SAN MATEO COUNTY

RESOURCE CONSERVATION DISTRICT

650.712.7765 | PHONE
650.726.0494 | FAX

625 Miramontes Street, Suite 103, Half Moon Bay, CA 94019
www.sanmateorcd.org

Meeting of the Board of Directors
May 21, 2009
Location: RCD Office
6:30 pm- 8:30 pm

1. Call to Order
2. Introduction of Guests and Staff
3. Public Comment- The Board will hear comments on items that are not on the agenda where the Board has jurisdiction. Comments are limited to three minutes per person. The Board cannot take action on an item unless it is an emergency as defined under Government code Sec. 54954.2.
4. Approval of Agenda
5. Consent Agenda 5.1. April, 2009 Draft Financial Statements
6. Discussion Items 6.1. Market Based Conservation in San Mateo County. Presentation by students from Goldman School of Public Policy, UC Berkeley: Jerrod Mason, Tiffany Chow/Yin Kyauk, and Antoine Guthmann. 6.2. FY 09-10 budget 6.3. Current fiscal situation and recent efforts to restore funding. 6.4. Executive Director report 6.4.1.Community Wildfire Protection Plan 6.4.2.Coral Reef Fuels Management Demonstration Project
7. Action Items 7.1. Resolution 2009-1 designating authority to enter into contract with San Mateo County. Recommend Board approval of Resolution 2009-1, authorizing Executive Director to enter into contract with San Mateo County to complete Phase III of Midcoast Groundwater Study.
8. Adjourn

Public records that relate to any item on the open session agenda for a regular board meeting are available for public inspection. Those records that are distributed less than 72 hours prior to the meeting are available for public inspection at the same time they are distributed to all members, or a majority of the members of the Board. The Board has designated the San Mateo RCD office, located at the address above, for the purpose of making those public records available for inspection.

SAN MATEO COUNTY RESOURCE CONSERVATION DISTRICT VOLUNTARY SIGN IN SHEET

DATE OF MEETING: 5/21/09

	NAME	**EMAIL**
1.	RICH ALLEN	
2.	JERROD MASON	
3.	ANTOINE GUTHMANN	
4.	Jim Reynolds	
5.	NEAL KRAMER	
6.	CAROLANN TOWNE	
7.	Jim Howard	
8.	Ron Sly	
9.	Tim Frahm	
10.	Kellyx Nelson	
11.	Rich Steiner, Director	
12.		
13.		
14.		
15.		
16.		
17.		

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Half Moon Bay, CA 94019

Minutes
May 21, 2009
Meeting of the Board of Directors

1. **CALL TO ORDER**: Rich Allen called the meeting to order at 7:05 p.m. A quorum was declared present.

2. **INTRODUCTION OF GUESTS and STAFF**:
   - Directors: Rich Allen, TJ Glauthier, Roxy Stone, Jim Reynolds
   - Staff: RCD: Kellyx Nelson, Renee Moldovan
   - Guests: Neal Kramer, Tim Frahm

3. **PUBLIC COMMENT**:
   There was no public comment.

4. **APPROVAL OF AGENDA**
   - Agenda was approved.

5. **CONSENT AGENDA**
   Discussion:
   - Postponed budget discussion to June due to persisting financial uncertainty.
   - TJ Glauthier will further review audit and based on his findings, if no other changes, the auditor would prepare the final report for distribution.

   5.1 Financials to be approved at next meeting

6. **DISCUSION ITEMS**:

   6.1 Presentation on *Market Based Conservation in San Mateo County* by students from Goldman School of Public Policy, UC Berkeley: Jerrod Mason, Tiffany Chow/Yin Kyauk, and Antoine Guthmann.

   6.2 FY 09/10 Budget – Prior discussion under Consent Agenda - moved to June meeting.

   6.3 Current fiscal year situation –
   - KN advised bond sale went well and RCD has been paid for most of outstanding invoices.

- Cash coming in for unfrozen projects, however, still determining how much owed and billed.
- Advised using line of credit to allow some staff full time work for four months while waiting for remaining money owed to RCD to come in. Discussed pros and cons and ability to ensure repayment.
- Two grant applications were denied: eucalyptus removal permit streamlining (grant program oversubscribed), and Tierra al Mar partnership with Puente de la Costa Sur. Puente took RCD proposal and shopped it around.
- Fish and Wildlife provided two full scholarships for Range Camp

6.4 Executive Director Report

6.4.1 Community Wildfire Protection Plan

- KN advised save date for first public meeting June 2nd.
- Marti has been developing workshop and outreach strategy with CalFire and RCD of Santa Cruz. There will be at least 3 public workshops and a blog.

6.4.2 Coral Reef Fuels Management Demonstration Project

- One-third completed in reducing fuel load and creation of buffer by homes, etc
- Removing limbs up to 12 ft., removing trees up to 6 ft.
- Blog on RCD website.
- Neighbors generally happy with actions to date.
- Using CalFire crews who can be called off for other tasks.
- Public workshop will be conducted on site after completion (within week or two).
- TF suggested CalFire provide indemnification for RCD.

7. ACTION ITEMS

7.1 Resolution 2009-1 designating authority to enter into contract with San Mateo County. Recommend Board approval of Resolution 2009-1, authorizing Executive Director to enter into contract with San Mateo County to complete Phase III of Midcoast Groundwater Study.

Discussion:

County wishes to contract with RCD to coordinate immediate data collection due to third consecutive dry year conditions. RCD would need to start work on project even though final terms of agreement not yet hammered out. Discussion ensued regarding political risks of the project for RCD. Kellyx supported recommendation, but agreed water scarcity is a charged issue, and the project has a number of political risks though the study will provide valuable information.

Scope of proposed work was reviewed. County would be contracting with the technical consultants directly. RCD would ensure timely deliverables, help get wells to monitor (some with existing gauges), and look for additional funding. Technical work will be finished this summer/ fall. Discussed potential regulatory implications of the study and risks to current and potential users of groundwater, as well as risks to not doing the study and not knowing if groundwater is jeopardized.

ACTION: TJ Glauthier MOVED to approve Resolution 2009-1. The motion was SECONDED by Roxy Stone and CARRIED unanimously.

7. **ADJOURNMENT**

7.1 **ACTION**: The Regular Meeting of the Board of Directors was adjourned at 8:35p.m.

1:38 PM

05/21/09

Accrual Basis

San Mateo County Resource Conservation District
Profit & Loss
July 2008 through April 2009

	Jul '08 - Apr 09
Ordinary Income/Expense	
Income	
4010 · Contracts/Grants	592,026.50
4015 · Fines and Mitigation Funds	36,506.00
4030 · Interest Income	527.57
4100 · Misc. Income	610.96
4200 · Property Tax Revenue	50,348.19
4300 · Service Fees	5,101.00
Total Income	685,120.22
Expense	
5000 · Personnel	
5010 · Salary	141,063.01
5030 · Salary Tax Expense	11,903.64
5020 · Salary Service Fees	792.75
5040 · Benefits	14,142.37
Total 5000 · Personnel	167,901.77
6020 · Bank Fees	864.08
6040 · Blue Circle	266.68
6060 · Computer Service	120.00
6070 · Communications	
6075 · Internet	729.14
6080 · Telephone	255.05
Total 6070 · Communications	984.19
6200 · Discretionary	999.51
6300 · Equipment & Furniture	43.29
6400 · Insurance-Liability	1,829.80
6450 · Legal Services	91.50
6500 · Membership, Dues & Subscription	65.00
6550 · Mileage	216.24
6650 · Postage and Delivery	25.87
6750 · Professional Development	120.65
6800 · Public Relations	239.72
6850 · Rent	9,000.00
6900 · Supplies	524.14
6950 · Travel/Accomodations	1,679.65
7200 · Program Consultant	19,340.89
7500 · Program Expense	460,040.81
Total Expense	664,353.79
Net Ordinary Income	20,766.43
Net Income	**20,766.43**

1:37 PM
05/21/09
Accrual Basis

San Mateo County Resource Conservation District
Balance Sheet
As of April 30, 2009

	Apr 30, 09
ASSETS	
Current Assets	
Checking/Savings	
1000 · Checking RCD 8123985	25,586.31
1004 · Checking Restricted 8121907	10,580.20
1008 · Checking SEP 8129517 (SEP and CalTrans)	27,309.32
Total Checking/Savings	63,475.83
Accounts Receivable	
1110 · Contracts Receivable	383,598.20
Total Accounts Receivable	383,598.20
Total Current Assets	447,074.03
Other Assets	
1600 · Long-Term Receivables	806,938.32
1610 · Security Deposits	1,300.00
1620 · Prepaid Expenses (Liability Insurance)	365.98
Total Other Assets	808,604.30
TOTAL ASSETS	**1,255,678.33**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
2000 · Accounts Payable	307,200.48
Total Accounts Payable	307,200.48
Other Current Liabilities	
2100 · Payroll Taxes Payable	-690.58
2200 · Defered Revenue	833,620.22
Total Other Current Liabilities	832,929.64
Total Current Liabilities	1,140,130.12
Total Liabilities	1,140,130.12
Equity	
3200 · Unrestricted Net Assets	2,500.00
3900 · Retained Earnings	-98,513.97
3910 · Restricted Retained Earnings (Unearned revenue)	190,795.75
Net Income	20,766.43
Total Equity	115,548.21
TOTAL LIABILITIES & EQUITY	**1,255,678.33**

San Mateo County Resource Conservation District
Profit & Loss
July 2008 through May 2009

	Jul '08 - May 09
Ordinary Income/Expense	
Income	
4010 · Contracts/Grants	605,703.80
4015 · Fines and Mitigation Funds	36,506.00
4030 · Interest Income	569.00
4100 · Misc. Income	320.00
4200 · Property Tax Revenue	50,523.40
Total Income	693,622.20
Expense	
5000 · Personnel	
5010 · Salary	147,136.08
5030 · Salary Tax Expense	13,094.42
5020 · Salary Service Fees	792.75
5040 · Benefits	14,142.37
Total 5000 · Personnel	175,165.62
6020 · Bank Fees	902.29
6040 · Blue Circle	266.68
6060 · Computer Service	120.00
6070 · Communications	
6075 · Internet	729.14
6080 · Telephone	255.05
Total 6070 · Communications	984.19
6200 · Discretionary	849.56
6300 · Equipment & Furniture	43.29
6400 · Insurance-Liability	2,012.78
6450 · Legal Services	91.50
6500 · Membership, Dues & Subscription	65.00
6550 · Mileage	216.24
6650 · Postage and Delivery	31.10
6750 · Professional Development	1,057.43
6800 · Public Relations	239.72
6850 · Rent	9,000.00
6900 · Supplies	562.64
6950 · Travel/Accomodations	451.91
7200 · Program Consultant	68,130.74
7500 · Program Expense	444,467.36
Total Expense	704,658.05
Net Ordinary Income	-11,035.85
Net Income	**-11,035.85**

San Mateo County Resource Conservation District
Balance Sheet
As of May 31, 2009

	May 31, 09
ASSETS	
Current Assets	
Checking/Savings	
1000 · Checking RCD 8123985	10,494.70
1004 · Checking Restricted 8121907	10,586.92
1008 · Checking SEP 8129517 (SEP and CalTrans)	37,341.30
Total Checking/Savings	58,422.92
Accounts Receivable	
1110 · Contracts Receivable	383,777.05
Total Accounts Receivable	383,777.05
Total Current Assets	442,199.97
Other Assets	
1600 · Long-Term Receivables	831,624.11
1610 · Security Deposits	1,300.00
1620 · Prepaid Expenses (Liability Insurance)	183.00
Total Other Assets	833,107.11
TOTAL ASSETS	**1,275,307.08**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
2000 · Accounts Payable	338,185.35
Total Accounts Payable	338,185.35
Other Current Liabilities	
2100 · Payroll Taxes Payable	103.88
2200 · Defered Revenue	869,711.27
Total Other Current Liabilities	869,815.15
Total Current Liabilities	1,208,000.50
Total Liabilities	1,208,000.50
Equity	
3900 · Retained Earnings	-94,988.87
3910 · Restricted Retained Earnings (Unearned revenue)	173,331.30
Net Income	-11,035.85
Total Equity	67,306.58
TOTAL LIABILITIES & EQUITY	**1,275,307.08**

Conservation Banking in San Mateo County
Prepared for the San Mateo Resource Conservation District

Analysts: Jerrod Mason, Tiffany Chow, and Antoine Guthmann,
Goldman School of Public Policy
University of California, Berkeley
May 2009

The authors conducted this study as part of the program of professional education at the Goldman School of Public Policy, University of California at Berkeley. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the authors, and are not necessarily endorsed by the Goldman School of Public Policy, by the University of California, or by any other agency.

Table of Contents

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Executive Summary

The purpose of this policy analysis is to answer the question of whether or not a market-based approach to conservation for farms, ranches and other working landscapes is feasible, and what the role of the San Mateo County Resource Conservation District (SMCRCD) should be in any such market system. Our analysis reframes the question into whether or not the current methods by which land developers achieve "no net loss" of wetlands and endangered species critical habitat are inefficient.

In response to environmental destruction due to land development, federal regulations were enacted to force land developers to mitigate the negative environmental impacts of their activities by restoring equivalent amounts of wetland or endangered species critical habitat. To comply with these regulations, firms & agencies can mitigate on wetlands and habitat themselves onsite or contract mitigation with an outside firm. However, both choices incur high administrative and transaction costs and have uncertain environmental impacts.

We find that conservation banking can lower costs related to mitigation as well reduce environmental uncertainties. San Mateo County farmers and ranchers may have the means to establish conservation banks, but due to high costs of start-up and long-term cost uncertainty, it is unclear whether the implementation of conservation banking will be profitable for agricultural landowners in San Mateo County. The SMCRCD can potentially play an important role in identifying likely candidates for conservation banking activity, as well as assisting participants in undertaking the steps necessary to establish a conservation bank.

Recommendations

If the SMCRCD decides to pursue conservation banking as a strategy for San Mateo County:

1. The SMCRCD should identify sites within its jurisdiction which may be good locations for a future conservation bank. In its analysis, it should consider the receptivity of landowners to conservation activity, the suitability of land for use as a conservation bank, and the degree of critical species habitat overlap.

2. The SMCRCD should conduct an analysis of potential costs associated with conservation banking activity on identified sites, using appropriate cost estimation software such as the Center for Natural Lands Management's PAR 3 software package.

3. The SMCRCD should identify roles it can play in a conservation bank located within its jurisdiction, potentially including facilitating the permitting and bank certification process and providing monitoring support to bank activities.

Definitions and Acronyms Used Throughout the Paper

Definitions

1. Conservation Banking: A conservation bank is a specific type of mitigation bank for restoring, establishing, enhancing, or preserving the habitat of specific threatened or endangered species.

2. Externality: An externality is a cost or a benefit which accrues to a party not directly involved in the production or consumption of a good or service, resulting in an inefficient market outcome.

3. Mitigation Banking: also referred to as Mitigation. A mitigation bank is where resources such as wetlands, streams, or riparian areas are restored, established, enhanced, and preserved in compliance with the "no net loss" criteria for the purpose of offsetting land development activity.

4. Public Good: Public Goods are goods or services that are not provided efficiently by the free market due to their unique characteristics. They are often characterized by non-rivalry of consumption and non-exclusion.

5. San Mateo County Resource Conservation District (SMCRCD): The SMCRCD is a non-regulatory public benefit district to help people protect, conserve, and restore natural resources through information, education, and technical assistance programs.

Acronyms

1. CORPS: U.S. Army Corps of Engineers

2. CRF: California Red-legged Frog

3. CWA: Clean Water Act

4. EPA: Environmental Protection Agency

5. ESA: Endangered Species Act

6. FWS: U.S. Fish and Wildlife Services

7. NOAA: National Ocean and Atmospheric Administration

8. SFGS: San Francisco garter snake

9. SMCRCD: San Mateo County Resource Conservation District

1. Introduction

Human activity in the U.S. has destroyed the environment and consumed natural resources at an alarming rate. Over the past several decades, the US has lost 120 million acres of wetlands due to land development, and the US Fish and Wildlife Service (FWS) has currently listed 409 species as endangered[1]. Both wetlands and endangered species habitats provide invaluable ecosystem services that once damaged or destroyed become costly or impossible to replace. Wetlands are ecosystems that have a variety of functions, including recycling nutrients, assimilating waste, and regulating climate. Direct benefits to humans include filtering drinking water and providing water storage to control flooding. Moreover, endangered species habitats provide a multitude of resources and processes that benefit mankind such food and products, the purification of water and air as well as pest and disease control.[2] Wetlands are also a vital source of habitat for endangered species such as the California Red-legged Frog and the San Francisco Garter Snake. As a result of the degradation of these resources, federal and state authorities have implemented regulations designed to reduce the negative impacts of human activity on a broad range of natural resources. However, these regulations may in some cases result in inefficiency in the production of species habitat and other natural resources in compliance with environmental impact requirements.

1.1. Problem Statement

The current system by which land developers in San Mateo County comply with regulations protecting wetlands and endangered species habitat is inefficient.

1.2. San Mateo County in Context

Development in San Mateo County has significantly reduced the acreage of wetlands and has threatened the sustainability of several native species. This development includes both agricultural use of land and development for housing and commercial and industrial uses. While efforts have been made to improve the ecological footprint of San Mateo County residents, four species in particular are at risk as a result of human activity, and have been targeted for protection by federal environmental regulation: the San Francisco Garter Snake, the California Red-legged Frog, the Coho Salmon and the Steelhead Trout.

