Restoring Natural Water Systems in Rural Residential Landscapes

Creative Environmental Conservation

I. Restoring Natural Water Systems in Rural Residential Landscapes

Gabilan Watershed
Restoration Project

Section 319 (h) Funding
Agreement #05-104-553-0
Total Cost: $594,000

Creative Environmental Conservation

P.O. Box 355

Moss Landing, CA 95039

(2/20/2009)

II. Grant Summary

Completed Grant Summaries are made available to the public on the State Water Resources Control Board's (SWRCB) website at http://www.waterboards.ca.gov/funding/grantinfo.html

Use the tab and arrow keys to move through the form. If field is not applicable, please put N/A in field.

Date filled out:

Date filled out: **June 12, 2006**

Grant Information: Please use complete phrases/sentences. Fields will expand as you type.

1. **Grant Agreement Number:** 05-104-553-0

2. **Project Title:** Restoring Natural Water Systems in Rural Residential Landscapes

3. **Project Purpose – Problem Being Addressed:** This project focuses on the water systems in the watersheds of the Moro Cojo and Tembladero Sloughs, which produce significant non-point sources of pollution. This project will establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape, by developing and testing a tax incentive system for these many rural residential landowners to participate in wetland restoration.

4. **Project Goals**
   a. **Short-term Goals:** Establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape, by developing and testing a tax incentive system for these many rural residential landowners to participate in wetland restoration.
   b. **Long-term Goals:** Our goal is to reduce nonpoint source pollution in the Moro Cojo and Tembladero Slough Watersheds – particularly excessive sediments, nutrients, and pesticides – and thereby improve near-shore coastal waters of Moss Landing Harbor and the Monterey Bay.

5. **Project Location**: (lat/longs, watershed, etc.) Moro Cojo and Tembladero Slough Watersheds
   a. **Physical Size of Project**: (miles, acres, sq. ft., etc.) NA
   b. **Counties Included in the Project:** Monterey County
   c. **Legislative Districts:** (Assembly and Senate) Assembly District 27, Senate District 15

6. **Which SWRCB program is funding this grant?** Please "X" box that applies.

☐ Prop 13 ☐ Prop 40 ☐ Prop 50 ☒ EPA 319(h) ☐ Other

Grant Contact: Refers to Grant Project Director.

Name: James Oakden **Job Title:** Project Manager

Organization: Creative Environmental Conservation **Webpage Address:** NA

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Grant Time Frame: Refers to the implementation period of the grant.

From: January 15, 2006 **To:** December 31, 2008

Project Partner Information: Name all agencies/groups involved with project.
Monterey County, Moss Landing Marine Laboratories, The Watershed Institute, and Coastal Conservation and Research.

Nutrient and Sediment Load Reduction Projection: (If applicable) Yes, we expect little reduction in nutrient or sediment loads during the first year while plant abundances is low; by year 3 we expect a minimum 50% reduction per linear mile in restored, previously unvegetated corridors.

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IV. Executive Summary

One of the main goals of this project was to test an incentive program to entice landowners into restoring natural water systems in the Gabilan watershed, and especially the lower Gabilan including Moro Cojo Slough. The incentive is a federal and state tax write-off for gifting a habitat conservation easement, which could contain wetlands and buffering forests and grasslands that are important parts of the natural water system. Our primary target areas were in the Moro Cojo Slough and its watershed in the Prunedale Hills, where all of the historical creeks were ditched decades ago. Four subwatersheds were targeted in the Prunedale Hills- where residential density was highest, property values were highest per acre, and therefore the potential value of the tax incentive was also highest. Here we contacted over 50 landowners who own the ditches (historical creeks) or important forest habitat adjacent to the ditches. Landowners were sent brochures describing the conservation easement incentive, the overwhelming need to recover our natural water system, and the important wetland and forest ecosystems that are present or could be restored on their property. We also spoke directly with many. We also attended local meetings organized by Supervisor Calcagno to address existing well and water delivery problems in the Prunedale region; and distributed similar materials, and talked with local property owners. In addition, we had a project poster, the brochure materials, project staff, and landowners with an existing conservation easement at the annual open house for Moss Landing Marine Laboratories, in both 2007 and 2008. We were able to talk with local landowners and many others who attended the two open house events.

The easement incentive experiment did not attract a single new landowner in the historical creeks, because these relatively flat regions of the watershed are used for other purposes that local landowners valued more than recovering the natural water system. The main use of the historical creeks was for corrals and pastures for horses, cattle, goats, and other large grazing animals. Many of these enclosures were essentially feed lots. One of the four target areas in the Prunedale Hills was Walker Valley, where four landowners were involved in restoration before the project started. In fact, it was the successful previous work with this group that led to the grant proposal. Fortunately, we were able to continue working with this group, and the grant supported the restoration and enhancement of native habitats on one of these parcels, the Wagner property. Here, we enhanced an existing pond, improved upper watershed drainage into the pond, removed non-native plants from the property, enhanced grassland and oak habitat, and created five smaller seasonal ponds along the historical course of Walker Creek. The Wagner pond and the Guerrero pond just up creek are very important breeding ponds for endangered Red-legged Frogs and California Tiger Salamanders. While no new landowners were interested in restoring their portion of the historical creeks, several wanted to remove Eucalyptus trees (non-natives) for fire protection, and recover oak woodlands, which are fire resistant. Since the areas covered with Eucalyptus were not considered important land use, fire protection was a highly desirable incentive for restoring native oak forest and removing Eucalyptus. This is an important direction for future efforts to restore natural water systems, but was not pursued in the present project.

Since we were unable to gain new landowner participants in wetland landscapes of the dense rural residential regions of the upper watershed (the four initial subwatersheds), we focused additional habitat restoration on the Calcagno property adjacent to Moro Cojo Slough. Here we constructed a fence to exclude cattle from the brackish wetlands of the slough, enhanced the wetlands by planting native species and created wetland buffers of oak trees and native grasses. We controlled invasive non-native plants, and developed an irrigation system for the oak trees. This system can be added to with little investment in the future to expand the oak and grassland areas. Both the Wagner and Calcagno families were interested in the conservation easement and the tax write-off, but neither was ready to establish a formal easement until their own land use plans were further implemented. In contrast, the landowners who wanted to replace Eucalyptus with native oak forests were willing to use the easement if this was a requirement for the fire protection they wanted. Fire protection was a much greater incentive than the easement and tax

advantage. One of the four core properties in Walker Valley (Guerrero) had a habitat easement in place before the grant started. Another important lesson from the project is that future restoration work should not be limited to a particular habitat type or part of the watershed. Recovery of the natural water system involves wetlands and adjacent forests, and any site can become a critical nucleus for spreading restoration up and down the watershed.

Preface

Funds for this Project were provided in full or in part through Agreement number 05-104-553-0 with the State Water Resources Control Board (SWRCB) by a federal grant (Cooperative Agreement No. C9-96906801-0) from the United States Environmental Protection Agency (USEPA) to the SWRCB to implement California's Nonpoint Source Program pursuant to CWA Section 319 (h).

V. Problem Statement & Relevant Issues

The low quality and quantity of freshwater is the most serious environmental problem in California and most of the world. Restoration of the core of natural water systems is the most important positive action to the freshwater crisis. In the Salinas Valley and much of California, the natural water systems flow through three major landscapes: urban, agriculture, and rural residential regions. The Project focuses on the water systems in the upper watersheds of the Moro Cojo and Tembladero Sloughs in the Prunedale Hills. Each targeted landowner parcel in the water system contains a relatively small section of the natural wet corridor.

The first target area involves a series of highly degraded, but restorable small creeks (Walker, Paradise, and Castroville Creeks) flowing into the slough from the adjacent Prunedale Hills. This historically rich system of connected creeks, marshes, and small lakes is completely confined to ditches, which keep the wet corridors dry and highly degraded. The restoration methods we used are well tested and consist primarily of fencing the easement, plugging the ditch to allow water to spread over the natural wet area, and establishing native plants while controlling exotic weeds. Education and outreach are integral to project implementation. Benefits of restoring the target waterways include slowing the flow of water into downstream reaches resulting in increased percolation into the watershed and reduced downstream flooding, reduced erosion and sediment input into the downstream reaches of the watershed (and associated nutrients and pesticides). These are important services provided by a healthy natural water system. Similar restoration techniques were used at the Calcagno Parcel to improve the quality of the water that flows into the Moro Cojo, and then into the Monterey Bay.

VI. Project Goals

The Project focuses on the water systems in the upper watersheds of the Moro Cojo and Tembladero Sloughs in the Prunedale Hills. Our primary target was 20 miles of waterway, with an eventual target of hundreds.

The goals of this project were:

1. Educate landowners and the public as to the importance of wetland habitats and their functions
2. Ensure ongoing and widespread implementation of the management measures long after the project period has ended
3. Educate landowners about the federal and state habitat conservation easement programs
4. Restore wet corridors (wetland and upland habitat) in the upper watersheds of the Moro Cojo and Tembladero Sloughs
5. Reduce non-point source pollution entering and exiting the watershed, particularly sediments, nutrients, and pesticides
6. Increase coverage of native vegetation
7. Increase habitat for invertebrates and vertebrates associated with wetland habitats

VII. Project Description

Figure 1 Map of project area including the main properties involved in habitat restoration

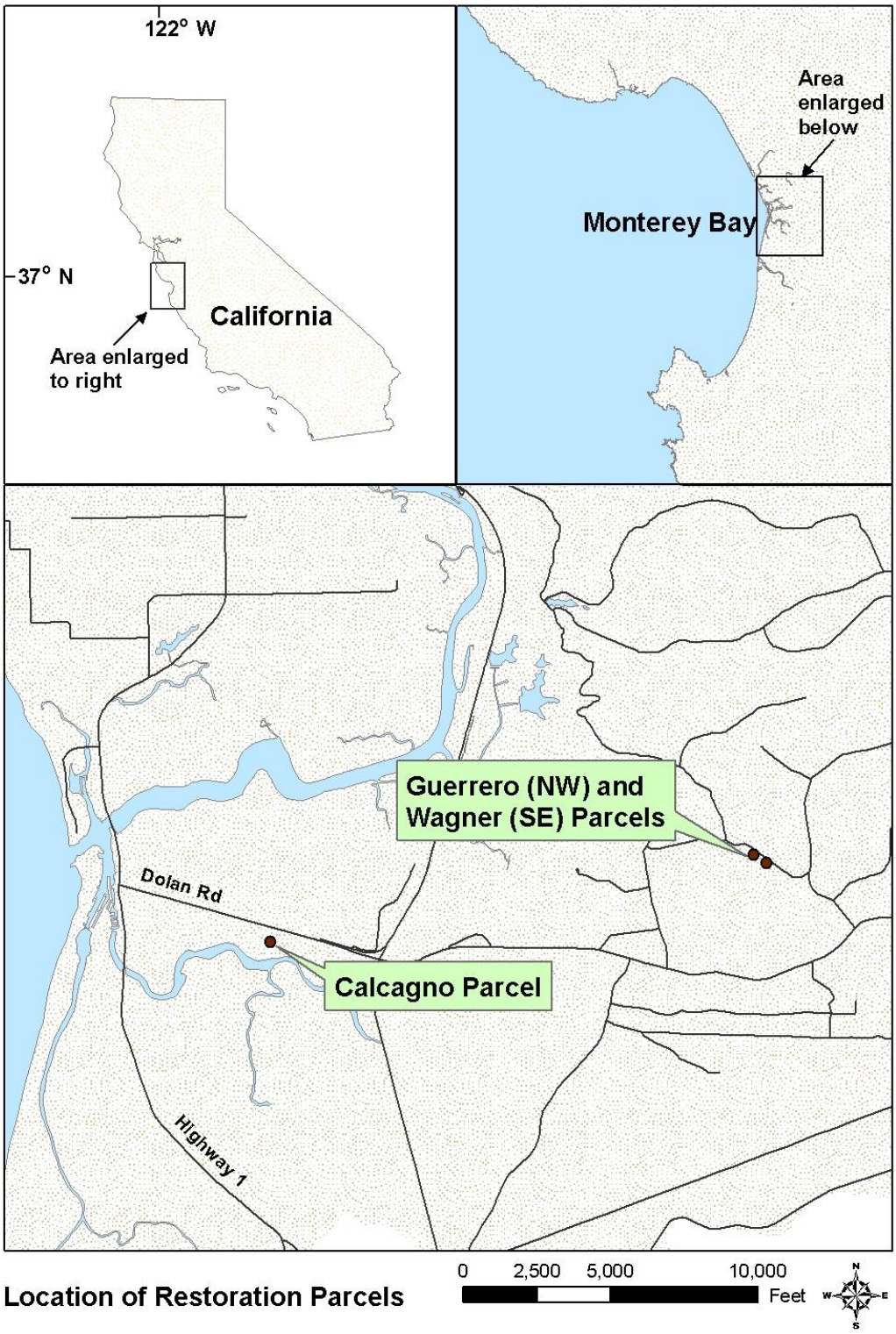


Figure 2 Walker Creek on the Johnson property directly downstream of Wagner. This site has one of the best fields of native Caryx (the low grass pictured here) in the Prunedale hills, and a well developed willow forest. Johnson is one of 8 properties surrounding the 4 core properties in Walker Valley. These 8 all have well developed native communities that buffer the 4 core properties.

This project focuses on the natural water systems in the watersheds of the Moro Cojo Slough, Elkhorn Slough, and Tembladero Slough (see map of region, Figure 1). The first target area involves a series of highly degraded, but restorable small creek ecosystems flowing into Moro Cojo Slough from the adjacent Prunedale Hills. These denser residential areas were the first targets because they contain smaller parcels with very high land values, so the tax incentive from a conservation easement is highest here. We wanted to test the easement model where the chances of success were highest; and we did this. We selected four creek regions as the first target areas. They are Walker Creek, Valley Road, Long Valley, and Paradise/Castroville Creek (Figures 3 to 6). Our first targets for receiving easement materials were 56 landowners in these four subwatersheds (see Appendix 1).

We were already involved with several landowners in the Walker Creek area (Figure 2). The Guerrero, Wagner, Bacerra, and Yniguez families had reduced soil erosion in Walker Valley and recovered wetlands and riparian forests before the grant started. They were all involved in the grant, but only work on the Wagner property was charged to the grant.

In addition to this core of four landowner participants, Palacios, Testa, Moore, Johnson, and Gouldy have riparian habitat downstream from Guerrero. Gonzales, Schmeiser, and Heckel have oak forest buffering the creek. The natural habitats on this group of eight properties are managed primarily as wildlife areas that are contiguous with the natural habitats on the four core properties (Guerrero, Wagner, Bacerra, and Yniguez: Figure 3). Therefore, the additional eight properties contribute to the grant success because they provide a larger contiguous region of native wetland and critical oak woodland for the project, which clearly increases success. The oak forests capture water, retain it, clean it, and regulate its flow downstream and into aquifers. This is the

most important ecosystem service of forests worldwide, not board feet of lumber. Therefore, we started with 12 contiguous parcels forming a functional part of the natural water system in Walker Valley.

Two other types of properties were also included in the grant. Slattery and Zembach are isolated, small parcels in the larger project area with good forest that can be protected forever in conservation easements. They could become future core properties for spreading restoration in other rural residential settings. The other group of target properties are larger and around Moro Cojo Slough and Carr Lake, also in a complex rural residential land use within the larger project region.

This grant was designed for restoration work anywhere in rural residential landscapes within the three larger target watersheds. We began the grant work in the four target areas in the Prunedale Hills, because the high property values for smaller parcels (most less than 10 acres) give the best tax incentives- that is the highest value for a tax write off. The grant was written to provide a broad geographic area where we were certain of grant success if the easement incentive model did not stimulate landowner participation in the upper watershed.

In summary, we had a minimum of 12 target landowners in one large contiguous habitat (Walker Valley); another 44 target landowners spread throughout the four dense target areas (56 total); two additional small parcels (Slattery and Zemsch); and a number of larger parcels around Moro Cojo and Carr Lake.

The initial part of the project focused on this original goal, trying to promote the tax incentives to the landowners. However, these efforts were not very successful and we ended up focusing on restoration mainly on the Wagner Parcel, and the Calcagno Parcel which was added to the target after the preliminary attempts.

Figure 3 Walker Valley subwatershed showing the property locations in relation to Walker Creek

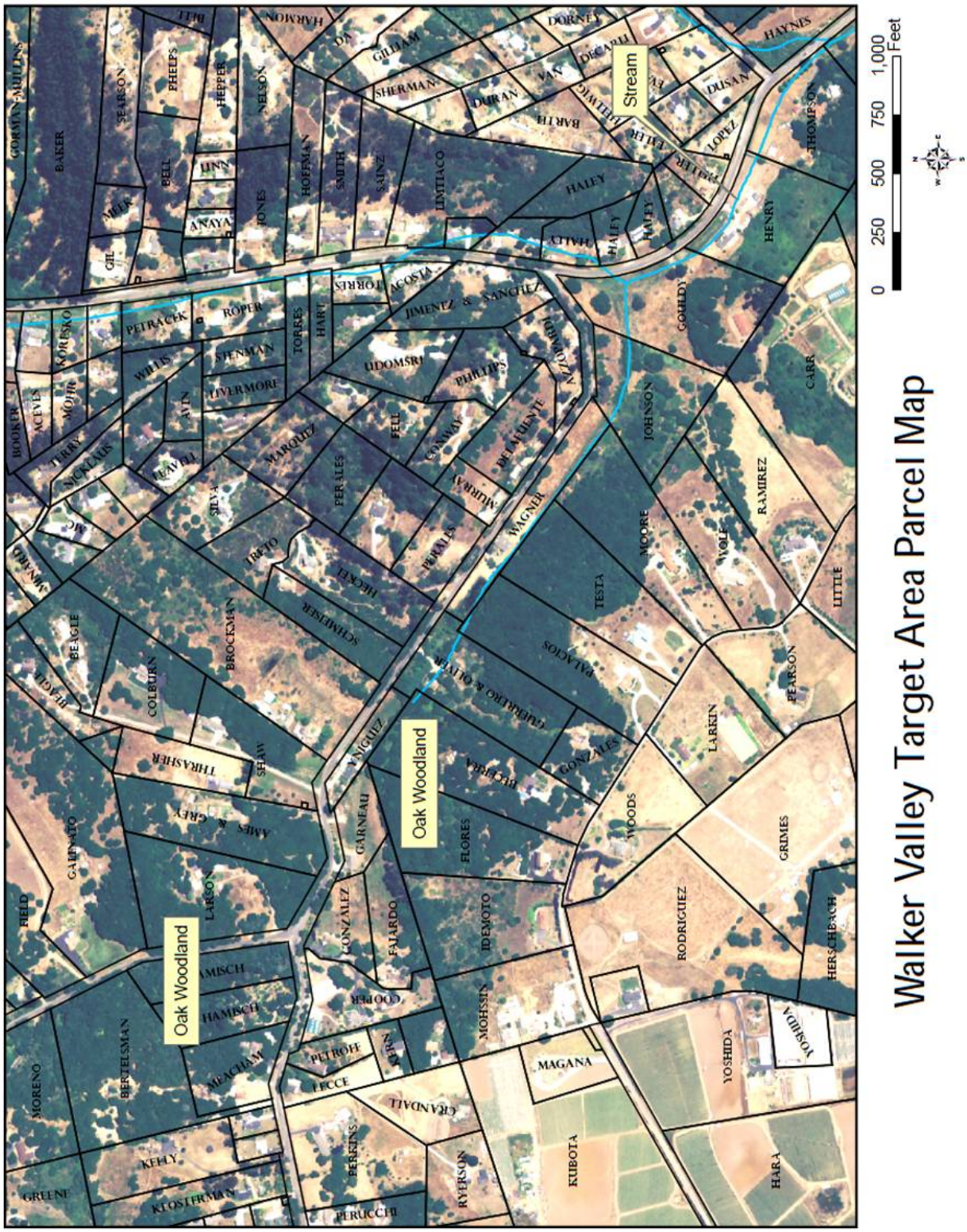


Figure 4 Paradise/ Castroville Creek subwatershed, just downstream of Walker Valley

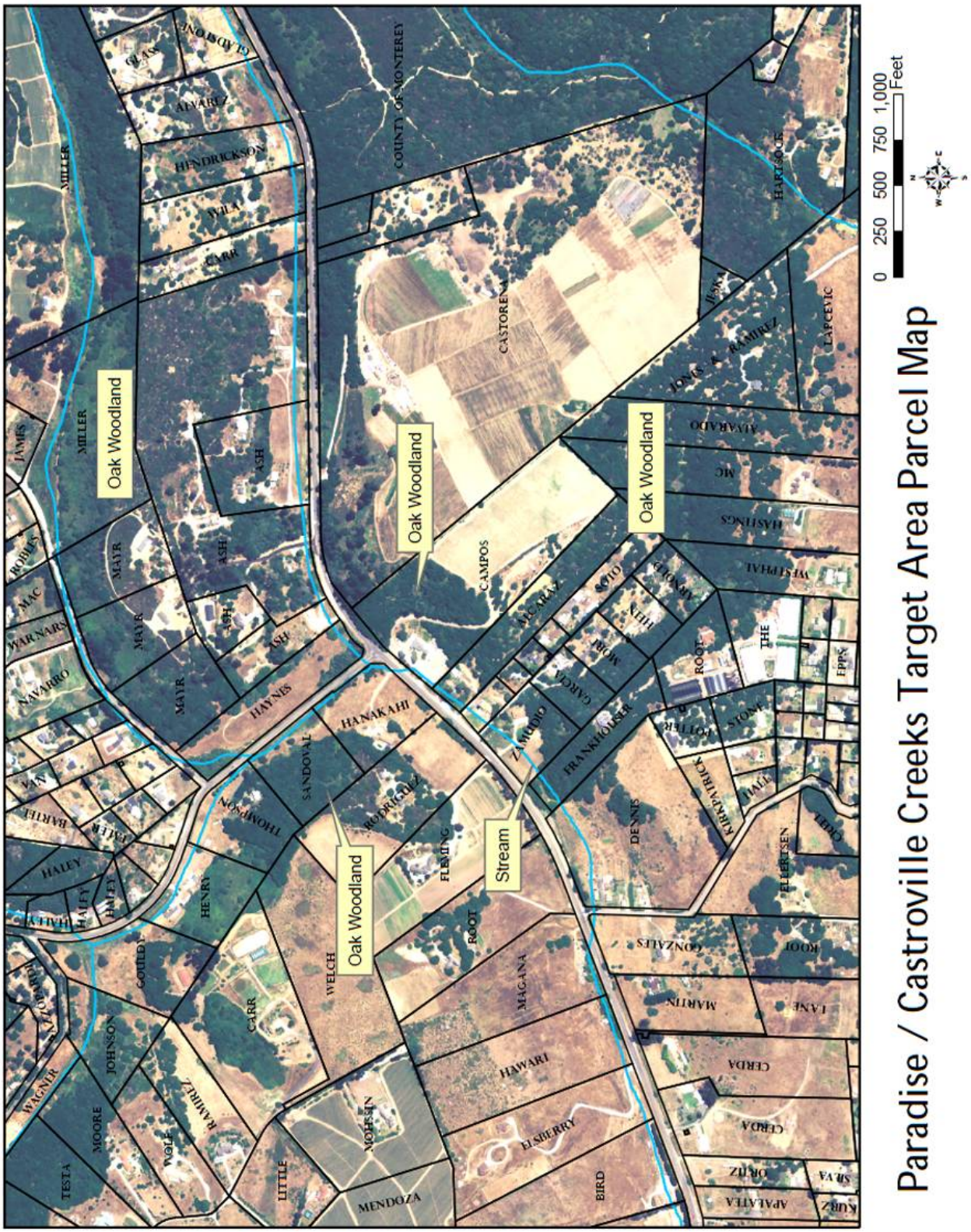

Paradise / Castroville Creeks Target Area Parcel Map
0 250 500 750 1,000 Feet
Oak Woodland
Oak Woodland
Oak Woodland
Oak Woodland
Stream
COUNTY OF MONTEREY
CASTOREVILLE
CAMPOS
HANAKAHI
THOMPSON
SANDOVAL
RODRIGUEZ
FLEMING
ZAMUDIO
FRANKHOUSER
DENNIS
KIRKPATRICK
ELLERTSEN
GONZALES
MARTIN
LANE
CERDA
HAWARI
ELSBERRY
BIRD
MENDOZA
LITTLE
MORSEN
WELCH
ROOT
MAGANA
HENRY
GOULDY
CARR
WOLF
RAMIREZ
MOORE
TESTA
WAGNER
JOHNSON
HALEY
MAYR
ASH
MILLER
JAMES
ROBLES
MAC
WARNARS
NAVARRO
VAN
BARTELL
MILLER
GLASS
ALVAREZ
HENDRICKSON
VILA
CARR
HARTGOUS
JESSA
CAPCEVIC
JONES
RAMIREZ
ALVARADO
MC
HASTINGS
WESTPHAL
ROOT
THE
EPPS
STONE
HALL
CHEEK
LANE
ROOT
CERDA
CERDA
ORTIZ
SILVA
APALATEA
KUBZ

Figure 5 Long Valley subwatershed, downstream from the Walker Valley and Paradise/ Castroville areas. This is an upper arm of Moro Cojo Slough.

