			1		9.3	71.7	8.21	308	439	0.2	
			2		9.4	72.1	8.25	308	440	0.2	
			3		9.2	39.9	4.58	308	441	0.2	
12/2	0915	YSI 85	0	12.3	10.3	86.8	9.73	316	440	0.2	
			1		10.2	85.7	9.61	319	445	0.2	
			2		10.2	83.7	9.40	319	445	0.2	
			3		10.2	78.1	8.78	319	445	0.2	
12/5	0925	YSI 85	0	12.4	9.8	83.4	9.44	319	449	0.2	
			1		9.8	81.9	9.28	318	449	0.2	
			2		9.7	79.7	9.04	318	449	0.2	
			3		9.7	76.8	8.72	318	450	0.2	
12/9	0915	YSI 85	0	14.1	11.2	76.9	8.44	342	464	0.2	
			1		10.6	77.3	8.58	338	465	0.2	
			2		10.4	84.0	9.38	342	475	0.2	
			3		10.8	44.8	4.94	960	1318	0.7	tidal influence
12/12	0805	YSI 85	0	8.6	9.8	78.2	8.85	335	472	0.2	
			1		9.9	78.4	8.86	338	475	0.2	
			2		9.9	77.9	8.80	348	490	0.2	
			3		11.4	68.4	7.44	913	1234	0.6	tidal influence

Table A-1 (cont.). Water Quality Monitoring Results – San Vicente Pond at Diversion Pump

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
12/16	1000	YSI 85	0	15.2	12.8	87.4	9.22	120	156	0.1	storm during 3 prior days
			1		12.7	84.1	8.90	121	158	0.1	
			2		12.8	84.2	8.93	122	160	0.1	
			3		12.7	86.1	9.13	122	160	0.1	
			4		12.7	82.5	8.75	130	170	0.1	increased water depth
12/19	0945	YSI 85	0	11.9	9.6	83.4	9.51	217	307	0.1	
			1		9.5	80.4	9.16	217	308	0.1	
			2		9.5	80.5	9.18	217	307	0.1	
			3		9.5	79.0	9.01	217	308	0.1	
12/24	1015	YSI 85	0	12.0	8.8	80.8	9.38	216	313	0.1	once-a-week sampling
			1		8.7	80.3	9.36	214	312	0.1	
			2		8.5	70.4	8.22	214	312	0.1	
			3		8.4	65.9	7.71	217	317	0.2	
12/31	0940	YSI 85	0	14.0	10.7	92.6	10.27	173	238	0.1	
			1		10.6	94.0	10.45	172	237	0.1	
			2		10.7	91.5	10.16	173	238	0.1	
			3		10.5	87.9	9.79	176	244	0.1	
1/6	0925	YSI 85	0	12.9	10.3	71.8	8.04	213	297	0.1	
			1		10.2	70.8	7.95	213	298	0.1	
			2		10.2	69.7	7.83	214	298	0.1	
			3		10.1	67.5	7.59	215	300	0.1	
1/13	0920	YSI 85	0	12.7	12.7	80.4	8.53	193	253	0.1	
			1		12.7	81.9	8.69	193	252	0.1	
			2		12.7	78.6	8.34	193	252	0.1	
			3		12.7	74.6	7.92	194	254	0.1	
1/24	0915	YSI 85	0	12.9	11.7	79.8	8.65	212	283	0.1	
			1		11.7	77.8	8.44	212	285	0.1	
			2		11.6	71.5	7.76	214	287	0.1	
			3		11.5	73.4	7.99	212	286	0.1	
1/29	0935	YSI 85	0	14.5	10.9	84.1	9.29	210	287	0.1	
			1		10.8	85.9	9.50	210	287	0.1	
			2		10.7	84.9	9.42	209	288	0.1	
			3		10.7	80.1	8.89	209	288	0.1	
2/3	0945	YSI 85	0	12.3	9.6	76.0	8.66	225	319	0.2	
			1		9.5	77.6	8.85	224	319	0.2	
			2		9.5	75.7	8.63	225	319	0.2	
			3		9.5	71.8	8.20	224	319	0.2	
2/12	0915	YSI 85	0	14.5	10.7	81.6	9.05	230	316	0.2	
			1		10.2	87.5	9.82	227	316	0.2	
			2		10.0	78.3	8.83	226	317	0.2	
			3		9.9	77.2	8.71	226	317	0.2	
2/17	0940	YSI 85	0	13.6	10.3	84.6	9.48	192	266	0.1	rain on 2/15-2/16
			1		10.2	85.5	9.60	192	267	0.1	
			2		10.2	87.3	9.81	192	268	0.1	
			3		10.1	85.5	9.62	192	268	0.1	
2/26	0930	YSI 85	0	10.7	10.7	80.5	8.93	215	296	0.1	rain on 2/24
			1		10.8	87.5	9.69	214	294	0.1	
			2		10.8	87.2	9.65	214	294	0.1	
			3		10.9	61.4	6.79	215	294	0.1	