1.2.1. Current Conditions of Sustainability in San Mateo

According to the annual report of the Indicators for a Sustainable San Mateo County, San Mateo requires improvement in several key areas to ensure a sustainable future. While the county's agricultural production and ecological footprint have been decreasing compared to past periods, there is no clear trend for important ecological indicators such as pesticide use and land development.

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[1] Fernandez, and Karp, p 323
[2] Brown and Lant, p 333

1.2.1.1.Land Use and Development

Land development in San Mateo County has generally trended upwards over the past several decades. As a result of the general economic downturn in 2008, San Mateo experienced a decline in new land developments, but land development companies plan to develop new residential areas in early 2009. The percentage of urbanized land has not grown since 2000, which is an indication of the high proportion of open spaces the county has (approximately 60% of land in San Mateo County is open space). In fact, in 2005, only 37 percent of the land was urban; major infrastructure such as roads and highways constituted about a fourth of all urban land. By 2025, the population of San Mateo County is projected to grow by 80,000 people from a current level of 715,000, so the county must develop enough land to house its residents as part of its current land development plans.[3] Sustainable future practices will incorporate land policies that encourage land development in areas that are easily accessible to jobs and transit while protecting open spaces and agriculture.

1.2.1.2.Agricultural Production

San Mateo farmers and ranchers have developed a diverse set of agricultural and livestock products that have a significant impact on the local economy. According to the county farm bureau's 2007 crop summary report, the total agricultural production value was $172,869,000, which is a 2.6 percent increase from 2006.[4] However, the total production value has declined more than 27 percent since 1988, indicating a long-term downward trend in farmland and agricultural activity. San Mateo farmers grow a variety of crops including the following types: floral and nursery, vegetables, field, and fruits and nuts. In particular, the highest revenue grossing products are the floral and nursery crops along with Brussels sprouts and mushrooms. Floral and nursery crops generate about 80 percent of total crop production value. Besides crops, San Mateo farmers and ranchers make profits though raising livestock, producing apiary and forest products, and commercial fishing.[5]

1.2.2. Threats to Conservation in San Mateo County

1.2.2.1.Pest Control

One of the biggest challenges to California farmers is pest control.[6] Both the county agricultural department and San Mateo farmers control several animal and plant pests to successfully grow crops. Currently, there are several programs for the exclusion, detection, and eradication of pests as alternatives to pesticide use, which harms the local habitat.[7] One preventive measure is the Pest Exclusion Program. Shipments of plant and animal species that might compete for resources with the local crops are restricted from entering specific locations in the county, including San Francisco International Airport. In the past several years, government officials have intercepted thirty-seven different pests such as various species of weeds, moths, and bugs.

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[3] "San Mateo County Statistics", p 1
[4] San Mateo County 2007 Crop Summary, p 1
[5] Indicators for a Sustainable San Mateo County, p 16
[6] Cash and Zilberman p 219
[7] San Mateo County 2007 Crop Summary, p 10

The next line of defense after exclusion is pest detection, which involves trapping insects and exotic plants. In 2007, the San Mateo Health Department set over 5000 insect traps throughout the county[8]. However, if the pests multiply quickly and start to displace the native vegetation and wildlife, the county agricultural commissioner can allow for its eradication. Some of these invasive species include the Skeletonweed and the Purple Loosestrife, which have spread rapidly throughout the county. Additional initiatives to control pests include insect monitoring, cover crops, weed covers, refined oils, and steam sterilization of soil.[9]

1.2.2.2.Pesticide Use

Overall pesticide use has remained stable over the past five years, but use of the most toxic pesticides has increased 6 percent in 2007. In fact, The California Department of Pesticide Regulation stated that approximately 288,000 pounds of pesticides were used for non-residential uses in 2007. Agricultural production was the largest area of pesticide use and constituted 58 percent of the total pesticide usage.[10] High usage is problematic because pesticides pollute water sources and threaten wildlife species. To ensure a sustainable future, the county must reduce use of extremely toxic pesticides and employ nontoxic management practices, along with alternative means to control pests. San Mateo's integrated pest management (IPM) is a program that adopts less toxic alternatives to pesticide use. In addition, farming practices such as organic certification minimize environmental pollution by restricting pesticide use.

1.2.2.3.Ecological Protection

An area's ecological footprint measures the use of natural resources to satisfy consumption and to absorb waste. Specifically it tracks the natural resources used in production such as crop land, grazing land, fishing grounds, and forest land along with the land required to accommodate human infrastructure such as housing, transportation, and industrial production. The ideal ecological footprint for a sustainable community occurs when the area's demand for natural resources reflects the capability of natural resources to replenish themselves. Currently, San Mateo County residents use natural resources faster than nature's ability to replace them, although consumption rates have stabilized since 2005. Agriculture represents a significant portion of this footprint: next to energy use, crop land for food production constitutes the second largest part of San Mateo's footprint at 18 percent of the total ecological footprint[11]. Essentially, this means that each resident requires about 3.4 acres of crop land each year for food production.

1.2.3. Conservation Efforts in San Mateo County

1.2.3.1.Habitat Protection

A sustainable future requires current ecosystems to be healthy for all native species to thrive. San Mateo is home to over 30 threatened and endangered species, but the number of endangered

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[8] Ibid., p 12
[9] Ibid., p 13
[10] Indicators for a Sustainable San Mateo County, p 43
[11] Indicators for a Sustainable San Mateo County, p 26

species has remained stable in the past three years.[12] However, a few species have been particularly hurt from land development and habitat destruction. Due to pollution, poor water quality and stream conditions, the Coho salmon have greatly declined in population. In addition, agricultural, commercial, and urban land development have damaged wetland habitats, which are home to the California red- legged frog and San Francisco garter snake.[13] To facilitate habitat restoration, the county has re-graded and replaced a two acre Christmas tree farm in the Skyline Open Space Preserve with native oak woodland. This new ecosystem will allow the California red legged frog and the San Francisco garter to flourish by keeping sediment from eroding into the nearby Horseshoe Lake, an important water source and natural habitat for the two endangered species.[14]

1.2.3.2.Local Agriculture and Organic Farming

A sustainable future requires agricultural production to conserve natural resources and biodiversity, provide food for local residents, and maintain healthy soils and ecosystems. In response to habitat destruction due to agricultural production, San Mateo has established an Agricultural Awareness Ordinance in 2007 that states the "declared policy of this county to conserve, protect, and encourage agricultural operations on agricultural land within the county." [15] In fact, the growing number of certified farmer's markets and organically certified farms indicate the county's successful path toward enhancing biodiversity. Currently, San Mateo is home to fourteen certified farmers markets in which the local farmers sell agricultural products directly to consumers.[16] This is significant because locally grown food is fresh and maintains its nutritional value, and it may reduce delivery costs and air pollution associated with transportation. In addition, eleven farms in San Mateo are registered as organic certified, and these farms sell a variety of fruit and vegetable crops.[17] Organic farming practices restrict pesticide use and thereby reduce collateral environmental damage and preserve soil quality.

1.2.4. Endangered Species in San Mateo County

1.2.4.1.San Francisco Garter Snake

The San Francisco Garter Snake (SFGS) is classified as a subspecies of the garter snake, and it can be differentiated from other snakes by its checkered hues. Native only to San Mateo County and some parts of Northern Santa Cruz in California, it lives in marshy, wet areas and can be found scattered around the various aquatic environments such as wetlands.[18] Specifically, the San Francisco garter snake obtains all its necessary living needs near small, vegetated water bodies located near open hillsides. Streams, ponds, water bank sides, and grasslands are perfect areas for the snake to hide and scrounge for food. Here, it can bask in the sunlight, locate rodent burrows, and prey on young bullfrogs, the toxic California newt, and the California red-legged frog, which is an also endangered species.

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[12] Ibid., p 35
[13] Ibid., p 35
[14] Ibid., p 35
[15] Indicators for a Sustainable San Mateo County, p 16
[16] Ibid., p 16
[17] San Mateo County 2007 Crop Summary, p 13
[18] US Fish and Wildlife Service: SF garter snake 5 year review, p 5

It is estimated that about 1000 snakes of this type are still living in San Mateo County, but the FWS cannot obtain accurate population statistics on the animal because the snake is elusive and because most of the species' habitat is on private property. The SFGS is difficult to locate and capture due to its elusive personality—it will flee quickly if bothered. Several factors have threatened the survivability of the garter snake. The animal's preferred habitats have been destroyed due to several years of industrialization. Specifically, land development and agricultural production has filled up several wetlands over the past 60 years. Moreover, other factors such as illegal land development, illegal collection by private citizens, and poor regulatory enforcement contribute to the dwindling snake numbers in the Pescadero Marsh, Año Nuevo State Reserve, and at the San Francisco State Fish and Game Refuge[19]. As a result of its delicate population status, the SFGS is under intense federal and state regulatory scrutiny.

California assigned the San Francisco garter snake the highest level of protection by enlisting the animal in the state endangered species status in 1971. The regulation prohibits any action that results in the death of a garter snake, unless it is for beneficial research purposes. The SF garter snake is also protected under the Endangered Species Act as an endangered species.

1.2.4.2.California Red-Legged Frog

The California Red-Legged Frog (CRLF) is a subspecies of the Red-legged Frog found mainly in the Northern and Southern Coast Ranges of California, and it thrives in areas with vegetation near water sources.[20] Over the past several years, the conversion of wetlands into farmland and commercial and urban development has destroyed about 70 percent of the frog's original habitats. Currently, it is estimated that the species is limited to only 238 water sources.[21] As a result of its dwindling population, the California Red-legged frog is subject to federal protection. In 1999, the Fish and Wildlife Service listed the frog as a threatened species and has promoted Habitat Conservation Plans in hopes of restoring habitat.[22]

1.2.4.3.Coho Salmon

The Coho Salmon is a species of the salmon family that is easily identified by its red skin and dark back. The fish can be found in the Great Lakes, North Pacific Ocean, Bering Sea and the Monterey Bay in California.[23] It lives in freshwater for part of its life, and feeds on aquatic insects, zooplankton and other small fish. Human induced factors, environmental pollution, and natural events have significantly reduced the species population in the West Coast area.[24] Human activity such as sport fishing, shoreline development, residential drainage, the filling of marine wetlands, and private industry fishing has greatly contributed to the fish's decline. In addition, poor forest and agricultural management practices pollute the water quality of local streams and hamper salmon eggs from spawning. Some natural causes of destruction include hurricanes and increased predation from the harbor seal and California Sea Lion.[25] While Coho

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[19] Ibid., p 6
[20] Fellers, p 2
[21] Ibid., p 9
[22] Ibid., p 13
[23] McMahon, p 1
[24] Ibid., p 3
[25] Ibid., p 7

populations worldwide are not considered threatened, individual Evolutionary Significant Units (ESUs) of the Coho species have been identified as threatened or endangered, including the ESU which inhabits the coastal areas of Northern California. As a result of its declining numbers, the U.S. Marine Fisheries Service has listed the Coho Salmon ESU in the Central California Coast as endangered. Moreover, the NOAA has labeled the Coho Salmon a "Species of Concern." However, habitat restoration efforts such as the Salmon Protection Watershed Network (SPAWN) have been successful in protecting the salmon population in parts of California.[26]

1.2.4.4.Steelhead Trout

The Steelhead trout is a dark colored fish with specks and a white underbelly that lives in the ocean after hatching in freshwater water sources. The fish can survive in a range of temperature conditions but prefer water sources with high dissolved oxygen concentration.[27] When it is young, the fish feast on zooplankton but feed on aquatic and terrestrial insects, mollusks, eggs, and other small fish during adulthood. In particular, the loss of dams, stream pollution from sediment and debris, inadequate stream flows, have destroyed the Steelhead's native habitat and have severely reduced the fish's population size.[28] In fact, the current population in the Central Valley Rivers in California are about half the size compared to the population size 30 years ago.[29] As a result, in addition to designating ten west coast areas critical habitat for the Steelhead trout, the National Ocean and Atmospheric Administration (NOAA) has enlisted the steelhead under the threatened species list. However, specific conservation efforts such as the restoration of damaged habitat and water quality improvements have helped the Steelhead population multiply more rapidly.[30]

1.3. Current Polices and Federal Regulations

Over the past several years, significant conversion of wetlands acreage into agricultural farmland has taken place.[31] In response to degradation of wetlands and endangered species habitats, the federal government has enacted several regulations to minimize further environmental damage and has established several incentive programs designed to encourage environmentally friendly agricultural practices. The two main regulations related to habitat protection are the federal Clean Water Act and Endangered Species Act. Regulation compliance proceeds from a hierarchy, starting with avoiding any harmful projects, minimizing their adverse impacts on critical habitat, and finally offsetting the residual unavoidable impacts. Offsetting requires the land developers to restore land to its natural state, or to create new wetlands and habitats.

The 2008 Farm Bill incorporates several incentive programs that provide technical and financial assistance to those landowners, farmers, and ranchers willing to engage in programs which improve the environmental impacts of their operations.

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[26] Ibid., p 8
[27] U.S. Fish and Wildlife Service, Species Profiles, p 1
[28] Ibid., p 3
[29] Ibid., p 8
[30] Ibid., p 13
[31] Cash and Zilberman, p 216

1.3.1. Clean Water Act (CWA)

The Clean Water Act was enacted in 1972 by Congress to reduce and eliminate water pollution in rivers, streams, lakes, and coastal waters.[32] The CWA employs a variety of means to control pollution through watershed approaches, water quality standards, permits and more. In particular, the CWA section 404 requires agricultural operators and land developers conducting activities that affect a water source to obtain a permit, which are subject to both the U.S. Army Corps of Engineers (CORPS) and the Environmental Protection Agency's (EPA) review and approval.[33] Several different types of activities are allowed under the 404 General and Nationwide Permits such as emergency watershed protection and rehabilitation as well as wetland and riparian area restoration and creation, although permits will denied if the activity has detrimental effects on a water source. A permit may include mitigation such as the restoration or protection of wetlands onsite or offsite. Specifically to wetlands, the CWA states that any development activities that affect a wetland must be minimized. The "no net loss criteria" states that a reduction in wetland acreage or function must be offset by creation or restoration of a commensurate amount of wetlands.[34] Different types of wetland mitigation (creation, restoration, enhancement, preservation – see Appendix G) are possible, although they are not equivalent in terms of the rate of offsetting activity required: mitigation regulation requires only 1 acre of restored wetland per acre destroyed, but as much as 10 to 20 acres of preserved wetlands, to mitigate 1 acre of destroyed wetland. Mitigation is done either on the site of the damaging activity, or off-site, and may be undertaken either by the developer or through a contracted third-party.

1.3.2. Endangered Species Act (ESA)

The ESA was passed by Congress in 1973 and was designed in response to land development to protect specific threatened species from any further harm.[35] It includes provisions that protect plants and animal species, as well as the habitats and ecosystems they depend on. Since its inception, the rate of listing species as either "threatened" or "endangered" has increased but took a decline to its lowest rate under the previous presidential administration.[36] This is alarming because the longer a species is listed, the more likely it is to recover in numbers and thrive. One important factor in the amount of listings is citizen awareness and involvement.

Individuals or organizations can request government agencies to list a species as "endangered" or "threatened" or the government agencies themselves can choose to enlist the species through a candidate assessment form.[37] The United States Secretary of State and Secretary of Treasury help enforce ESA, along with other federal agencies. Both the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) specialize in administering different aspects of ESA.[38] Both agencies share joint responsibility over some species, but the FWS oversees freshwater fish, whereas the NOAA supervises marine animals. In

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[32] Environmental laws affecting California agriculture p CA-1
[33] Ibid., p CA-5
[34] Environmental laws affecting California agriculture p CA-6
[35] Nicholopoulos, p 6
[36] Ibid., p 6
[37] Nicholopoulos, p 9
[38] Clark, p 4

addition, section 6 of the ESA provides funding for states to develop and manage programs to benefit threatened or endangered species.[39] As a result, states can often list species that are at risk within the state borders but not necessarily considered "threatened" or endangered outside.

Depending on the type of offense, there are varying penalties associated with violating ESA. The highest punishment is given to those that break the law consciously from importing, exporting, harming, wounding, killing, possessing, selling, delivering, carrying, transporting, and shipping enlisted species without consent.[40] The penalties are either $50,000 dollars or 1 year of imprisonment with civil penalties up to 25 dollars per violation. In addition to imprisonment and fines, violators of ESA can have their license and permit to export plants and animals revoked, modified, and suspended. However, there are some conditions on the violations.[41] People protecting themselves from bodily harm from enlisted species will not be prosecuted. Moreover, farmers and ranchers who accidentally harm or kill enlisted species during agricultural activity will not face criminal penalties.