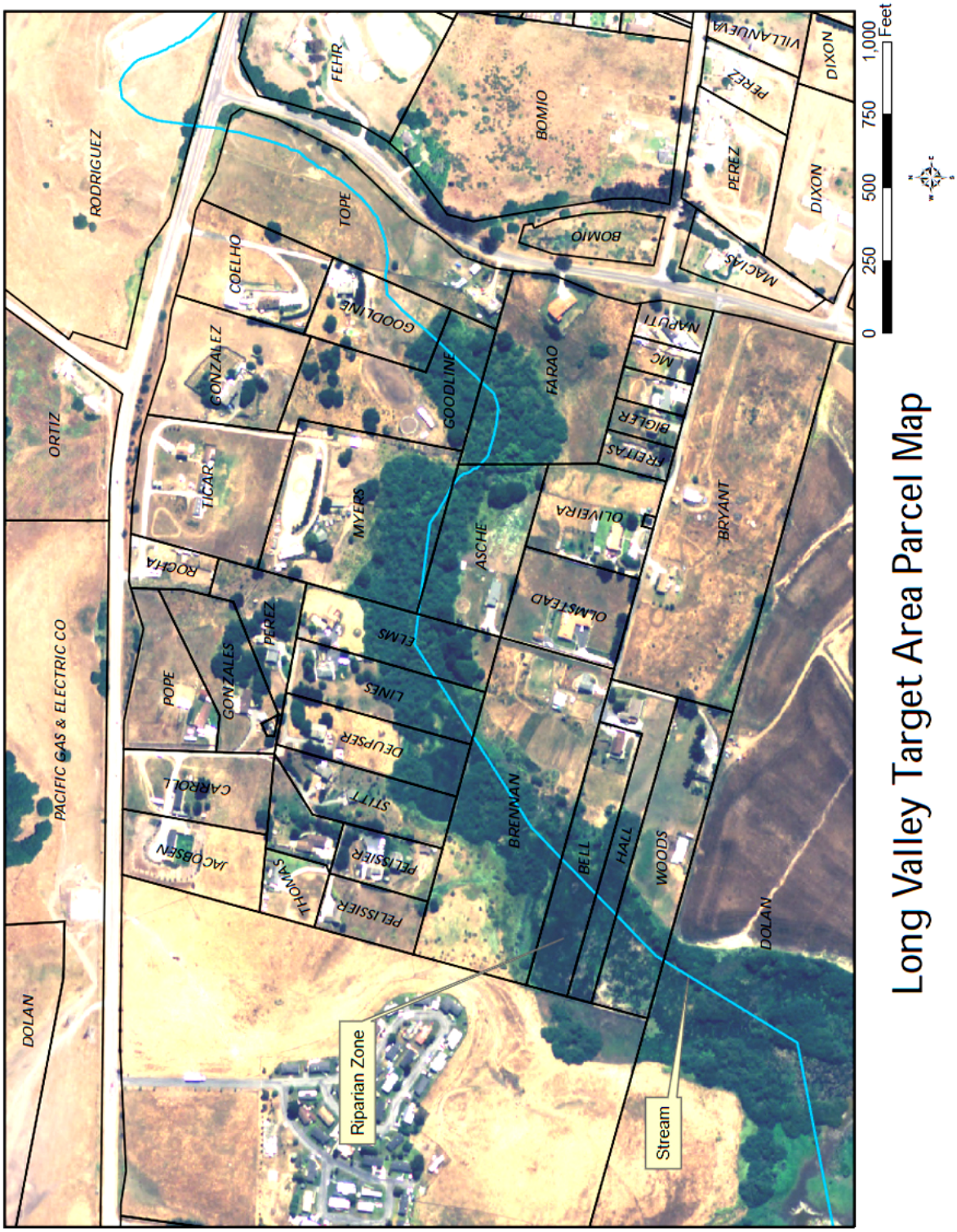


Figure 6 Valley Creek subwatershed flowing into another arm of Moro Cojo Slough just above North Monterey County High School.

VII.1 Tax Incentives

Easement Incentive Experiment

A main goal of the proposal was to establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape. The rural residential interfaces involve many more landowners than the normal rural agricultural setting. Each parcel contains a relatively small section of the natural wet corridor. This grant developed and tested a tax incentive system for these many rural residential landowners to participate in wetland restoration, and commenced restoration where landowners want to participate. The easement model was thoroughly developed and tested and did not work for the creek habitats. No landowners wanted to convert their land to wetland and use the tax incentive. Among the four core landowners in Walker Valley, Guerrero placed a conservation easement over their wet corridor (creek and buffering forest habitats) before the grant started. The other three landowners participated in restoration through the grant, but did not want to establish an easement during the grant period. One of these, the Wagner family, is interested in an easement after the property house and barn structures are permitted and finalized.

Landowner Education

Landowner education in terms of habitat conservation easement programs was achieved for this project through pamphlets given to each of the target landowners listed in Appendix 1. The landowners received one or both of the pamphlets depending on the habitat types found on their property. The pamphlets can be found in Appendices 2 and 3.

We prepared both working maps and outreach maps to educate landowners about the extent of their local steams, riparian areas, and oak woodlands, and how they fit into the larger watershed. We used parcel maps overlain on aerial photos with hydrologic coverages in ArcGIS to help landowners envision who owns what portion of the watershed, and how much benefit this project can provide. We conducted further site reconnaissance to identify properties in the Moro Cojo and Tembladero Slough watersheds that do not have conflicting land uses.

All of the targeted landowners were mailed brochures about restoration and the habitat conservation and tax incentive programs. Brochures were slightly different to landowners with creek habitat or only oak forest (See Appendix 3). Later, selected non-participating landowners were picked from the four first target areas and contacted to discuss the easement incentive. None wanted to change the existing land use they enjoyed (preferred), which included animal feed lots, grazing pastures, horse riding, motor vehicle riding and racing, and non-native landscape and various structures from barns to water tanks.

We put very significant effort into these tasks during the first 1.5 years of the project. However, by Fall 2007 it was apparent that we would not be able to get significant small landowner participation. At that point we discussed the situation with our Project Manager, and took the project in a different direction towards larger parcels. Many of the tasks revolving around landowner participation were dropped at that time.

We participated via a representative, native plant display, and poster presentations in the Moss Landing Marine Labs open house on two occasions. This proved an excellent way to get the word out and reach interested people, although few were from the targeted area. The poster is in Appendix 7.

We had two workshops during the annual Open House at Moss Landing Marine Laboratories: on 9-10 September 2006, and again in 2007 and 2008. We prepared a poster to gain interest and

handouts to read and take home. Visitors were free to read the poster, take handouts, and converse with project participants, including landowners doing restoration and using the easement incentive. The Open Houses went from 10:00 to 17:00 on each day, with several thousand visitors for each Open House. Visitors had access to dozens of reading materials and a chance to talk with staff and landowners. Since we did not have a new group of landowner participants, the Open House workshops had the greatest potential to draw in a larger target population from the project watersheds and beyond. At each Open House, we also had other posters on watershed restoration, live native plant displays, and live pond animals to help stimulate interactions that might bring visitors to the grant project poster, handout materials, and project staff.

The documents prepared and or used for the Open Houses include:

- The Value of Streams and Wetlands (Mailer #1 – Appendix 3)
- The Value of Oak Woodlands (Mailer #2 – Appendix 2)
- The Benefits of Conservation Easements (Poster – 36" x 24" – Appendix 7)
- What Are Conservation Easements? (Handout – Appendix 5)
- Our Purpose (Why We are Interested in Putting a Conservation Easement on Your Property) (Handout – Appendix 6)
- Tax Benefits of Easement Donations (Handout – Appendix 4)

Supervisor Calcagno had several water-related meetings for property owners and water users in the Prunedale Hills. We prepared a handout for these meetings on the easement incentive. We also attended the meeting to disperse the handouts and to field any questions on site. We developed a number of other descriptive materials for use with participating landowners and potential participants which include the following.

- Procedures for Making Gifts of Easements
- Conservation Easement Acquisition Procedures
- Easement Holder Statements
- Attorney's Checklist
- Supplement to the Attorney's Checklist:: Qualified Conservation Contributions
- Typical Easement Issues to Include
- Land Acquisition Information Sheet
- Hazardous Materials Policy and Checklist for Hazardous Wastes: Preliminary Site Investigation
- Estoppel Certificate
- Mortgage Subordination Procedures/Checklist
- Statement on Land Protection Costs
- Conservation Planning Data Sheet
- Conservation Easement Plan
- Example Conservation Easement

There was no public support for workshops, so we instituted a 1 on 1 door to door approach. The documents passed out during these 1 on 1 visits can be found in Appendices 4, 5 and 6.

Fire Risk Incentive

The only other existing landowner participants that were interested in pursuing the easement incentive were those wanting the removal of Eucalyptus forest and replacement with native oak forest. This includes Bacerra in Walker Valley, Burton in Paradise Canyon, and Langholz on Tarpey Road. They are interested in Eucalyptus removal for fire protection. There are undoubtedly many more potential participants for Eucalyptus removal, but this aspect of the project was not developed further in the grant. RWQCB staff wanted to focus on Walker Valley wetlands and the Calcagno parcel to finish the grant.

Eucalyptus forests are easy to ignite and fuel rich, and therefore an extreme fire risk. In contrast, forests of coastal live oaks are well-known fire suppressants. Since the existing Eucalyptus forests are not involved in desirable land use, the landowners do not perceive the easement as a loss of land use, but rather as desirable fire protection. The removal of fire risks is more incentive to these landowners than the tax incentives from the easement, but they will accept the conservation easement in exchange for fire safety. Climate Change and the extensive early wildfires this year fueled additional interest in Eucalyptus removal.

This should spawn a highly effective model for oak woodland recovery and permanent protection with conservation easements in the target watersheds and other regions where coast live oak forests can be re-established. We hope to pursue this successful model in future wildlife-oriented grants. We started this work during the grant period on the Bacerra parcel, where we removed 34 large Eucalyptus trees from an oak woodland (Figures 17 and 18), but did not use grant funds.

Not a single new landowner in the four first target areas (Walker Valley, Paradise/Castroville Creek, Long Valley, and Valley Road) (Figures 3-6) was interested in doing restoration in their wet corridor or using the easement incentives. They used the low flat historical creek for other land use, primarily grazing horses and other large domesticated animals. The only participants in the project were already lined up before the grant project commenced. These included the four core parcels in Walker Valley (Guerrero, Wagner, Bacerra, and Yniguez); the Slattery and Zemsch parcels; and a series of larger parcels around Moro Cojo and Carr Lake. Later, after discussions with RWQCB staff, we focused on the four core parcels in Walker Valley (actually part of a 12 parcel habitat patch) and one large parcel on Moro Cojo (Calcagno).

So, the easement incentive model does not work in these dense rural residential creek habitats, because of existing land use conflicts. On the other hand, we discovered a new incentive model that can recover oak forests and also result in wet corridor restoration and conservation easement protection. Fire protection is perceived as an extremely valuable land use. In time, these oak conversions could even reduce fire insurance costs, as the reduction in fire risk becomes more widely known.

Project Costs

Approximately $117,000 was spent on the tax incentive efforts described above, $109,000 from grant funds and $8,000 in matching funds (see Appendix 16).

VII.2 Walker Valley Parcel

Existing Condition Base Maps
The map below (Figure 7) detail the condition of the Wagner parcel before any restoration work was done.

Figure 7 Existing conditions on Wagner parcel

Restoration Project Design

1. Existing Large Pond

Culvert Installation

The main drainage into the wet corridor on the Wagner property was through an 18 inch culvert under Walker Valley Road (Figure 7). When the County installed the culvert, they left the down-flow end about 6 ft. from the pavement in a hole. This filled with sand every year. The culvert either clogged and flowed over the pavement along several paths, or the hole was eroded open and a fan of sand developed on the property before the pond. In both cases, the upstream flow would either miss the pond or arrive with erosion.

The ponds and soil on the road and property were our introduction to the property owners. They were eager to "clean up the mess". The hydrographic solution was simple: extend the culvert from across the property to dump directly into the pond. This prevents ponding along the road and soil erosion at the present culvert hole. Soil that makes it through the culvert from erosion of the upper watershed can also be collected much more effectively where the culvert enters the pond. However, the best solution is to fix erosion problems where they originate.

Native Grass Swath

The culvert installation left a strip of bare ground about 10-20 feet wide. This was seeded with native grasses (meadow barley, brome, hair grass) directly after culvert installation. The site was watered to obtain decent grass growth before the winter rains, preventing local erosion, while eliminating the only excavation scar from the hydrographic improvements.

Trimming Pond Willows

One of the problems with smaller ponds was overgrowth by native willows. This creates different habitat, but at the expense of the most endangered species using the ponds- amphibians and the pond fauna and flora they depend upon. For their own reasons, most property owners like an open pond better than one that is overgrown by willows. So once again, the property owners asked for this pond improvement. This included a cooperative willow trimming at the upstream property boundary with JoAnn Guerrero as well.

2. Five Small Ponds

Low Berm and Pond

Small ponds were be made along the wet corridor below the large existing pond and the house. These are natural low regions. The excavated holes are a foot or less in depth. The excavated soil can be placed in a low berm to help pond more water.

Native Wetland Plants

The ponds and berm were planted with native grasses. Meadow barley, California brome, and hair grass by seed- and plugs of Iris-leafed rush. The ponds were seeded or plugged with other native sedges and rushes. The landowner does not want riparian trees, preferring open grassland around the ponds.

6^{th} Small Pond

This site is a larger version of one of the five small ponds constructed downstream of the house. The 6^{th} pond is near the house, and the homeowner wants more time to learn from the results from the 5 small ponds.

Weed Control

The entire wetland corridor is surrounded by grassland. We mowed the grassland once to control non-native plants- particularly dock, mustard, raddish, and hemlock. See Figure 8 for visual.

Figure 8 Restoration plan for Wagner parcel

Figure 9 displays the signed landowner agreement for the Wagner parcel of land.

Figure 9 Signed landowner agreement for Wagner parcel

CREATIVE ENVIRONMENTAL CONSERVATION, INC. A Non-Profit Corporation, est. 1969

P. O. BOX 228, MOSS LANDING, CALIFORNIA 95039

I give permission to Coastal Conservation and Research to access my land and perform monitoring and restoration on my property. It is understood that all activities will be approved before they are implemented. . It is also understood that at any point during the project that either party may terminate this agreement with written or oral notice to the other.

Susan Wagner Date January 6, 2008.

Because the landowner at the Wagner parcel wishes to keep the property open (no trees or shrubs), we were limited to a seeding a selection of grasses (Deschampsia cespitosa, Hordeum californicum, and Bromus carinatus) and transplanting plugs of iris-leaved rush (Juncus xiphiodes).

Table 1 Native plants used for restoration by site

Plants collected and propagated in Moss Landing		
Scientific name	**Common name**	**Site used on**
Juncus xiphiodes	Iris-leaved Rush	Wagner
Plant Seeds Purchased for Restoration		
Deschampsia cespitosa	Hair Grass	Wagner
Hordeum brachyantherum	Meadow Barley	Wagner
Bromus carinatus	California Brome	Wagner

Implement a range of BMPs

The best management practices (BMP) for the restoration parcels are listed in Table 3. The BMP numbers and types used in the table are from State and Federal lists. As you can see, all but one of the BMPs concern the recovery of native habitats and one is about the removal of invasive non-native weeds, which is a critical step in the restoration process. The following pictures show a variety of the BMP's for the project (Figures 10-21)

Table 2 BMPs for restoration parcels

	Acres in major properties				
BMP #	BMP Type	Guerrero	Wagner	Bacerra	Yniguez
676	Nat Plant Res/Mng	4	2	3	
638	Water/sed basin	1	1		
657	Wetland Restore	4	2		
745	Stream Corridor	1	2		
393	Filter Strip	1	1		1
741	Veg Buffer	3	1	3	1
412	Grassed waterway		2		1
612	Tree/Shrub	1	1	3	
950	Weeds	1	1	1	
644	Wet wildlife	4	2	1	
	(numbers in parenthesese) = possible acres				

Figure 10 Eucalyptus forest on the Bacerra property directly adjacent to Walker Creek.

Figure 11 The same site after the removal of 34 Eucalyptus trees, an example of the weed removal BMP.

Figure 12 The watershed above the Wagner property is dominated by a wide road and at least as much impervious surfaces at each home site along the private road.

Figure 13 Water running down the road is captured in this drain and sent to a holding pond.

Figure 14 The horizontal culvert brings water from the road into the collecting basin which then flows into the vertical pipe and from here directly into Wagner pond. Before this project, the culvert ended at the edge of Walker Valley Road causing erosion and road flooding

Figure 15 Looking from the water capture basin towards Wagner pond. We extended the culvert from the road's edge directly into the pond

Figure 16 The new culvert in Wagner pond

Figure 17 A view of the new culvert from further back in the pond. All water from the watershed now comes into this culvert and empties directly into the pond. This permits earlier filling of the pond and increases the total amount of water captured here

Figure 18 Wagner pond in March 2008 after a low rain year

Figure 19 The downstream end of Wagner pond in March 2008. Several BMPs are illustrated by the reduced soil erosion and flooding and the improved pond hydrology resulting from the new culvert installation, as well as by the positive impacts on wetland plant and animal communities.

Figure 20 This part of the Guerrero and Wagner ponds was overgrown with willow trees, which extended into the middle of the pond. We improved the ponds for the endangered amphibians by removing willows from the pond (BMP). Several Sycamore trees and other native plants are now expanding after release from willow overgrowth (BMP).

Figure 21 This bridge was constructed over Walker Creek on the Guerrero parcel. They no longer drive through the creek, with important positive impacts to the stream corridor, wetlands, plants, and wildlife (Table 3- BMPs)

Plug the ditched waterway to allow water to spread over the natural low area at Wagner and Guerrero parcels.

The images below, Figures 22-26 show the work done at the Wagner parcel to allow for water to spread naturally over the low areas.

Figure 22 The lower end of the Wagner property where we constructed five small berms to spread water over the flood plain

Figure 23 A closer view of two of the berms this Fall

Figure 24 An example of a low berm constructed along Walker Creek on the Guerrero parcel

Figure 25 Water captured behind another low berm at Guerrero last winter

Figure 26 Spreading water behind another berm just downstream of the Guerrero bridge

Table 3 below lists the native species that were used to establish native grasslands, wetlands, and oak woodlands on the two parcels in places that were previously over-grown with invasive weeds. Once the invasive species were removed the native species had the ability to take over the sites and in so doing will make it difficult for the weeds to return.

Table 3 Restoration plant species by number planted at sites

Scientific name	Common name	Site used on	Number planted at site
Juncus xiphiodes	Iris-leaved Rush	Wagner	350
Deschampsia cespitosa	Hair Grass	Wagner	5 lbs
Hordeum brachyantherum	Meadow Barley	Wagner	5 lbs
Bromus carinatus	California Brome	Wagner	5 lbs

Water Quality

Water quality data was collected at the Guerrero (Site 1) and Wagner (Sites 2 and 3) parcels. The monitoring stations were selected to document water quality changes above and below the Wagner property, and to integrate this sampling program with past and ongoing water quality sampling in the Moro Cojo Slough and watershed. First year runoff never reached the bridge on the Guerrero property, and the Wagner pond never filled and overflowed. This overflow would fill the five small ponds made along the downstream end of the Wagner parcel. In 2008, the water flowed under the bridge, but once again did not fill the Guerrero pond. Wagner pond did not overflow again. So, there was no flow below the Wagner parcel. While this reality prevents us from using the water quality samples to assess the impacts of restoration work at Wagner, it is also an extremely positive assessment of how well the two properties capture and retain freshwater. Almost all the water that flowed into the Guerrero wetland went underground, and so

did much of the water captured in the Wagner pond. The wetlands on these water capture and retention properties are an outstanding water quality filter as well.

Two types of samples were collected at the stations with water: 1) standard nutrient and basic physical sampling, and 2) anthropogenic poisons (pesticides and herbicides). Since there are no pesticide or herbicide data available from the watershed above the Moro Cojo Slough, these samples were given the highest ranking for completion. They provide the first measurements of anthropogenic pesticides and herbicides from the upper watershed, and are thus an important data set for future workers to examine. The pesticide and herbicide data from the sediment and water sampling are now part of the State's database.

Shortly after the winter 2007-08 water quality samples were taken, questions arose as to if there was funding available in the proper budget category to pay for their analyses. The samples were therefore frozen until the question could be resolved. The question still hadn't been resolved 6 months later when the recommended holding period of the samples expired, so the samples were not analyzed. Because this task had been included in the original proposal, the money that would have been spent on these samples was not spent and will be returned to the State.

Figures 27 and 28 show where the water samples were taken.

Figure 27 Water quality sampling stations for the project

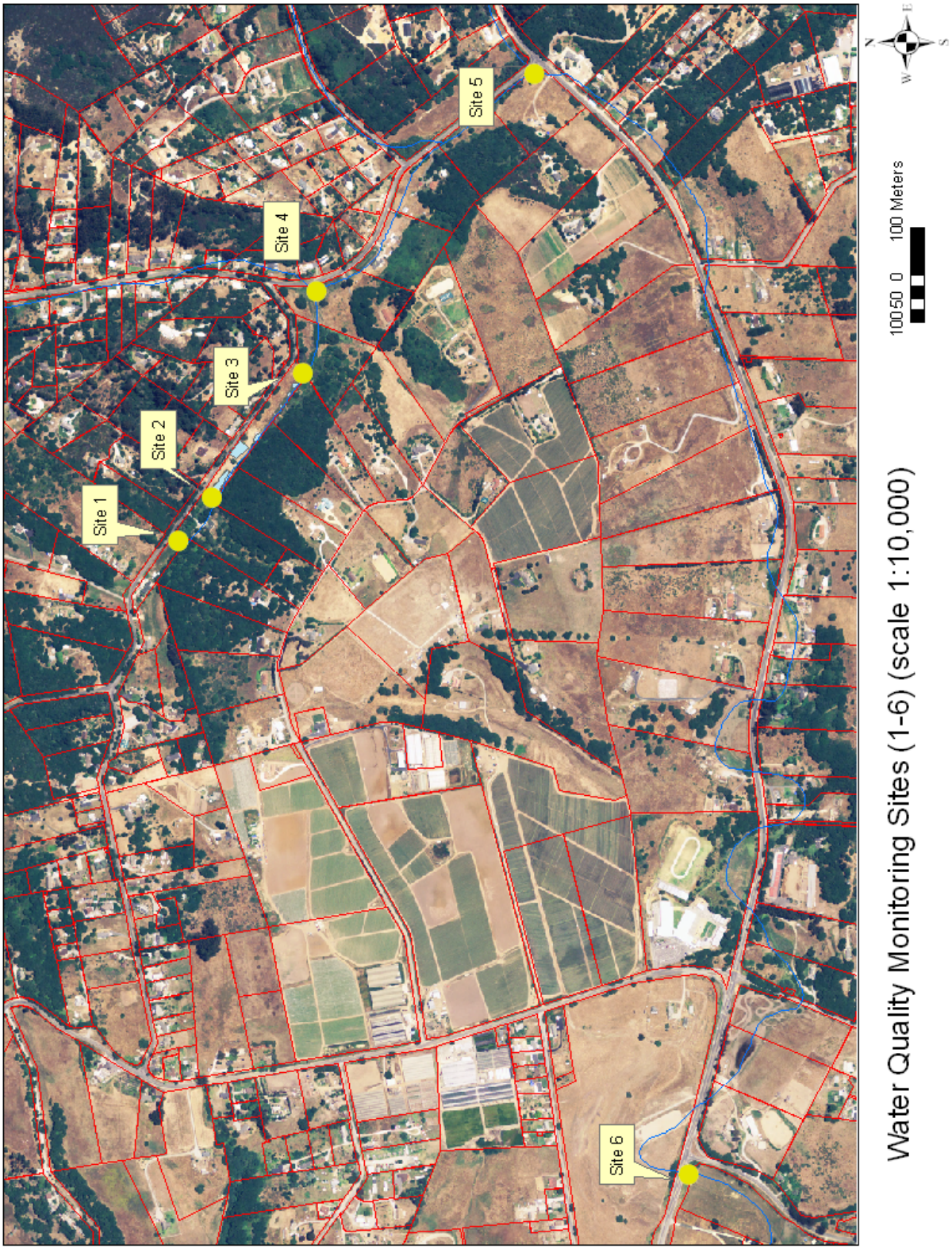
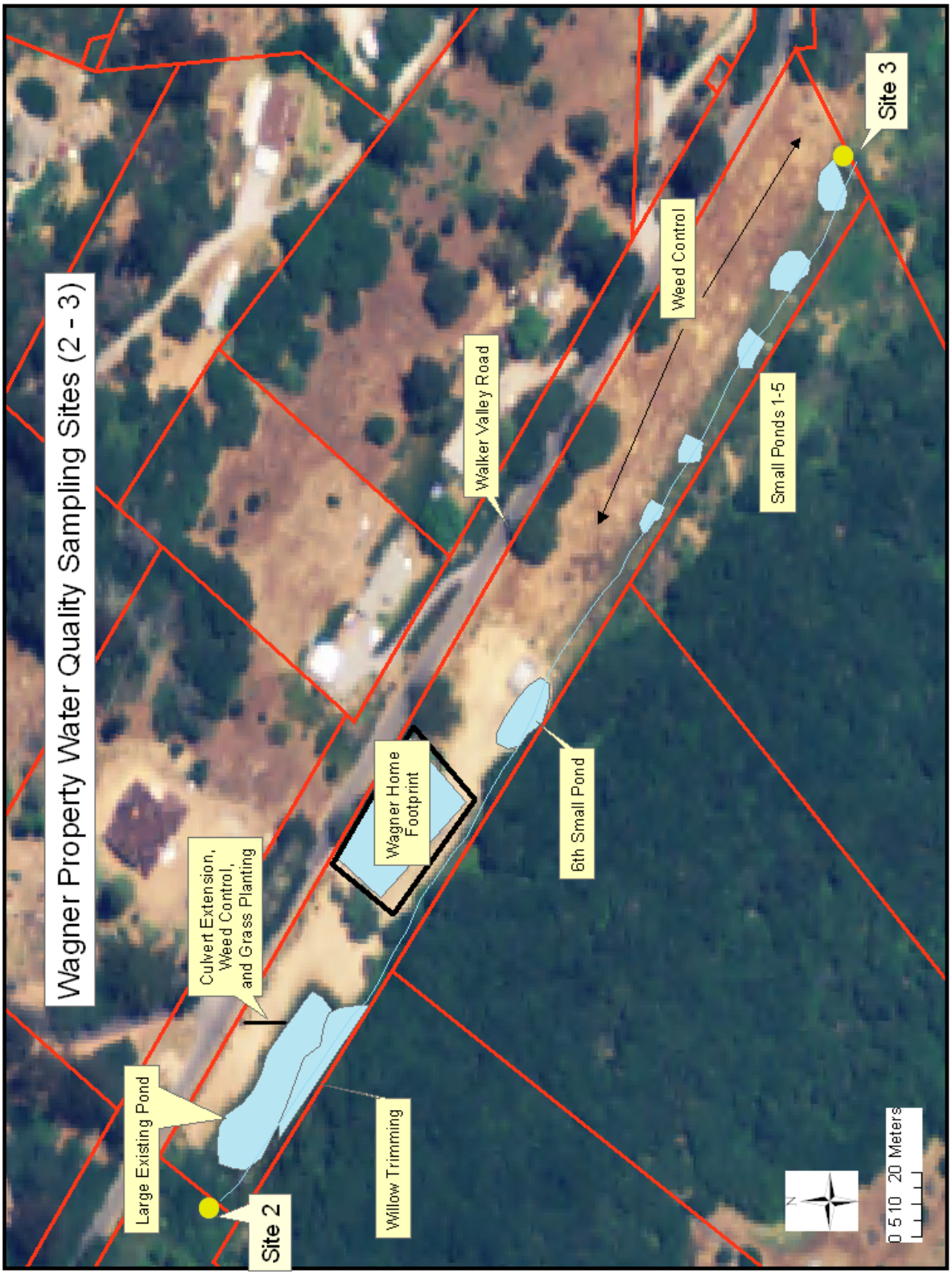


Figure 28 Water quality stations at both ends of the Wagner parcel



Explanation of Water Quality Sampling

All samples were collected in Walker Valley and are tied in with small parcels on which we have done restoration as part of this program. Additional samples were taken which were not analyzed. Site 1 is highest in the watershed moving to 6 which is lowest.