Table A-1 (cont.). Water Quality Monitoring Results – San Vicente Pond at Diversion Pump

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
3/3	0920	YSI 85	0	13.2	10.8	90.0	9.97	216	297	0.1	
			1		10.6	90.7	10.08	214	296	0.1	
			2		10.5	96.6	10.77	214	296	0.1	
			3		10.4	86.9	9.70	214	296	0.1	
3/10	0910	YSI 85	0	11.1	10.6	88.5	9.85	223	308	0.1	
			1		10.6	97.3	10.83	223	308	0.1	
			2		10.5	96.3	10.72	222	307	0.1	
			3		10.5	63.5	7.08	222	307	0.1	
3/17	0910	YSI 85	0	11.1	11.5	85.3	9.29	208	280	0.1	rain on 3/14, 3/15, 3/16
			1		11.5	85.5	9.32	208	280	0.1	
			2		11.5	85.4	9.30	208	280	0.1	
			3		11.5	67.0	7.30	208	280	0.1	
3/24	0915	YSI 85	0	10.9	11.0	90.1	9.93	219	299	0.1	
			1		11.0	96.6	10.63	219	298	0.1	
			2		11.0	94.8	10.43	219	298	0.1	
			3		11.0	57.3	6.31	219	298	0.1	
3/31	0845	YSI 85	0	14.7	12.2	96.5	10.34	237	314	0.2	weir completed on 3/26
			1		12.2	96.9	10.39	236	312	0.2	raised pond H2O ~ 1.5 ft
			2		12.1	92.0	9.88	236	312	0.2	
			3		12.0	88.8	9.56	235	313	0.2	
4/21	0900	YSI 85	0	12.0	11.1	92.5	10.17	217	296	0.1	intermit. rain for past 1.5 weeks
			1		11.1	89.4	9.84	217	296	0.1	
			2		11.0	87.2	9.60	217	296	0.1	
			3		11.0	89.0	9.80	217	296	0.1	
4/28	0910	YSI 85	0	10.6	10.9	94.9	10.47	186	255	0.1	intermit. rain for past week
			1		10.9	94.4	10.42	185	253	0.1	
			2		10.9	92.1	10.18	184	252	0.1	
			3		10.8	90.7	10.04	183	250	0.1	
5/6	0855	YSI 85	0	10.7	11.0	92.9	10.24	195	267	0.1	rain on 4/29 and 5/2
			1		11.0	94.4	10.39	196	267	0.1	
			2		11.0	90.5	9.96	196	267	0.1	
			3		10.9	91.0	10.05	195	267	0.1	
5/13	0900	YSI 85	0	13.0	12.1	99.5	10.70	204	271	0.1	rain on 5/7 and 5/8
			1		12.0	93.2	10.04	205	272	0.1	
			2		11.7	93.5	10.13	204	273	0.1	
			3		11.6	93.9	10.21	203	273	0.1	
5/21	0915	YSI 85	0	16.8	13.1	94.8	9.96	220	284	0.1	
			1		12.9	93.2	9.83	218	284	0.1	
			2		12.7	94.5	10.02	218	285	0.1	
			3		12.5	94.2	10.02	217	286	0.1	
5/28	0855	YSI 85	0	17.7	14.1	92.9	9.55	229	289	0.1	
			1		13.9	94.8	9.79	228	289	0.1	
			2		13.7	94.4	9.78	228	291	0.1	
			3		13.6	95.8	9.96	227	290	0.1	

Table A-1 (cont.). Water Quality Monitoring Results – San Vicente Pond at Diversion Pump

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
6/4	0950	YSI 85	0	14.5	14.1	99.6	10.24	240	303	0.1	
			1		14.0	92.4	9.52	240	304	0.1	
			2		13.7	97.3	10.10	238	304	0.1	
			3		13.6	99.6	10.35	238	304	0.1	
6/12	0950	YSI 85	0	13.3	13.3	103.5	10.82	234	302	0.1	
			1		13.3	99.2	10.38	234	301	0.1	
			2		13.3	99.8	10.45	234	302	0.1	
			3		13.1	113.2	11.88	232	301	0.1	