Because threatened and endangered species need a specific habitat to thrive, the ESA gives federal agencies the authority to label certain areas as "critical habitat" zones.[42] By definition, critical habitats encompass private or public lands that are needed for the survivability and recovery of threatened or endangered species. Under this provision, both private landowners and federal agencies are restricted from executing any activity that might destroy or adversely modify these habits. To designate areas as critical habitats zones, ESA uses cost benefit analysis to determine if the economic costs exceed the benefit.[43] Currently, public agencies or private landowners who wish to pursue development project consult with the Fish and Wildlife Service to assess the impact of a project on critical habitat, and the risk of incidental harming, wounding, or killing of species. If the project results in permanent habitat loss, land developers are encouraged to avoid or minimize, and eventually mitigate this loss, either directly (setting aside part of the land for conservation purposes, through easements in particular) or through a third party fee-based arrangement. In addition, private landowners can obtain permits to conduct specific activities on these habitats in otherwise restricted areas by participating in incentive programs that promote species conservation. For example, landowners prepare Habitat Conservation Plans (HCP) and are approved by FWS or NOAA can obtain incidental take permits to conduct activity on critical habitats.[44]

1.3.3. Incentive Programs

In addition to federal regulations, several incentive programs have been developed under the framework of the Farm Bill, to encourage conservation efforts. The legislation authorizes the NRCS to establish voluntary programs that target landowners to improve biodiversity. Under the programs, the NRCS will provide financial aid and technical assistance to landowners, farmers, and ranchers that implement needed conservation practices.[45] While some programs encourage

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[39] Cleva , p 20
[40] Ibid., p20
[41] Ibid., p21
[42] Scott, p 16
[43] Nelson, p 12
[44] Nelson, p 12
[45] Ibid.

retirement of land from agricultural activity, the largest amount of funds come through the cost-sharing programs which subsidize the best environmental practices regarding wildlife habitat, as well as soil quality, water quality and conservation. In addition to the three incentive programs described below, at least three other incentive programs exist in California.

1.3.3.1.Wildlife Habitat Incentives Program (WHIP)

WHIP is a 5 – 10 year voluntary program in which NRCS provides technical and financial aid to private landowners to improve wildlife habitat. People who own private agricultural land, non-industrial private forest land, and tribal land are all eligible for WHIP. Under the 2008 Farm Bill, total WHIP funds for 15 year long term projects that protect or restore plant or animal habitat have increased from 15 – 25 percent.[46] The payments, however, may not surpass 50,000 dollars per year per person or legal entity.[47]

1.3.3.2.Wetlands Reserve Program (WRP)

WRP gives technical and monetary aid to landowners and Tribes to protect and restore wetlands in exchange for retiring land from agriculture. Wetlands are ecosystems that provide habitat for wildlife and fish and benefits mankind through water filtration and water storage. The three enrollment options are permanent easement, 30-year easement, and restoration cost-share agreement. In the permanent easement program, the USDA pays up to 100 percent of the easement value and restoration costs; essentially, it is a conservation easement in perpetuity. In the 30-year easement program, the USDA pays up to 75 percent of the easement value and restoration costs. In the restoration cost-share agreement, the USDA pays up to 75 percent of restoration.[48] It is an agreement to restore or enhance wetland functions and values without placing an easement on enrolled acres. Under the 2008 Farm Bill, the Secretary of Agriculture can compensate participants in WRP the lowest of either the landowner's offer for easement value or the fair market value of land according to the Uniform Standards of Professional Appraisal Practices.[49]

1.3.3.3.Environmental Quality Incentives Program (EQIP)

EQIP is the largest incentive scheme for farmers and ranchers to receive financial and technical aid with structural and management conservation practices on agricultural land. Its goal is to promote agricultural production and environmental quality in compliance with national standards. EQIP pays about 75 percent of the incurred costs and income foregone of certain conservation practices and activities but socially disadvantaged producers may be eligible for payments up to 90 percent of total incurred and opportunity costs.[50] If needed, eligible people may call upon the services of a Technical Service Provider (TSP) for technical assistance needed for certain eligible activities and services.

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[46] Ibid.
[47] Ibid.
[48] USDA NRCS website
[49] Ibid.
[50] Ibid.

2. Economic Analysis

2.1. Economic Rationale for Public Intervention

When evaluating potential policy interventions, it is necessary to consider whether or not there exists an economic rationale for intervention. One reason often used to justify intervention by the public sphere is the concept of market failure. Although there may be situations in which freely operating markets achieve the most efficient production of goods, under certain circumstances this may not be the case. Under these conditions, public intervention may have the potential to improve both the efficiency and equity of the outcome; understanding the economic rationale for intervention can assist us in evaluating what type of intervention is most likely to be effective and what potential improvement we can expect to achieve. In the case of agricultural production and its impact on the environment, the potential for several market failures exists. The two main ones are the problems of externalities and public goods.

2.1.1. Water quality and Aquatic Species Habitat Degradation as a Market Externality

An externality occurs when some of the costs of production of a good are not borne by the producer of the good, or when some of the benefits of the good are not received by the consumer. In these circumstances, a good will be either over- or under-produced relative to the "socially optimal" amount of the good. This occurs because the full costs or benefits of a good are not captured by the market. By definition, an externality results in a burden or a benefit accruing to someone who is not directly involved in the production or consumption of the good. This is an example of a market failure, because freely functioning markets fail to provide the correct amount of the good to society.

In the case of agriculture, the most obvious externality is the production of pesticide, sediment and coliform bacteria runoff, which can enter water sources adjacent to the agricultural activity in question and can degrade the quality of the water source. This has negative impacts on the water's functions as both a source for consumption by humans and also as habitat for aquatic species[51]. As sediment, bacteria and pesticide levels increase in a water source, its use for human consumption becomes more difficult, and requires more expensive processing.

Additionally, the aquatic species which need clean, abundant water sources to survive, are impaired by elevated levels of water contaminants. These aquatic species provide general benefit to the ecosystem by enhancing its diversity and sustainability, as well as by functioning as important links that tie other species together; they also represent aesthetic and scientific assets which are in many senses priceless, since their destruction would mean the loss of an irreplaceable resource. However, in addition to these somewhat amorphous benefits, many of these species also have direct economic value. The Coho salmon and the steelhead trout, for example, are important resources for commercial fishermen; any externality which reduces their population levels has therefore a direct negative impact on a major commercial industry.

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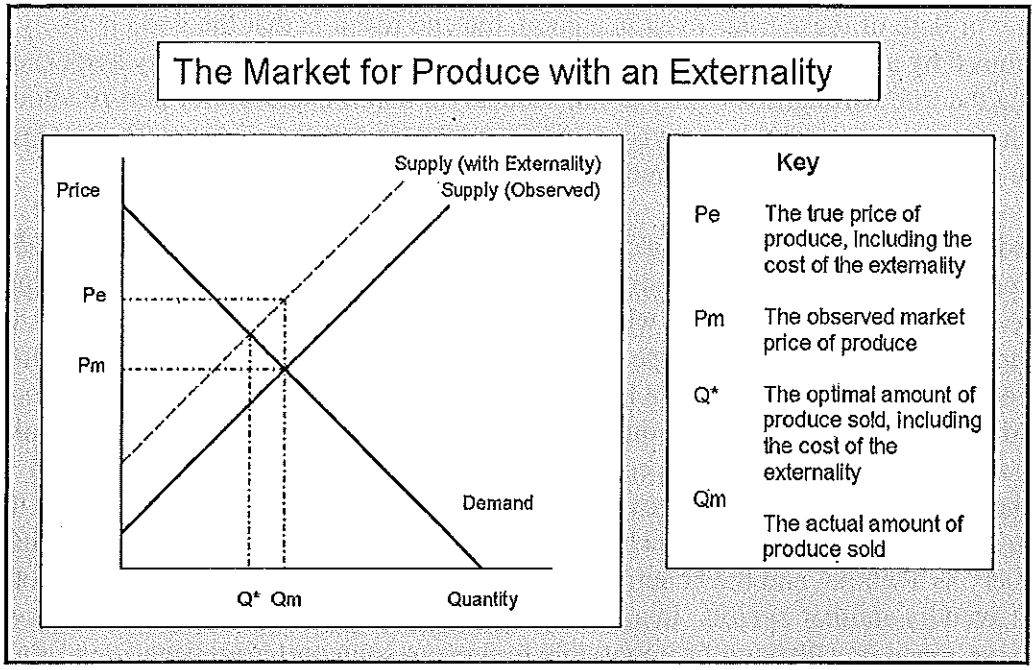
[51] Hascic and Wu, p 223



In the presence of an externality, production of agricultural goods will not be efficient. For example, the chart above illustrates a market for produce which contains an externality, like water pollution by pesticide runoff. If the externality is not recognized, produce will be supplied along the observed supply curve, the price of produce will be Pm, and the quantity supplied will be Qm. However, this outcome does not take into account the cost of the externality, which is equal to the distance between Pe and Pm. Pe represents the true cost of supplying produce, since it incorporates the cost of water pollution, which could be in terms of reduced supply of fish for commercial fishing, reduced habitat for endangered species, or increased cost of water purification. Also, the amount of produce supplied in this market is too high—suppliers produce Qm units, while the optimal quantity when accounting for the cost of water pollution is really Q*. We can see that the existence of water pollution as an externality results in a market failure in the market for produce, if the externality is not accounted for.

2.1.2. Species and Habitat as a Public Goods Problem

Another type of market failure concerns the production of public goods. Public goods, generally, are goods which possess one or both of the following characteristics. First, public goods may be non-rivalrous in consumption, meaning that the good by one person does not reduce the amount of the good available for use by another person. Examples of this might be the information contained in an online database, which is available to anyone and which can be accessed by multiple people without its availability to others being restricted. Second, public goods may be non-exclusive, meaning that it is difficult or impossible to restrict access to the good's use. An example of a non-exclusive good may be a large, open national park with porous boundaries: fencing or other methods of exclusion may be difficult or impractical due to the size of the park and the natural features of its location, and monitoring the entrance and exit of each person may be practically impossible.

When either or both of these traits exist in a good, the end result is that the good is likely to be under-produced by a competitive market. This is primarily due to the difficulty associated with determining the true willingness to pay of individuals for a non-exclusive or non-rivalrous good. Under such circumstances, public provision of the good may result in a more efficient level of production than that achieved by the free market[52].

Species and their habitats exhibit many characteristics of public goods. For example, they are to some degree non-rivalrous, since an individual's benefit from the existence of a given species does not reduce the amount of benefit which others may experience. These benefits are very diverse, and vary widely by species type, location and habitat specifics. Plant species provide important environmental benefits, from land fertilization and carbon sequestration to flood control and support of animal populations[53]. Animal species provide ecosystem continuity and stability, genetic variation and various ecological benefits including pollination and soil replenishment. All types of species provide aesthetic benefits which, although difficult to quantify in monetary terms, are nonetheless real and important. These benefits accrue in large part to society as a whole, and the benefit one person receives from them is generally not reduced by that received by another person. In addition to being non-rivalrous, many of these goods are non-exclusive, since it is difficult or impossible to prevent someone from benefiting from them. For example, the carbon sequestration function provided by forested land results in equal benefits to everyone. Because of the presence of these traits, we would expect that in at least some cases, species and their habitats would be underprovided by an unregulated market.

2.2. Strategies to Correct Market Failures

2.2.1. Fee Assessment

Because both public goods and externalities are results of the failure of unregulated market activity, their presence can be a justification for public action to correct the market shortcoming. Since the failure associated with an externality is a cost or benefit which is not accruing to the individual entities involved in producing and consuming the good, the solution is generally to find some way to "internalize" the externality, in order to force the markets' active participants to account for all of the costs and benefits resulting from the production and consumption of the good. Often this can mean monitoring the production of the externality and assessing charges (if the externality is negative) or compensation (if it is positive) to the producer of the good. For example, authorities may choose to charge agricultural producers a fee per unit of sediment emitted into water sources as a result of their activities. If this fee is equal to the true cost of the externality, it will result in the farm or ranch choosing the "optimal" amount of sediment to emit, in the sense that emitting any more would result in costs greater than the benefits of doing so.

This type of regulation is a common method of correcting for the problems of environmental externalities. However, it has limitations. For one, achieving the desired level of reduction is entirely dependent upon choosing the emission fee which exactly equals the true cost of the externality. When the costs of an externality are readily apparent, this may be easy to quantify; often this is not the case. For example, the effect of sediment emission into a single watershed

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[52] For an in-depth discussion of the problem of public goods, see Olson, The Logic of Collective Action.
[53] Daily, p 2

may have unclear impacts on the overall population of Coho salmon; even if the direct economic impacts could be quantified, the more diffuse impacts on ecological diversity and sustainability, and the benefits of the species' existence are much more difficult to quantify, but may be significantly larger in the overall picture than the impacts to which we can affix a price tag. Additionally, this method may be effective when production of an externality is easily identified and quantified, however this may not always be the case. For example, the amount of pesticide runoff from an individual farming activity may be difficult to measure, since it is emitted over a large area and may depend significantly on external factors, (such as frequency and intensity of rain) which may vary widely from period to period. In such cases, the inability to identify exactly how much of the externality is produced by one firm makes the imposition of fines impractical[54].

2.2.2. Production Quotas

An alternative method of regulation involves limiting the amount of the externality which may be produced to a certain level for each producer. While this may result in an overall reduction in the emission of the externality, it may be inequitable in its impact on producers. This is due to the fact that some producers may find it relatively easier to reduce below the cap than others, which means the cost to some may be much higher than to others. Further, the result may be inefficient, in that a given overall level of reduction may be attainable at a lower cost if those with the lowest costs of reduction are allowed to reduce more and those with the highest cost are allowed to reduce less. In the case of water source pollution, a given level of pollution reduction may be attainable at a lower overall cost to farms and ranches if those firms which find it easier to reduce pollution levels are allowed to reduce by more and those who find it difficult are allowed to reduce by less. For all of these reasons, policy developers have tried to identify market-based solutions which achieve the goal of reducing the negative impacts of market failure at a lower social cost.

2.2.3. Cap and Trade

One way authorities have attempted to use market methods to correct the negative effects of externalities is through assigning tradable property rights to the externality. The regulatory authority sets a limit on the amount of carbon dioxide which can be emitted in a given geographical region or by a particular industry, and distributes permits which allot a certain level of emissions to each participant. If the cap is binding, firms which find it less costly to reduce pollution than to use their allotment will sell some of their unused CO2 emissions in a carbon market. The end result will be more efficient, since the firms will be forced to incorporate the cost of the externality into their production decisions. SO2 and carbon cap-and-trade programs are a much-discussed example of this technique, but water quality and water rights trading markets have been successfully established in several areas, notably in the Western United States, to incentivize efficient use of resources[55].

The effectiveness of this solution is also subject to shortcomings. Much of whether or not the end result is "efficient" (in the sense of reducing production of the externality to its optimal

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[54] Helfand and House, p 1024
[55] Colbie, p 642

level) depends on the ability of authorities to identify the "cap", that is the optimal amount of the externality to produce. If the target is set too low, the cost of emission may be higher than the true cost of the externality, in which case it would be under-produced. On the other hand, a too-lenient cap would result in a price of emissions lower than the true cost of the externality, in which case the regulation would still be ineffective because the externality would still be overproduced. This strategy too requires that authorities be able to monitor the emissions of individual firms, so that they can identify who is emitting how much of the targeted externality at any point in time.

2.3. Current Government Efforts to Correct Market Failures

2.3.1. The Clean Water Act and the Endangered Species Act

The Clean Water Act and the Endangered Species Act both contain provisions which use the concepts of emission fees and production caps to attempt to address the problems of market failure in the production of wetlands, endangered species and their associated habitats. For example, the CWA requires permits which limit production of "End-Of-Pipe" pollution into water sources, to account for the costs which pollution of water cause; it also provides restrictions on some types of Non-Point Source Pollution, that is pollution which does not enter water sources from one specified location, like agricultural runoff[56]. Additionally, the CWA and the ESA both attempt to mitigate the negative environmental impacts associated with lost wetlands and species habitat by requiring firms to offset their destruction or degradation of these resource by restoring or creating wetlands or habitat according to the stipulations of the Acts. Specifically, the CWA requires any negative impacts on wetlands to be completely offset, resulting in a "no net loss" of wetlands acreage as a result of development activities[57]. The ESA similarly prevents activities which would result in the impairment or harassment of protected species as the result of activities financed, regulated or carried out by federal agencies[58]. Any such activities must be offset to prevent damage to the protected species' survivability.

2.3.2. Shortcomings of Current Environmental Regulations

2.3.2.1.On-Site Mitigation

The aforementioned federal and state regulations are designed to address the problems of market failure associated with the production of species, habitat and wetlands. However, they may result in substantial inefficiencies in production if the costs of following these requirements exceed the benefits which accrue as a result. Specifically, if land developers and others who fall within the scope of the CWA and the ESA face a higher cost of restoring or creating the required habitat or wetlands acreage, the net result will be that the lost production associated with these regulations will be higher than it needs to be, an economically inefficient outcome. Nor is inefficiency the whole problem; if those undertaking required mitigation activity are not equipped to carry out the operations necessary to ensure the long-term stability and successful

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[56] See Clean Water Act, sections 402 and 319
[57] See Clean Water Act, section 404.
[58] See Endangered Species Act, section 9

restoration or creation of habitat or wetlands, the ecological benefits of this mitigation activity may be reduced as a result.

In some cases, land developers have responded to the problems of high mitigation costs by contracting with lower-cost providers of mitigation activity to provide the required habitat or wetland acreage in lieu of provision by the developer. Often this is done by means of a project specific contract between the developer and an agricultural or open space landowner to provide the necessary mitigation activity for an agreed-upon price. Since the cost of mitigating is lower for the landowner, both parties benefit: the developer, because he discharges his obligation vis-à-vis the relevant environmental regulation; the landowner, because she receives a fee for providing the mitigation service that is higher than her cost to provide it. Additionally, if the landowner is better-equipped to provide stable, successful habitat or wetlands, the environmental outcomes may improve as well[59].