Station/Sample Descriptions

Site 1. At the upstream edge of the Guerrero property in Walker Valley. A small pond where the culvert dumps water from the upper watershed.
Water Sample: 1/7/08
Soil Sample: 1/2/08

Site 2. Guerrero Pond at the downstream border of the parcel next to the Wagner property. 100m from ST 1. Water never reached the pond this year. All runoff was sucked into the ground in the upper part of the Guerrero wetland corridor. Surface water flow reached within 30m of the pond.
Soil Sample: 1/2/08

Site 3. Wagner Pond- had the most water for the longest time in the Walker Valley. About 50m from ST 2.
Water Samples: 1/7/08
Soil Sample: 1/2/08

Site 4. Downstream end of Wagner parcel- in the last small pond made during the grant. About 200m from St 3. This never had water this year. The Wagner Pond never overflowed. This is the lowest flow we've observed in Walker Valley for over 10 years, but we also have better water traps in natural landscapes as well. Mostly the rains were too short for sustained flow.
Soil Samples: 1/2/08

Site 5. Walker Valley and Paradise Road intersection
Soil Sample: 1/2/08

Site. 6. The Tope parcel at the intersection of Castroville Blv. and Dolan Road. Topes are potential candidate for a pond, and are still considering pond construction and wetland creation, but won't decide quickly enough to be part of this project.
Soil Samples: 1/2/08

Sites 1-5 are in the Walker Valley target area. Site 6 is in the Castroville Blvd target area, which Walker flows into. Both flow into the Dolan Ranch arm of the Moro Cojo. The final target area was Valley Road which flows into the high school branch of Moro Cojo.

Soil samples for pesticide analysis were taken January 2, 2008, frozen, and sent to CDFG WPCL Rancho Cordova for analysis on January 9, 2008. Water samples for pesticide analysis were taken from sites 1 and 3 on January 7, 2008, and from site 2 on March 4, 2008. The samples were sent to CDFG WPCL Rancho Cordova for analysis on January 9 and March 6, respectively. Due to funding issues, the March sample was pulled prior to analysis at the lab. The results of this data can be found in Appendix 8.

Water quality measurements (Temperature, Oxygen, Conductivity, pH, Salinity, Turbidity, and Nutrient Samples) were taken on January 7, January 21, January 29, February 4, February 18, and March 4, 2008. Due to the very dry winter, not all sites contained water for sampling to occur (refer to table below). Site 4, for instance, was dry regardless of rain events, and only one

measurement (pH) could be collected during the monitoring effort. This data is in Appendices 9 and 10

Number of Times Water Quality Data Collected

Site 1	5
Site 2	1
Site 3	6
Site 4	0
Site 5	2
Site 6	2

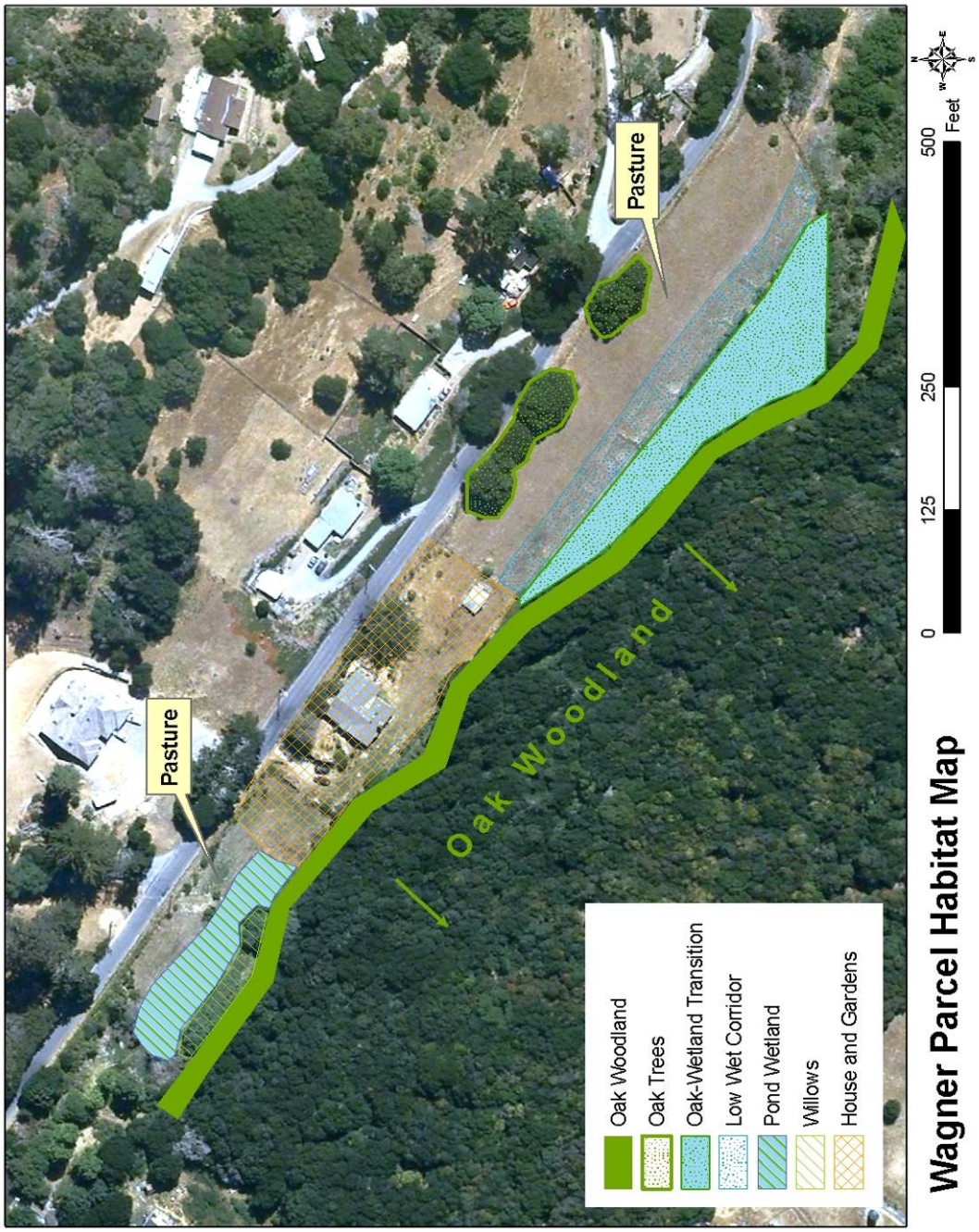
The sites for water quality sampling were chosen to monitor both the restoration activities on properties that were anticipated to participate in the project, and because they fit into the existing monitoring effort for the Moro Cojo Slough watershed.

Vegetation Survey

The vegetation and faunal surveys were originally intended to document the success of many small restoration projects. However, when we were unable to get landowner participation, and the emphasis changed towards doing restoration of ongoing projects, the utility of the surveys vanished. It was not possible to differentiate the work done under this project from previously-done work, so the effort that would have gone into monitoring was put into restoration implementation at the Wagner and Calcagno parcels.

The results of the vegetation survey led to the habitat map shown in Figure 29. The habitat map and associated information below shows the most common plant groupings and the dominant species within each grouping.

Figure 29 Habitat map for the Wagner parcel



Oak Woodland

This is a dense, heathy stand of coast live oak with an understory dominated by poison oak, brackin fern, coffeeberry, and many other species. It is adjacent to the Wagner parcel on several other properties. Animal trails are common throughout the forest.

Oak-Wetland Transition

This is a region where the oaks give way to lower vegetation on the other side of the fence separating Wagner from the uphill parcels. Coyote bush, Caryx, and Marsh Baccarus are the dominant plants. The Caryx patch is important, because it is likely to spread into the Wagner parcel in time.

Oaks and Weeds

There are several large oak trees along the property fronting Walker Valley Road. Their understory harbors the worse surviving weeds on the parcel. These include thistle, poison hemlock, wild raddish, and mustard, which are all highly invasive and tall enough to spread over much of the parcel and dominate the plant community, if left uncontrolled.

Old Pasture

The old pasture (farm animals were removed the year before the project started) is dominated by the non-native winter annuals that are common in pastures throughout the watershed, including Ripgut Brome, Bromus sp., Avena sp., Lolium sp., and Hordeum. There is also some flannel grass and rabbit foot grass, which are both non-native, like wetter areas, and easily give way to native grasses like those in the low wet corridor and Caryx. Some years the pasture is covered with star lupine, a small native annual.

Low Wet Corridor

This region is dominated by patches of Iris-leafed Rush. Flannel grass and the winter annual grasses are dispersed between these patches.

Pond

The pond is dominated by large pond sedge with much less cover of pond weed and several species of smaller species like algae. Flannel grass and fat hen are common at the pond edges.

Willow Patch

There is a large patch of arroyo willow next to the pond, which is also growing in the pond as well. There are many more willows and also cottonwoods in the riparian forest that extends along most of the Guerrero parcel, just upstream of the Wagner pond.

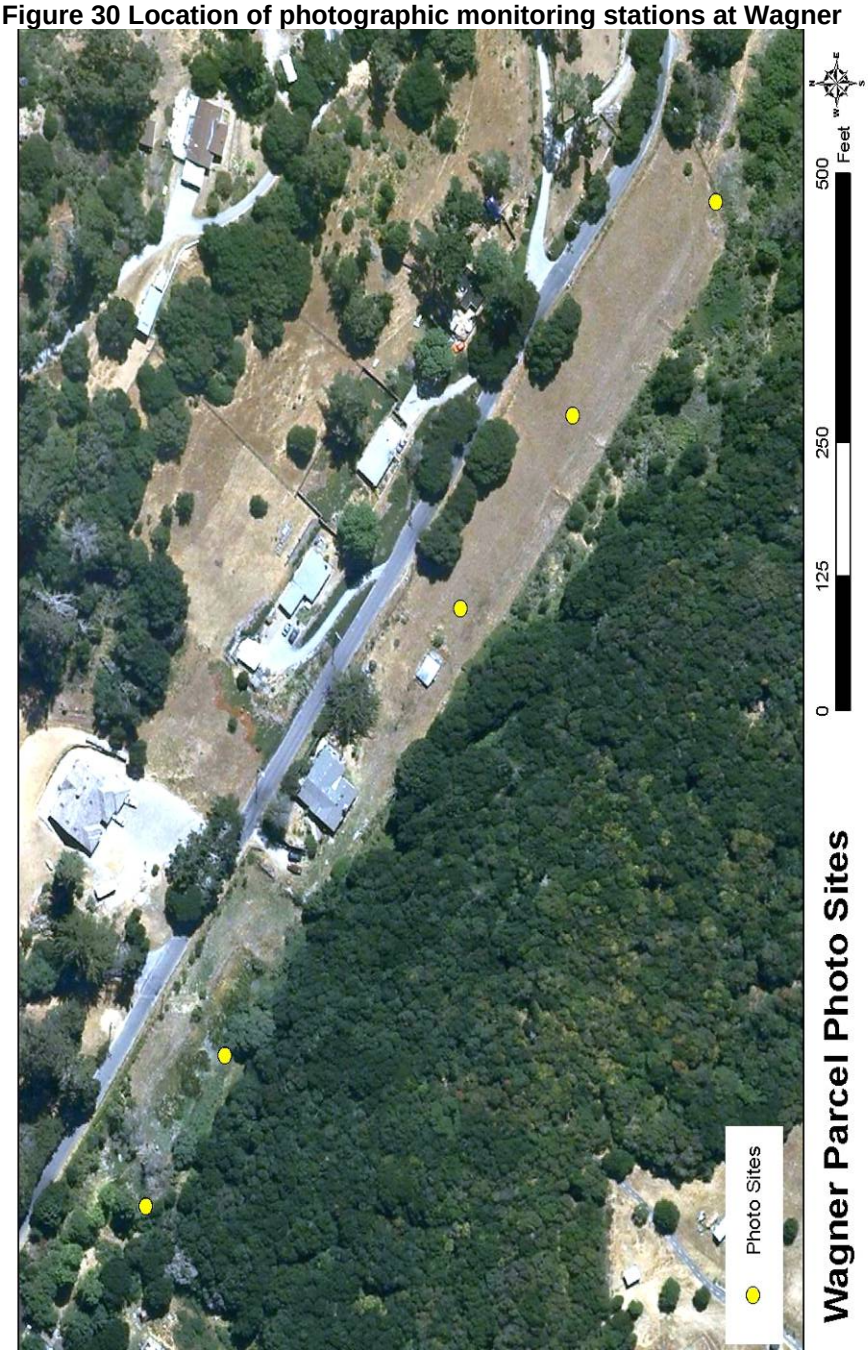
A complete species list for the Wagner parcel can be found in Appendix 11

For many decades, the Wagner parcel was regularly grazed by a cow, goat, and sometimes other animals. The large grazers were removed the year before the present project. The continued weed control work during the grant period has prevented any increases in invasive non-native species. The grazing animals kept the parcel in a low pasture, and annual mowing and target weeding is now converting the parcel to a mosaic of recovering native habitats, with the pond and surrounding wetlands as the center.

Pre, During and Post Photo Documentation

We have 5 photo sites for the Wagner parcel which have been utilized to document the site before, during and after restoration. The sites are highlighted below in Figure 30 and a list of the coordinates for each site can be found in Appendices 13 and 14.

Figure 30 Location of photographic monitoring stations at Wagner



In addition to the photo sites from each location, numerous photos were taken around the restoration sites before, during and after restoration. Many of these photos are found throughout this document. Figures 31-33 below are some additional photos showing the work we have done.

Figure 31 The new bridge lets the Guerrero family access their home without driving through the creek. This riparian forest is 15 years old. The same parcel was covered with chicken coups before the restoration started.

Figure 32 Water enters the upper end of the Guerrero wetland much like it does to Wagner pond, it is collected into a central culvert and piped underground to the top of the natural stream habitat. The pipe ends in a bath tub to prevent local erosion.

Figure 33 The end of water flow through the Guerrero wetland in 2008. The flow stopped behind the last low sediment berm just before the Guerrero pond, which was dry for both years of the project (2007-2008). This natural wetland cleaned and retained all the water went underground

Faunal Survey

We made qualitative surveys of important wildlife species throughout the Walker Valley wetlands. The year before the project Gage Dayton lived at the Guerrero house and monitored for the presence and number of dear, coyote, fox, raccoon, snake, and endangered amphibians. By the first year of the present project, Dayton had two interns continuing his observations. One presently lives in the Guerrero house. The interns are supervised by Dayton, Slattery, and Oliver. Surveys include direct observation of animals and observations from other neighbors; examining scat patterns; and using baited camera traps. Surveys were conducted throughout the year, and often at times when animals are known to be active and therefore more likely to be seen. For example, the first rainy, warm nights of the wet season tiger salamanders migrate to ponds. We survey them each year on these warm, rainy nights along Walker Valley Road. They are easier to see along the road, and are following water downhill (from upland burrows) to the Wagner breeding pond. We also surveyed the invertebrate communities (see Figures 34-40).

Figure 34 A California Tiger Salamander found in the enclosed porch at the Guerrero house

Figure 35 A raccoon eating pizza on the berm between Wagner and Guerrero Ponds

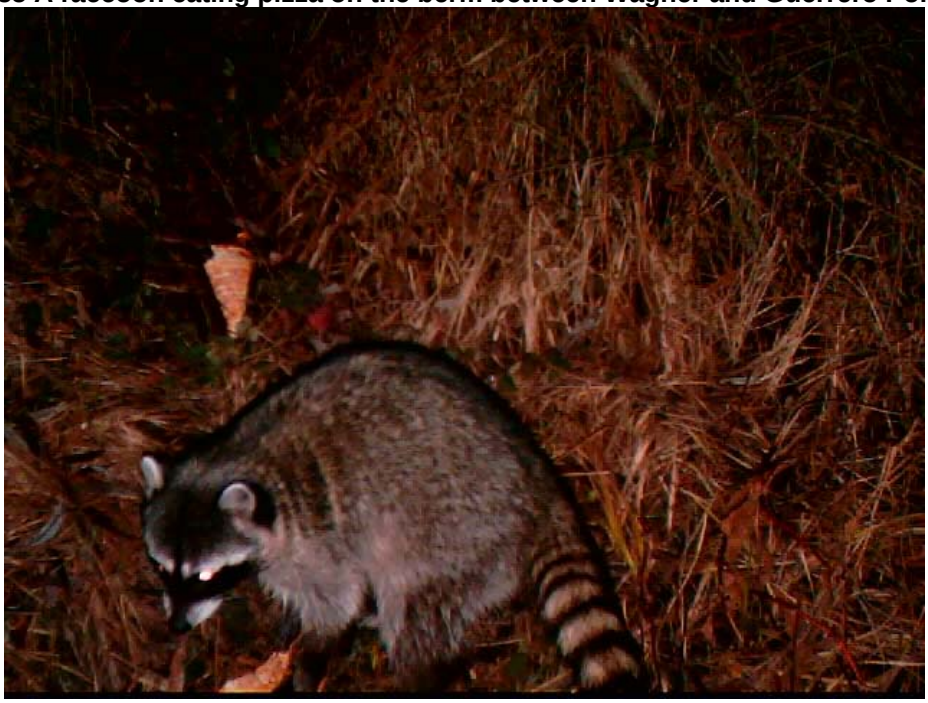


Figure 36 Gray Fox eating pizza on the berm between Wagner and Guerrero Ponds. Photographed in January 2007 with a motion sensitive camera. They are the most common mammal predator along the wetland.

Figure 37 A coyote was commonly seen from Walker Valley Road in the large pasture on the Gouldy property

Figure 38 The most common large snake in Walker Valley, the gopher snake

Figure 39 Red-legged frog from Guerrero wetland April 2007. Animals this large have been present since the first year of restoration at Guerrero, since 1995. Wagner pond has been important red-legged frog and tiger salamander habitat for over 50 years.

Figure 40 The other side of the red-legged frog showing the distinct red legs.

We qualitatively surveyed invertebrate species living in the Wagner pond and around it each year as the water arrived and dried up. These observations resulted in plans for obtaining quantitative benthic core samples from the pond at the height of spring development in 2009. These samples will be in the benthic community database for the California Department of Fish and Game. Moss Landing Marine Labs and the Watershed Institute at CSUMB provide support for taking and processing the quantitative samples at Wagner. These data permit a regional comparison with other aquatic habitats, which is likely to lead to an even higher bioassessment of Wagner pond.

Deer roamed throughout the valley throughout the year. When the ponds were dry, the Guerreros and others maintained drinking water for wildlife. The water bowls were frequently used by deer, which created distinct traveling trails to the bowls. Coyote were only observed at the downstream end of the Wagner parcel and the adjacent downstream properties (Johnson and Gouldy). Here they dug for mice, ate two roaming cats, and left scat (Figure 37). The interns set baited camera traps along the berm between the Wagner and Guerrero ponds. The camera is triggered by motion. It captured gray fox and raccoon (Figures 35 and 36), but not coyote. Gray fox dominate the Guerrero wetlands. They defecate around the Guerrero bridge almost every evening. This June a family of gray fox (2 adults and 4 pups) spent several days on the Wagner porch, and another day under the Guerrero porch and bridge. The fox family has a den on the Schmeiser property across the road from Guerrero. The dominant small snake in the valley was the sharp-tailed and the most common larger snake was the gopher (Figure 38).

The interns focused survey efforts on locating tiger salamander and red-legged frog to protect them from automobiles when they crossed over Walker Valley Road. They also counted the living and dead (only found on the road). They helped live ones to the pond, and collected dead animals and froze them for Gage Dayton. Live animals were also photographed for size and individual markings. The tissue results (including DNA) and photographs are entered into the State's amphibian database. The first year we located 4 dead salamanders and one live on the road. Another live individual was observed under the Guerrero porch. The second year (2008) we

found 2 dead animals on the road and one alive in the Guerrero driveway. All observations were on warm, rainy nights. These are large animals (Figure 34). Large red-legged frogs have been observed around the Walker wetlands for many years. We found four during the first year, and two in 2008 (Figures 39-40).

Each year we also surveyed invertebrate use of Wagner pond. Within a day or so after water arrives, flies accumulate in dense wind drifts along the water's edge. Spiders run across the water. Within a month, ostracod crustaceans are booming and the bottom of the pond can be covered with these tiny bean-like animals. They are one of the best examples of an early succession species in pond communities. Later there are clam shrimp, fairy shrimp, many zooplankton, back striders, beetles, and other insects in and out of the water. Tree frogs dominate the pond: adults and larvae. Tiger salamander and red-legged frog larvae were found in the pond.

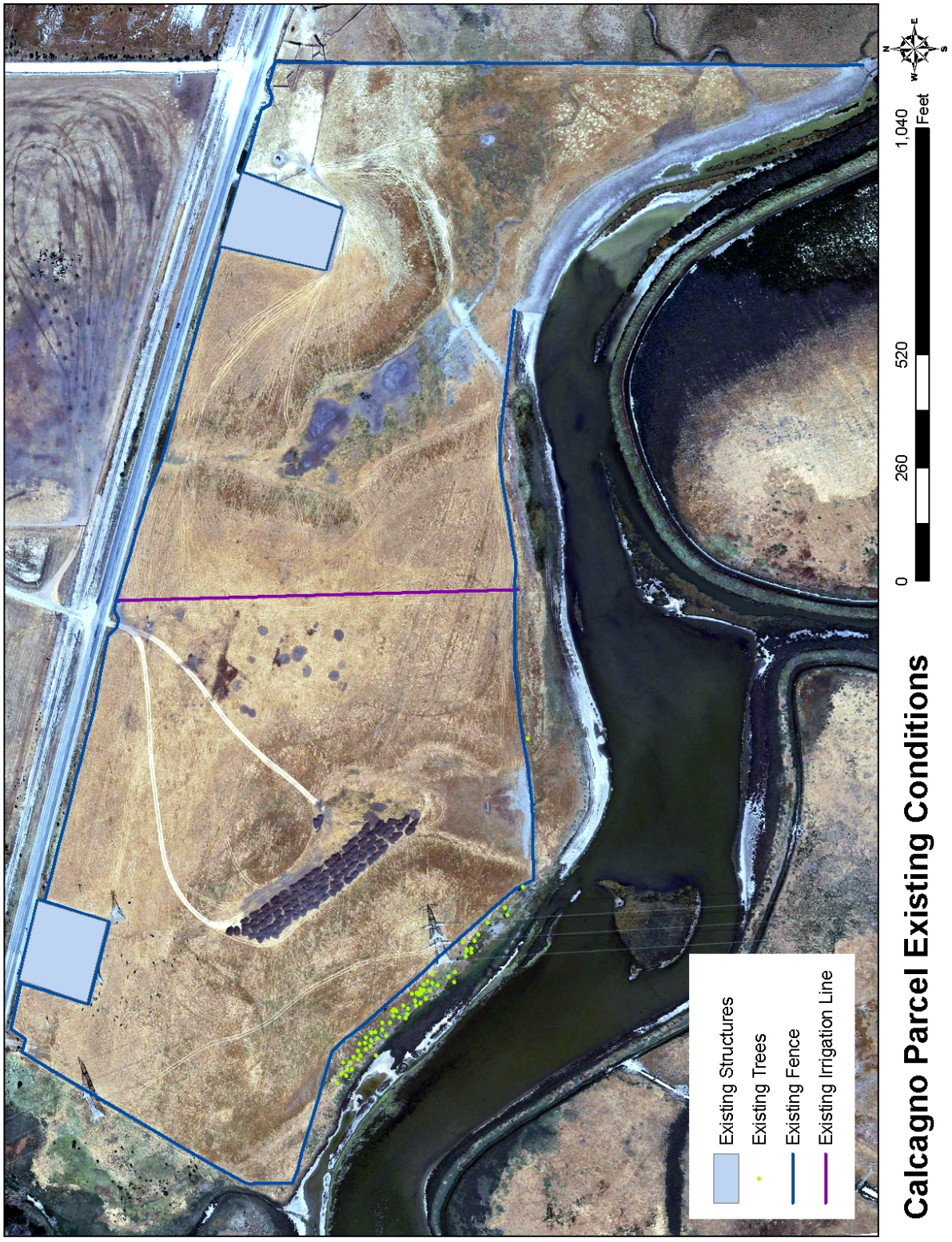
Wagner pond is unique for the watershed. It is a critical breeding site for tiger salamanders and red-legged frogs. It has a diverse and productive invertebrate pond community, which the amphibians depend upon for food. The deer and predatory mammals (especially gray fox) are thriving in the valley, and the wetland pond is the watering hole center.

Project Costs

Approximately $118,000 was spent on properties in Walker Valley, including $29,000 on water quality sampling and analyses. Of the total amount, approximately $9,800 was from matching funds (see Appendix 16).