Table A-2. Water Quality Monitoring Results – San Vicente Pond at Beach

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
9/17	1020	YSI 85	0	18.4	15.0	80.5	8.12	350	433	0.2	
			1		14.5	75.1	7.65	343	429	0.2	
9/23	1325	YSI 85	0	17.6	17.2	65.6	6.31	391	460	0.2	
			1		15.1	81.0	8.14	357	441	0.2	
9/26	0840	YSI 85	1	14.5	14.1	77.9	8.00	348	440	0.2	
			2		14.0	77.6	7.99	345	437	0.2	
10/1	1345	YSI 85	0	17.8	16.6	101.3	9.82	373	442	0.2	
			1		13.9	108.8	11.22	347	441	0.2	
10/7	0945	YSI 85	0	13.8	13.2	76.9	8.06	348	450	0.2	
			1		13.0	75.2	7.92	348	452	0.2	
10/10	0930	YSI 85	0	17.4	13.9	74.2	7.66	354	450	0.2	
			1		13.7	76.9	7.97	354	452	0.2	
10/14	0915	YSI 85	0	15.3	12.5	81.7	8.69	341	448	0.2	
			1		12.5	82.0	8.73	341	448	0.2	
10/17	0905	YSI 85	0	13.0	13.0	78.6	8.28	349	453	0.2	
			1		12.9	81.3	8.57	349	453	0.2	
10/21	0910	YSI 85	0	14.3	12.7	67.1	7.11	345	450	0.2	
			1		12.7	67.5	7.15	345	450	0.2	
10/24	0920	YSI 85	0	11.1	12.2	62.0	6.64	341	451	0.2	
			1		12.2	65.0	6.96	341	451	0.2	
10/28	0905	YSI 85	0	13.9	11.7	73.9	8.01	333	447	0.2	Time change
			1		11.5	77.9	8.48	331	447	0.2	
10/30	0925	YSI 85	0	14.4	11.5	67.2	7.32	331	447	0.2	pre-aeration test
			1		11.2	77.1	8.45	329	447	0.2	
11/4	0925	YSI 85	0	15.3	9.9	98.7	11.16	324	455	0.2	post-aeration test
			1		9.6	106.5	12.13	320	455	0.2	
11/7	0920	YSI 85	0	16.0	12.0	77.7	8.36	347	461	0.2	light rain prior to measurements
			1		11.7	71.0	7.70	346	465	0.2	
11/11	0955	YSI 85	0	16.7	12.2	75.6	8.08	296	390	0.2	~5.5" rainfall since 11/4
			1		11.7	75.9	8.22	285	382	0.2	
11/14	0920	YSI 85	0	13.2	12.2	82.4	8.83	318	421	0.2	
			1		11.9	82.1	8.86	313	418	0.2	
11/18	0920	YSI 85	0	13.0	10.7	77.6	8.62	314	432	0.2	
			1		10.5	77.0	8.59	312	432	0.2	
11/22	1110	YSI 85	0	15.6	12.1	79.6	8.54	334	443	0.2	
			1		11.9	81.7	8.81	331	441	0.2	
11/25	0900	YSI 85	0	9.9	11.2	81.2	8.89	328	444	0.2	
			1		11.2	80.4	8.81	327	444	0.2	
11/28	0935	YSI 85	0	11.1	9.4	83.7	9.56	314	447	0.2	
			1		9.3	83.8	9.60	313	446	0.2	
12/2	0920	YSI 85	0	12.3	10.3	84.3	9.43	326	454	0.2	
			1		10.2	84.7	9.49	325	453	0.2	
12/5	0930	YSI 85	0	12.4	9.8	84.7	9.58	321	452	0.2	
			1		9.7	84.7	9.61	320	452	0.2	
12/9	0920	YSI 85	0	14.1	10.5	82.5	9.18	348	481	0.2	
			1		10.4	82.4	9.21	348	483	0.2	
12/12	0810	YSI 85	0	8.6	9.8	82.7	9.37	324	458	0.2	
			1		9.7	83.0	9.41	321	452	0.2	