2.3.2.2.Contracted Mitigation

However, this alternative too has its shortcomings. First, the cost to both developers and landowners of identifying willing partners may be significant under a project-specific mitigation contracting system. Demanders of mitigation activity must be able to identify landowners with acreage suitable for undertaking habitat or wetlands restoration or creation, and must contract with a provider regarding the specific terms of the agreement. Depending on the scale of the project, this may mean contracting with more than one party if no single provider can produce the necessary amount of restoration activity.

After identifying a suitable contractor to provide mitigation, the terms of the agreement must be arranged. This includes issues of payment, including the types of specific activities to be undertaken, which depend largely on the type of mitigation activity undertaken and the natural conditions of the land set aside for habitat production. These requirements range widely from one mitigation site to another as do the costs associated with undertaking them. Secondly, the requirements for quantifying the mitigation activity must be defined. These include the amount of raw acreage, as well as other indicators like species numbers and growth rates, water quality and quantity indicators, and other ecologically important metrics. Finally, the costs of monitoring the long-term progress of the mitigation activity must be considered. Restored or created habitat and wetlands often require multi-year monitoring to ensure the stability and long-term sustainability of the ecosystem, and the terms of this monitoring must be arranged for each specific project.

Because of these information and transaction costs, the outcome of contracted mitigation activity may still be inefficient. Any contracted activity would necessarily represent an improvement over on-site mitigation, since it would need to be advantageous to both the demander and the supplier of the mitigation activity in order for them to agree to it. However, in light of the significant transaction costs associated with contracting off-site, many potentially beneficial arrangements may go unmade, if the costs associated with undertaking the transaction are sufficiently high.

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[59] "Compensating for Wetland Losses under the Clean Water Act", p. 9

3. Criteria for Evaluation

3.1. Minimize Total Costs of Conservation

This criterion will analyze the extent to which banking can reduce the costs associated with undertaking conservation or mitigation activity. The potential areas for minimizing cost include information and transaction costs, production costs associated with conservation activity, long-term maintenance costs, and oversight, administration and compliance costs.

3.2. Maximize the Supply of Mitigation and Conservation Activity in San Mateo County

This criterion will look at whether or not the use of banking is likely to result in an increase in the amount of mitigation and conservation activity which is occurring in San Mateo County. The analysis will consider increases in both the quantity of conservation in acreage and in the quality of conservation activity provided.

3.3. Maximize the Sustainability of Local Agricultural Activity

This criterion will evaluate the extent to which the alternative will improve the financial sustainability of local working landscapes in San Mateo County. It will also consider whether the alternative will reduce the amount of land available for use in agriculture.

3.4. Maximize the Net Benefits to Endangered Species

This criterion will consider whether the alternative results in a net increase in the sustainability of threatened and endangered species in San Mateo County.

3.5. Maximize the Abundance of Water

Analysis of this criterion will consider the potential impact that banking will have on the use of water by agricultural users and on the availability of water in San Mateo County water sources.

3.6. Maximize Water Quality

This criterion will evaluate the potential impact that the alternative will have on the quality of water resources in San Mateo County, as measured by sediment, pesticide, fertilizer and coliform bacteria levels.

4. Banking as an Alternative to Current Mitigation Activity

4.1. What is mitigation and conservation banking?

Mitigation banking is an innovative form of regulation compliance allowed under the Clean Water Act and Endangered Species Act. It enables land developers to mitigate their adverse impact on species habitat through the purchase of specific credits from a mitigation bank, which needs to be previously approved by federal agencies. The argument behind this approach is that

it increases efficiency of the system, on both economic and biological aspects. Environmental benefits are expected to be larger when preserved areas are large enough and adjacent to each other. Mitigation banking should enable larger areas of habitat to be provided more easily by bank owners, rather than a scattered pattern of mitigation areas surrounded by developed land.

Mitigation banking is expected to have economic benefits as well. Allowing banks to be the providers of wetlands and habitat rather than land developers themselves should increase economic efficiency. Developers often do not have the technical expertise to create the wetlands at the lowest cost. Besides, bank owners benefit from economies of scale which should enable production of habitat at a lower cost than land developers mitigating on their own.

4.1.1. Wetlands Mitigation Banking

Wetlands banking allows an external supplier to establish a "wetlands bank" approved by the US Army Corps of Engineers. A wetlands bank grants its owner a number of credits, determined as a function of the bank size and the gain in wetlands area resulting from its creation (this may vary according to the method used for creating the bank: preservation, creation, ...)[60]. Credits are measured in acres of wetlands provided. The owner of the bank can then sell these credits to land developers that need to offset damage to a wetland in another location. For each acre of wetland it harms, the land developer will need to buy one credit from the bank, which ensures the "no net loss" objective is met. Credit prices are determined by supply and demand, and may vary significantly by region and year. The providers of wetlands banking should, however, be able to produce each acre of wetland at a lower price than the price at which it can sell its credits. Mitigation banking also transfers the conservation burden from short-sighted land developers to long-term bank owners, which should also increase economic efficiency.
This alternative assumes that wetland banks would be developed in San Mateo County so that land developers can access wetland credits market with low transaction costs. Farmers would convert some of their existing land into wetlands and gain credits which they would be able to sell to land developers both inside and outside of San Mateo County. As a condition of the mitigation bank's establishment, the US Army Corps of Engineers would need to monitor the preservation and biological effectiveness of wetland areas, as well as the process of credit allocation. The San Mateo RCD may be able to fulfill or facilitate this oversight and monitoring role to reduce the administrative burden for regulatory authorities and to reduce costs to mitigation suppliers.

4.1.2. Conservation banking

Following the example of wetland mitigation banks, conservation banking has developed on the same model: conservation banks are areas located within a species' critical habitat and are managed in such a way that they offer a safe haven for the targeted endangered species. Banks need to be approved by federal and state agencies, which in turn grant credits for conservation. Credits may vary significantly by type, but the most general type of credit corresponds to an acre of the particular species habitat provided. Project developers that expect their project to destroy an endangered species habitat can therefore offset this negative impact by purchasing credits for

[60] See Appendix G, "Wetlands Mitigation Activity Definitions"

this particular species from the bank. However, unlike wetlands, credits need to be purchased in the same critical habitat area, so as not to displace species from their original habitat.

This alternative would require San Mateo County to establish conservation banks for each of the four endangered species of interest, the San Francisco Garter snake, the California red-legged frog, the Coho Salmon and the Steelhead Trout. Farmers would either set aside part of their land from agricultural production, or adopt best practices that are compatible with species conservation, such as rangeland management to maintain species habitat. Again, a role for the San Mateo County RCD in facilitating the establishment of the bank and in providing oversight and monitoring assistance is possible.

5. Analysis of Criteria

This section presents the projected outcomes of each of the two alternatives presented in the previous section. Based on each criteria, the preferred outcome is discussed and each alternative is attributed a number of points. Finally, a table presents a summary of expected outcomes and the total scores of each alternative.

5.1. Minimize Total Costs of Conservation

5.1.1. Mitigation Costs

Current regulation compliance methods:
Under current regulation compliance methods, the cost of mitigation for developers, whether undertaken "in-house" or through fees to a third party, can be very high. However these costs crucially depend on the region where mitigation occurs; the type of mitigation pursued; the size of the mitigated area; land specificities; and the need to achieve particular works to make it suitable to wetland mitigation or conservation. Therefore, cost-estimates might be difficult to compare, especially between the different methods of mitigation.

In the case of wetlands mitigation, creation of new wetlands results in the highest costs, because it involves a large amount of planning and construction costs in addition to the land value (or opportunity cost). A review of existing studies on wetlands mitigation costs revealed that on average, a developer that wishes to create or restore wetlands would face the same costs, which would be three times as high as the cost of enhancement. Preservation, in turn, should present lower costs, but the credits associated are also significantly lower (usually, at least 10 acres of preserved wetlands are required to equal 1 acre of created wetland).

In San Mateo, mitigation costs are expected to be high, because land values are already particularly high, and some critical wetlands areas are under increasing pressure for urbanization, in particular around developed areas (eastern San Mateo in particular). Obtaining a cost-estimate for mitigation is difficult because of the large variability; however we could obtain a high estimate of development opportunity cost per acre. For instance, we can reference a recent lawsuit as an example. The City of Half Moon Bay sued Joyce Yamagiwa, Trustee, concerning the prohibited development of a 24.7-acre parcel owned by the latter to create wetlands. The court judgment required the City of Half Moon Bay the payment of $36,795,000 to J. Yamagiwa,

which resulted in a de facto payment of nearly $1,500,000 per acre of wetland[61]. Although that figure is probably much higher than the actual cost the City of Half Moon Bay would have faced to provide the wetland itself, we can see it as a high estimate for the cost of mitigation activity in Half Moon Bay.

Based on wetlands development costs observed by the Corps of Engineers – South Pacific Division, another study reported a lower average cost at $229,500 per acre of wetlands[62], with significant variation across districts as close as Sacramento and San Francisco. This average figure also includes in-lieu fee payments, which assumed to be lower than the costs of mitigation activity.

Mitigation Banking:
Mitigation and conservation banks should face lower costs of mitigation per acre because of their environmental expertise and higher scale efficiency. Indeed, mitigation banks operate at a much larger scale than individual developers, and thus their costs can be potentially dramatically lower. A recent study of conservation banks, the majority of which were located in California, revealed that the average size of conservation banks already approved by the Fish and Wildlife Service Department was 1,129 acres – much larger than the typical size of mitigation required by most individual projects. Likewise, in 2007 the average California wetlands mitigation bank averaged 217 acres and had established 112 wetland credits63.

Besides this size effect, competition among banks should lower costs, especially in areas where multiple banks are involved, competing to provide credits. Because developers choose the least-cost method for mitigating their impact (including comparing purchase of credits vs. mitigating on their own, and purchase of credits between different competing banks), competition would eventually result in a lower price of mitigation credits, and reward the most efficient suppliers[64].

Although the US Corps of Engineers reported an average price of wetland credits of $25,600 to $32,700 per acre, respectively in the districts of Sacramento and San Francisco[65], other sources relate to contracts with a major mitigation bank owner, Wildlands, Inc. In San Mateo County, this mitigation provider sells credits at a price of $125,000-150,000 per acre of wetland while facing a cost of mitigation estimated at $70,000 per acre[66].

The costs of mitigation under mitigation banking are still significantly lower than the costs assumed by land developers on their own, or through in-lieu fee payments.

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[61] "Yamigawa v. Half Moon Bay", p 165. After final settlement, the City of Half Moon Bay was required to pay only half this amount, i.e. $18,000,000, which still represents a mitigation cost per acre of $750,000.
[62] Environmental Law Institute (2007)
[63] Author's estimate, based on the California Wetlands Mitigation Banking Report to the Legislature (2007).
[64] The state of Oregon illustrates this competition effect, with a price per acre of $175,000 in the Portland area where demand is high and only one bank operates, while it is three times as low at $60,000 per acre in Oregon mid-valley which counts 9 mitigation banks.
[65] Environmental Law Institute (2007)
[66] "Management Audit of the San Francisco International Airport" (2003), sec. 6

5.1.2. Oversight and Administrative Costs

Current regulation compliance methods:
The existing conservation programs and regulations related to habitat protection require extensive oversight and administrative costs, as they involve a large number of administrations, both at the federal and the state level, including the Fish and Wildlife Service, the US Department of Agriculture, the US Army Corps of Engineers. Monitoring costs of the "no net loss" policy are projected to be high, since it requires consultations of the federal and state agencies for each project, writing many reports, and setting up consultations with various regulatory entities to ensure compliance. It is estimated that a "Habitat Conservation Plan" could cost $50,000 to $100,000 per year in administrative and monitoring costs.[67] In the case of mitigation through in-lieu fee payments to a public agency, these costs can be partially covered, but in-lieu fees need also finance the construction of mitigation areas.
Enforcement costs of these policies are likely to be high; in particular, the "no take" policy should result in a significant administrative burden. However, we lack relevant information in San Mateo County to assess a reasonable figure for these expenses.
Mitigation banking:
This alternative transfers a large part of the maintenance and monitoring costs from public authorities to bank owners, which are required to manage their property, and have an interest to preserve their ecological assets. However, some external agencies, together with the Corps of Engineers, would still need to provide an independent monitoring of the bank's potential for mitigation (before delivery of credits) and its performance in terms of biological function, throughout its life. In San Mateo County, the Resource Conservation District could act as the monitoring entity, since its extensive knowledge of San Mateo conservation specificities and its existing ties to farmers and ranchers would significantly decrease the additional cost of monitoring mitigation activities.

Maintenance costs are usually difficult to disentangle from mitigation cost data; however, in the previously discussed transaction between the San Francisco Airport and Wildlands, Inc., annual management costs for wetlands were estimated as low as $50 per acre per year. We expect in any case that administering a conservation bank should be cheaper for the farmers of San Mateo, who have a better knowledge of wildlife and of long-term natural land management than land developers.

Administrative costs for establishing a bank can be a real burden for farmers, and the average time delay until the bank is established is of 2 years. In addition, accurate estimates of all the relevant costs for conservation in perpetuity are essential for establishing an accurate picture of the financial needs of a mitigation or conservation bank. These include long-term oversight costs which require professional assistance, periodic maintenance of bank infrastructure (roads, ponds, etc) and regular annual maintenance needs. These costs may be difficult to project accurately, and the needs associated with these categories can change drastically over the medium to long term, as local development alters the surrounding environment and introduces new threats and concerns and as global trends such as climate change create new challenges to wetlands and habitat maintenance. The complexity of both estimating long-term costs and the administrative burden of applying for the relevant permits and authorizations to undertake

[67] Sheldon (1998)

mitigation activity could be a strong deterrent for San Mateo County farmers. The RCD may be poised to play a role in facilitating the application process and in helping local landowners develop cost estimates for long-term conservation activities.

5.1.3. Transaction Costs

Current regulation compliance methods:
Mitigating on-site for the impacts of a project on an endangered species habitat, currently results in large transaction costs. After conducting a study to determine the impact of the project on the species habitat, land developers need to find a proper site to compensate this impact, or pay an environmental firm to do so; and pay a fee at the acquisition of the land, or negotiate with the landowners. This involves a great share of risk of failure if the wetlands mitigated are not approved, and a risk of time delay for the project, both of which increase the cost of undertaking mitigation activity.

Providers of mitigation services also face costs to supply their mitigation service, if the market is not developed enough. Besides, these firms might compete to provide mitigation services to large projects, ignoring smaller projects that may not be profitable enough to get involved into. Finally, uncertainty about the quality and cost-effectiveness of mitigation services provided can harm the whole market for mitigation services.

Mitigation banking:
This alternative reduces transaction costs by bringing together demanders and suppliers of mitigation services and by providing a standardized vehicle for quantifying and overseeing mitigation activities. First, buyers and suppliers face reduced costs of identifying and contracting with each other for specific projects. The reason is that a mitigation bank would provide a single point of contact for developers and providers of mitigation credits, reducing the need for them to spend time and resources identifying and contacting each other.

Second, a developer would be able to purchase credits from multiple suppliers without contracting with each of them separately, if the scale of the required mitigation exceeds the ability of any individual mitigation supplier, so this further reduces transaction costs.

Finally, mitigation banks pool the risks of providers not being able to obtain the credits from the related agencies, and therefore this should significantly reduce the risk of failure of a mitigation project.

5.2. Maximize Supply of Mitigation Activities

5.2.1. Market Efficiency

Current regulation compliance methods:
The market for endangered species habitat provision suffers from several market failures, as detailed in Section XX. A key result from the economic analysis is that because biodiversity in San Mateo County is currently not marketable for farmers, endangered species habitat is not supplied at its optimal level. Moreover, because of the transaction costs detailed previously,

there are market barriers on the demand side, so the size of the current market for mitigation might be substantially lower the actual demand for mitigation credits which would be observed in a perfectly competitive market.

Finally, the lack of standardization in mitigation areas is also a deterrent for suppliers to engage in the market, because the information on the quantity and quality of habitat provided is not efficiently conveyed to buyers.

Mitigation banking:
Mitigation banking puts an effective price on habitat, so it should only increase habitat production and achieves a supply of habitat that is closer to its efficient level.

Besides, mitigation banking reduces transaction, administrative and oversight costs, and decreases risks, so providers and buyers of mitigation credits are more likely to engage in trade, resulting in a more efficient mitigation market.

However, the market is driven by regulation, and uncertainty on its stringency and reliability (regarding the commitment to protect some particular species, for example) negatively impact the decision to provide mitigation services. Other factors may also impede market efficiency in San Mateo County. It may be difficult for San Mateo Farmers to compete with outside suppliers in the wetlands mitigation market, in particular with actors like Wildlands, Inc. that have a significant market power in California. The lack of market thickness would also be a key issue, because demand is low given the relatively low urbanization pressure (especially in the western area where most endangered species are currently located); however, the latter point is mitigated by the fact that the San Francisco Garter Snake is an endangered species that is only present in San Mateo County, and particularly around the San Francisco International Airport. Thus, a development of the airport would necessarily require offsets from San Mateo, and a conservation bank should be the most competitive in this particular mitigation.