VII.3 Calcagno and Adjacent Parcels

Figure 41 Existing conditions at Calcagno parcel



Initial Restoration of Calcagno MoroCojo Parcel

The map above (Figure 41) shows existing conditions of the areas Mr. Calcagno was willing to restore during the grant period, and Figure 42 outlines the restoration plan, creating a completely protected wetland and the core of a wetland buffer habitat. Figure 43 is the landowner agreement. These areas are core sites that eventually can be filled out to make a much larger restored wetland ecosystem (with habitat buffers) including the large swales in the interior of the parcel. In this first stage, under the present grant, we extended the fence along Moro Cojo Slough to protect all of the wetland along the slough. Inside the fenced wetland area, we restored a native wetland. We broadcast the seeds of native wetland species here, and planted root stock of wetland species that do not colonize well from seed (Jaumea and Frankenia). We removed invasive non-native weeds to prevent a succession of weeds and stimulate a natural succession of native wetland plants.

We also established oak/grassland buffers that can easily be expanded in the future to develop larger forested corridors. These oak/grassland sites were drill seeded with the native grasses that we obtain commercially (meadow barley, creeping wild rye, hair grass, California brome). Coast live oaks were planted, protected from cows with fencing, and irrigated with a drip system. We removed invasive non-native weeds here as well. These first oak/grassland corridors can be expanded in the future using the same irrigation system.

Figure 42 Restoration plan for Calcagno parcel

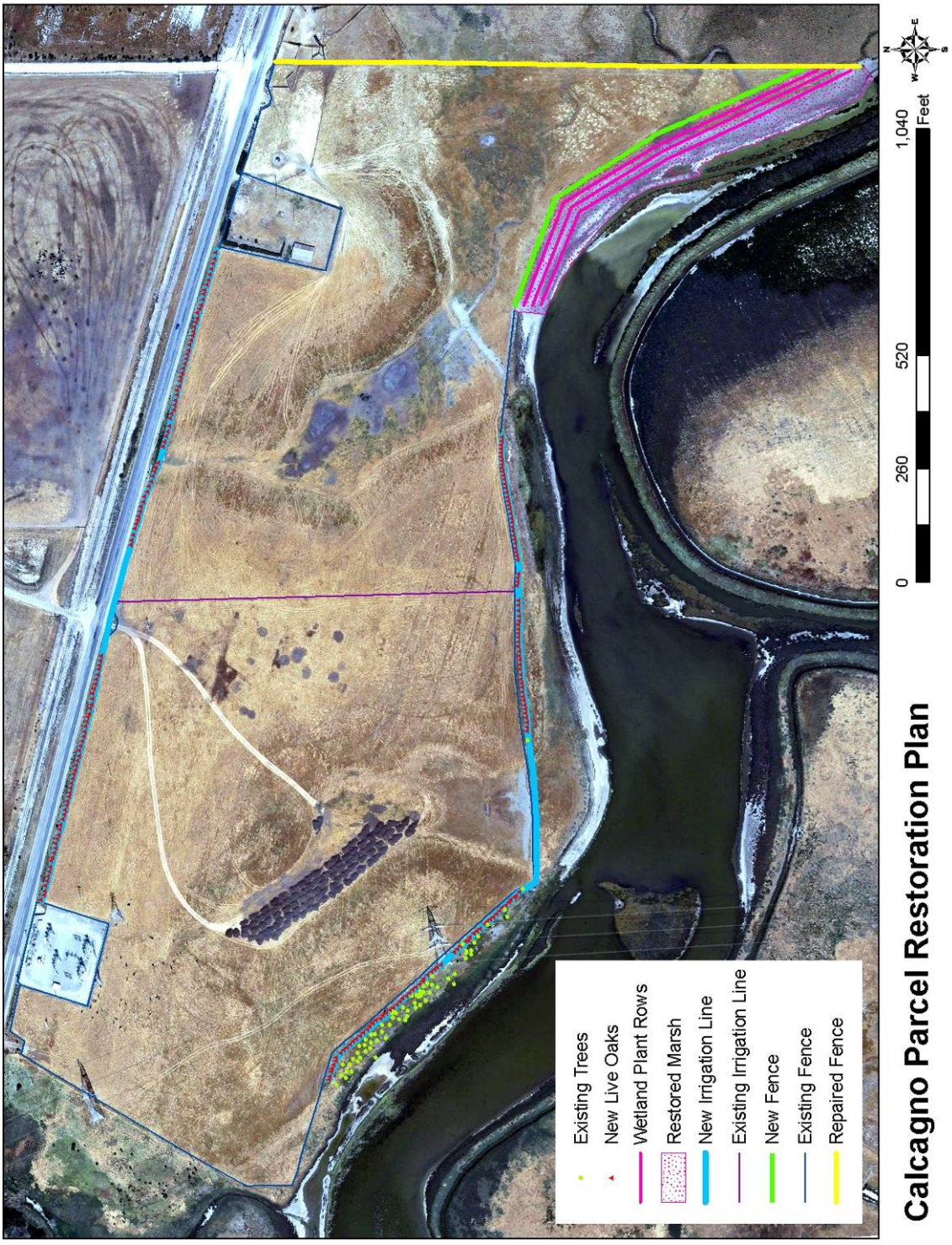
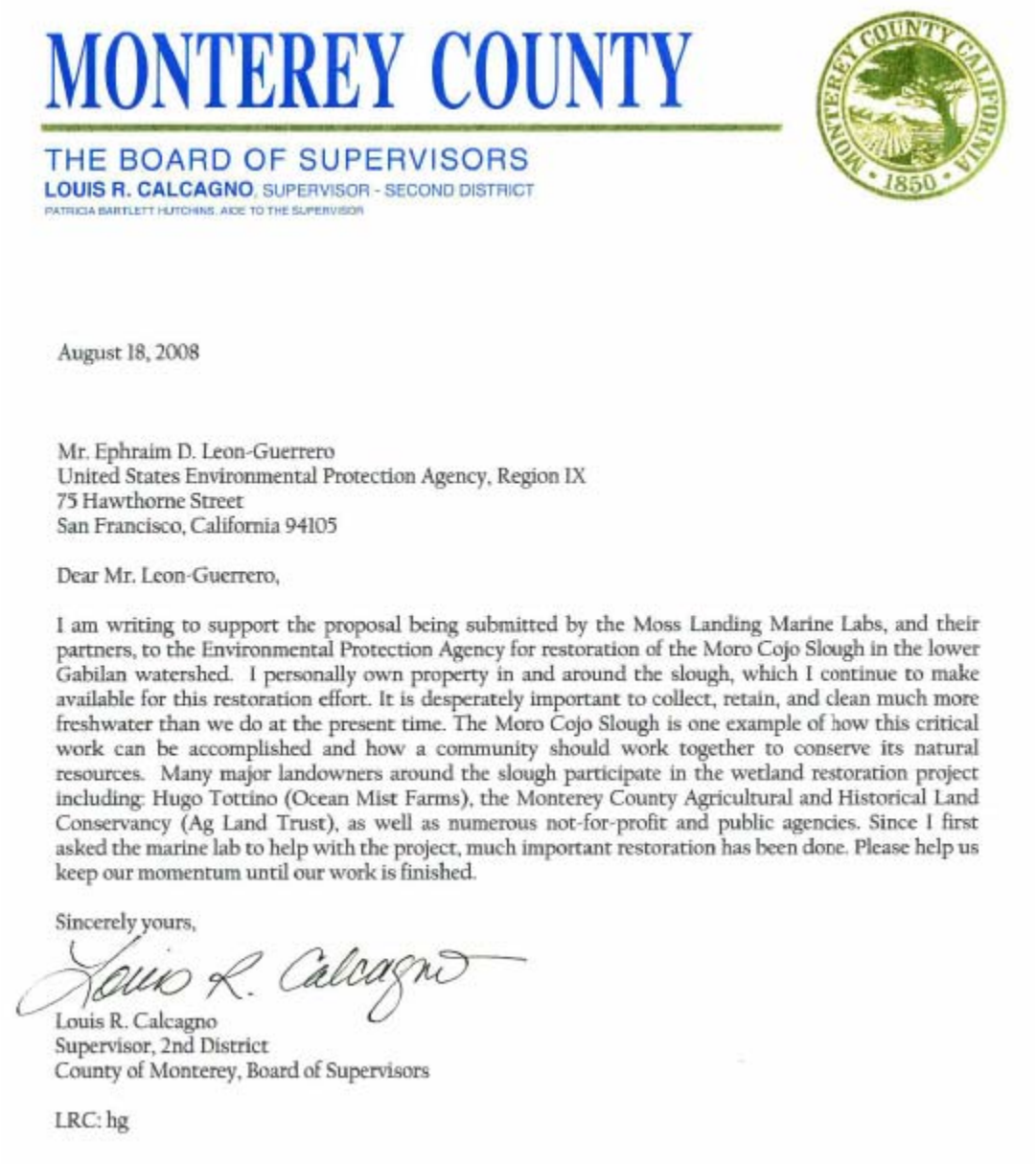


Figure 43 Signed landowner agreement for the Calcagno parcel.



MONTEREY COUNTY

THE BOARD OF SUPERVISORS
LOUIS R. CALCAGNO, SUPERVISOR - SECOND DISTRICT
PATRICIA BARTLETT HUTCHINS, AIDE TO THE SUPERVISOR

August 18, 2008

Mr. Ephraim D. Leon-Guerrero
United States Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105

Dear Mr. Leon-Guerrero,

I am writing to support the proposal being submitted by the Moss Landing Marine Labs, and their partners, to the Environmental Protection Agency for restoration of the Moro Cojo Slough in the lower Gabilan watershed. I personally own property in and around the slough, which I continue to make available for this restoration effort. It is desperately important to collect, retain, and clean much more freshwater than we do at the present time. The Moro Cojo Slough is one example of how this critical work can be accomplished and how a community should work together to conserve its natural resources. Many major landowners around the slough participate in the wetland restoration project including: Hugo Tottino (Ocean Mist Farms), the Monterey County Agricultural and Historical Land Conservancy (Ag Land Trust), as well as numerous not-for-profit and public agencies. Since I first asked the marine lab to help with the project, much important restoration has been done. Please help us keep our momentum until our work is finished.

Sincerely yours,

Louis R. Calcagno

Louis R. Calcagno
Supervisor, 2nd District
County of Monterey, Board of Supervisors

LRC: hg

Native plant propagation

We collected some seed and plant roots for greenhouse propagation from Moon Glow Marsh, Granite Rock Marsh, and the Calcagno parcel. The oak trees planted on the Calcagno property were propagated at the greenhouse at CSU Monterey Bay from acorns collected from the Moro Cojo watershed.

For the Calcagno parcel restoration, native wetland species were taken from local sites and transplanted at the Coastal Conservation and Research Inc greenhouse where they were given some time to adjust (Figures 43 and 44). Then after approximately 10 days in the greenhouse the species were transplanted into the newly fenced-off marsh.

Figure 44 The wetland plant Jaumea growing in the project greenhouse

Figure 45 Another wetland plant, Frankenia (Alkali Heath) in the greenhouse

The following table (Table 4) lists the native plants that were used on the restoration site.

Table 4 Native plants used for restoration by site

Plants collected and propagated in Moss Landing		
Scientific name	**Common name**	**Site used on**
Jaumea carnosa	Fleshy Jaumea	Calcagno
Frankenia salina	Alkali Heath	Calcagno
Quercus agrifolia	Coast Live Oak	Calcagno
Plant Seeds Purchased for Restoration		
Deschampsia cespitosa	Hair Grass	Calcagno
Hordeum brachyantherum	Meadow Barley	Calcagno
Leymus triticoides	Creeping Wild Rye	Calcagno
Bromus carinatus	California Brome	Calcagno

Table 5 shows the number of plants propagated by species.

Table 5 Native plants used in restoration by number propagated

Plants collected and propagated in Moss Landing		
Scientific name	**Common name**	**Number Propagated**
Jaumea carnosa	Fleshy Jaumea	1300
Frankenia salina	Alkali Heath	1300
Quercus agrifolia	Coast Live Oak	242
Juncus xiphiodes	Iris-leaved Rush	400

Fencing the Wetland Areas

A 909 foot long fence was installed on the Calcagno property on the South East corner of the parcel, see Figures 46 and 47. The fence follows the Moro Cojo Slough at a distance of 12 feet from the edge of the water. This keeps animals out of a total of 2.3 acres of salt marsh that has been heavily grazed. With the help of planting hundreds of wetland plants, this area should return to a healthy marsh now that the grazing has been stopped. Work was also performed on the fence at the West side of the parcel to improve its condition and help continue to block grazing animals from gaining access to the area.

Figure 46 The Calcagno parcel before and after construction of the new fence to exclude cattle from the Moro Cojo wetlands.

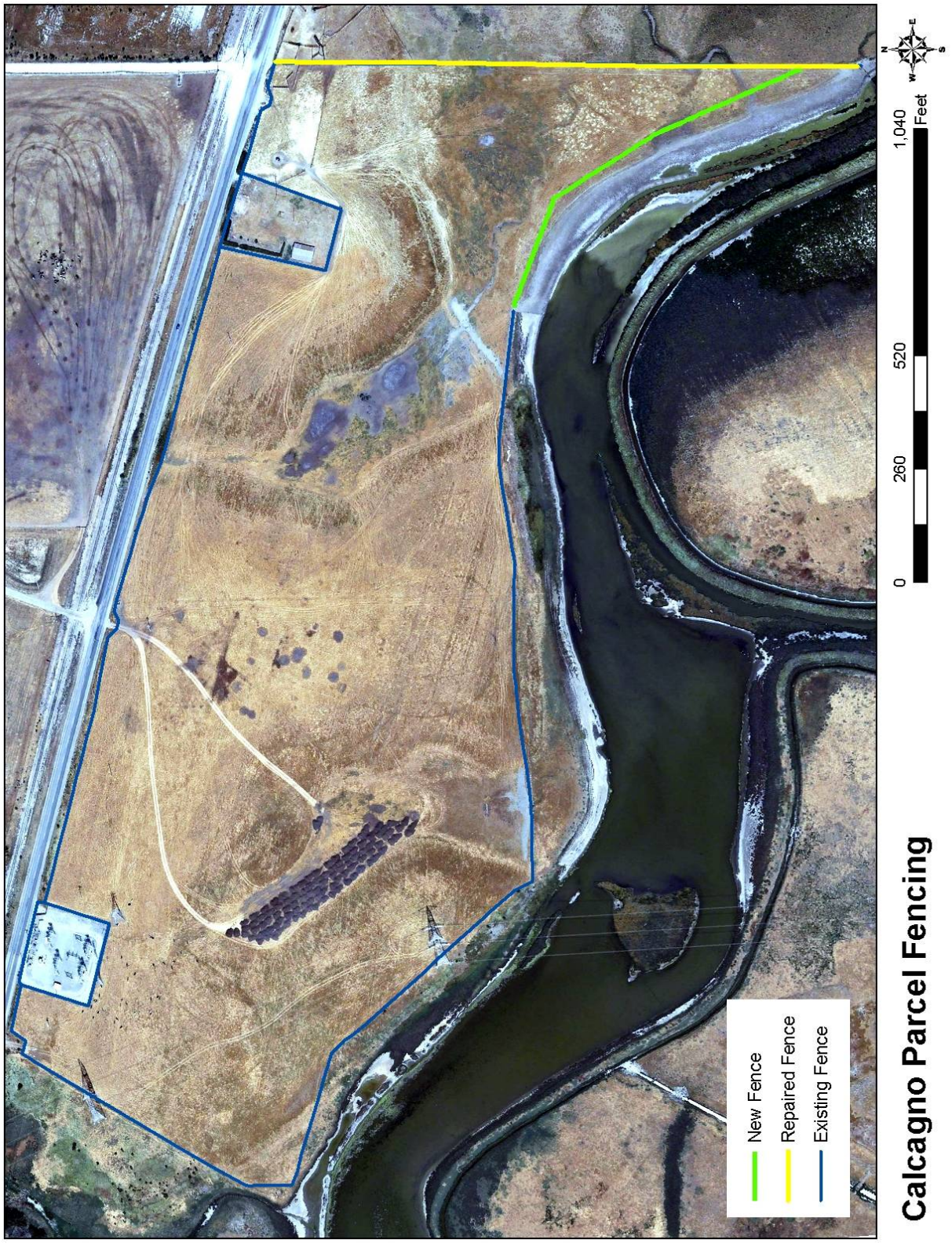
a) Before

b) After

c) Before

d) After

Figure 47 Map of new, repaired and existing fences at Calcagno parcel



Implement BMPs

The best management practices (BMP) for the restoration parcels are listed in Table 6. The BMP numbers and types used in the table are from State and Federal lists. As you can see, all but one of the BMPs concern the recovery of native habitats and one is about the removal of invasive non-native weeds, which is a critical step in the restoration process.

Table 6 BMPs for restoration parcels

	Acres in major properties	
BMP #	BMP Type	Calcagno
676	Nat Plant Res/Mng	20
638	Water/sed basin	20
657	Wetland Restore	20
745	Stream Corridor	
393	Filter Strip	20
741	Veg Buffer	5
412	Grassed waterway	10
612	Tree/Shrub	1
950	Weeds	2
644	Wet wildlife	20
	(numbers in parenthesese) = possible acres	

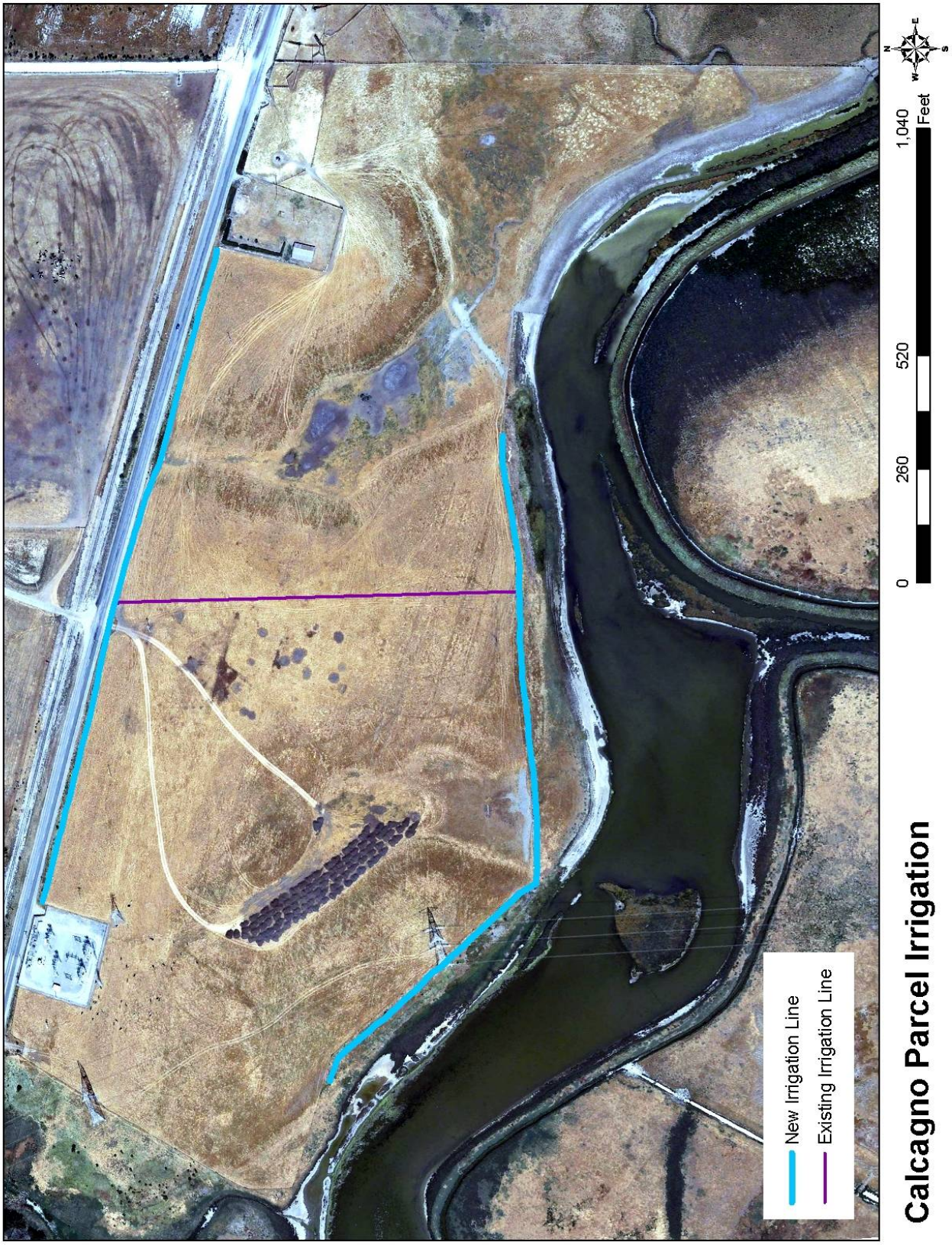
Importing water to help establish wetland vegetation

A landscape contractor was hired to install manually gated hard-drip irrigation on both the Slough side and the Dolan Road side of the Calcagno parcel outside the fence line. The irrigation system was installed to provide water to the new oaks and seeded grasses. A 2" hard drip line was placed two feet behind the line of oaks on the slough side of the parcel, and between the fence and oaks on the road side. Pipes go from the hard line to each individual tree. The hard drip line was attached to the existing line that goes under the feedlot. It was designed to be manually controlled, with the ability to shut off water to just the left or just the right side of both control points. See Figures 48-50 for details.

Figure 48 Photograph of new irrigation line being attached to existing line on the slough side

Figure 49 Oak being watered by the new irrigation line

Figure 50 Map of new and existing irrigation lines



Native plants

Table 7 lists the native species that were used to establish native grasslands, wetlands and oak woodlands in places that were previously over-grown with invasive weeds. With the invasive species removed, the native species have the ability to take over the site and in so doing will make it difficult for the weeds to return.

Table 7 Restoration plant species by number planted at sites

Scientific name	Common name	Site used on	Number planted at site
Jaumea carnosa	Fleshy Jaumea	Calcagno	1081
Frankenia salina	Alkali Heath	Calcagno	567
Quercus agrifolia	Coast Live Oak	Calcagno	242
Deschampsia cespitosa	Hair Grass	Calcagno	55 lbs
Hordeum brachyantherum	Meadow Barley	Calcagno	17 lbs
Bromus carinatus	California Brome	Calcagno	59 lbs

Figures 51 and 52 show the location of the new Live Oaks and wetland plants, and the areas that were seeded and the photographs below, Figures 53 and 54 show the Live Oaks and wetland plants being planted at the Calcagno parcel.