Table A-2 (cont.). Water Quality Monitoring Results – San Vicente Pond at Beach

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
12/16	1010	YSI 85	0	15.2	12.8	88.5	9.36	125	164	0.1	
			1		12.7	89.2	9.45	125	164	0.1	
12/19	0950	YSI 85	0	11.9	9.6	80.6	9.19	218	309	0.1	
			1		9.6	80.0	9.11	218	309	0.1	
12/24	1020	YSI 85	0	12.0	8.5	69.9	8.17	221	323	0.2	once-a-week sampling
			1		8.5	66.2	7.75	221	323	0.2	changed inlet angle
12/31	0945	YSI 85	0	14.0	10.6	99.0	11.01	175	241	0.1	
			1		10.6	96.9	10.78	175	242	0.1	
1/6	0945	YSI 85	0	12.9	10.5	67.5	7.54	217	301	0.1	
			1		10.3	67.6	7.58	216	301	0.1	
1/13	0925	YSI 85	0	12.7	12.7	85.5	9.06	196	256	0.1	
			1		12.7	85.0	9.00	197	257	0.1	
1/24	0920	YSI 85	0	12.9	11.5	83.9	9.13	205	276	0.1	
			1		11.5	82.6	8.99	208	280	0.1	
1/29	0945	YSI 85	0	14.5	10.8	86.3	9.56	211	290	0.1	
			1		10.7	85.4	9.48	210	288	0.1	
2/3	0950	YSI 85	0	12.3	9.6	80.7	9.18	225	318	0.2	
			1		9.6	80.9	9.22	224	318	0.2	
2/12	0920	YSI 85	0	14.5	10.3	96.3	10.78	230	319	0.2	
			1		10.3	92.6	10.37	229	319	0.2	
2/17	0945	YSI 85	0	13.6	10.1	93.2	10.49	196	274	0.1	rain on 2/15-2/16
			1		10.1	91.6	10.31	196	273	0.1	
2/26	0935	YSI 85	0	10.7	11.0	84.4	9.31	217	297	0.1	rain on 2/24
			1		10.9	84.2	9.29	217	297	0.1	
3/3	0925	YSI 85	0	13.2	10.6	98.9	11.00	220	303	0.1	
			1		10.5	99.6	11.10	219	303	0.1	
3/10	0915	YSI 85	0	11.1	10.8	100.4	11.10	226	310	0.1	
			1		10.6	100.1	11.12	224	309	0.1	
3/17	0915	YSI 85	0	11.1	11.9	88.0	9.48	211	281	0.1	rain on 3/14, 3/15, 3/16
			1		11.8	90.2	9.75	210	281	0.1	
3/24	0920	YSI 85	0	10.9	11.7	93.3	10.10	225	301	0.1	
			1		11.3	99.7	10.90	222	300	0.1	
3/31	0850	YSI 85	0	14.7	12.5	102.4	10.89	238	312	0.1	weir completed on 3/26
			1		12.3	98.9	10.58	236	311	0.1	raised pond H2O ~ 1.5 ft
4/21	0905	YSI 85	0	12.0	11.3	94.2	10.30	220	297	0.1	intermit. rain for past 1.5 weeks
			1		11.3	94.8	10.37	219	297	0.1	
4/28	0915	YSI 85	0	10.6	11.2	95.0	10.42	192	261	0.1	intermit. rain for past week
			1		11.2	94.0	10.30	193	261	0.1	
5/6	0900	YSI 85	0	10.7	11.8	95.5	10.33	199	267	0.1	rain on 4/29 and 5/2
			1		11.4	90.9	9.93	198	267	0.1	
5/13	0905	YSI 85	0	13.0	12.1	99.3	10.67	205	272	0.1	rain on 5/7 and 5/8
			1		11.9	95.4	10.28	205	273	0.1	
5/21	0920	YSI 85	0	16.8	13.2	102.2	10.72	222	286	0.1	
			1		12.9	100.9	10.65	219	285	0.1	
5/28	0900	YSI 85	0	17.7	14.1	97.8	10.06	231	291	0.1	
			1		13.9	97.6	10.07	229	291	0.1	
6/4	0955	YSI 85	0	14.5	14.1	98.3	10.10	241	304	0.1	
			1		13.8	96.9	10.03	239	304	0.1	
6/12	1000	YSI 85	0	13.3	13.5	97.9	10.20	236	303	0.1	
			1		13.4	98.5	10.27	236	303	0.1	

Table A-3. Water Quality Monitoring Results – San Vicente Pond Inlet Channel (upstream of inlet culvert)