5.2.2. Incentives for Farmers

Current regulation compliance methods:
The existing framework does not encourage farmers to protect habitat, because it provides net disincentives for conservation. Indeed, regulations on wildlife protection negatively impact the regular activities of farmers and ranchers. They substantially decrease their income as they restrict some practices and entire areas, prevent most development, and may involve a lot of paperwork that is time consuming. The result is that farmers tend to adopt the rule: "Shoot, Shovel and Shut up" when they find an endangered species on their own land, so that the regulation result in the opposite effect as what they were designed to protect.

Besides, financial incentives program for conservation are not taken up as expected by farmers in San Mateo. The largest and most significant cost-sharing program is the Environmental Quality Incentive Program (EQIP), which offers a subprogram EQIP – Wildlife Habitat Initiative, directly targeted at farmers engaging in wildlife conservation efforts on their agricultural land. In 2009, the state of California made $1 million available for EQIP Wildlife Habitat Initiative, out

of $50 million available for the EQIP program[68]. However, in San Mateo County, very few farmers received funds from EQIP: over the 2003-2005 period, San Mateo County farmers received $43,000 allocated to 10 beneficiaries, representing only 0.1% of the $37 million funds distributed throughout California[69]. This ranks San Mateo County 49th out of 58 counties in terms of EQIP funds received, while its agricultural production is the 34th largest in the state[70].

Mitigation Banking:
Mitigation banking provides farmers and ranchers willing to engage in the mitigation market with direct financial payments from the bank owner, and thus corrects the incentive problem caused by regulation. With credit prices above the costs of protecting habitat, mitigation activities can represent a complement and a diversification of their income, since credit prices are independent from agricultural prices. This is of particular interest in San Mateo County, since 19% of the land is used for agricultural or grazing practices and overlap to a large extent with endangered species habitat. Farming land alone represents more than 57,000 acres[71], so engaging farmers in a profitable business offers a large potential to develop mitigation activities. Besides, farmers can take advantage of the EQIP cost-sharing program to develop wildlife-friendly activities and thus provide acres of suitable habitat at a lower cost, fostering furthermore the supply of mitigation activities.

5.3. Maximize Sustainability of Local Agriculture

Current regulation compliance methods:
The current provision of mitigation services is largely disconnected from agricultural activity, and it is unlikely that farmers should engage much further in mitigation activities absent a mitigation bank. Therefore under existing trends, farming and ranching would not be much affected by mitigation activities, so we expect this alternative should sustain existing agriculture practices in the long run. Furthermore, provisions to the Endangered Species Act greatly reduced the risk of regulations to farmers, in particular with the "No surprise rule" providing certainty on regulatory costs, and section 10 of the ESA authorizing farmers' permits for the "incidental" take of species.

Yet, other factors are affecting San Mateo's agriculture: between 2002 and 2007, the value of agricultural production decreased by 22% whereas farming land increased by 37%. The average production value per farm fell sharply by 27% over the last 5 years, to reach $412,000 in 2007[72] (i.e. an average of $2,400 per acre per year). This could imply that current agricultural trends may not be sustained, and that farmers with the lowest agricultural production value might be tempted to find another more valued use for their land, either through conservation banking, or by selling it to a land developer. Under this scenario, it is not clear whether present trends provide local agriculture with long-term sustainability or not.

Mitigation Banking:

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68 "California 2009 Environmental Quality Incentives Program."
69 "EWG Farm Bill 2007 Policy Analysis Database"
70 "San Mateo County Farm Bureau Information"
71 "2007 Census of Agriculture"
72 ibid.

On the same agricultural land, mitigation banking competes with agriculture production for land use. This implies that farmers would have to give up traditional use of land in order to engage in conservation practices that can be granted mitigation credits.

This is true for wetlands in particular, where no agricultural activity can be sustained if farmers decide to convert their land into wetlands. However, this situation is unlikely since agricultural land on its own has more value than wetlands, and it would require a high price of wetland credits and a low cost of transforming the land to observe this.

Conservation banking, on the other hand, is more likely to accommodate with some farming or grazing practices, especially those developed in the EQIP cost-sharing program. In practice, we expect to see an efficient pattern of conservation, occurring on lands that are the least valued economically and the more value as habitat for endangered species. Thus, mitigation activities could be more complementary to agricultural activities, as a diversification of income for farmers who set aside part of their land in that purpose. In any event, the number of restrictions on property set aside for conservation banks is significant; therefore conservation banking as an alternative is likely to reduce the usefulness of land for agricultural purposes[73].

However, uncertainties on the costs of mitigation banking might also jeopardize the sustainability of agriculture in San Mateo County, because certain farmers that invested in conservation practices might be worse off if the price they can sell their credits is lower than the costs they face for maintaining the protected area.

5.4. Maximize Production of Endangered Species Habitat

Current regulation compliance methods:
While on-site mitigation should have a null impact on habitat of endangered species because it relocates the habitat destroyed within the same adjacent area, off-site mitigation may result in a net loss of habitat or biological function for San Mateo County. A first reason is that some large wetland mitigation banks are located outside of San Mateo, and project development in San Mateo would relocate wetlands from San Mateo to other counties[74]. A second reason is that preservation and enhancement of wetlands, which are methods authorized by states to achieve "no net loss" of wetlands habitat, do not actually result in any net gain of wetland acreage and therefore do not provide any new habitat for endangered species[75].

Another reason is that, even when an acre of habitat destroyed is actually replaced with a newly created acre, the choice of the new location is mostly dictated by economic rather than environmental decisions. The biological function of the created habitat might not be equivalent to the initial habitat. It may not be adjacent to already preserved land or it may be worse suited in terms of other characteristics (water availability, distribution of prey or food sources, etc). The ecosystem net results of such offsets may therefore in fact be negative.

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[73] For an idea of the types of activities restricted or prohibited under a conservation banking agreement, see Appendix F: Excerpted Sections of the California Fish and Wildlife Conservation Easement Deed.

[74] The San Francisco International Airport wetlands mitigation involved the relocation of more than half the wetlands outside of San Mateo County

[75] Brown and Lant (1999)

In the absence of a market price for species, the "Shoot, Shovel and Shut up" rule is more likely to occur and goes against the survival of endangered species and the protection of their habitat.

Mitigation Banking:
Because of the increase in supply of mitigation activities, we would expect the supply of endangered species to increase thanks to mitigation banking. However, this increase would also have a multiplier effect on any net loss of wetlands or biological function, so that any net habitat loss may be accentuated even more than under the existing compliance methods. Another concern is that if the bank goes out of business, the land is likely to be abandoned (thus destroying any habitat restoration that had occurred on the land), as has been documented in New Jersey, North Carolina and Florida[76]

However, other effects could compensate this potential loss in habitat in wetlands. Conservation banking targets endangered species habitat directly, and they produce habitat more efficiently than wetlands banking. Conservation banks are contiguous areas and thus have the potential to preserve habitat at a large enough biological scale. Moreover, conservation banks provide habitat today in order to mitigate projects that would take place in the future, so it creates a net time gain of habitat.

5.5. Maximize Abundance of Water

Abundance of water is one of the objectives pursued by the RCD as part of their conservation program, however we believe it would not be directly impacted by the way mitigation is achieved. Current cost-sharing programs like EQIP offer subsidies for water conserving devices (e.g. the establishment of ponds or reservoirs) that also increase water resources available for wildlife. Streambank protection through native vegetation should also positively impact water abundance. Yet we should expect only a marginal positive impact of conservation banking on the adoption of such techniques.

Mitigation banking should increase also wetland provision in San Mateo County, which would provide benefits on water abundance, through improved flood control and groundwater recharge. Still, these impacts are only partially and indirectly related to water abundance, and effects are expected to be low and extended over time. For these reasons we finally considered that both alternatives would have a null impact on water abundance, acknowledging that mitigation banking could have a marginal positive impact.

5.6. Maximize Water Quality

Wetlands provide natural water quality services, filtering sediments and nutrients through their natural vegetation and fauna, and preventing flood runoff and transport of agricultural chemicals that would otherwise negatively impact water quality. Therefore, they have a value for both agriculture use and endangered species.
Improving the provision of wetlands in San Mateo County through a wetlands mitigation bank would thus directly improve water quality, which in turn is a key element of the survival and the

[76] Gardner and Radwan (2005), p 10598-601

habitat suitability of San Mateo County's four endangered species (that are either amphibians or anadromous fish).
Establishing and maintaining a conservation bank for the Coho Salmon and the Steelhead Trout would therefore require a close monitoring of water quality in San Mateo's affected watersheds. This would be beneficial not only to those aquatic species, but also to the Red-legged frog and the San Francisco Garter Snake that share habitat in the same watershed (Pescadero and Butano in particular).

Thus, establishing a mitigation bank at a large scale – such as that of a watershed – seems to be the only method that could improve water quality in San Mateo.

6. Summary of Tradeoffs

The tradeoffs related to the establishment of a mitigation bank in San Mateo County involve weighing the gains in economic efficiency and environmental benefits against the added complexity and the difficulty to induce a change in current farmers' practices, which could result in a lack of engagement of farmers in a mitigation bank.

The main challenge of the RCD is to facilitate the acceptability of a mitigation bank to farmers, and enable the conditions of a sustainable and reliable commitment of farmers into the bank. Such commitment could in turn bring substantial benefits to the farmers and to wildlife diversity in San Mateo County.

The Table below summarizes these tradeoffs, by attributing a score for each criterion to the two alternatives listed.

Outcomes Matrix: How Each Alternative Fulfills the Criteria

Criteria:	Existing compliance methods	Mitigation Banking
[1] Minimize total cost of mitigation (25pts)	5	20
[2] Maximize supply of mitigation activities (20pts)	10	20
[3] Maximize sustainability of local agriculture (30pts)	25	10
[4] Maximize production of habitat (15pts)	5	10
[5] Maximize abundance of water (5 pts)	0	0
[6] Maximize water quality (5 pts)	0	5
Total Points (100pts)	**45**	**65**

7. Recommendations

Based on the data available, we believe that conservation banking has the potential to significantly increase the provision of wetlands and critical habitat for endangered species in San Mateo County. However, it is difficult to project the practicality and profitability of a potential bank in the absence of cost data concerning the necessary activities required for habitat preservation, restoration and maintenance at a given site. To that end we have the following recommendations for the San Mateo County RCD, should it wish to pursue conservation banking as a framework for providing species habitat in San Mateo County.

7.1. Identify Potential Sites for Banking Activity

The first step in evaluating whether or not conservation banking makes sense for San Mateo County will be to identify likely candidates within San Mateo County for establishing a conservation bank. The RCD will want to evaluate candidates based on at least three criteria. First, the RCD will want to identify landowners who are open to implementing conservation practices, and who may be willing to undertake further conservation activities, including habitat restoration or preservation, in the future. The openness of the landowner to undertake banking activity will of course be a primary prerequisite for identification as a potential site. Additionally, the RCD will want to consider sites which have lower costs of conservation or

restoration of habitat. Landowners who have already undertaken conservation activities may be likely to fulfill this criterion, since it is less expensive to maintain extant habitat than it is to create new habitat. Finally, the RCD will want to identify sites which contain significant overlap of the critical habitat of multiple endangered species. This criterion will ensure that the bank will be able to sell credits for multiple species and improve its profitability. The opportunity for this situation exists, since the California Red-Legged Frog and the SF Garter Snake tend to exist in the same ecological niches, as do the Coho Salmon and Steelhead Trout. Ideal sites would be ones with willing landowners, low costs of habitat conservation, and multiple habitat overlaps.

7.2. Estimate the Costs of Banking for Identified Sites

Much of the uncertainty involved in conservation banking centers around projecting costs estimates of conservation activities over the very long run. The RCD can assist landowners in this process by leveraging its experience in participating in conservation projects in San Mateo to help landowners identify potential costs and estimate their magnitudes. Software programs such as the Center for Natural Lands Management's PAR 3 program evaluate land characteristics for specific sites and estimate a broad variety of conservation costs over several time horizons. Such analysis will be crucial to assessing the "break-even" point of a potential conservation bank, the point at which conservation banking will be profitable for a specific site to undertake.

7.3. Identify Roles the SMCRCD Can Play in a Banking System

The SMCRCD can likely play an important role in the establishment of conservation banking in San Mateo County, by assisting interested landowners in undertaking the permit and certification application processes, which are time-consuming and complex for non-initiates, and by bringing together landowners with conservation professionals who can assist them in undertaking the process of bank establishment. This can lower the costs that landowners face when considering undertaking conservation activity, since the administrative burden associated with conservation can be a substantial impediment to participation.

Additionally, the SMCRCD may be able to play a role in the monitoring and oversight of banking activities, if it can undertake the periodic analyses of practices and habitat or species levels which are required by the banking agreement. The SMCRCD should identify its institutional assets which may be of value under a banking system, and provide those services as necessary.

8. Conclusion

The purpose of this report was to evaluate whether the current methods by which land developers achieve "no net loss" of wetlands and endangered species critical habitat are inefficient. We have evidence to conclude that mitigation banking for farmers and ranchers with the help of SMCRCD can increase the efficiency of current mitigation activity. Mitigation banking can reduce costs associated with mitigation activity and maximize production of habitat in compliance with federal regulations.

8.1. Summary of Alternatives

The Current Regulatory System

The current methods by which land developers conduct mitigation activity on-site and off-site in compliance with federal regulations can be improved upon. Mitigation results in high costs because of the large amount of planning and construction expenditures. It also involves extensive oversight and administrative costs. It is estimated that a "Habitat Conservation Plan" could cost $50,000 to $100,000 per year in administrative and monitoring costs.[77] Moreover, mitigating on-site for the impacts of a project on an endangered species habitat results in large transaction costs because of the time and money associated with coordinating the logistics of mitigation activity.

There are other non-monetary issues that arise from mitigation. The current provision of mitigation services is largely disconnected from agricultural activity, and it is unlikely that farmers should engage much further in mitigation activities absent a mitigation bank. The lack of standardization also deters the supply because the information on the quantity and quality of habitat provided is not efficiently conveyed to buyers. Furthermore, the current federal laws and incentive programs do not encourage farmers to engage in conservation. Instead, regulations decrease income by preventing development, and it may involve a lot of paperwork that is time consuming. Financial incentive programs for conservation are not taken up as expected by farmers in San Mateo.

Mitigation does not yield optimal results for the environment. On-site mitigation relocates the habitat destroyed within the same location, but off-site mitigation may result in a net loss of biological function. The reason is that mitigation often fails to create new adequate habitat for endangered species, because the newly built habitat is often too small and may be disconnected from other important biological functions, such as prey, habitat or water resources, leaving the species worse off than before the mitigation.

Mitigation Banking

Mitigation banking increases efficiency in both economic and biological aspects. Conservation banks increase economic efficiency by lowering overall costs, and it maximizes environmental benefits by consolidating habitats into larger units to ensure ecosystem sustainability and success.

Mitigation banks face lower costs of mitigation per acre because it allows bank owners to utilize environmental expertise and achieve higher scale efficiency. Moreover, the banks reduce transaction costs by bringing together demanders and suppliers of mitigation services and by providing a standardized vehicle for quantifying and overseeing mitigation activities. Because mitigation banking reduces overall costs, providers and buyers of mitigation credits are more likely to engage in trade, resulting in a more efficient mitigation market. Moreover, mitigation banking puts an explicit and known price on habitat, so it should only increase its production, and makes the supply become closer to its efficient level. In addition, competition should lower costs because developers will choose the least-cost method for mitigating their impact. According to Wildlands Inc., a mitigation provider in San Mateo, the cost of mitigation is

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77 Sheldon (1998)

estimated at $70,000 per acre but the company is able to sell wetlands credits at $125,000-150,000 per acre. However, San Mateo farmers would face challenges such as a relatively low demand and competition with private companies that hold market power.

Mitigation banking also corrects for the incentive problem caused by regulation by providing farmers and ranchers willing to engage in the mitigation market with direct financial payments from the bank owner. With credit prices above the costs of protecting habitat, mitigation activities can represent a diversification of their income.

Moreover, mitigation banking creates an efficient pattern of conservation. Farmers can choose to mitigate on the lands that are the least valued economically and transform them into habitat for endangered species. However, uncertainties on the costs of mitigation banking might still jeopardize the sustainability of agriculture in San Mateo County, because certain farmers that invested in conservation practices would be left worse off if the price they can sell their credits is lower than the costs they face for maintaining the protected area.

In San Mateo County, the Resource Conservation District could potentially act as the monitoring entity, since its extensive knowledge of San Mateo conservation specificities and its existing ties to farmers and ranchers would significantly decrease the cost of mitigation monitoring activities. We can expect that administering a conservation bank would be cheaper to farmers of San Mateo, with the technical assistance of the RCD, because they have a better knowledge of wildlife and long term natural land management than land developers. Some financial assistance could yet be necessary in these first years, in order to cover expenses before the bank is established and the first credits are sold.