Figure 51 Map of new propagated plant locations

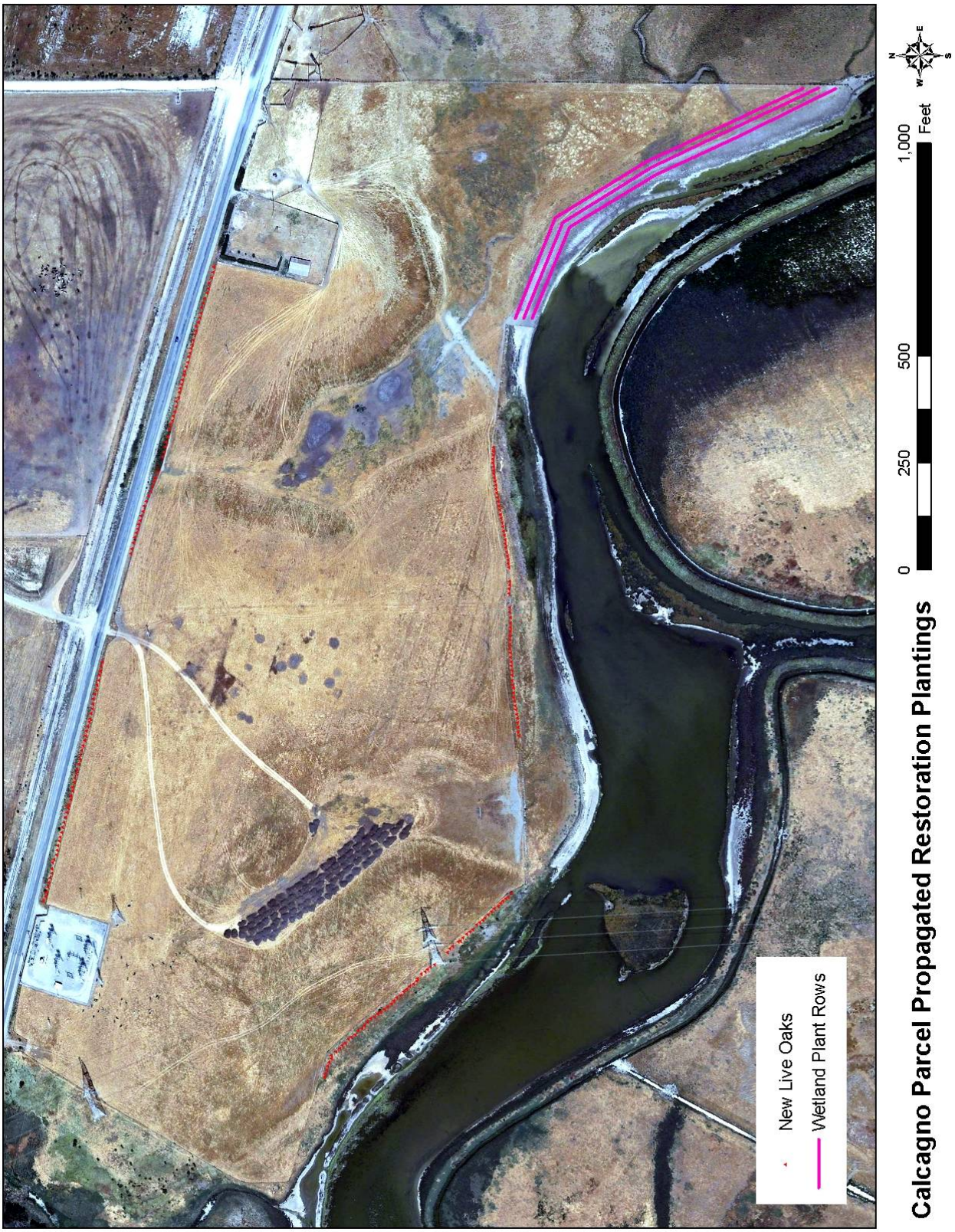


Figure 52 Map of areas seeded with native grasses at Calcagno parcel

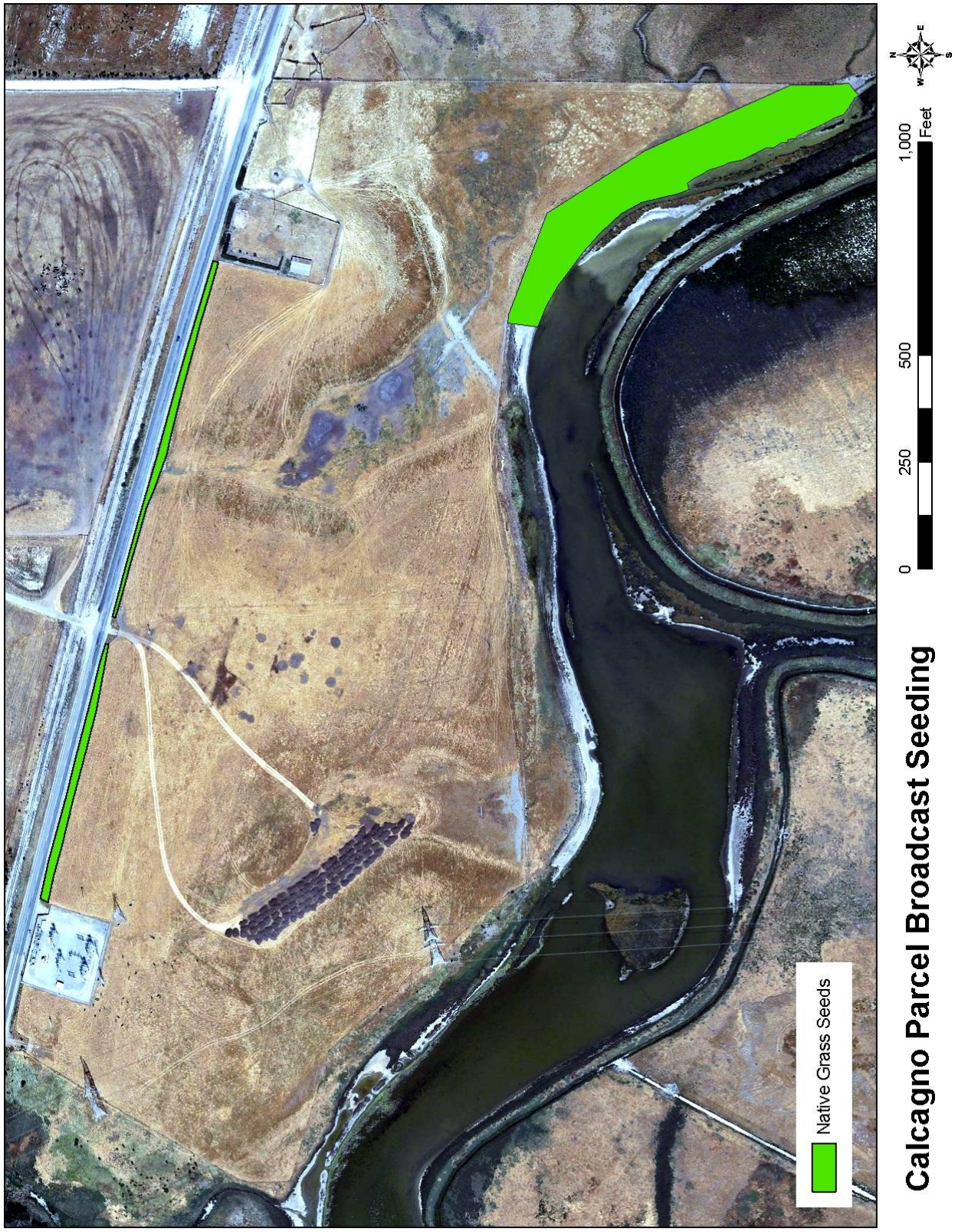


Figure 53 Oaks about to be planted at Calcagno

Figure 54 Picture of roadside before weeds were removed and grass seeds planted

Vegetation Survey

The results of the vegetation survey led to the habitat map shown in Figure 55. The habitat map and associated information below shows the most common plant groupings and the dominant species within each grouping.

Figure 55 Habitat map of Calcagno parcel

Feedlot Swale

Current habitat is covered with manure in an attempt to make soil amenable to grasses for the cows to graze. Peach and Apricot pits have been dumped there as fill. There is evidence of many salt marsh species which would likely come back and extend the swale to be more like a Salt Marsh.

Species found there include:
Frankenia salina, Distichlis spicata, Atriplex sp., Atriplex triangularis

Previously observed species include:
Salt clover

Feedlot Mosaic

Grazed area, fill, bare ground, feed, silage, geese, cows.

Plants include:
A mix of Mediterranean annuals (2 Bromus sp., Avena sp., Lolium sp., Hordeum sp.), Distichlis spicata, Atriplex triangularis, Camissonia sp., cotyledons of unknown plants, Plantago coronopus.

Creeping Wild Rye Stand

Upland and steep slope interface with erosional surface. Ecosystems healing at the moment with fencing off of feedlot only done a few years ago.

Plants observed include:
Leymus triticoides, Distichlis spicata, Polygonum sp, Atriplex triangularis, Carex barbarae, Centaurea solstitialis, as well as the Mediterranean annuals listed above. Although some of the species found are invasive, they are greatly outnumbered by native species and their numbers appear to be dwindling. A few isolated Baccharis pilularis plantsare located in this habitat type as well.

Upland/Marsh Interface

This is a small stretch where the Creeping Wild Rye stand meets the Salt Marsh habitat.

Species found here include:
Jaumea carnosa, Frankenia salina, 2 Juncus sp., and Atriplex triangularis.

Salt Marsh

This is a reasonably healthy salt marsh with no invasive species and good interspersion amongst the natives. Possible evidence of coyote trails.

The main species there include:
Salicornia virginica, Distichlis spicata, Jaumea carnosa, and Frankenia salina.

Marsh Feedlot

Mudflat area that has been destroyed. Area completely hoofed and there is no visible vegetation. Will likely return to Salt Marsh conditions once cows are removed.

Feedlot Transition Zone

Transition zone between the Marsh Feedlot and Feedlot mosaic. Mostly bare ground but some small patches of Frankenia salina.

Disturbed Creeping Wild Rye stand

Same as the CWR stand but some areas have been disturbed by people trying to do restoration work on the hill. Some young Quercus agrifolia in addition to the CWR stand species.

Annual Grassland

Swath of land that flattens out above the slope that makes the Disturbed Creeping Wild Rye Stand. The swath starts at a width of 10 feet but increases in size as you move from the slough towards Dolan Rd to 30 feet. One ground squirrel hole and evidence of small rodents. No evidence of recent deer activity.

Consists of:
Mediterranean annuals, some Carex barbarae, as well as several dozen Quercus agrifolia and approximately 9 Baccharis pilularis bushes.

Roadside Habitat

The land between the fence and Dolan Rd is characteristic of disturbed soil with a high concentration of invasive species.

Species found there include:
Foeniculum vulgare, Baccharis pilularis, Cirsium arvense, Mediterranean annual grasses, Leymus triticoides, Grindelia stricta, Phalaris aquatica, Raphanus sativus, Conium maculatum, Brassica nigra, Rumex crispus, Plantago lanceolata, and Eschscholzia californica.

A complete species list for the Calcagno parcel in Appendix 12.

The Calcagno parcel is still primarily a feedlot which continues to have a great influence on the habitat types found there. In areas that are not being grazed we see a variety of native grasses and wetland plants which would likely return to the area if grazing ceased.

Pre, During and Post Photo Documentation

We have 12 photo sites for the Calcagno parcel which have been utilized to document the site before, during and after restoration. The sites are highlighted below in Figure 56, and a list of the coordinates for each site can be found in Appendices 14.

Figure 56 Location of photographic monitoring stations at Calcagno

Annotated photo documentation

Figure 57 Marsh area of Calcagno parcel after the new fence was built but before the wetland species were planted. Flags indicate rows for plants.

Figure 58 Wetland plants being transported from project greenhouse to the marsh to be planted

Figure 59 Habitat Restoration crew planting the wetland species in the Marsh on the Calcagno parcel

Figure 60 Oaks being brought from the Watershed Institute greenhouse to be planted at the Calcagno parcel

Figure 61 Workers planting the oaks next to the new irrigation line at the Calcagno Parcel.

Figure 62 Shade cloth is used as a windbreak for the young Oak trees on the Calcagno property

Faunal Surveys

A faunal survey was also conducted at the Calcagno parcel using a similar method to that of the Wagner Parcel. A species list for Calcagno's can be found in Appendix 15

Analysis of faunal species found at the Calcagno parcel is ongoing due to the late start of the restoration work.

Project Costs

Approximately $176,000 was spent on the Calcagno Moro Cojo and surrounding properties. Of this amount, approximately $62,300 was from matching funds (see Appendix 16).

VIII Public Outreach

At the beginning of the grant, Walker Valley and Dolan Road had been part of the Moro Cojo Slough Watershed Restoration Project. The Guerrero property was the nucleus of past restoration work in Walker Valley. With the Wagner parcel, the two are the center of the best wetland habitats in the valley. The Dolan Road work was made possible by Lou Calcagno. We began the present grant by picking up roadside garbage around our Walker Valley and Dolan Road restoration sites. Our staff continued conversations with a dozen property owners in the Walker Valley target area, and in other target areas including Dolan Road. Each parcel is a different discussion, and different implementation tasks. Wagner quickly became the primary target for habitat restoration. The most important structural modification to the site was the new culvert. Water runs directly from upstream roads to the pond. Although this is a poor rain year, Wagner pond is nearly full and is the most active regional breeding habitat for Red-legged Frogs and California Tiger Salamanders. Three other landowners removed invasive non-native plants, restored freshwater pond habitat, and maintained grassland buffers with grant staff help. The staff field conversations quickly focused on fire protection and conservation easements. As a result of the present grant, we are focusing ongoing grant efforts to remove Eucalyptus and recover oak forests on several local properties. All of this work depended on the ongoing conversations with target landowners in the target watersheds. Another target landowner is Tope. They did not want to start any work during the grant period, but visited restoration sites and walked their land with our staff. This year they asked us for some trees, and we just planted a small cottonwood forest and will begin work on oak trees that will start a decade partnership with the Topes. We hope a pond can be constructed in a few years. At the end of the grant, we continue to help manage the watersheds around Moro Cojo Slough

We put very significant effort into public outreach tasks during the first 1.5 years of the project. However, by Fall 2007 it was apparent that we would not be able to get significant small landowner participation. At that point we discussed the situation with our Project Manager, and took the project in a different direction towards larger parcels. Many of the tasks revolving around landowner participation were dropped at that time.

During the first 1.5 years, landowner education in terms of habitat conservation easement programs was achieved for this project through pamphlets given to each of the target landowners listed in Appendix 1. The landowners received one or both of the pamphlets depending on the habitat types found on their property. The pamphlets can be found in Appendices 2 and 3.

We prepared both working maps and outreach maps to educate landowners about the extent of their local steams, riparian areas, and oak woodlands, and how they fit into the larger watershed. We used parcel maps overlain on aerial photos with hydrologic coverages in ArcGIS to help landowners envision who owns what portion of the watershed, and how much benefit this project can provide. We conducted further site reconnaissance to identify properties in the Moro Cojo and Tembladero Slough watersheds that do not have conflicting land uses.

All of the targeted landowners were mailed brochures about restoration and the habitat conservation and tax incentive programs. Brochures were slightly different to landowners with creek habitat or only oak forest (See Appendix 3). Later, selected non-participating landowners were picked from the four first target areas and contacted to discuss the easement incentive. None wanted to change the existing land use they enjoyed (preferred), which included animal feed lots, grazing pastures, horse riding, motor vehicle riding and racing, and non-native landscape and various structures from barns to water tanks.

We participated via a representative, native plant display, and poster presentations in the Moss Landing Marine Labs open house on two occasions. This proved an excellent way to get the word out and reach interested people, although few were from the targeted area. The poster is in Appendix 7.

We had two workshops during the annual Open House at Moss Landing Marine Laboratories: on 9-10 September 2006, and again in 2007 and 2008. We prepared a poster to gain interest and handouts to read and take home. Visitors were free to read the poster, take handouts, and converse with project participants, including landowners doing restoration and using the easement incentive. The Open Houses went from 10:00 to 17:00 on each day, with several thousand visitors for each Open House. Visitors had access to dozens of reading materials and a chance to talk with staff and landowners. Since we did not have a new group of landowner participants, the Open House workshops had the greatest potential to draw in a larger target population from the project watersheds and beyond. At each Open House, we also had other posters on watershed restoration, live native plant displays, and live pond animals to help stimulate interactions that might bring visitors to the grant project poster, handout materials, and project staff.

The documents prepared and or used for the Open Houses include:

- The Value of Streams and Wetlands (Mailer #1 – Appendix 3)
- The Value of Oak Woodlands (Mailer #2 – Appendix 2)
- The Benefits of Conservation Easements (Poster – 36" x 24" – Appendix 7)
- What Are Conservation Easements? (Handout – Appendix 5)
- Our Purpose (Why We are Interested in Putting a Conservation Easement on Your Property) (Handout – Appendix 6)
- Tax Benefits of Easement Donations (Handout – Appendix 4)

Supervisor Calcagno had several water-related meetings for property owners and water users in the Prunedale Hills. We prepared a handout for these meetings on the easement incentive. We also attended the meeting to disperse the handouts and to field any questions on site. We developed a number of other descriptive materials for use with participating landowners and potential participants which include the following.

- Procedures for Making Gifts of Easements
- Conservation Easement Acquisition Procedures
- Easement Holder Statements
- Attorney's Checklist
- Supplement to the Attorney's Checklist:: Qualified Conservation Contributions
- Typical Easement Issues to Include
- Land Acquisition Information Sheet
- Hazardous Materials Policy and Checklist for Hazardous Wastes: Preliminary Site Investigation
- Estoppel Certificate
- Mortgage Subordination Procedures/Checklist
- Statement on Land Protection Costs
- Conservation Planning Data Sheet
- Conservation Easement Plan
- Example Conservation Easement

There was no public support for workshops, so we instituted a 1 on 1 door to door approach. The documents passed out during these 1 on 1 visits can be found in Appendices 4, 5 and 6. Not a single new landowner in the four first target areas (Walker Valley, Paradise/Castroville Creek, Long Valley, and Valley Road) (Figures 3-6) was interested in doing restoration in their wet corridor or using the easement incentives. The only participants in the project were already lined up before the grant project commenced. These included the four core parcels in Walker Valley (Guerrero, Wagner, Bacerra, and Yniguez); the Slattery and Zemsch parcels; and a series of larger parcels around Moro Cojo and Carr Lake. Later, after discussions with RWQCB staff, we

focused on the four core parcels in Walker Valley (actually part of a 12 parcel habitat patch) and one large parcel on Moro Cojo (Calcagno).

Project Costs

The public outreach activites were by far the major portion of the Tax Incentive program. Approximately $117,000 was spent on the tax incentive efforts described in Section, 7.1 and Section 8. $109,000 was from grant funds and $8,000 were from matching funds (see Appendix 16).

IX Conclusions

Project performance A-J

A. A summary of the Project, describing Project purpose, scope and goals, activities completed, techniques used and partners involved.

The project summary and description are all mentioned in the Executive Summary at the beginning of the document on Page 8.

B. A report of all monitoring and management practices or management measures implemented, together with their corresponding locations. The report shall be in a format that enables the Grant Manager to find the physical location of each implemented practice or measure and/or monitoring event in a quick and efficient manner.

There are 19 maps throughout this document which have been georeferenced and produced using ArcGIS. The maps clearly indicate exactly where restoration and monitoring task was preformed, and are located under the relevant task headings. The first of these maps, Figure 1, shows where the restoration sites are within the State. The points and lines on these maps were taken with a Trimble GPS unit for greatest precision. There are also Latitude and Longitude coordinates for several locations in the Appendix.

C. Describe Project performance, including benefits, successes and shortcomings, consistent with the PAEP. Enumerate specific quantifiable environmental changes and results of the Project. As appropriate, include 1) behavioral results such as the amount of management practices or measures implemented, 2) estimates or measurements of the amount of pollutants prevented from reaching surface or ground water, and 3) documented changes in water quality based on monitoring.

The most important benefits of the project are 1) the testing of the easement incentive model; 2) the discovery of the fire incentive for recovery of oak forests (a critical part of the natural water system); 3) the stimulation of habitat restoration on the Guerrero, Baccera, and Yniguez properties by the owners; and 4) the restoration and enhancement work directly supported by the grant on the Wagner and Calcagno parcels.

The benefits of the testing the easement incentive model are considered more in the next section (D) about the key lessons learned. The primary benefit concerned the lesson learned from this experiment. The fire incentive is discussed more under section G about follow up activity.

D. Identify lessons learned in carrying out the Project. Describe what worked and what did not work, and how similar efforts could be utilized within the Project area, as well as in other watersheds.

The main lesson we learned from the project is that the easement incentive simply will not work for low creek habitat, because these habitats are used by landowners of other land use and they value this use much more than gaining a tax write off. The primary use is containing and grazing horses and other large domesticated animals. The easement model was thoroughly developed and tested and did not work for the creek habitats. No landowners wanted to convert their land to wetland and use the tax incentive. Among the four core landowners in Walker Valley, Guerrero placed a conservation easement over their wet corridor (creek and buffering forest habitats) before the grant started. The other three landowners participated in restoration through the grant, but did not want to establish an easement during the grant period. We believe that this was a successful experiment. The outcome was simply not what we hoped. The lesson is that we cannot depend on these incentives to restore creek and other historically wet habitats in the rural residential landscape. They may work here and there, as was the case with the Guerrero's, but

they are not useful for spreading to many sites to restore the larger natural water system (at least at this time). We think this result is relevant to watersheds throughout the State.

The restoration work that we stimulated on the Guerrero, Baccera, and Yniguez parcels and the work that was directly funded by the grant on the Wagner and Calcagno properties was highly successful. There were no significant new lessons from this work, because we have been restoring similar habitats throughout Monterey Bay for over a decade.

The lessons we learned about the potential importance of using fire protection to help recover oak forests are considered in Section G (below).

E. Describe the extent of outreach that has been conducted and if there are plans to further promote the results of the Project to achieve additional implementation.

The outreach attempts are discussed in detail in Sections 2.1 and 2.5 on pages 79 and 118 respectively. Plans for implementation are discussed below in Section 2.10 G.

F. Describe the Project's funding. Include the projected cost and actual cost of the Project, how much of the grant funds were spent, and how much funding was put into the Project from sources other than CWA Section 319(h). Identify funding sources that have been "leveraged" by the Project and plans for funding future activities.

The projected cost of the State funds for the project was $495,000. Of this amount, all except approximately $1400 was spent. The unspent funds would have been spent on additional water samples but the samples couldn't be analyzed within the necessary period (see Section 2.6). Funding was spent on a combination of public outreach, planning, monitoring, management, and construction implementation. A significant percentage of the project personnel costs were spent on management activities, including required documents (see Section 1), quarterly reports, justification of work plan changes, and the final report. The originally proposed budget underestimated the costs for sediment monitoring and the above personnel costs.

The CWA Section 319(h) funding was leveraged with match from a variety of sources (see Appendix 16). Money and personnel time came from private corporations, non-profit corporations, State educational institutions, and private individuals. Numerous contacts with local landowners were made or solidified through this project. Some landowners have additional lands which are prime candidates for future restoration: a list of these lands was included in previous communications to the RWQCB. The Calcagno Moro Cojo project is an excellent example. We restored approximately 4 of the 66 acres of this parcel as part of this project. Restoration of the remaining 62 acres of this parcel could have a dramatic impact on local water quality. We currently are uncertain about our future plans for pursuing funding, particularly given the unprecedented complications and hardships we have experienced in trying to administer this project. However, there is much work that remains to be done. One of the primary regional needs is for funding to maintain previously-implemented restoration projects. Unfortunately, almost no currently-available funding sources are available for maintenance—a lack which we hope the funding agencies will recognize and rectify

G. Identify planned or potential follow-up activity, such as any additional steps necessary to achieve the water quality objectives, Total Maximum Daily Loads (TMDL) or local watershed plans.

During the project we discovered that landowners were interested in pursuing the easement incentive to the remove Eucalyptus forest and replace them with native oak forest. They are interested in Eucalyptus removal for fire protection. There are undoubtedly many more potential

participants for Eucalyptus removal. Eucalyptus forests are easy to ignite and fuel rich, and therefore an extreme fire risk. In contrast, forests of coastal live oaks are well-known fire suppressants. Since the existing Eucalyptus forests are not involved in desirable land use, the landowners do not perceive the easement as a loss of land use, but rather as desirable fire protection. The removal of fire risks is more incentive to these landowners than the tax incentives from the easement, but they will accept the conservation easement in exchange for fire safety. Global warming and the extensive early wildfires this year fueled additional interest in Eucalyptus removal. This should spawn a highly effective model for oak woodland recovery and permanent protection with conservation easements in the target watersheds and other regions where coast live oak forests can be re-established. We hope to pursue this successful model in future wildlife-oriented grants. We started this work during the grant period on the Bacerra parcel, where the landowner removed 34 large Eucalyptus trees from an oak woodland under our direction (Figures 17 and 18). So, the easement incentive model does not work in these dense rural residential creek habitats, because of existing land use conflicts. On the other hand, we discovered a new incentive model that can recover oak forests and also result in wet corridor restoration and conservation easement protection. Fire protection is perceived as an extremely valuable land use. In time, these oak conversions could even reduce fire insurance costs, as the reduction in fire risk becomes more widely known.

In addition to these maps, it has become very clear that almost everyone in the watershed is suffering from “shifting baselines”. They think the historical setting was similar to something in the recent past; the conditions experienced by them as children or passed on by their parents or in old photographs. Few if any have a view of what was lost by human developments over the last 150 years. We want to bring this baseline to them by making pictures of key watershed sites using Adobe Photoshop. This is a potentially powerful tool. We have begun this process. We want to make the best examples we can and see if a greater awareness of past conditions will help landowners become more interested in recovering some of this historical ecosystem on their property. The same photographic and computer tools will be used to show what key sites can look like after restoration. However, what we have learned so far is that a better view of what was lost all around their homes is an essential step in teaching property owners the value and potential of a whole neighborhood recovering their natural water system. We need the wet corridors and as much forest and permeable ground as possible. We also want to develop additional written, schematic, and photographic materials to complement the historical photographs, allowing us to make a more thorough presentation about why the recovery of wet corridors is essential for capturing, retaining, and cleaning freshwater and how this benefits each landowner in the short and long term. The key to these additional materials is that they are focused on our region and the targeted local settings. The results can be posted on the internet, and will help teach people way after the grant is competed. Since we expect to gain little access to these small, numerous parcels during the grant period, we want to develop a future educational tool that might help the recovery of the natural water systems in the future. This grant started this ongoing work, and we hope to see it continue after the grant ends.

After the grant ends, we will continue to follow the progress of the restoration at the Wagner and Calcagno properties. However, unless we can find suitable funding for follow-up activities, then further restoration and the long-term maintenance of the restored areas will fall upon the landowners. For reasons unfathomable to us, most funding agencies do not seem to recognize the need for long-term maintenance on restored parcels. Most restoration efforts take from 5 to 10 years to become fully established. When a restoration project is abandoned after 1 or 2 years, there is a significant risk that the area will revert to its pre-restoration state. The Central Coast is littered with such examples. Fortunately, the two primary landowners involved in this grant are very responsible, and have expressed a willingness to maintain the work we’ve done. Perhaps in the future funding will become available to allow us to perform maintenance on the sites, and perhaps restore the remaining 60+ acres of the Calcagno parcel.

H. Include appropriate photos and graphics.

Photos and graphics are included throughout this document. A table of figures is included at the beginning of the document.

I. A list of items submitted as outlined in the Table of Items for Review.

The tasks from the Table of Items for Review are discussed throughout section VII, under the project descriptions.

J. Any additional information that is deemed appropriate by the Grant Manager.

We have not received any requests for additional information.

Appendix

Appendix 1 – List of Targeted Landowners

APN	Assessee
133172011	CALCAGNO
129093012	DEOUDES
131021015	CAMPOS
131021016	ALCARAZ
131032001	DENNIS
131041022	FEHR
131042001	SANDERSON
131051024	GUERRERO & OLIVER
131051062	MOHSSIN
131092009	WAGNER
131093011	LARSON
131093012	AMES & GREY
131093034	SHAW
131093039	SCHMEISER
131101032, 131101033	HAMISCH
131131010	THOMPSON
131131011	HENRY
131131012	GOULDY
131131013	JOHNSON
131141003	PANTOJA
131151011	MOORE
131151012	TESTA
131151013	PALACIOS
131151015	BECERRA
131151016	FLORES
131151017	IDEMOTO
133121001	ABBOT
133121008	RODRIQUEZ
133131006	NASON
133131007	DOYLE
133131008	YAMAGUCHI
133131013	WHITE
133131020	GONZALEZ
133131121	SORENSEN
133134006	RAMIREZ
133134007	CRANFORD
12711101900	SLATTERY
12909403400	AVILLA

13105202000	TOPE
127101007000	PALMER
127101008000	WETNAM
APN	**Assessee**
127101009000	WRIGHT
127101013000	HELM
127111003000	OLIVER
127111004000	RAGEN
127111020000	MARTINEZ
127111023000	SEYMOUR
127111024000	VINCENT
127111026000	WASINGER
127111027000	COPE
129093012000	DEOUDES
129093013000	WOODS
129094036000	ROBINSON
129097039000	SNODGRASS
129097048000	LIMTIACO
1811261015000	ZEMBSCH
129097007000, 12909704000, 129097041000, 129097042000	MAURICE

Appendix 2 – Landowner brochure entitled: Conservation Easements-Benefiting from Your Oak Woodlands, Streams, and Wetlands.