Date	Time	Equipment	Depth (ft)	Temperature - Air (^{0}C)	Temperature -Water (^{0}C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
10/24	0915	YSI 85	0	11.1	11.9	76.5	8.25	337	449	0.2	
10/28	0910	YSI 85	0	11.3	10.1	77.1	8.66	321	449	0.2	Time change
10/30	0930	YSI 85	0	11.3	10.5	75.7	8.44	326	451	0.2	
11/4	0930	YSI 85	0	11.3	9.3	88.8	10.18	318	455	0.2	
11/7	0925	YSI 85	0	13.1	12.3	81.8	8.75	346	457	0.2	
11/11	1000	YSI 85	0	11.3	11.1	86.9	9.55	292	398	0.2	
11/14	0925	YSI 85	0	12.6	11.0	88.7	9.75	311	423	0.2	
11/18	0930	YSI 85	0	13.1	9.8	81.4	9.21	309	435	0.2	
11/22	1115	YSI 85	0	12.5	11.8	87.4	9.44	330	440	0.2	
11/25	0905	YSI 85	0	9.6	10.6	88.3	9.83	323	446	0.2	
11/28	0940	YSI 85	0	11.1	9.0	91.5	10.58	309	446	0.2	
12/2	0925	YSI 85	0	11.6	10.0	87.3	9.84	323	452	0.2	
12/5	0935	YSI 85	0	11.3	9.9	88.7	10.03	321	451	0.2	
12/9	0925	YSI 85	0	12.0	11.0	85.4	9.40	330	451	0.2	
12/12	0815	YSI 85	0	8.9	9.7	86.1	9.77	313	442	0.2	
12/16	1015	YSI 85	0	14.3	12.7	91.8	9.72	127	165	0.1	
12/19	0955	YSI 85	0	9.1	9.8	86.8	9.84	219	308	0.1	
12/24	1025	YSI 85	0	9.2	9.0	76.6	8.86	224	323	0.2	once-a-week sampling
12/31	0950	YSI 85	0	11.9	10.7	90.8	10.07	167	229	0.1	
1/6	1000	YSI 85	0	11.0	10.3	73.5	8.25	215	299	0.1	
1/13	0930	YSI 85	0	13.1	12.5	96.7	10.29	195	256	0.1	
1/24	0925	YSI 85	0	12.1	11.2	95.0	10.42	202	275	0.1	
1/29	0950	YSI 85	0	13.7	10.1	96.8	10.90	205	287	0.1	
2/3	0955	YSI 85	0	11.0	8.8	85.3	9.90	217	315	0.2	
2/12	0925	YSI 85	0	13.2	10.4	104.3	11.65	229	318	0.2	
2/17	0950	YSI 85	0	10.9	10.0	100.7	11.37	199	279	0.1	rain on 2/15-2/16
2/26	0940	YSI 85	0	10.5	10.3	88.0	9.85	211	293	0.1	rain on 2/24
3/3	0930	YSI 85	0	11.3	9.6	101.2	11.52	212	300	0.1	
3/10	0920	YSI 85	0	11.3	9.4	97.6	11.17	215	307	0.1	
3/17	0920	YSI 85	0	11.3	9.9	96.4	10.91	177	249	0.1	rain on 3/14, 3/15, 3/16
3/24	0925	YSI 85	0	11.4	9.3	101.8	11.66	210	299	0.1	
3/31	0855	YSI 85	0	12.5	10.9	102.0	11.26	227	310	0.1	
4/21	0910	YSI 85	0	10.6	10.4	98.9	11.03	215	297	0.1	intermit. rain for past 1.5 weeks
4/28	0920	YSI 85	0	11.5	10.5	100.5	11.21	167	231	0.1	intermit. rain for past week
5/6	0905	YSI 85	0	11.7	10.4	99.7	11.14	193	267	0.1	rain on 4/29 and 5/2
5/13	0910	YSI 85	0	11.8	11.2	96.6	10.59	202	274	0.1	rain on 5/7 and 5/8
5/21	0925	YSI 85	0	13.3	11.9	95.5	10.31	214	286	0.1	
5/28	0905	YSI 85	0	14.0	12.8	95.0	10.05	225	294	0.1	
6/4	1000	YSI 85	0	14.1	13.4	102.3	10.67	236	303	0.1	
6/12	1005	YSI 85	0	12.7	12.5	96.4	10.26	231	303	0.1	

Table A-4. Water Quality Monitoring Results – San Vicente Creek (upstream of outlet channel confluence)