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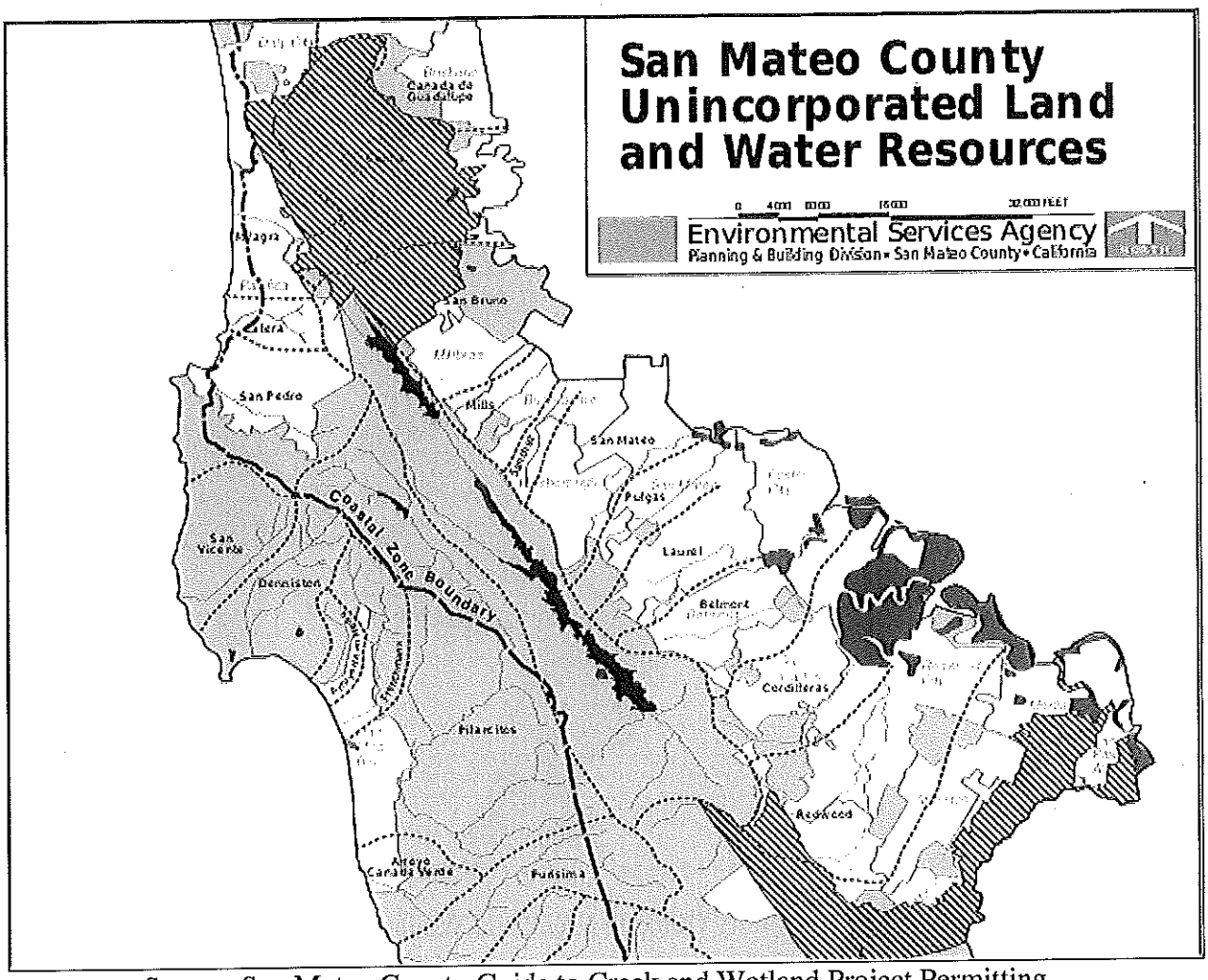
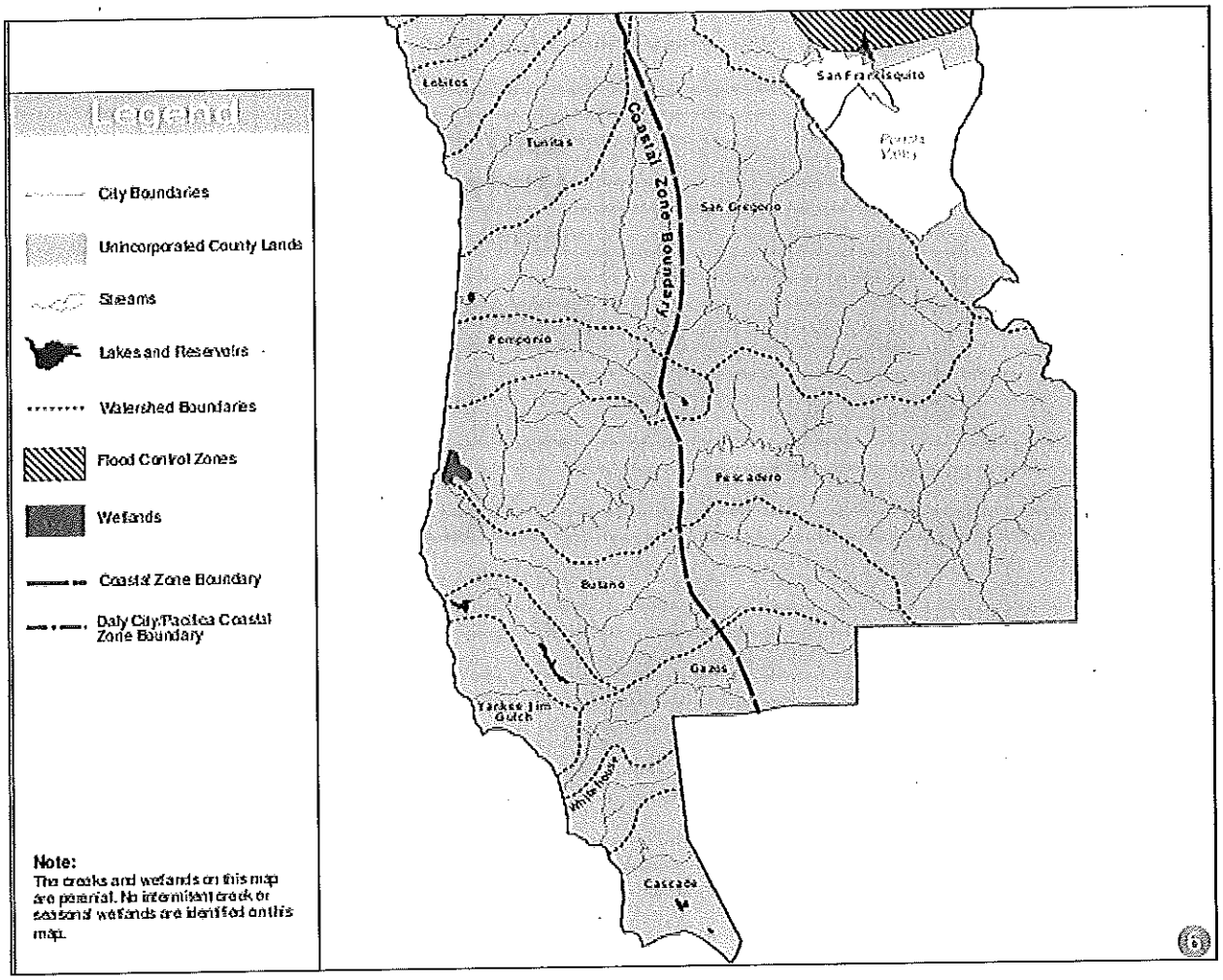
Appendix B: Maps of San Mateo County

San Mateo County Land Use



Source: San Mateo County Guide to Creek and Wetland Project Permitting

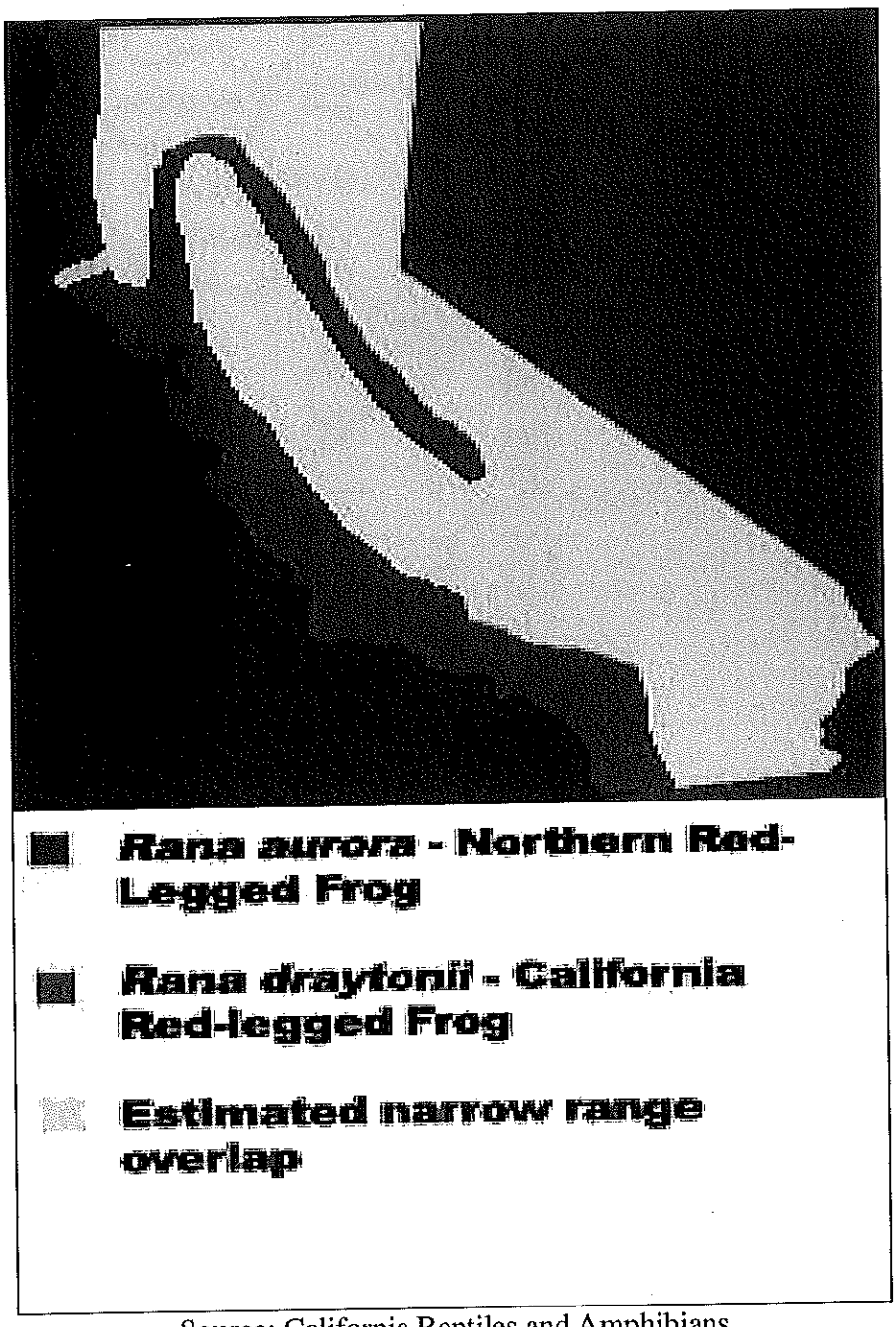
San Mateo County Land Use, Cont'd



Source: San Mateo County Guide to Creek and Wetland Project Permitting

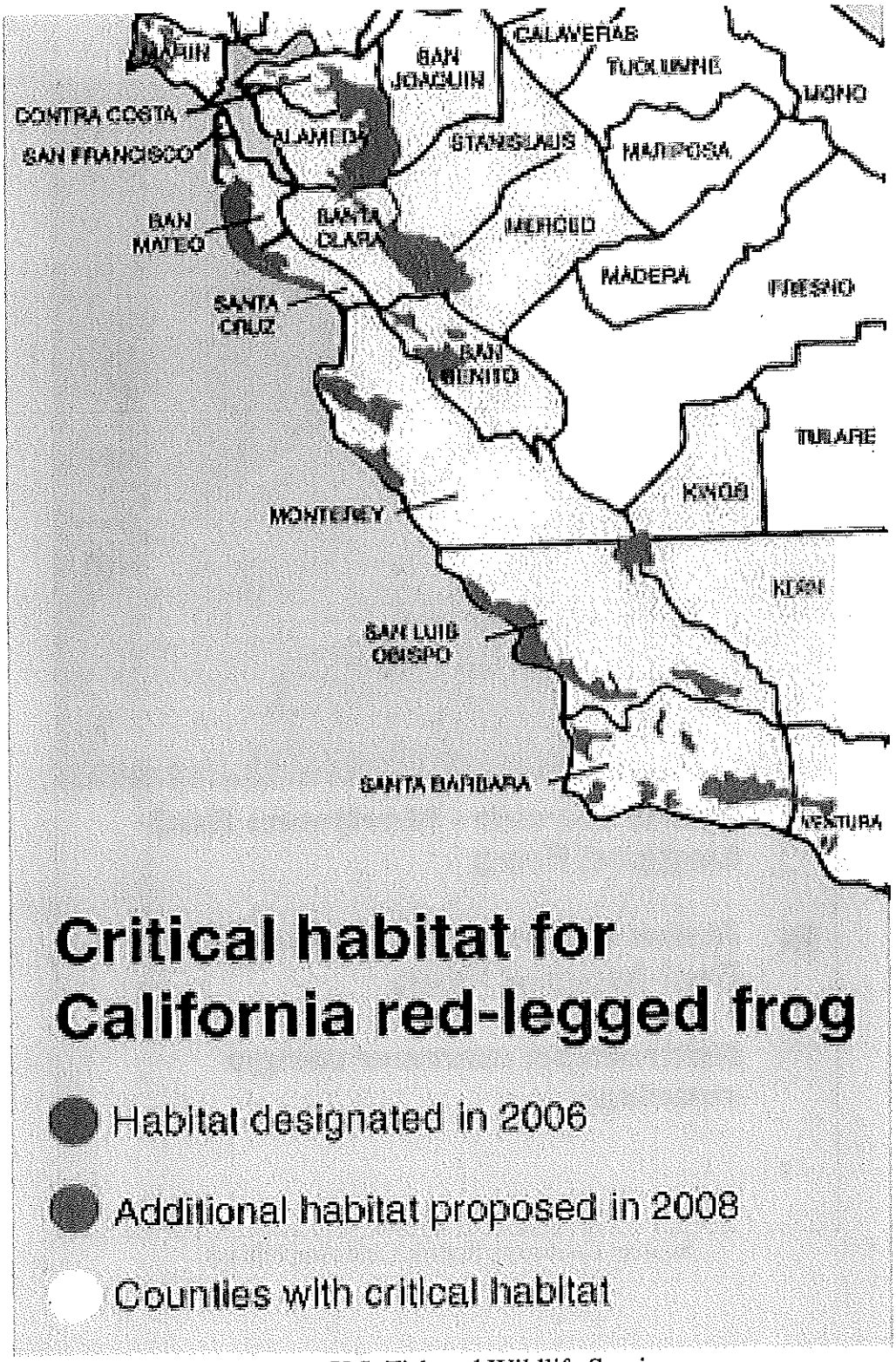
Appendix C: San Mateo County Endangered Species Range and Critical Habitat Maps

California Red-Legged Frog Range



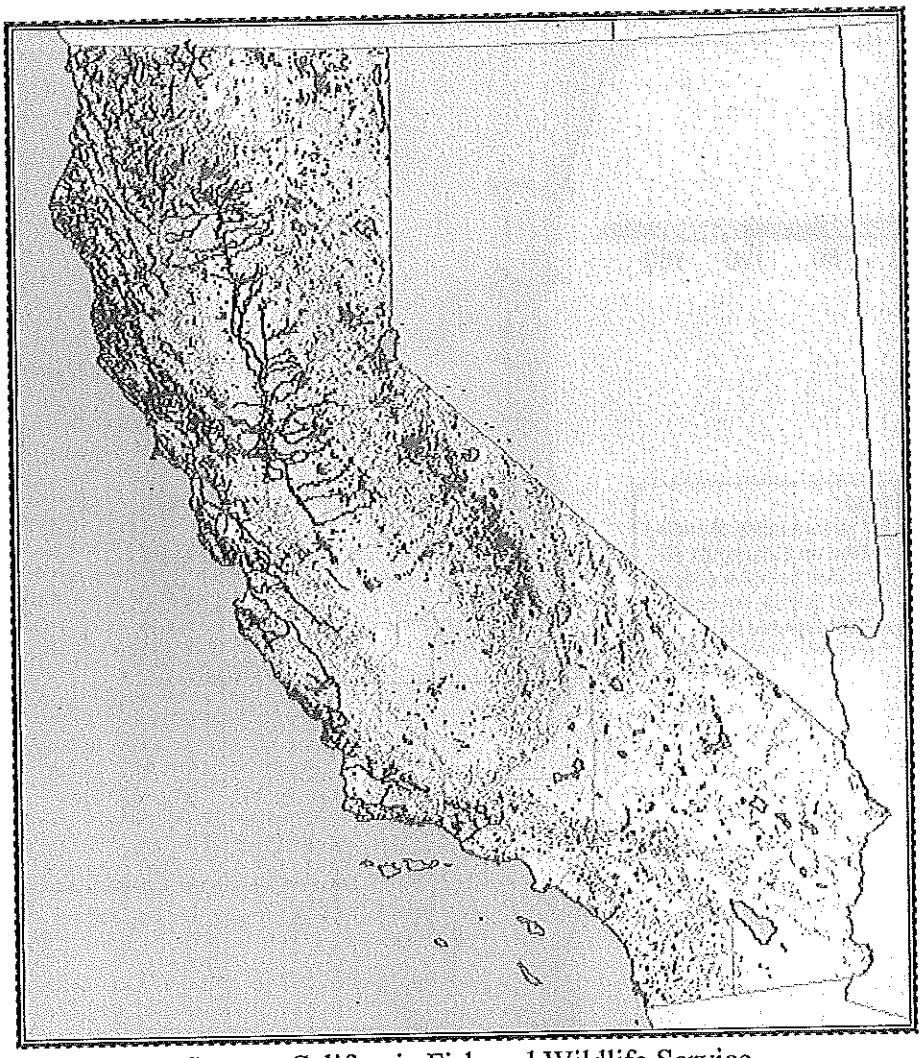
Source: California Reptiles and Amphibians