Easements can be designed to:

- Protect natural habitat and open space from conversion to other uses such as subdivision and development
- Protect water resources and woodlands by limiting disturbances of lands in the watershed

Easement benefits for landowners include:

- Potentially large tax benefits from the donation of an easement (general estimate $50,000 to $100,000)
- Land remains privately owned; ownership rights stay in place
- Land protected beyond their lifetimes
- Landowners can fulfill their vision for the future of their land and waters
- Ecological, wildlife, and scenic values preserved
- Easement terms are individually tailored to meet the landowner's needs
- Easement agreement remains with the property, even if the land is sold

What to expect

Landowners who decide to participate in this project will expect us to both work with them to place the woodland or wet corridor into a conservation easement, and to work with them on restoring their section of the watershed, if desired and needed.

This ecological engineering approach has been used successfully throughout the Salinas Valley in restoration projects with the Watershed Institute and Moss Landing Marine Laboratories.

Are you interested?

If you are interested in protecting and restoring the values of the oak woodland, stream, or wetland on your property, and receiving a potentially large tax benefit, please contact us:

Creative Environmental Conservation
PO Box 228
Moss Landing, CA 95039
ethan.barnes@ceconservation.org

CREATIVE ENVIRONMENTAL CONSERVATION, INC.

Conservation Easements

Benefiting from Your Oak Woodlands, Streams, and Wetlands

http://www.ceconservation.org

Who we are

Creative Environmental Conservation (CEC) is a non-profit organization based out of Moss Landing, CA. We are involved in the restoration and protection of natural resources in northern Monterey County. Our focus is on the natural water system, specifically streams, wetlands, and oak woodlands. We are committed to working with landowners to restore wet corridors in the Moro Cojo and Tembladero Slough Watersheds.

Local Problems

The movement of water from the land to the sea in the Salinas Valley has been dramatically altered over the last 100 years. The first survey of the Monterey Bay area in 1853 described a remarkably wet landscape. Today, most creeks have been converted into drainage ditches. Water is now rapidly drained into Monterey Bay through collecting channels that were once creeks and rivers. This ditch system rapidly drains fresh water - the most limiting natural resource in the region - into the ocean.

The Solution

A fundamental solution to the freshwater problem is to restore and protect the core of the natural water system, the woodlands, rivers, creeks and marshes. Our goal is to increase aquifer recharge, and reduce flooding and pollution (sediments, nutrients, pesticides) beginning with the Moro Cojo and Tembladero Slough Watersheds. Our strategy is to restore the natural function of the watershed to filter pollutants, reduce erosion and sedimentation, increase groundwater recharge, and provide wildlife habitat.

The most important functions that woodlands provide are water collection and flow regulation. Forests trap rainwater and fog and regulate flow into the wet corridors. Woodlands also slow the water flowing through them, allowing it to recharge groundwater and reduce flooding. Naturally vegetated wet corridors are amongst the best pollution filters known, filtering sediment and contaminants from surface water, and capturing and degrading toxic chemicals. Restored watersheds increase the flood storage capacity of the landscape by slowing water flow and holding a larger volume of water for a longer time. Ponding water that is now allowed to flow off the land into the ocean will allow it to percolate into and replenish the aquifers, protecting them from further seawater intrusion.

What are Conservation Easements?

Conservation easements are one of the most powerful, effective tools available to permanently protect and preserve private land and avoid government involvement. Easements are uniquely flexible tools in that they are designed to reflect landowner's needs and wishes for the land. Conservation easements can help those private landowners who want to be stewards of the land, who appreciate the value of natural spaces, and who want to leave an enduring legacy.

A conservation easement is a legal agreement between a landowner and an eligible organization that keeps property in private ownership, while protecting specific conservation values according to the wishes of the individual landowner and the easement holder. The landowner continues to own the property, and the easement simply adds future protection. The only right the landowner gives up is the right to destroy the habitat protected by the easement this effectively means leaving the area alone and not grazing animals so that the native plants can recover.

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P. O. BOX 228, MOSS LANDING, CALIFORNIA 95039

Appendix 3 – Landowner brochure entitled: Restoring the Steams, Wetlands, and Woodlands on Your Property

Wildlife Habitat

Increasing natural habitat in wet areas or woodlands increases the attraction for wildlife. Restored wet areas and intact woodlands are haven for a variety of birds and amphibians.

One further benefit is that many rodents, especially house mice, are reduced or eliminated after a site is converted from non-native weeds to native plants.

What to expect

Landowners who decide to participate in this project will expect us to both work with them on restoring their section of the watershed. After a landowner agrees to participate, the actual restoration is straightforward, although somewhat site specific. First, the easement is fenced to keep livestock out (if needed). If a ditch is present in a wet corridor, it is plugged to spread water over the natural low area. Ecologically engineered berms are then constructed for secondary flood protection where needed. For both woodlands and wet corridors, the general planting strategy will vary for different native habitats with input from the landowner. We then work with the landowner to control weeds until the native plants to take over.

This ecological engineering approach has been used successfully throughout the Salinas Valley in restoration projects in cooperation with the Watershed Institute and Moss Landing Marine Laboratories. We can also work with landowners to protect their investment with a conservation easement (through which you could receive a potentially large tax benefit).

Are you interested?

If you are interested in protecting and restoring the values of the oak woodland, stream, or wetland on your property, please contact us:

Creative Environmental Conservation
PO Box 228
Moss Landing, CA 95039
ethan.barnes@ceconservation.org

CREATIVE ENVIRONMENTAL CONSERVATION, INC.

Restoring the Steams, Wetlands, and Woodlands on Your Property

Why it is needed, and how we can help

http://www.ceconservation.org

Who we are

Creative Environmental Conservation (CEC) is a non-profit organization based out of Moss Landing, CA. We are involved in the restoration and protection of natural resources in northern Monterey County. Our focus is on the natural water system, specifically streams, wetlands, and oak woodlands. Beginning in 2006, CEC received a federal grant to work with landowners to restore the natural water system in the Moro Cojo and Tembladero Slough Watersheds.

Local Problems

The movement of water from the land to the sea in the Salinas Valley has been dramatically altered over the last 100 years. The first survey of the Monterey Bay area in 1853 described a remarkably wet landscape. Today, most creeks have been converted into drainage ditches. Water is now rapidly drained into Monterey Bay through collecting channels that were once creeks and rivers. This ditch system rapidly drains fresh water - the most limiting natural resource in the region - into the ocean.

The Salinas Valley's water quality is among the worst in the state: there are particularly high levels of pesticides. Almost all water flowing through the valley's wet corridors is filled with sediment. The Salinas Valley is also facing a severe lack of water caused by decades of over pumping water supply wells, which is the primary cause of the extensive saltwater intrusion into Monterey Bay area aquifers. This is the most significant intrusion along the west coast.

The Solution

A fundamental solution to the freshwater problem is to restore and protect the core of the natural water system, the woodlands, rivers, creeks and marshes. Our goal is to increase aquifer recharge, and reduce flooding and pollution (sediments, nutrients, pesticides) beginning with the Moro Cojo and Tembladero Slough Watersheds. Our strategy is to restore the natural function of the watershed to filter pollutants, reduce erosion and sedimentation, increase groundwater recharge, and provide wildlife habitat.

Woodlands

The most important functions that woodlands provide are water collection and flow regulation. Forests trap rainwater and fog and regulate flow into the wet corridors. Woodlands also slow the water flowing through them, allowing it to recharge groundwater and reduce flooding.

Streams and Wetlands

Naturally vegetated wet corridors are some of the best pollution filters known, filtering sediment and contaminants from surface water, and capturing and degrading toxic chemicals. Restored watersheds increase the flood storage capacity of the landscape by slowing water flow and holding a larger volume of water for a longer time. Ponding water that is now allowed to flow off the land into the ocean will allow it to percolate into and replenish the aquifers, protecting them from further seawater intrusion.

Appendix 4 - Document for 1 on 1 interaction

TAX BENEFITS OF EASEMENT DONATIONS

Donating a conservation easement to a qualified recipient can provide the landowner with both satisfaction (knowing the land will be protected) and a reduction in income, estate, property, and/or gift taxes. The following is designed to inform landowners about the potential tax benefits available to them when donating a conservation easement. Please contact Creative Environmental Conservation (CEC) for more information (see below).

Income Tax Benefits

The landowner may qualify for a federal charitable income tax deduction under IRC section 170(h). This section stipulates that the donation of the conservation easement must be made to a "qualified conservation organization" and worth more than $5,000.00 documented by a qualified appraisal. The IRS treats gifts of conservation easements as it does other gifts of land to qualified recipients – taxpayers can deduct the present value of their easement gifts as charitable deductions from income. In addition, the state of California also provides for deductions in state income tax.

The amount of the charitable contribution by the landowner is based on the appraised fair market value of the easement. For tax purposes, the value of a donated conservation easement generally equals the difference between the property's value before and immediately after the easement is granted. This is the market value of the property rights the landowner extinguishes. This is determined by calculating the difference between the value of the property today without (or "before") the imposition of the easement and the value of the property today subject to (or "after") the imposition of the easement. This latter value is determined by the nature of the restrictions and their impact on present and future land use. The resulting amount is the value of the easement for tax purposes. Generally, a property's value is based on its "highest and best use," which often means development. Conservation easements in which development rights are given up can often qualify the property for a substantial value for tax deduction purposes, as the parcel's development potential no longer exists.

To claim this amount as a charitable contribution, the valuation must be determined by an appraisal prepared by a qualified appraiser and commissioned by the landowner*. Under IRS rules, the donor of the easement is responsible for obtaining an independent appraisal to

substantiate the value of the easement for tax purposes, and the IRS has published rules as to what constitutes a "qualified appraisal" and a "qualified appraiser" for such purposes.

The realized income tax benefit depends on variables such as the donor's income, the size of the gift in relation to the donor's income, and the amount of other deductions claimed. The maximum charitable deduction is set by federal tax law at a percentage of the landowner's annual adjusted gross income. Generally the landowner may deduct up to 30% of this adjusted gross income in one year. The excess value of such a gift may be carried forward for five additional tax years. After that time, any unused remainder will be lost.

For example, if a property has an appraised fair market value of $1,000,000 and the easement restrictions reduce the property's market value to $600,000, the value of the easement gift is then $400,000, assuming the easement meets IRS requirements, the landowners would be eligible to deduct charitable gifts of up to 30 percent of their adjusted gross income each year for a total of six years, or until the value of the gift is used up. Locally, landowners may expect from $50,000 to over $100,000 for the easement.

Estate Tax Benefits

In addition to the income tax deduction, under IRC 2031(c), the gift of the easement can also entitle a landowner to qualify for an estate tax exclusion for a portion of the value of the underlying land that is subject to a conservation easement, thereby reducing the estate tax on the value of the landowner's assets that pass to the heirs.

State Tax Benefits

In California, landowners who make gifts of conservation easements are also eligible for state-level tax benefits through the Natural Heritage Preservation Tax Credit Act of 2000 (Public Resources Code Section 37000). Under this program, state tax credits are available to private landowners who donate qualified land (i.e., conservation easement) to a qualified holder.

Property Tax Benefits

Local real property tax benefits may be available for landowners who convey conservation easements on their lands. Property taxes are based on the assessed value of the property, which is usually for its highest and best use. A reduction in the fair market value of the property due to the easement restrictions may mean that a corresponding reduction in property tax value is due.

Please contact us for more information:

Ethan Barnes
CEC
559-664-8330
ethanb1@earthlink.net

*We recommend that landowners utilize a state-licensed or state-certified appraiser who follows Uniform Standards of Professional Appraisal Practice, and we will require a copy of the appraisal. We will not knowingly participate in projects where we have significant concerns about the tax deduction. Compliance with the law and determination of deductibility and tax benefits are the purview of the landowner and the landowner's advisors. CEC does not guarantee the amount of deduction the IRS will allow or that a donation will be deductible, since the IRS decisions are beyond our control. CEC urge the landowner to consult with their own experienced legal and tax counsel to review all legal documents. Although the tax deductibility is the landowner's responsibility, we must ensure that the easement transaction is properly structured so that the donation can be tax deductible.

Appendix 5 - Document for 1 on 1 interaction

WHAT ARE CONSERVATION EASEMENTS?

Conservation easements are one of the most effective methods to permanently protect and preserve land. A conservation easement is a legal agreement between a landowner (grantor) and an eligible organization (grantee) that restricts future activities on the land to protect its conservation values. The appeal of an easement is that it keeps property in private ownership, while protecting specific conservation values according to the wishes of the individual landowner and the easement holder. When you own land, you also own many rights associated with it, such as the rights to farm, graze, build structures, etc. When you donate a conservation easement to a land trust, you voluntarily give up some of those rights. In essence, the rights are forfeited and no longer exist. The landowner retains the remainder of the rights. Additionally, the landowner is not obligated to provide access to the general public.

Each property is unique; therefore each conservation easement is unique. Most conservation easements consist of list of activities and uses that can take place on the property and a list of prohibited activities and uses. Each easement is tailored to the particular property, to the interests of the individual owner, and to the policies and purposes of the easement holder. A conservation easement often applies to just a portion of the property, leaving the option of development open for the remaining part. Conservation easements are permanent agreements, recorded by the County as deed restrictions to appear in the chain of title, and apply to any subsequent land ownership. The right to enforce the restrictions is held by the easement holder.

The landowner may reap many benefits from a conservation easement placed on his/her property. A conservation easement is legally binding, whether the property is sold or passed on to heirs. The perpetual protection of the property will ensure that it will remain in its current physical state. With the threat of development removed, the natural resource values will be enhanced. The landowner can be assured that the property will be enjoyed by future generations according to his/her desires for the property. Conservation

easements also often enable the landowner to qualify for tax benefits in compliance with Internal Revenue Service rules. This approach preserves unique and important habitat, increases groundwater recharge, cleans the water, and provides an incentive program that may pay from $50,000 to over $100,000 for the easement.

Easements Can Be Designed To:

- Protect natural habitat and open space from conversion to other uses such as subdivision and development
- Protect water resources by limiting disturbance of lands in the watershed
- Conserve forests through limitations on forest management and development
- Preserve agriculture and grazing lands from subdivision and development

Easements offer landowners:

- Potential tax benefits from the donation of an easement.
- Land remains privately owned; ownership rights stay in place
- Landowners can live on the land
- Land protected from subdivision
- Tax benefits help keep land intact and in the family
- Land protected beyond their lifetimes. Landowners can fulfill their vision for the future of their land and waters
- Ecological and scenic values preserved
- Easement agreement remains with the property, even if the land is sold
- Easement terms individually tailored to meet landowners' needs

Conservation Easements Protect Landscapes Efficiently and Effectively

- Conservation easements are one of the most popular conservation tools used by the more than 1,260 land trusts in the United States.
- Conservation easements extend conservation dollars by protecting ecologically important private lands without using fee purchase, thus freeing limited funds for other projects.
- Conservation easements target only those rights (such as subdivision development) necessary to protect specific conservation values (such as preserving wetland functions).

For more information, please contact us:

Ethan Barnes
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PO Box 228
Moss Landing, CA 95039
559-664-8330
ethanb1@earthlink.net

Appendix 6 – Document for 1 on 1 interaction

Our Purpose (Why We are Interested in Putting a Conservation Easement on Your Property)

Who We Are

Creative Environmental Conservation (CEC) is a non-profit organization based out of Moss Landing, CA. We are involved in the restoration and protection of natural resources in northern Monterey County. Our focus is on the natural water system, specifically streams, wetlands, and oak woodlands.

The Problem

The Salinas Valley is the largest watershed in the Monterey Bay area, and has been dramatically altered over the last 100 years. The movement of water from the land to the sea is radically modified from natural conditions in both urban and rural environments. The first survey of the Monterey Bay area in 1853 described a remarkably wet landscape. Drainage channels developed by the 1800's dramatically altered the movement of water from land to sea. Today, most creeks have been converted into drainage ditches. The oak woodlands, which collect water and regulate its flow into streams, have been removed from much of the landscape. Water is now drained into channels through farms and towns, into central collecting channels that were once magnificent creeks and rivers, and finally into Monterey Bay. This ditch system rapidly drains the most limiting natural resource in the region into the ocean- fresh water.

Thousands of acres of wetlands are ditched and dried, reducing natural water quality and flood control and the groundwater recharge needed to stop saltwater intrusion. Most of the wetland landscape is now gone; over 90% of its freshwater wetlands, lakes, rivers, streams, and riparian areas have been destroyed. This loss, combined with groundwater overuse, has resulted in numerous problems including poor water quality, saltwater intrusion into fresh aquifers, soil erosion, severe flooding, pollution, and endangered species. The valley's water quality is among the worst in the state: there are high levels of pesticides, nutrients, and sediments. The Salinas Valley is facing a severe lack of water caused by decades of over pumping water supply wells, which is the primary cause of the extensive saltwater intrusion into Monterey Bay area aquifers.

The Solution

A fundamental solution to the freshwater problem is to restore and protect the core of the natural water system, the wet corridors, rivers, creeks and marshes. Our goal is to increase aquifer recharge, and reduce flooding and pollution (sediments, nutrients, pesticides) beginning with the Moro Cojo and Tembladero Slough Watersheds. Our strategy is to restore the natural function of the watershed to filter pollutants, reduce erosion and sedimentation, increase groundwater recharge, and provide wildlife habitat.

Whenever you slow and pond water, you improve your water supply. Naturally vegetated wet corridors are amongst the best pollution filters known, physically filtering sediment and contaminants from surface water, and capturing and degrading many chemical toxins. Restored watersheds increase the flood storage capacity of the landscape by slowing water flow and holding a larger volume of water for a longer time. Ponding water that is now allowed to flow off the land into the ocean will allow it to percolate into and replenish the aquifers, protecting them

from further seawater intrusion. One further benefit is that many rodents, especially house mice, are reduced or eliminated after a site is converted from non-native weeds to native plants.

What to Expect

Landowners who decide to participate in this project will expect us to both work with them to place the former wet corridor into a conservation easement, and to work with them on restoring their section of the watershed. After a landowner agrees to participate, the actual restoration is straightforward, although somewhat site specific. First, the easement is fenced to keep cattle and other large grazers out of the wet corridor (if needed). Then the ditch is plugged to spread water over the natural low area, the former creek and marsh system, and ecologically engineered berms are constructed for secondary flood protection where needed. Native plants are then established while non-native invasive weeds are controlled. The general planting strategy will vary for different native habitats with input from the landowner.

The wet area is preserved with a conservation easement and property tax exemption (please see our other handouts), and the public has secured a functioning section of the natural freshwater system. This ecological engineering has been used successfully throughout Salinas Valley in the restoration projects with the Watershed Institute and Moss Landing Marine Laboratories. Included below are several photos of a successful example of restoration on Walker Creek.

Photo 1. Walker Creek 1 year after restoration.

Photo 2. Walker Creek 5 years after restoration during wet season (distance photo).

Photo 3. Walker Creek 5 years after restoration during wet season (close-up photo).

Please contact us for more information:

Ethan Barnes

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PO Box 228
Moss Landing, CA 95039
559-664-8330
ethanb1@earthlink.net

The Benefits of Conservation Easements

•Are you a landowner in the Moro Cojo or Tembladero Slough Watershed?

•Do you have a wet area or oak woodland on your property?

•Do you wish your property to contribute to the well being of future generations?

•Do you wish to gain potentially large federal, state, and property tax deductions?

You can do this with a Conservation Easement!

What are Conservation Easements?

Conservation easements are one of the most powerful, effective tools available for the conservation on private lands. Easements are uniquely flexible tools in that they are designed to reflect landowner's needs and wishes for the land. Conservation easements can help those private landowners who want to be stewards of the land, who appreciate the value of natural spaces, and who want to leave an enduring legacy.

A conservation easement is a permanent legal agreement between a landowner and an eligible organization that restricts future activities on the land to protect its conservation values. When you own land, you also own many rights associated with it, such as the rights to farm, graze, and build structures. When you donate a conservation easement to a land trust, you voluntarily give up only those rights (e.g. subdivision development) necessary to protect specific conservation values (e.g. preserving wetland functions).

Easements can be designed to:

➢Protect natural habitat and open space from conversion to other uses such as subdivision and development

➢Protect water resources and woodlands by limiting disturbance of lands in the watershed

Easement benefits for landowners:

➢Potentially large tax benefits from the donation of an easement

➢Land remains privately owned; ownership rights stay in place

➢Land protected beyond their lifetimes.

➢ Landowners can fulfill their vision for the future of their land and waters

➢Ecological and scenic values preserved

➢Easement terms are individually tailored to meet landowners' needs

Creative Environmental Conservation (CEC) is a non-profit organization based out of Moss Landing. We are involved in the restoration and protection of lands in northern Monterey County. Beginning in 2006, CEC received a Federal Grant to work with landowners to restore wet corridors in the Moro Cojo and Tembladero Slough Watersheds.

These photos illustrate a successful restoration on Walker Creek.

Appendix 8 - Pesticide data from water samples

Organophosphate pesticide in Water

Dioxathion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.18839**	94.195	**0.192284**	96.142
Disulfoton	EPA 8141AM	0.01	0.05	ND	ND	ND		ND	0.2	**0.163128**	81.564	**0.149732**	74.866
Ethion	EPA 8141AM	0.02	0.05	ND	ND	ND		ND	0.2	**0.178163**	89.081	**0.170602**	85.301
Famphur	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.121386**	60.693	**0.14439**	72.195
Fenchlorphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.149863**	74.931	**0.144276**	72.138
Fenitrothion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.185126**	92.563	**0.181766**	90.883
Fensulfothion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.16902**	84.51	**0.154826**	77.413
Fenthion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.166352**	83.176	**0.14025**	70.125
Fonofos	EPA 8141AM	0.02	0.05	ND	ND	ND		ND	0.2	**0.163012**	81.506	**0.163842**	81.921
Leptophos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.152202**	76.101	**0.148706**	74.353
Malathion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.162224**	81.112	**0.156088**	78.494
Methidathion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.325684**	81.421	**0.306616**	76.654
Methyl parathion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.314**	78.5	**0.314092**	78.523
Mevinphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.12323**	61.615	**0.105178**	52.589
Monocrotophos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.16251**	81.255	**0.171996**	85.998
Naled	EPA 8141AM	0.05	0.1	ND	ND	ND		ND	0.2	**0.172354**	86.177	**0.148354**	74.177
Oxydemeton-methyl	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.169202**	84.601	**0.188426**	94.213
Parathion, ethyl	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.367292**	91.823	**0.34052**	85.13
Aspon	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.177032**	88.516	**0.163542**	81.771
Phorate	EPA 8141AM	0.05	0.1	ND	ND	ND		ND	0.2	**0.1660828**	83.0414	**0.146058**	73.029
Azinphos ethyl	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.19428**	97.14	**0.161772**	80.886
Mevinphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.12323**	61.615	**0.105178**	52.589
Carbophenothion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.16251**	81.255	**0.171996**	85.998
Phosmet	EPA 8141AM	0.05	0.1	ND	ND	ND		ND	0.2	**0.172354**	86.177	**0.148354**	74.177
Chlorfenvinphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.169202**	84.601	**0.188426**	94.213
Phosphamidon	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.168597**	84.2985	**0.188898**	94.449
Chlorpyrifos	EPA 8141AM	0.02	0.05	ND	ND	ND		ND	0.2	**0.188608**	94.304	**0.160322**	80.161
Ethoprop	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.179942**	89.971	**0.148476**	74.238
Chlorpyrifos methyl	EPA 8141AM	0.02	0.05	ND	ND	ND		ND	0.2	**0.152558**	76.279	**0.145195**	72.5975
Sulfotep	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.362544**	90.636	**0.320824**	80.206
Ciodrin	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.15965**	79.825	**0.153672**	76.836
Bolstar	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.181676**	90.838	**0.158061**	79.0305
Coumaphos	EPA 8141AM	0.04	0.05	ND	ND	ND		ND	0.2	**0.143148**	71.574	**0.134702**	67.351
Terbufos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.12563**	62.815	**0.171613**	85.8065
Demeton-s	EPA 8141AM	0.04	0.05	ND	ND	ND		ND	0.2	**0.151854**	75.927	**0.152586**	76.293
Tetrachlorvinphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.16075**	80.375	**0.128568**	64.284
Diazinon	EPA 8141AM	0.005	0.02	0.018118	0.26	0.08554		ND	0.2	**0.192774**	96.387	**0.18888**	94.44
Thionazin	EPA 8141AM	0.04	0.05	ND	ND	ND		ND	0.2	**0.187858**	93.929	**0.19182**	95.91
Dichlofenthion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.167095**	83.5475	**0.166852**	83.426
Tokuthion	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.181784**	90.892	**0.167903**	83.9515
Dichlorvos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.169468**	84.734	**0.147426**	73.713
Merphos	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.2**	100	**0.18338**	91.69
Dimethoate	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.340964**	85.241	**0.339708**	84.927

WPCL Lab#				L-018-08-8	L-018-08-9	L-018-08-10	QA/QC Samples	L-018-08-MB		L-018-08-LCS		L-018-08-LCSD	
Analytical Method		**Estimated MDL**	**Reporting Limit**										
Sample Identification				**Site #1**	**Site #3A**	**Site #3B**							
Date Collected				10/Jan/2008	10/Jan/2008	10/Jan/2008							
Time Collected				13:30	13:55	14:00							
Date Received				10/Jan/2008	10/Jan/2008	10/Jan/2008							
Date Extracted				11/Jan/2008	11/Jan/2008	11/Jan/2008		11/Jan/2008		11/Jan/2008	11/Jan/2008	11/Jan/2008	11/Jan/2008
Date Analyzed				27/Feb/2008	27/Feb/2008	27/Feb/2008		27/Feb/2008		27/Feb/2008	27/Feb/2008	27/Feb/2008	27/Feb/2008
Organophosphate Pesticides by GC/FPD		**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**		**ppb (µg/L)**	**Exp. Value ppb (µg/L)**	**ppb (ug/L)**	**% Recovery**	**ppb (ug/L)**	**% Recovery**
Azinphos methyl	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.4	**0.314**	78.5	**0.314092**	78.523
Coumaphos	EPA 8141AM	0.04	0.05	ND	ND	ND		ND	0.2	**0.134482**	67.241	**0.132484**	66.242