Date	Time	Equipment	Depth (ft)	Temperature - Air (°C)	Temperature -Water (°C)	DO: Saturation (%)	DO: Concentration (mg/L)	Conductivity (uS)	Conductivity -- Specific (uS)	Salinity (ppt)	Notes
10/24	0925	YSI 85	0	11.3	12.1	82.2	8.82	305	405	0.2	
10/28	0915	YSI 85	0	11.2	10.7	72.3	8.02	328	451	0.2	Time change
10/30	0935	YSI 85	0	12.0	11.0	71.3	7.85	332	453	0.2	
11/4	0935	YSI 85	0	12.0	9.9	83.0	9.39	326	459	0.2	
11/7	0930	YSI 85	0	13.6	12.3	75.1	8.03	348	459	0.2	
11/11	1005	YSI 85	0	11.9	11.3	85.4	9.34	298	404	0.2	
11/14	0930	YSI 85	0	12.3	11.3	85.0	9.30	317	429	0.2	
11/18	0935	YSI 85	0	12.9	10.2	79.8	8.96	315	440	0.2	
11/22	1120	YSI 85	0	12.3	12.0	82.2	8.86	335	446	0.2	Tidal influence?
11/25	0910	YSI 85	0	11.1	11.0	81.5	8.99	328	448	0.2	
11/28	0945	YSI 85	0	11.3	9.5	87.3	9.95	318	451	0.2	
12/2	0930	YSI 85	0	10.8	10.3	82.3	9.21	327	454	0.2	
12/5	0940	YSI 85	0	11.2	10.2	79.6	8.94	326	455	0.2	Tidal influence?
12/9	0930	YSI 85	0	12.1	11.1	80.9	8.86	334	453	0.2	
12/12	0820	YSI 85	0	9.2	10.1	82.3	9.26	319	446	0.2	
12/16	1020	YSI 85	0	NA	NA	NA	NA	NA	NA	NA	site not accessible
12/19	1000	YSI 85	0	10.1	9.8	82.4	9.33	221	312	0.1	
12/24	1030	YSI 85	0	9.6	9.1	74.6	8.60	226	325	0.2	once-a-week sampling
12/31	0955	YSI 85	0	11.6	10.8	86.8	9.62	168	231	0.1	
1/6	1005	YSI 85	0	11.0	10.3	71.5	8.00	217	301	0.1	
1/13	0935	YSI 85	0	13.1	12.5	89.6	9.54	198	260	0.1	
1/24	0930	YSI 85	0	12.4	11.2	89.3	9.80	204	278	0.1	
1/29	0955	YSI 85	0	13.5	10.2	87.6	9.84	208	290	0.1	
2/3	1000	YSI 85	0	10.0	9.1	86.3	9.95	221	318	0.2	
2/12	0930	YSI 85	0	13.5	10.4	99.5	11.11	231	321	0.2	
2/17	0955	YSI 85	0	11.2	10.1	100.9	11.37	201	281	0.1	rain on 2/15-2/16
2/26	0945	YSI 85	0	10.9	10.4	86.2	9.64	213	295	0.1	rain on 2/24
3/3	0930	YSI 85	0	12.4	9.7	96.3	10.94	215	304	0.1	
3/10	0925	YSI 85	0	11.6	9.5	94.7	10.79	219	310	0.1	
3/17	0925	YSI 85	0	11.6	10.1	94.8	10.67	198	277	0.1	rain on 3/14, 3/15, 3/16
3/24	0930	YSI 85	0	10.7	9.6	97.9	11.14	213	302	0.1	
3/31	0900	YSI 85	0	12.9	11.1	98.9	10.88	231	315	0.1	
4/21	0915	YSI 85	0	10.5	10.5	95.4	10.63	217	300	0.1	intermit. rain for past 1.5 weeks
4/28	0925	YSI 85	0	10.9	10.5	96.6	10.77	169	234	0.1	intermit. rain for past week
5/6	0910	YSI 85	0	11.9	10.5	96.8	10.80	195	269	0.1	rain on 4/29 and 5/2
5/13	0915	YSI 85	0	12.0	11.2	94.7	10.39	203	275	0.1	rain on 5/7 and 5/8
5/21	0930	YSI 85	0	12.8	11.9	94.0	10.14	216	288	0.1	
5/28	0910	YSI 85	0	14.7	12.9	93.7	9.90	227	296	0.1	
6/4	1005	YSI 85	0	14.3	13.4	102.4	10.69	237	304	0.1	
6/12	1010	YSI 85	0	12.9	12.5	94.4	10.05	233	306	0.1	