California Red-Legged Frog Designated Critical Habitat



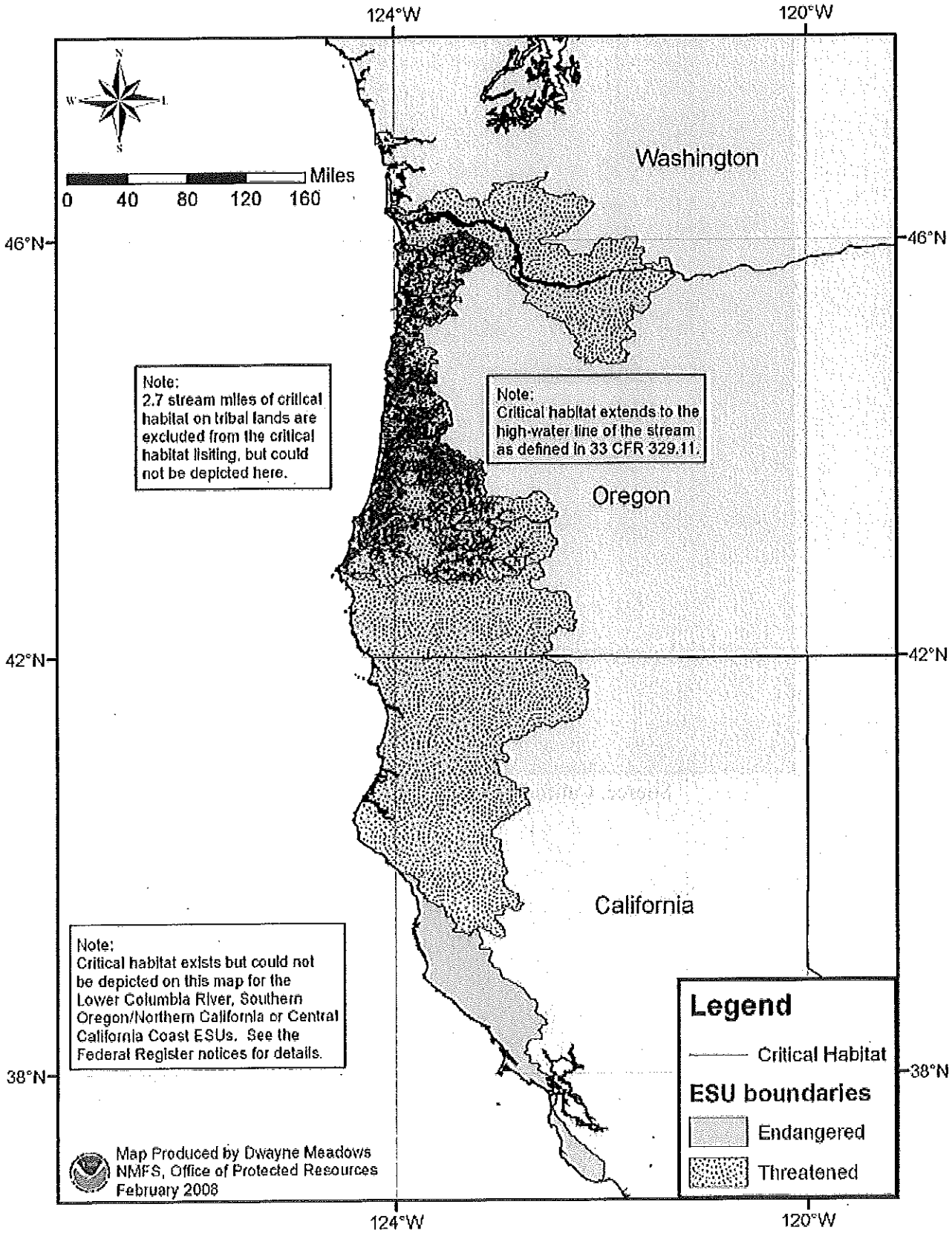
Source: U.S. Fish and Wildlife Service

Coho Salmon Range



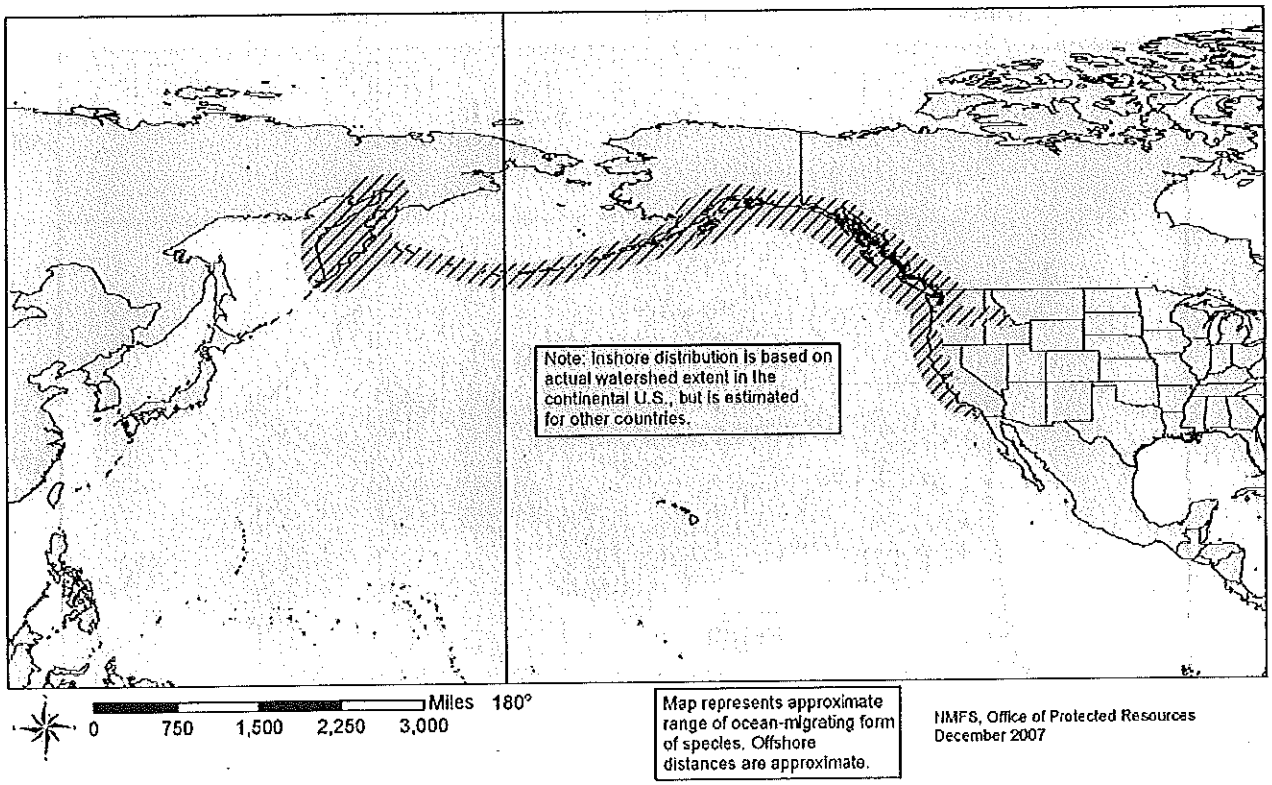
Source: California Fish and Wildlife Service

Coho Salmon Designated Critical Habitat



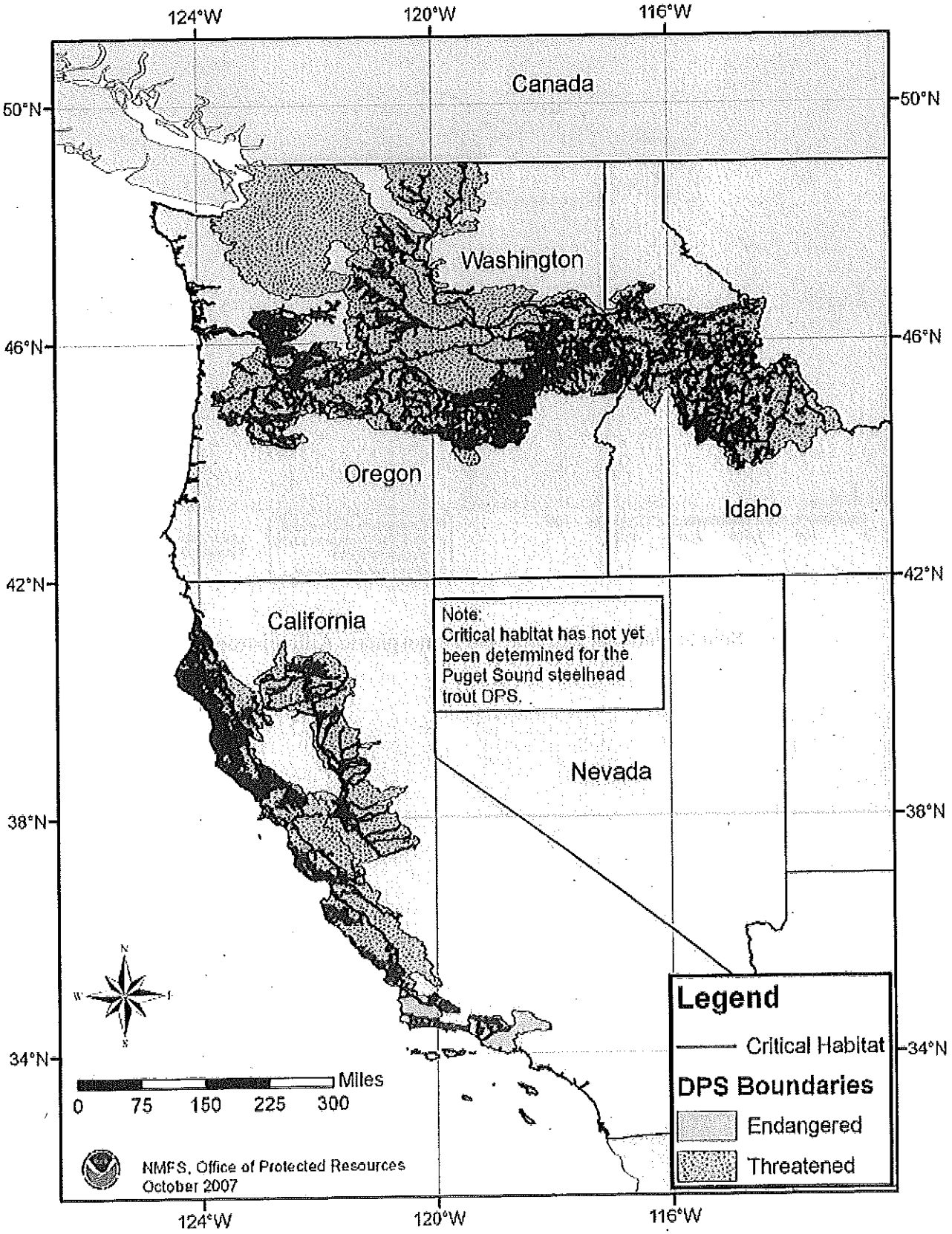
Source: National Oceanic and Atmospheric Administration

Steelhead Trout Range



Source National Oceanic and Atmospheric Administration

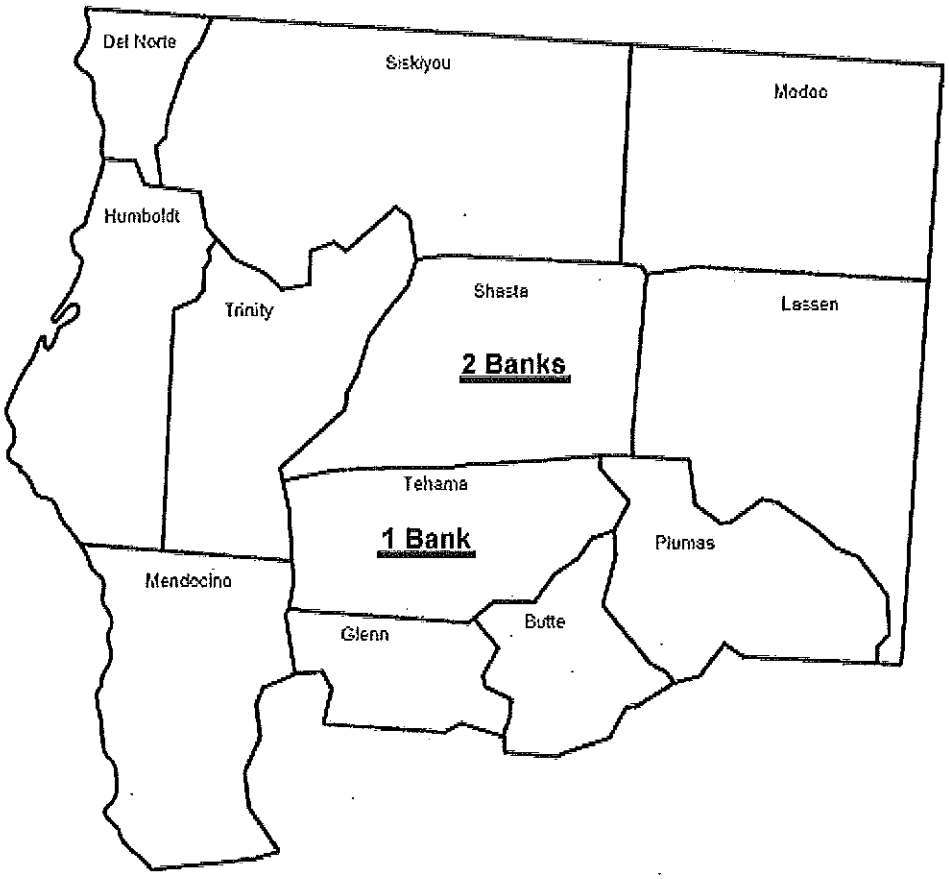
Steelhead Trout Designated Critical Habitat



National Oceanographic and Atmospheric Administration

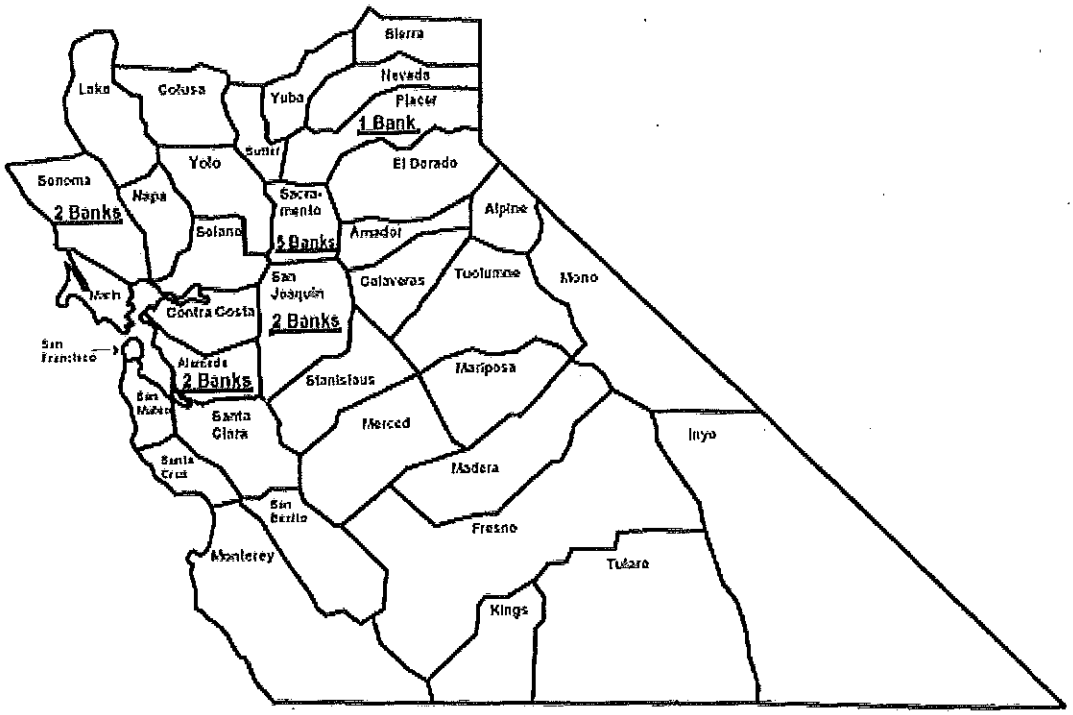
Appendix D: Maps of Conservation and Mitigation Activity in California