Trichlorfon	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.1356944**	67.8472	**0.119298**	59.649
Trichloronate	EPA 8141AM	0.03	0.05	ND	ND	ND		ND	0.2	**0.173736**	86.868	**0.151458**	75.729
Surrogate (% Recovery)													
Triphenyl phosphate	EPA 8141AM	NA	NA	92.66	94.83	101		88.773	0.2	**0.163768**	81.884	**0.161542**	80.771

Organophosphate Pesticides in Sediment

WPCL Lab#	Analytical Method	Estimated MDL	Reporting Limit	L-018-08-1	L-018-08-2	L-018-08-3	L-018-08-4	L-018-08-5	L-018-08-6	L-018-08-7	L-018-08-7dup	QA/QC	L-018-08-MB		L-018-08-LCS	L-018-08-LCS	Qualifier	L-018-08-4MS	L-018-08-4MS	
Sample Identification				**Site #1**	**Site #2**	**Site #3**	**Site #5**	**Site #6A**	**Site #6B**	**Site #4**	**Site #4**							**Site #5**	**Site #5**	**Site #5**
Date Collected				02/Jan/08	02/Jan/08	02/Jan/08	02/Jan/08	02/Jan/08	02/Jan/08	02/Jan/08	02/Jan/08							02/Jan/08	02/Jan/08	02/Jan/08
Time Collected				15:34	15:40	16:00	16:15	15:20	15:21	16:05	16:05							16:15	16:15	16:15
Date Received				10/Jan/08	10/Jan/08	10/Jan/08	10/Jan/08	10/Jan/08	10/Jan/08	10/Jan/08	10/Jan/08							10/Jan/08	10/Jan/08	10/Jan/08
Date Extracted				08/Feb/08	08/Feb/08	08/Feb/08	08/Feb/08	08/Feb/08	08/Feb/08	08/Feb/08	08/Feb/08		08/Feb/08		08/Feb/08	08/Feb/08		08/Feb/08	08/Feb/08	08/Feb/08
Date Analyzed				27/Feb/08	27/Feb/08	27/Feb/08	27/Feb/08	27/Feb/08	27/Feb/08	27/Feb/08	27/Feb/08		27/Feb/08		27/Feb/08	27/Feb/08		27/Feb/08	27/Feb/08	27/Feb/08
Percent Moisture				19.1	20.5	27.2	9.32	4.08	4.88	30.6	30.6									
														Exp. Value	**Amount Recovered**			**Amount Recovered**		**Amount Recovered**
Organophosphate Pesticides by GC/FPD		**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**		**ppb (ng/g) Dry wt**	**ppb (ng/g)**	**ppb (ng/g) Dry wt**	**% Recovery**		**ppb (ng/g) Dry wt**	**% Recovery**	**ppb (ng/g) D wt**
Chlorpyrifos	EPA 8141AM	5.00	10.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	110	**88.3**	80.3		**81.7**	74.3	**88.6**
Chlorpyrifos methyl	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**77.0**	48.1	EUM	**80.3**	50.2	**97.0**
Diazinon	EPA 8141AM	5.00	10.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	110	**84.5**	76.8		**79.1**	71.9	**81.4**
Dichlofenthion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**114**	71.2		**117**	73.0	**113**
Dioxathion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**81.0**	50.6		**148**	92.8	**138**
Ethion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**107**	66.6		**126**	78.8	**125**
Fenchlorphos	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**118**	73.5		**113**	70.6	**92.9**
Fenitrothion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**85.0**	53.1		**155**	97.1	**146**
Fonofos	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**120**	75.2		**116**	72.3	**108**
Malathion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**82.3**	51.5		**121**	75.8	**122**
Parathion, Methyl	EPA 8141AM	10.0	20.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**96.2**	60.1		**112**	70.0	**123**
Parathion, Ethyl	EPA 8141AM	10.0	20.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**87.8**	54.9		**91.5**	57.2	**89.5**
Phosphamidon	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**93.7**	58.5		**116**	72.5	**86.6**
Ethoprop	EPA	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**102**	64.1		**122**	76.0	**134**

	8141AM																			
Sulfotep	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**89.6**	56.0		**101**	63.2	**91.0**
Thionazin	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**104**	64.8		**105**	65.6	**118**
Tokuthion	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**128**	79.9		**125**	78.1	**118**
Merphos	EPA 8141AM	25.0	50.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**106**	66.1		**136**	85.3	**141**
Trichloronate	EPA 8141AM	10.0	20.0	ND	ND	ND	ND	ND	ND	ND	ND		ND	160	**128**	79.9		**121**	75.5	**123**
Surrogate (% Recovery)																				
Triphenyl phosphate	EPA 8141AM	NA	NA	117	104	71.7	100	114	105	94.9	103		81.8	0.200	**0.108**	53.8		**0.212**	106	**0.234**

Pyrethroid Pesticides in Water

WPCL Lab#	Analytical Method	Method Detection Limit	Reporting Limit	L-018-08-8	L-018-08-9	L-018-08-10	QA/QC Samples	L-018-08-MB		L-018-08-LCS	L-018-08-LCS	L-018-08-LCSD	L-018-08-LCSD
Sample Identification				**Site #1**	**Site #3A**	**Site #3B**							
Date Collected				07/Jan/2008	07/Jan/2008	07/Jan/2008							
Time Collected				13:30	13:55	14:00							
Date Received				10/Jan/2008	10/Jan/2008	10/Jan/2008							
DCM Preservation				10/Jan/2008	10/Jan/2008	10/Jan/2008							
Date Extracted				11/Jan/2008	11/Jan/2008	11/Jan/2008		11/Jan/2008		11/Jan/2008	11/Jan/2008	11/Jan/2008	11/Jan/2008
Date Analyzed				06/Feb/2008	06/Feb/2008	06/Feb/2008		06/Feb/2008		06/Feb/2008	06/Feb/2008	06/Feb/2008	06/Feb/2008
									Expected Value	**Amount Recovered**		**Amount Recovered**	
Pyrethroid Pesticides by GC/ECD		**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**		**ppb (µg/L)**	**ppb (µg/L)**	**ppb (ug/L)**	**% Recovery**	**ppb (ug/L)**	**% Recovery**
Bifenthrin	EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.020	0.021	104	0.018	87.8
Cyfluthrin, total	EPA 8081BM	0.002	0.004	ND	ND	ND		ND	0.040	0.041	103	0.040	100
Cypermethrin, total	EPA 8081BM	0.002	0.004	ND	ND	ND		ND	0.040	0.036	89.6	0.035	87.8
Deltamethrin	EPA 8081BM	0.002	0.004	ND	ND	ND		ND	0.040	0.040	100	0.040	100
Esfenvalerate/Fenvalerate, total	EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.020	0.020	99.6	0.020	99.9
Fenpropathrin	EPA 8081BM	0.002	0.004	ND	ND	ND		ND	0.040	0.041	103	0.037	91.6
Permethrin, total	EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.020	0.019	94.7	0.019	92.8
Warrior (Lambda Cyhalothrin), total	EPA 8081BM	0.003	0.005	ND	ND	ND		ND	0.050	0.053	105	0.054	107
Surrogate (% Recovery)													
Dibromooctafluorobiphenyl	EPA 8081BM	NA	NA	89.7	78.9	78.0		98.6	0.020	0.016	81.6	0.017	83.3

Pyrethroid Pesticides in Sediment

WPCL Lab#	Analytical Method	Method Detection Limit	Reporting Limit	L-018-08-1	L-018-08-2	L-018-08-3	L-018-08-4	L-018-08-5	L-018-08-6	L-018-08-7	L-018-08-7dup
Sample Identification				**Site #1**	**Site #2**	**Site #3**	**Site #5**	**Site #6A**	**Site #6B**	**Site #4**	**Site #4**
Date Collected				02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008
Time Collected				15:34	15:40	16:00	16:15	15:20	15:21	16:05	16:05
Date Received				10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008
Date Extracted				08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008
Date Analyzed				12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008
Percent Moisture				19.1	20.5	27.2	9.32	4.08	4.88	30.6	30.6
Pyrethroid Pesticides by GC/ECD		**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**
Bifenthrin	EPA 8081BM	0.5	1	ND	ND	ND	ND	ND	ND	ND	ND
Cyfluthrin, total	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Cypermethrin, total	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Deltamethrin	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Esfenvalerate/Fenvalerate, total	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Fenpropathrin	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Permethrin, total	EPA 8081BM	4	8	ND	ND	ND	ND	ND	ND	ND	ND
Warrior (Lambda Cyhalothrin), total	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Surrogate (% Recovery)											
Dibromooctafluorobiphenyl	EPA 8081BM	NA	NA	72.6	82.4	81.4	72	75.4	81.6	71.1	71.8
Dibutylchlorendate	EPA 8081BM	NA	NA	90.2	86	85.8	79.2	80.5	77.8	82.7	76.7

QA/QC Samples	L-018-08-MB		L-018-08-LCS	Qualifier	L-018-08-LCS	L-018-08-6MS	L-018-08-6MS	L-018-08-6MSD	L-018-08-6MSD
						Site #6B	Site #6B	Site #6B	Site #6B
						02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008
						15:21	15:21	15:21	15:21
						10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008
	08/Feb/2008		08/Feb/2008		08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008
	12/Mar/2008		12/Mar/2008		12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008
		Expected Value	Amount Recovered			Amount Recovered		Amount Recovered	
	ppb (ng/g) Dry wt	ppb (ng/g)	ppb (ng/g) Dry wt		% Recovery	ppb (ng/g) Dry wt	% Recovery	ppb (ng/g) Dry wt	% Recovery
	ND	10	7.71		77.1	7.49	74.9	8.17	81.7
	ND	40	21.6		54	29.88	74.7	32.56	81.4
	ND	40	22.08		55.2	25.2	63	30	75
	ND	40	16.44	EUM	41.1	23.52	58.8	26.52	66.3
	ND	20	11.06		55.3	13.16	65.8	14.58	72.9
	ND	40	23.96		59.9	24.96	62.4	26.4	66
	ND	80	53.04		66.3	58.48	73.1	63.68	79.6
	ND	20	11.44		57.2	14.06	70.3	15.08	75.4
	65.1	4	2.372		59.3	2.884	72.1	3.196	79.9
	78	4	3.028		75.7	3.128	78.2	2.992	74.8

Organochlorine Pesticides in Water

	WPCL Lab#	Analytical Method	Estimated MDL	Reporting Limit	L-018-08-8	L-018-08-9	L-018-08-10	QA/QC Samples	L-018-08-MB		L-018-08-LCS	L-018-08-LCS	L-018-08-LCSD	L-018-08-LCSD
Sample Identification					**Site #1**	**Site #3A**	**Site #3B**							
Date Collected					07/Jan/2008	07/Jan/2008	07/Jan/2008							
Time Collected					13:30	13:55	14:00							
Date Received					10/Jan/2008	10/Jan/2008	10/Jan/2008							
Date Extracted					11/Jan/2008	11/Jan/2008	11/Jan/2008		11/Jan/2008		11/Jan/2008	11/Jan/2008	11/Jan/2008	11/Jan/2008
Date Analyzed					06/Feb/2008	06/Feb/2008	06/Feb/2008		06/Feb/2008		06/Feb/2008	06/Feb/2008	06/Feb/2008	06/Feb/2008
Organochlorine Pesticides by GC/ECD			**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**	**ppb (µg/L)**		**ppb (µg/L)**	**Exp. Value ppb (µg/L)**	**Amnt Recovered ppb (ug/L)**	**% Recovery**	**Amnt Recovered ppb (ug/L)**	**% Recovery**
Aldrin		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01712	85.6	0.01602	80.1
Chlordane, cis-		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.0188	94	0.01788	89.4
Chlordane, trans-		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01866	93.3	0.01772	88.6
Dacthal		EPA 8081BM	0.001	0.002	0.008	0.012	0.012		ND	0.02	0.02	100	0.01844	92.2
DDD(o,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01802	90.1	0.01698	84.9
DDD(p,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01618	80.9	0.01522	76.1
DDE(o,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01878	93.9	0.01776	88.8
DDE(p,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01756	87.8	0.01672	83.6
DDMU(p,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.0165	82.5	0.01586	79.3
DDT(o,p')		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.0176	88	0.01738	86.9
DDT(p,p')		EPA 8081BM	0.002	0.005	ND	ND	ND		ND	0.04	0.0508	127	0.0516	129
Dieldrin		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01734	86.7	0.01644	82.2
Endosulfan I		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.0189	94.5	0.01782	89.1
Endosulfan II		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.01962	98.1	0.01874	93.7
Endosulfan sulfate		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.025	125	0.0242	121
Endrin		EPA 8081BM	0.001	0.002	ND	ND	ND		ND	0.02	0.02	100	0.01984	99.2
Endrin Aldehyde		EPA 8081BM	0.002	0.005	ND	ND	ND		ND	0.04	0.03848	96.2	0.03712	92.8
Endrin Ketone		EPA 8081BM	0.002	0.005	ND	ND	ND		ND	0.04	0.0404	101	0.03892	97.3

HCH, alpha	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.021	105	0.01974	98.7
HCH, beta	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01996	99.8	0.01746	87.3
HCH, gamma	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01722	86.1	0.01764	88.2
HCH, delta	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01924	96.2	0.0157	78.5
Heptachlor	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01844	92.2	0.0176	88
Heptachlor epoxide	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01782	89.1	0.01686	84.3
Hexachlorobenzene	EPA 8081BM	0.0005	0.001	ND	ND	ND	ND	0.01	0.00978	97.8	0.00915	91.5
Methoxychlor	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.0276	138	0.028	140
Mirex	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01962	98.1	0.01914	95.7
Nonachlor, cis-	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01894	94.7	0.01804	90.2
Nonachlor, trans-	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01932	96.6	0.01834	91.7
Oxadiazon	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01852	92.6	0.0177	88.5
Oxychlordane	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.0188	94	0.01786	89.3
Tedion	EPA 8081BM	0.001	0.002	ND	ND	ND	ND	0.02	0.01888	94.4	0.01956	97.8
Surrogate (% Recovery)												
Dibromooctafluorobiphenyl	EPA 8081BM	0.001	0.002	78.6	75.7	80.1	83.9	0.02	0.0174	87	0.016	80

Organochlorine Pesticides in Sediment

WPCL Lab#	Analytical Method	Estimated MDL	Reporting Limit	L-018-08-1	L-018-08-2	L-018-08-3	L-018-08-4	L-018-08-5	L-018-08-6	L-018-08-7	L-018-08-7dup
Sample Identification				**Site #1**	**Site #2**	**Site #3**	**Site #5**	**Site #6A**	**Site #6B**	**Site #4**	**Site #4**
Date Collected				02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008	02/Jan/2008
Time Collected				15:34	15:40	16:00	16:15	15:20	15:21	16:05	16:05
Date Received				10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008	10/Jan/2008
Date Extracted				08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008	08/Feb/2008
Date Analyzed				12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008	12/Mar/2008
Percent Moisture				19.1	20.5	27.2	9.32	4.08	4.88	30.6	30.6
Organochlorine Pesticides by GC/ECD		**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**	**ppb (ng/g) Dry wt**
Aldrin	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane, cis-	EPA 8081BM	1	2	ND	1.70*	ND	ND	ND	ND	ND	ND
Chlordane, trans-	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Dacthal	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
DDD(o,p')	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
DDD(p,p')	EPA 8081BM	1	2	ND	ND	ND	ND	**2.22**	1.90*	ND	ND
DDE(o,p')	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
DDE(p,p')	EPA 8081BM	2	4	3.37*	3.14*	ND	ND	**17.2**	**13.3**	**5.47**	**5.55**
DDMU(p,p')	EPA 8081BM	3	6	ND	ND	ND	ND	ND	ND	ND	ND
DDT(o,p')	EPA 8081BM	3	6	ND	ND	ND	ND	ND	ND	ND	ND
DDT(p,p')	EPA 8081BM	5	10	ND	ND	ND	ND	**19.2**	**10.2**	ND	ND
Dieldrin	EPA 8081BM	0.5	1	ND	ND	ND	ND	**1.47**	**1.15**	ND	ND
Endosulfan I	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 8081BM	5	10	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	EPA 8081BM	5	10	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
HCH, alpha	EPA 8081BM	0.5	1	ND	ND	ND	ND	ND	ND	ND	ND
HCH, beta	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
HCH, gamma	EPA 8081BM	0.5	1	ND	ND	ND	ND	ND	ND	ND	ND
HCH, delta	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	EPA 8081BM	0.3	0.6	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	EPA 8081BM	3	6	ND	ND	ND	ND	ND	ND	ND	ND
Mirex	EPA 8081BM	1.5	3	ND	ND	ND	ND	ND	ND	ND	ND
Nonachlor, cis-	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Nonachlor, trans-	EPA 8081BM	1	2	1.23*	1.90*	ND	ND	ND	ND	1.31*	1.21*
Oxadiazon	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Oxychlordane	EPA 8081BM	1	2	ND	ND	ND	ND	ND	ND	ND	ND
Tedion	EPA 8081BM	2	4	ND	ND	ND	ND	ND	ND	ND	ND
Surrogate (% Recovery)											
Dibromooctafluorobiphenyl	EPA 8081BM	NA	NA	93.6	97.4	92.2	94.4	97.2	96	86.8	89.8

QA/QC Samples	L-018-08-MB		L-018-08-LCS	L-018-08-LCS	Qualifier	L-018-08-5MS	L-018-08-5MS	Qualifier	L-018-08-5MSD	L-018-08-5MSD	Qualifier
						Site #6A	Site #6A		Site #6A	Site #6A	
						02/Jan/2008	02/Jan/2008		02/Jan/2008	02/Jan/2008	
						15:20	15:20		15:20	15:20	
						10/Jan/2008	10/Jan/2008		10/Jan/2008	10/Jan/2008	
	08/Feb/2008		08/Feb/2008	08/Feb/2008		08/Feb/2008	08/Feb/2008		08/Feb/2008	08/Feb/2008	
	12/Mar/2008		12/Mar/2008	12/Mar/2008		12/Mar/2008	12/Mar/2008		12/Mar/2008	12/Mar/2008	
		Exp. Value	Amount Recovered			Amount Recovered			Amount Recovered		
	ppb (ng/g) Dry wt	ppb (ng/g)	ppb (ng/g) Dry wt	% Recovery		ppb (ng/g) Dry wt	% Recovery		ppb (ng/g) Dry wt	% Recovery	
	ND	4	3.792	94.8		2.776	69.4		3.204	80.1	
	ND	4	2.924	73.1		4.56	114		3.596	89.9	
	ND	4	2.848	71.2		4.28	107		3.348	83.7	
	ND	4	3.976	99.4		3.344	83.6		2.972	74.3	
	ND	4	2.888	72.2		6.28	157	GB	4.96	124	
	ND	4	3.184	79.6		4.08	102		2.9	72.5	
	ND	4	2.844	71.1		4	100		3.14	78.5	
	ND	4	3.184	79.6		3.568	89.2		4.4	110	
	ND	4	2.98	74.5		4.4	110		3.464	86.6	
	ND	4	4.4	110		3.888	97.2		4.44	111	
	ND	8	8.88	111		17.68	221	GB	4.488	56.1	
	ND	4	3.676	91.9		4.12	103		3.6	90	
	ND	4	3.02	75.5		3.496	87.4		2.912	72.8	
	ND	4	3.944	98.6		3.392	84.8		2.936	73.4	
	ND	4	3.476	86.9		3.968	99.2		3.708	92.7	
	ND	4	4.4	110		5.12	128		3.932	98.3	
	ND	4	3.772	94.3		2.824	70.6		3.66	91.5	
	ND	4	3.296	82.4		3.16	79		3.408	85.2	
	ND	4	3.76	94		3.656	91.4		3.744	93.6	
	ND	4	3.6	90		3.856	96.4		3.212	80.3	
	ND	4	3.784	94.6		3.648	91.2		3.104	77.6	
	ND	4	4.24	106		3.792	94.8		3.16	79	
	ND	2	0.912	45.6	EUM	0.516	25.8	GB	0.688	34.4	GB
	ND	4	4.72	118		8.76	219	GB	7.2	180	GB
	ND	4	2.74	68.5		2.8	70		2.82	70.5	
	ND	4	2.776	69.4		4	100		3.064	76.6	
	ND	4	3.092	77.3		4.52	113		3.716	92.9	
	ND	4	2.908	72.7		3.26	81.5		3.12	78	
	ND	4	3.02	75.5		3.656	91.4		3.1	77.5	
	ND	4	2.876	71.9		3.576	89.4		3.764	94.1	
	69.8	4	3.364	84.1		4.08	102		3.504	87.6	

Appendix 9 YSI Calibration data

EquipID	Date	Analyte	PreCalMeasurement	PostCalMeasurement	CalMethod	Person
YSI 556	1/7/2008	Oxygen, saturation (%)	100.8	84.1	Air @ 766	K. Rey
YSI 556	1/7/2008	Conductivity (mS/cm)	1.001	0.766	1.000 Stnd	K. Rey
YSI 556	1/21/2008	Oxygen, saturation	100.6	100.5	Air @ 764	K. Rey
YSI 556	1/21/2008	Conductivity (mS/cm)	1.001	0.643	1.000 Stnd	K. Rey
YSI 556	1/29/2008	Oxygen, saturation	101.8	112.6	Air @ 774	K. O'Connor
YSI 556	1/29/2008	Conductivity (mS/cm)	1.000	0.777	1.000 Stnd	K. O'Connor
YSI 556	2/4/2008	Oxygen, saturation	100.9	88.2	Air @ 763	K. Rey
YSI 556	2/4/2008	Conductivity (mS/cm)	1.000	0.977	1.000 Stnd	K. Rey
YSI 556	2/18/2008	Oxygen, saturation	101.1	97.8	Air @ 768	K. O'Connor
YSI 556	2/18/2008	Conductivity (mS/cm)	1.000	0.914	1.000 Stnd	K. O'Connor
YSI 556	3/4/2008	Oxygen, saturation	101.0	109.5	Air @ 766	K. O'Connor
YSI 556	3/4/2008	Conductivity (mS/cm)	1.000	0.918	1.000 Stnd	K. O'Connor

Appendix 10 YSI Collected data

ProjectID	Site Name	SampleDate	Sample Replicate	Latitude	Longitude	SampleType	Equipment ID	Water Temperature(degrees C)	pH	Dissolved Oxygen (mg/L)	Conductivity (uS)	Salinity(uS)	Turbidity (NTUs)
319	Site 1	1/7/2008	1	36.80616	-121.70972	Water	YSI 556	8.95	7.7	10.24	62	0.04	30.9
319	Site 3	1/7/2008	1	36.8055	-121.70832	Water	YSI 556	11.35	7.2	5.14	70	0.04	52.8
319	Site 1	1/21/2008	1	36.80616	-121.70972	Water	YSI 556	6.43	7.7	5.32	101	0.07	99.5
319	Site 3	1/21/2008	1	36.8055	-121.70832	Water	YSI 556	7.31	6.9	5.44	82	0.06	25.9
319	Site 1	1/29/2008	1	36.80616	-121.70972	Water	YSI 556	5.39	8.5	8.81	73	0.05	56.2
319	Site 3	1/29/2008	1	36.8055	-121.70832	Water	YSI 556	6.52	7.6	6.44	56	0.04	16.0
319	Site 1	2/4/2008	1	36.80616	-121.70972	Water	YSI 556	9.91	7.8	10.28	186	0.12	28.8
319	Site 3	2/4/2008	1	36.8055	-121.70832	Water	YSI 556	11.96	7.5	9.52	141	0.09	108.0
319	Site 3	2/18/2008	1	36.8055	-121.70832	Water	YSI 556	10.7	7.4	5.42	95	0.06	9.22
319	Site 1	3/4/2008	1	36.80616	-121.70972	Water	YSI 556	11.97	7.6	2.11	355	0.23	15.6
319	Site 2	3/4/2008	1	36.80449	-121.70891	Water	YSI 556	15	7.2	9.8	448	0.27	3.49
319	Site 3	3/4/2008	3	36.8055	-121.70832	Water	YSI 556	16	7.4	6.35	98	0.06	5.99

Appendix 11 - Plant species list for Wagner parcel

Common_Name	Scientific_Name
American Dogwood	*Cornus sericea*
Arroyo Willow	*Salix lasiolepis*
Blue Blossom	*Ceanothus thyrsiflorus*
Bull thistle	*Cirsium vulgare*
Calfornia rose	*Rosa californica*
California Blackberry	*Rubus ursinus*
California Coffeberry	*Rhamnus californica*
California Sage	*Artemisia californica*
Cluster Dock	*Rumex conglomeratus*
Coast Live Oak	*Quercus agrifolia*
Common Yarrow	*Achillea millefolium*
Coyote Bush	*Baccharis pilularis*
Curly Dock	*Rumex crispus*
English Plantain	*Plantago major*
Field Mustard	*Brassica rapa*
Hedge Nettle	*Stachys bullata*
Horseweed	*Conyza canadensis*
Ice Plant	*Carpabrotus edulus*
Iris-leaved Rush	*Juncus xiphioides*
Italian Rye	*Lolium multiflorum*
Juncus	*Juncus patens*
Juncus	*Juncus effusus*
Knotweed	*Polygonum sp.*
Lady Fern	*Athryum felix-femina*
Meadow Barley	*Hordeum brachyantherum*
Narrow-leaved Bur-reed	*Sparganium angustifolium*
Nutsedge	*Cyperus eragrostis*
Pearly Everlasting	*Gnaphalium ramosissimum*
Poison Hemlock	*Conium maculatum*
Poison Oak	*Toxicodendron diversilobum*
Rabbit's Foot Grass	*Polypogon monspeliensis*
Ripgut	*Bromus diandrus*
Santa Barbara Sedge	*Carex barbarae*
Sheep Sorrel	*Rumex acetosella*
Silver Wattle	*Acacia dealbata*
Silver-leaved Eucalyptus	*Eucalyptus pulverulenta*
Toyon	*Heteromeles arbutifolia*
Western Braken Fern	*Pteridium aquilinum*

Western Sycamore	*Platanus racemosa*
Wild Oats	*Avena fatua*
Wild Radish	*Raphanus sativa*