Conservation Banking Activity in Northern California



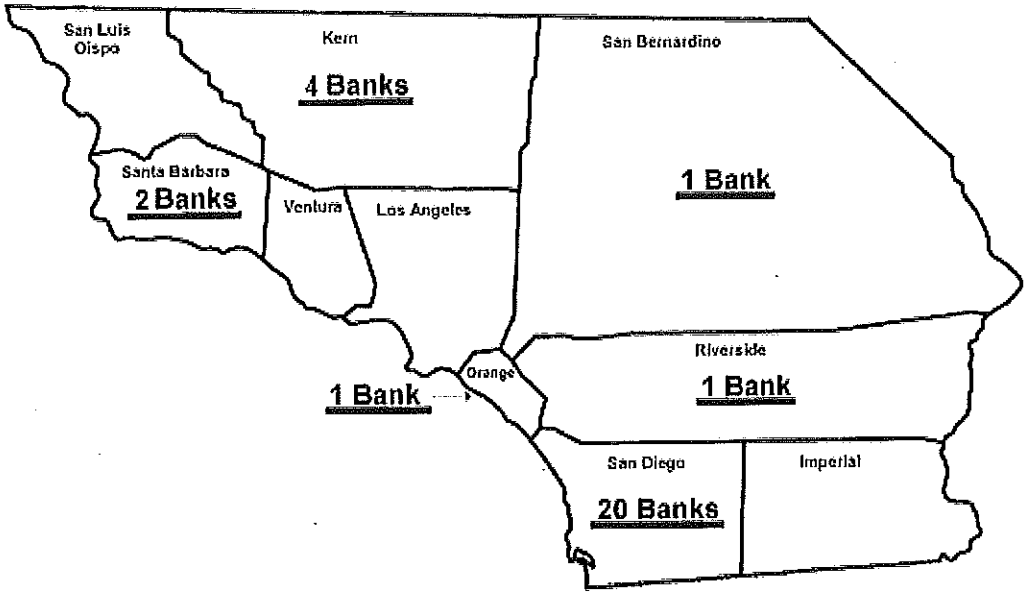
Source: California Natural Resources Agency

Conservation Banking Activity in Central California



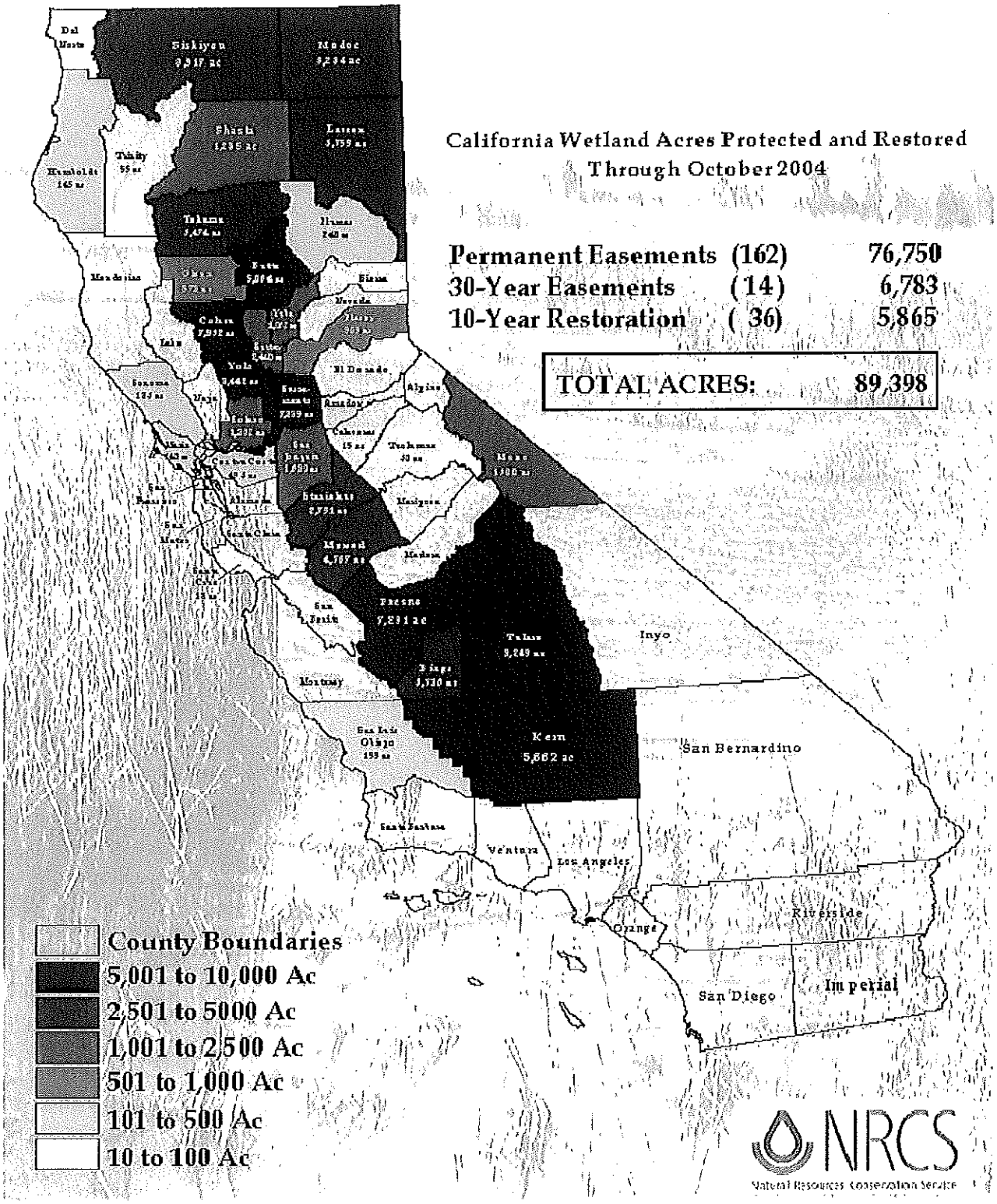
Source: California Natural Resources Agency

Conservation Banking Activity in Southern California



Source: California Natural Resources Agency

Wetlands Banking Activity in California



Source: NRCS

Appendix E: Selected Habitat and Wetlands Restoration Cost Estimates

Note: These cost estimates are provided for illustrative purposes only. Estimates for conservation activity costs vary widely dependent upon site-specific characteristics.

Natural Conservation Service EQIP Payments Schedule

Activity	**Cost per acre**
Restoration of Rare and Declining Habitats	
Tamarisk Eradication	$382 - $1498
Arundo Eradication	$500 - $2155
Blackberry Eradication	$571 - $1885
Pepperweed Eradication	$39 - $90
Thistle Eradication	$42 - $64
Wildlife Structures	$75 - $225
Wetland Wildlife Habitat Management	$5 - $25
Upland Wildlife Habitat Management	$10 - $50
Wetlands Restoration and Management	
Constructed Wetland	$2175
Coastal Wetland Restoration	$1235
Wetland Restoration, Northern California	$342
Wetland Enhancement	$27 – 102

Source: NRCS

Estimated Cost of Long-term Conservation Activities,
3000 acre Grassland Reserve in North San Francisco Bay Area

Activity	Per Hour Costs	Annual Costs	One-time Costs
Planning			
Natural Resources Management Plan			$500,000
Ongoing Operations			
Weed Control, one species per year		$43,000	
Predator Survey & Control, Multiple Ponds		$15,000	
Pond Maintenance		$8,000	
Monitoring			
Compliance Monitoring		$4,000	
Rangeland Health Monitoring		$12,000	
Management effectiveness and Plan Adaptation		$12,000	
Special-Status Species Monitoring		$12,000	
Periodic Operations			
30 yr. pond repairs			$35,000 - $250,000
Specialist Assistance			
Certified rangeland manager	$70 - $120		
Wildlife Biologist	$60 - $90		
Botanist	$60 - $90		
Certified professional in soil erosion and storm water management	$60 - $90		
Entomologist	$120 - $170		

Source: Larry Ford, certified rangeland management professional

Appendix F: Excerpted Sections of the California Fish & Wildlife Conservation Easement Deed

Note: This conservation easement is required by CA FWS for establishment of a conservation bank. Excerpted sections indicate some of the property holder's restrictions and rights associated with the easement.

"The purposes of this Conservation Easement are to ensure that **the Bank Property will be retained forever in its natural, restored, or enhanced condition ... and to prevent any use of the Bank Property that will impair or interfere with the Conservation Values of the Bank Property**. Grantor intends that this Conservation Easement will **confine the use of the Bank Property to activities that are consistent with such purposes, including, without limitation, those involving the preservation, restoration and enhancement of native species and their habitats** ..."

Grantee's Rights:

"To preserve and protect the Conservation Values of the Bank Property."

"To enter the Bank Property at reasonable times, in order **to monitor compliance with and otherwise enforce the terms of this Conservation Easement**..."

"To **prevent any activity on or use of the Bank Property that is inconsistent with the purposes of this Conservation Easement** and to require the restoration of such areas or features of the Bank Property that may be damaged by any act, failure to act, or any use or activity that is inconsistent with the purposes of this Conservation Easement."

"All present and future development rights appurtenant to, allocated, implied, reserved or inherent in the Bank Property; such rights are hereby terminated ..."

Prohibited Uses:

"Any activity on or use of the Bank Property that is inconsistent with the purposes of this Conservation Easement is prohibited..."

"Unseasonable watering; use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals; weed abatement activities; incompatible fire protection activities; and any and all other activities and uses which may impair or interfere with the purposes of this Conservation Easement..."

"Use of off-road vehicles and use of any other motorized vehicles except on existing roadways ..."

"Agricultural activity of any kind except grazing for vegetation management as specifically provided in the development plan..."

"Recreational activities, including, but not limited to, horseback riding, biking, hunting or fishing except for personal, non-commercial, recreational activities of the Grantor Commercial, industrial, residential, or institutional uses."

"Any legal or de facto division, subdivision or partitioning of the Bank Property. Construction, reconstruction, erecting or placement of any building, billboard or sign, or any other structure or improvement of any kind ..."

"Planting, introduction or dispersal of non-native or exotic plant or animal species. Altering the surface or general topography of the Bank Property, including but not limited to any alterations to habitat, building roads or trails..."

"Removing, destroying, or cutting of trees, shrubs or other vegetation, except as required by law for (i) fire breaks, (ii) maintenance of existing foot trails or roads, or (iii) prevention or treatment of disease..."

"Manipulating, impounding or altering any natural water course, body of water or water circulation on the Bank Property..."

Appendix G: Wetlands Mitigation Activity Definitions

Wetlands Mitigation Methods

Creation	Definition: The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site where a wetland did not previously exist. No net loss role: Results in a gain in wetland acres.
Restoration	Definition: The manipulation of the physical, chemical, or biological characteristics of a site, with the goal of returning natural or historic functions to a former wetland. No net loss role: Results in a gain in wetland functions, and may or may not result in a gain in wetland acres.
Enhancement	Definition: The manipulation of the physical, chemical, or biological characteristics of a wetland (undisturbed or degraded) site to heighten, intensify, or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes, such as water quality improvement, flood water retention, or fish and wildlife habitat. No net loss role: Does not result in a gain in wetland acres.
Preservation	Definition: The removal of a threat to, or preventing the decline of, wetland conditions by an action in or near a wetland. This term includes the purchase of land or easements, repairing water-control structures or fences, or structural protection such as repairing a barrier island. No net loss role: Does not result in a gain in wetland acres.

Source: Environmental Law Institute, "Mitigation of Impacts to Fish and Wildlife Habitat: Estimating Costs and Identifying Opportunities", p 15

June 2, 2009
Half Moon Bay

June 9, 2009
Felton

Save the Date

CAL FIRE San Mateo-Santa Cruz Unit and the Resource Conservation Districts of San Mateo and Santa Cruz Counties

Present:

COMMUNITY WILDFIRE PROTECTION PLAN INTRODUCTORY MEETINGS

Come participate in developing the Community Wildfire Protection Plan (CWPP) for San Mateo and Santa Cruz Counties. This meeting will introduce the CWPP process and explain how you can contribute your unique local knowledge to this collaborative community-based plan.

San Mateo County Meeting
Tuesday June 2nd at 7:00pm
Coastside Fire Protection District
1191 Main Street
Half Moon Bay, CA

Santa Cruz County Meeting
Tuesday June 9th at 7:00pm
Zayante Fire Protection District
7700 East Zayante Road
Felton, CA

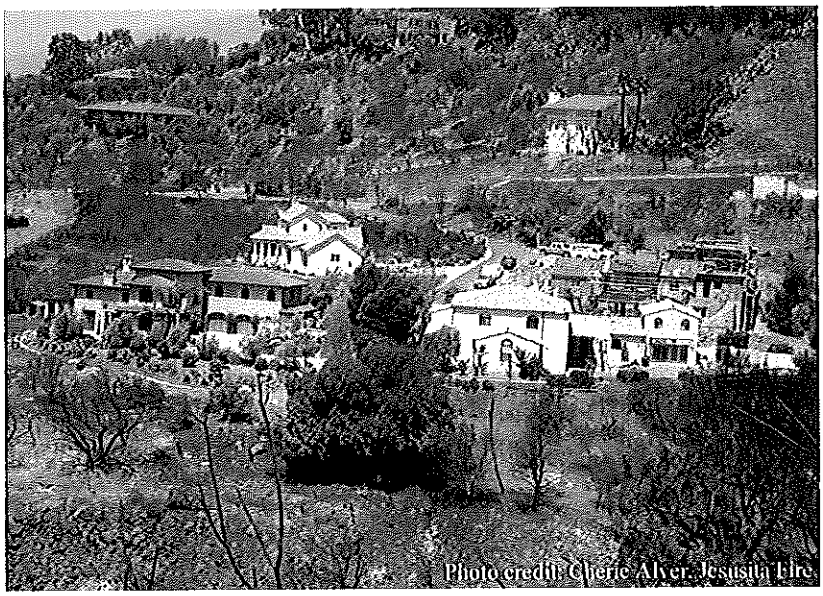


Photo credit: Cherie Alver, Jesusita Fire

For More Information visit:

http://wildfireplan.blogspot.com

E-Mail:
wildfireplan@gmail.com

CAL FIRE
(831) 335-6740

Resource Conservation District of San Mateo County
(650) 712-7765

Resource Conservation District of Santa Cruz County
(831) 464-2950 x 12

RESOURCE CONSERVATION DISTRICT

CAL FIRE

SAN MATEO COUNTY

RESOURCE
CONSERVATION DISTRICT

650.712.7765 | PHONE
650.726.0494 | FAX

625 Miramontes Street, Suite 103, Half Moon Bay, CA 94019
www.sanmateorcd.org

RESOLUTION N0. 2009-1

DESIGNATING AUTHORITY TO EXECUTIVE DIRECTOR TO CONTRACT WITH SAN MATEO COUNTY FOR PHASE III MIDCOAST GROUNDWATER STUDY

Whereas the San Mateo County Resource Conservation District is a Special District organized under Division 9 of the California Public Resources Code with an original petition granted on July 1, 1939; and

Whereas the San Mateo County Resource Conservation District is defined in Section 3501 of the Government Code as a public agency; and

Whereas San Mateo County has completed Phase II of the Midcoast Groundwater Study and has identified a need for additional data to develop a groundwater management plan; and

Whereas San Mateo County has requested the services of the Resource Conservation District to coordinate and manage the collection of those data;

NOW THEREFORE BE IT RESOLVED that the San Mateo County Resource Conservation District Board of Directors hereby authorizes Kellyx Nelson, Executive Director, to enter into a contract with San Mateo County to coordinate and manage the collection of data required to follow up on the Phase II report to develop a groundwater management plan.

ADOPTED at a regular meeting of the Board of Directors of the San Mateo County Resource Conservation District on May 21, 2009.

Rich Allen, President

5/21/09
Date

Midcoast Groundwater Study Phase 3

Purpose

Coordinate and manage the collection of data required to follow-up on the Phase II report and obtain any additional baseline information needed to develop a groundwater management plan.

Scope & Deliverables

1. Prior to June 15, 2009, identify and interview technical consultant(s) capable of:
   - obtaining supplemental well data during the summer of 2009 and documenting how the dry years of 2007-08 and 2008-09 affect the water balance model developed by the Phase II report;
   - identifying locations and methods for collecting the data needed to document how stream flows affect the water balance model;
   - analyzing the relationship between groundwater levels and riparian and wetland habitats;
   - monitoring and evaluating water quality issues that may impact the health of aquatic habitats and the suitability of groundwater for domestic uses;
   - identifying any additional data and analyses needed to provide the baseline information required to develop of a groundwater management plan;
   - installing and maintaining any equipment needed to perform the above monitoring activities; and,
   - coordinating this work with the County, water districts, and other interested parties.

2. Prior to June 30, 2009, submit a recommended consultant list along with estimated costs for conducting each of the tasks specified above.

3. Immediately pursue financial assistance from the water districts, economic stimulus funds, grant opportunities, and other sources to provide supplemental funding for the above work.

4. Assist the County in developing a contract and scope of work for the selected consultant(s) prior to July 15, 2009. Seek the input of the water districts and other interested parties in developing the scope of work.

5. Oversee the work of selected consultants and ensure the timely and complete production of project deliverables.

6. Work with property owners to obtain permission to conduct monitoring, and with regulatory agencies to obtain necessary permits.

7. Provide bi-weekly updates to the Planning and Building Department and quarterly status reports for distribution to interested parties by the County.