Appendix 12 - Plant species list for Calcagno parcel

Scientific Name	Common name	Plant Family	Notes
Achillea millefolium	Common yarrow	Asteraceae	
Amsinckia menziesii	Harvest fireweed	Boraginaceae	
Amsinckia menziesii var. intermedia	Common fiddleneck	Boraginaceae	
Anagallis arvensis	scarlet pimpernil	Primulaceae	
Anaphalis margaritacea	Pearly everlasting	Asteraceae	
Atriplex californica	California saltbrush	Chenopodiaceae	
Atriplex triangularis	Spearscale	Chenopodiaceae	
Avena sativa	Cultivated oats	Aveneae	
Baccharis pilularis	Coyote brush	Asteraceae	
Brassica rapa	Mustard	Brassicaceae	
Bromus diandrus	ripgut brome	Poaceae	
Bromus hordeaceus	Softchess brome	Poaceae	
Calandrinia ciliata	Red maids	Portulacaceae	
Calystegia macrostegia	Coast morning glory	Convolvulaceae	
Camissonia ovata	Suncups	Onagraceae	
Capsella bursa-pastoris	Shepherd's purse	Brassicaceae	
Cardaria spp. (draba?)	Hoary cress	Brassicaceae	need seeds to i.d.
Carpobrotus chilensis	Ice plant	Arzoaceae	
Centaurea melitensis	Tocalote	asteraceae	
Chamomilla suaveolens	pineapple weed	Asteraceae	
Chenopodium album	lambs quarter	Chenopodiaceae	
Chlorogalum spp.	Soap root	Liliaceae	
Cirisium vulgare	Bull thistle	Asteraceae	
Claytonia perfoliata	miner's lettuce	Portulacaceae	
Conium maculatum	Poison hemlock	Apiaceae	
Conium maculatum	Poison hemlock	Apiaceae	
Cotula coronopifolia	Brass buttons	Asteraceae	
Cupressus macrocarpa	Monterey Cypress	Cupressaceae	
Danthonia spp.	unident. stage	Aveneae	need seeds to i.d.
Distichlis spicata	Salt grass	Poaceae	
Distichlis spicata	Salt grass	Poaceae	
Eleocharis macrostachya	Spike rush	Cyperaceae	
Elymus trachycaulus ssp. trachycaulus	Creeping wild rye	Poaceae	
Elymus trachycaulus ssp. trachycaulus	Creeping wild rye	Poaceae	

Erodium cicutarium	Storksbill	Geraniaceae	
Eschscholzia californica var. californica	California poppy	Papaveraceae	
Foeniculum vulgare	Sweet fennel	Apiaceae	
Frankenia salina (grandifloria?)	Alkali heath	Frankeniaceae	
Geranium dissectum	Cut-leaved geranium	Geraniaceae	
Grindelia latifolia	Coastal gum plant	Asteraceae	
Hordeum brachyantherum	Meadow barley	Poaceae	
*Hordeum marinum ssp. gussoneanum**	Mediterranean barley	Poaceae	
Hordeum murinum	Barnyard foxtail	Poeceae	
Hordeum vulgare	Common barley	Poaceae	
Juncus bufonius	Toad rush	Juncaceae	
Juncus occidentalis	Western rush	Juncaceae	
Lolium multiflorum	Italian ryegrass	Poeceae	
Lotus strigosus	Bishop's lotus	Fabaceae	
Lupinus nanus	Sky lupine	Fabaceae	
Lythrum spp.	unident. stage	Loranthaceae	need flower to id
Malva parviflora	Cheese weed mallow	Malvaceae	
Medicago polymorpha	Bur clover	Fabaceae	
Melilotus indica	Sour clover	Fabaceae	
Melilotus officinalis	Yellow sweetclover	Fabaceae	
Oxalis pez-carpe	Sour clover	Oxalidaceae	
Picris echioides	Bristly ox-tongue	Asteraceae	
Plantago coronopus	Cut-leaved plantain	Plantaginaceae	
Plantago lanceolata	English Plantain	Plantaginaceae	
Plantago subnuda	Mexican Plantain	Plantaginaceae	
Poa Annua	Bluegrass	Poaceae	
Polygonum spp.	unident. stage	Polygonaceae	
Ranunculaceae californicus	California Buttercup	Ranunculaceae	
Raphanus sativus	Wild radish	Brassicaceae	
Rumex acetosella	Sheep sorrel	Polygonaceae	
Rumex conglomeratus	clustered dock	Polygonaceae	
Rumex crispus	Curly dock	Polygonaceae	
Scirpus americanus	three square	Cyperaceae	
Senecio vulgaris	Common groundsel	Asteraceae	
Silybum marianum	Milk Thistle	Asteraceae	
Sisymbrium officinale	Hedge mustard	Brassicaceae	
Sisyrinchium bellum	Blue-eyed grass	Iridaceae	
Sonchus oleraceus	Common sow-thistle	Asteraceae	
Spergularia marina	Salt-marsh sand spurry	Caryophyllaceae	
Stachys ajugoides var. ajugoides	bugle hedge-nettle	Lamiaceae	
Stellaria media	Common chickweed	Caryophyllaceae	

Taraxacum officinale	Common dandelion	Asteraceae
Thuja plicata	Western Red Cedar	Cupressaceae
Triphysaria eriantha ssp. Rosea	Johnny tuck	Scrophulariaceae
Urtica Urens	Dwarf nettle	Urticaceae
Vulpia bromoides	Six week fescue	Poeceae
Zantedeschia aethiopica	Cala lily	Araceae

Appendix 13 - Photo site locations at Wagner Parcel

SITE	Lat	Long
WAG 1	36.805282	-121.708465
WAG 2	36.805522	-121.708939
WAG 3	36.804575	-121.707150
WAG 4	36.804206	-121.706522
WAG 5	36.803754	-121.705823

Appendix 14 Photo sites at Calcagno Parcel

SITE	Lat	Long	PHOTOS	DESCRIPTION
CAL 1	36.79707	-121.76839	8	AT MORO COJO WHERE POWER LINES CROSS MORO COJO
CAL 2	36.79776	-121.76911	2	BELOW LOWER POST OF LARGE POWER POLE ONE PHOTO AT EITHER DIRECTION
CAL 3	36.79879	-121.77097	3	CORNER OF FENCE SE OF OWL BOX ONE IN EACH DIRECT
CAL 4	36.79919	-121.76798	6	OVERLOOKING W SWALE TO S OF DOLAN RD, LINED UP WITH TELEPHONE POLE
CAL 5	36.797398	-121.7657	5	ON SLOUGH SIDE OF METAL GATE
CAL 6	36.79754	-121.7652	10	FARM SIDE OF DOUBLE WOODEN X IN FENCE LOOING 360 DEGREES
CAL 7	36.79821	-121.76351	9	EDGE OF HILL BEFORE SLOPE, ZOOMED TO GET GOOD LOOK AT RESTORATION
CAL 8	36.79552	-121.76221	6	NEAR PROPOSED NEW FENCE END. START FACING S TOWARDS SLOUGH
CAL 9	36.79731	-121.76726	2	BETWEEN 1 AND 5 ALONG THE FENCH. 1 PIC IN EACH DIRECTION
CAL 10	36.79739	-121.76404	5	AT CORNER OF CURRENT GOOD FENCE END FACING RESTORATION AREA
CAL 11	36.79911	-121.76428	4	UNDER PHONE POLE FACING ROAD
CAL 12	36.79988	-121.76766	5	UNDER PHONE POLE FACING ROAD

Appendix 15 – Faunal Survey conducted at Calcagno Parcel

Amphibians and Reptiles (observed during surveys)

Southern alligator lizard	*Elgaria multicarinatus*
Western Fence Lizard	*Sceloporus occidentalis**
Western terrestrial garter snake	*Thamnophis elegans*
Aquatic garter snake	*Thamnophis couchii aquaticus*
Gopher Snake	*Pituophis melanoleucus*

Western terrestrial garter snake	*Thamnophis elegans**

Birds

Pacific loon	*Gavia pacifica*
Western grebe	*Aechmophorus occidentalis*
Pied-billed grebe	*Podilymbus podiceps*
Brown pelican	*Pelecanus* occidentalis
Double-crested cormorant	*Phalacrocorax auritus*
Black-crowned night-heron	*Nycticorax nycticorax* *
Green-backed heron	*Butorides (striatus) virescens*
Snowy egret	*Egretta thula*
Great egret	*Casmerodius albus* *
Great blue heron	*Ardea herodias* *
Mallard	*Anas platyrhynchos* *
Gadwall	*Anas strepera* *
Cinnamon teal	Anas cyanoptera *
Ruddy duck	*Oxyura jamaicensis*
American coot	*Fulica americana* *
Black-necked stilt	*Himantopus mexicanus* *
American avocet	*Recurvirostris Americana* *
Killdeer	*Charadrius vociferus* *
Western gull	*Larus occidentalis*
Elegant tern	*Sterna elegans*
Caspian tern	*Sterna caspia*
Turkey vulture	*Cathartes aura**
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle	*Aquila chrysaetos*
Peregrine falcon	*Falco peregrinus*
American kestrel	*Falco sparverius* *
California quail	*Callipepla californica*
Rock dove	*Columba livia* *
Band-tailed pigeon	*Columba fasciata*
Mourning dove	*Zenaida macroura*
Barn owl	*Tyto alba*
Great horned owl	*Bubo virginianus*
White-throated swift	*Aeronautes saxatalis*
Anna's hummingbird	*Calypte anna*
Allen's hummingbird	*Selasphorus sasin*
Belted kingfisher	*Ceryle alcyon*
Downy woodpecker	*Picoides pubescens*
Black phoebe	*Sayornis nigricans*
Says phoebe	*Sayornis saya*
Tree swallow	*Tachycineta bicolor*

Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stegidopteryx serripennis*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica* *
Scrub jay	*Aphelocoma coerulescens* *
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Wrentit	*Chamaea fasciata*
Chestnut-backed chickadee	*Parus rufescens*
Bushtit	*Psaltriparus minimus*
Marsh wren	*Cistothorus palustris*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
Wilson's warbler	*Wilsonia pusilla*
Rufous-sided towhee	*Piplio erythrophthalmus*
California towhee	*Piplio crissalis*
Song sparrow	*Melospiza melodia* *
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed junco	*Junco hyemalis*
Western meadowlark	*Sturnella neglecta* *
Red-winged blackbird	*Agelaius phoeniceus* *
Brewer's blackbird	*Euphagus cyanocephalus* *
Brown-headed cowbird	*Molothrus ater*
Northern oriole	*Icterus galbula*
House sparrow	*Passer domesticus* *
American goldfinch	*Carduelis tristis*
House finch	*Carpodacus mexicanus* *

Mammals

Botta's pocket gopher	*Thommomys bottae (*burrow*)*
Brush rabbit	*Silvilagus bachmanni*
California deer mouse	*Peromyscus maniculatus*
California vole	*Microtus californicus* *
Beechey ground squirrel	*Spermophilus beecheyi* *
Coyote	*Canis latrans*
Feral cat	*Felis domesticus* *
Red fox	*Vulpes vulpes*
Gray Fox	*Urocyon cinereoargenteus*
Opossum	*Didelphis virginianus*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitus mephitus*

Appendix 16 - Match sources of funding

	Donating Party	Location	Service	Amount
Personnel Services				
	Susan Wagner	Walker Valley Road Property	Access Coordination	$ 2,400
	Jo Guerrero	Walker Valley Road Property	Access Coordination	$ 2,400
	GraniteRock Inc	Dolan Rd parcel	Permits, Management, monitoring	$10,000
	Coastal Conservation and Research Inc	Dolan Rd parcel	Greenhouse, Personnel, Facilities	$15,000
	Louis Calcagno	Moonglow Parcel	Personnel, Access	$10,000
	Louis Calcagno	Moro Cojo Parcel	Personnel, Access	$10,000
	Moss Landing Marine Labs	MLML	Open House Personnel, Facilities	$10,000
	Creative Environmental Conservation Inc	Dolan Rd, Moonglow	Personnel	$ 9,260
			TOTAL	$69,060
Construction				
	Creative Environmental Conservation Inc	Dolan Rd, Moonglow	Planting, Weed Control	$ 8,000
	Louis Calcagno	Moro Cojo Parcel	Earthmoving, Fence Repair	$ 7,000
	Louis Calcagno	Moro Cojo Parcel	Earthmoving, Fence Repair	$10,000
	Jo Guerrero	Walker Valley Road Property	Bridge Construction	$ 5,000
			TOTAL	$30,000

Section 1 - Project Assessment and Evaluation Plan, Monitoring Plan, and Quality Assurance Project Plan

1.2 Project Assessment and Evaluation Plan (PAEP)

Project Summary

A. Funding Program:

The Project is supported by the Federal Clean Water Act Section 319 (h) as part of the Agricultural Water Quality Grant Program and local matching funds.

B. Project Description:

The low quality and quantity of freshwater is the most serious environmental problem in California and most of the world. Restoration of the core of natural water systems is the most important positive action to the freshwater crisis. In the Salinas Valley and much of California, the natural water systems flow through three major landscapes: urban, agriculture, and rural residential regions. This project will establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape, which involves many more landowners than the rural agricultural setting. Each parcel contains a relatively small section of the natural wet corridor. This project develops and tests a tax incentive system for these many rural residential landowners to participate in wetland restoration, and commences restoration where landowners choose to participate. The proposed model for gaining landowner participation can apply statewide and beyond.

The Project focuses on the water systems in the upper watersheds of the Moro Cojo and Tembladero Sloughs in the Prunedale Hills. The first target area involves a series of highly degraded, but restorable small creeks (Walker, Paradise, and Castroville Creeks) flowing into the slough from the adjacent Prunedale Hills. This historically rich system of connected creeks, marshes, and small lakes is completely confined to ditches, which keep the wet corridors dry and highly degraded. Our primary target is 20 miles of waterway, with an eventual target of hundreds. The restoration methods are well tested and consist primarily of fencing the easement, plugging the ditch to allow water to spread over the natural wet area, and establishing native plants while controlling exotic weeds. Monitoring will consist of water quality measurements, vegetation surveys, photographic documentation, and faunal surveys. Education and outreach are integral to project implementation. Benefits of the project include slowing the flow of water into downstream reaches resulting in increased percolation into the watershed and reduced downstream flooding, reduced erosion and sediment input into the downstream reaches of the watershed (and associated nutrients and pesticides). These are important services provided by a healthy natural water system.

C. Problem Statement:

i. Identify or characterize baseline data

The movement of water from the land to the sea is radically modified from natural conditions. This historically rich system of connected creeks, marshes, and small lakes is completely confined to ditches, which keep the wet corridors dry and highly degraded. Unvegetated wet corridors and steep, unstable slopes lead to increased erosion and habitat loss. Thousands of acres of wetlands are ditched and dried, reducing flood and natural water quality control and the groundwater recharge necessary to forestall saltwater intrusion. The Salinas Valley is facing a severe lack of water caused by decades of over pumping water supply wells, which is the primary cause of the extensive salt water intrusion into Monterey Bay area aquifers (Greene 1970, Johnson 1983). This is the most significant intrusion along the west coast. These hills contain many small farms, mostly growing strawberries, embedded within the rural residential neighborhoods. In addition, they harbor thousands of large grazing animals. Cattle, horses, and goats are the most abundant.

The valley's water quality is among the worst in the state (Ladd et al. 1984, Watkins et al. 1983, Oliver et al. 1997). Nonpoint source pollutants to receiving waters include nutrients, pesticides, pathogens, and excessive sediment. Elevated levels of contamination from persistent pesticides such as DDT, PCBs, dieldrin, and endosulfan have been reported from sediment and/or shellfish tissue for Moro Cojo Slough, Tembladero Slough, and Moss Landing Harbor. These sites are candidates for the Toxic Hot Spot List, and these waterways drain into the Monterey Bay National Marine Sanctuary. Moro Cojo and Tembladero Sloughs have been identified as impaired water bodies and are listed as such on the State Water Resources Control Board approved list of water bodies that do not meet water quality standards (Section 303d of the Clean Water Act 1972), due to problems associated with pesticides and sedimentation. Three Total Maximum Daily Load (TMDL) action plans (low dissolved oxygen, pesticides, and sedimentation/siltation) are scheduled for this watershed to address high levels of nickel, dieldrin, total DDT, toxaphene, and PCBs present in Moro Cojo Slough along with measurable levels of dacthal, endosulphan, and heptachlor epoxide. Tembladero Slough is also scheduled for three TMDLs (fecal coliform, nutrients, and pesticides). At the receiving end of the watershed is Moss Landing Harbor, a State listed Toxic Hot Spot, also on the 303(d) list and scheduled for three TMDLs (pathogens, pesticides, and sedimentation/siltation). In the harbor, deep water, sparse aquatic vegetation, and very high chemical concentrations combine to produce a setting where biological and physical processes that would degrade many of these toxins cannot function. Pesticides detected in exceedence levels at the Harbor include PCBs, tributyltin, dieldrin, total DDT, chlordane, toxaphene, and nickel, among others.

ii. Identify pollution source categories

See C.i. above.

iii. Identify and describe current restoration activities; BMPs; load reduction activities; prevention activities

While the project is its own discrete project, it is also the next phase of several ongoing efforts. Since 1995, dozens of partners, including Creative Environmental Conservation, Moss Landing Marine Laboratories, and the Watershed Institute have been joining forces to implement wet corridor restoration projects throughout the Northern Salinas Valley, focusing on Agricultural and Urban areas of the Salinas River, the Gabilan Watershed, Moro Cojo Slough, and Fort Ord. The project will continue these efforts to restore the watershed by including the rural residential landowners.

iv. Describe the manner in which the proposed best management practices or management measures will be implemented

The project develops and tests an incentive system for these many rural residential landowners to participate in wetland restoration, and commences restoration where landowners want to participate. The proposed model for gaining landowner participation can apply statewide and beyond. The first incentive will be an education outreach program, targeting ten parcels and landowners along some of the most restorable sections of the natural water system. For each target parcel, the natural water system will be described in its degraded form and in a restored form. We will also introduce the landowner to the federal and state habitat conservation easement programs. This pilot project also provides a very powerful additional incentive in the form of property tax write-offs that many landowners can understand more easily than an easement. As the upper watershed project becomes viable and accessible, it will be expanded to the entire upper Gabilan watershed to extend the work currently being implemented.

Design, landform changes, hydrologic assessment, and monitoring will be based on the conditions of the topography, geology, hydrology, wildlife and vegetation established at each site during baseline surveys, that will also ensure avoidance of negative impacts to existing natural resources. After a landowner agrees to participate, the easement area is fenced to keep grazing animals out. Then the ditch is plugged to spread water over the natural low area, the former creek and marsh system. This ecological engineering approach has been used successfully in restoration projects with the Watershed Institute and MLML throughout the Salinas Valley. Native plants will then be established in all project areas while non-native invasive weeds are controlled.

The Project directly implements the SWRCB's State of California Nonpoint Source Program Five-Year Implementation Plan, July 2003 through 2008 through the installation and demonstration of agricultural management measures (specifically, Erosion and Sediment Control; Education/Outreach), hydromodification management measures (Channel Modification-Instream and Riparian Habitat Restoration; Streambank and Shoreline Erosion; Education/Outreach), and through measures to protect and restore wetlands and riparian areas, and to install vegetated treatment systems (Protection and Restoration of Wetlands/Riparian Areas; Vegetated Treatment Systems; Education/Outreach). Management measures will include the following practices: sediment and water retention basins, grassed waterways, filter strips, critical area plantings, streambank stabilization projects, as well as the restoration of riparian ecosystems.

v. Summarize how the effectiveness of the proposed practices or measures in preventing or reducing pollution will be determined

The main goal of our monitoring program will be to quantify the effectiveness of the restored areas to improve several parameters of water quality and wetland resources. We will measure effectiveness of the project by quantifying the condition and ecological function of the restored habitats using a variety of standardized methods and protocols. Pre-restoration conditions will be documented as sites become available. Water quality and other sampling is well coordinated among different groups that sample in the watershed. The field and laboratory protocols for monitoring have been established by the Watershed Institute and their partners, and will conform to the standard procedures set by the State and Regional Water Quality Control Boards. Photographic documentation will also based on the standard procedures established for these projects. Ecological data will be gathered using statistically robust standard scientific procedures. All project data will be in a regional database compatible with and made accessible to SWRCB, SWAMP, and US EPA databases. This dataset will be evaluated within the context of an existing database of water quality measurements collected by the California Department of Fish and Game Marine Pollution Studies Group at Moss Landing Marine Laboratories.

Water quality and flow will be measured at a minimum of 10 samples at 2 sites, above and below the reach of the restoration site, as the wetland restoration progresses, and during a range of flow conditions for a minimum of 10 samples. Analytes will include suspended sediments, nutrients (primarily nitrates), dissolved oxygen, trash / debris / floatables, pathogens, pH, salinity / TDS / chlorides, and sulfates. Metals and organic compounds (pesticides, herbicides, hydrocarbons) will be measured from water and/or sediment or from the tissues of bivalves deployed in a mussel watch protocol. Ground water salinity and nutrients will be measured from central locations. Protocols for monitoring will be completely described in the Project Assessment and Evaluation Plan, and will be similar to those described in 'Protocols for Water Quality and Stream Ecology Research' (Watson et al. 2002).

Development of plant cover and wetland habitats provide an important measure of the success of restoration. The total area and condition of restored wetland and upland habitats will be quantified through a variety of means, including time series of aerial photographs, GPS/GIS mapping at each site; spatial data will be collected with GPS and inserted into a GIS database. On the ground vegetation surveys will be conducted seasonally at each site to monitor species diversity and extent of native cover. These surveys will inform the development and adaptation of management strategies that aim to eliminate weeds and encourage native stands. Periodic surveys will be made for birds, and amphibians and mammals. Rapid bioassessments using aquatic invertebrates will be done at selected sites using general protocols from Karr and Chu (1999) and modified with the results from ongoing work of Jim Harrington (CDFG Water Pollution Laboratory), researchers at Moss Landing Marine Laboratories (Benthic Lab), and RWQCB staff. Benthic invertebrate communities provide the best index of ecosystem health in freshwater and marine environments.

These realistic, quantitative data will be used to establish ecological baselines, demonstrate restoration success, evaluate watershed problems, and teach the public. By analyzing these data we can adapt our techniques and strategies during the course of the project, which improves the anticipated results of the project. We also have designed our monitoring program to enhance and build on data collected during

previous restoration projects. The results of the monitoring program will also be used to identify areas of needed research and additional monitoring that will benefit this and future projects. One of the most important outcomes of this task will be the collection of data that will enable us to communicate techniques and methods that will result in the continued successful restoration of wet corridors and improved water quality. The methods been used extensively in similar projects and have been found to work well in these settings to produce valuable and standardized data. The results of our monitoring program will, in these ways, help ensure ongoing and widespread implementation.

The final evaluation of the project will be based on the effectiveness of utilizing conservation easements and other tax incentives to increase rural residential participation in watershed restoration and conservation. The assessment will be based on the number of landowners and properties involved in the project.

vi. Determine "changes in flow pattern" in affected water bodies.

N/A

vii. Determine economic benefits of implementing the project.

N/A. Not a requirement of AWQGP.

D. Project Activities or Tasks*:*

1. Project Assessment and Evaluation Plan, Monitoring Plans, Quality Assurance Project Plan

1.1 In order for the Regional Water Quality Control Board (RWQCB) staff and SWRCB staff to verify work was adequately performed or conducted, Global Positional System (GPS) locations for monitoring must be identified for this Project prior to any disbursements.

1.2 All projects are required to prepare and implement a Project Assessment and Evaluation Plan (PAEP) (aka Project Monitoring and Performance Plan) to detail the methods of measuring Project benefits and reporting them in accordance with a PAEP. Many projects include multiple activities that will require measurement of several parameters to evaluate Project performance. All implementation projects that propose pollution load and/or concentration reductions must report such reductions annually. Projects protecting, restoring or creating streams, shorelines, or wetlands, must report an annual accounting of the acres of wetlands restored and created, feet of streambank and shoreline protected and feet of stream channel stabilized. The Grant Manager shall approve the PAEP prior to implementation of monitoring and performance assessment and/or evaluation actions. Guidance for preparing the PAEP is available at http://www.waterboards.ca.gov/funding/paep.html.

1.3 If water quality monitoring (chemical, physical, or biological) is undertaken, the Grantee shall prepare, maintain, and implement a Monitoring Plan (MP) as described on Page 9 of the Agricultural Water Quality Grant Program Guidelines (August 26, 2004). The MP shall include, but is not limited to, a description of the monitoring objectives, types of constituents to be monitored, and the sampling location frequency/schedule for the monitoring activities. The Grant Manager shall approve the MP prior to implementation of any sampling or monitoring activities. The MP will include the schedule for submittal of monitoring reports. No monitoring may occur prior to MP approval. The Grant Manager must approve any changes to the MP prior to implementation.

1.4 If an MP is prepared, the Grantee shall also prepare, maintain, and implement a Quality Assurance Project Plan (QAPP) in accordance with the SWRCB's Surface Water Ambient Monitoring Program's (SWAMP) QAPP and data reporting requirements, and the USEPA

QAPP, EPA AQ/R5, 3/01. Water quality monitoring data includes physical, chemical, and biological monitoring of any surface water. Electronic submittal of data collected in accordance with SWAMP shall be required. The QAPP shall be approved by the Regional Water Quality Control Board's (Regional Water Board) or SWRCB's Quality Assurance (QA) Officer prior to implementation of any sampling or monitoring activities. No monitoring may occur prior to QAPP approval. Any costs related to monitoring data collected prior to and not supported by the approved QAPP will not be reimbursed. Guidance for preparing the QAPP is available at http://www.waterboards.ca.gov/swamp/qapp.html.

2. Work To Be Performed by Grantee

2.1 Conduct education and outreach to landowners

2.1.1 Target a minimum of 12 (twelve) parcels and landowners along some the most restorable sections of the natural water system.

2.1.2 Identify participants for implementation.

2.1.3 Describe the target areas in restored and degraded form.

2.1.4 Utilize successful examples of restoration and computer generated images of target areas to visualize final results.

2.1.5 Educate landowners about the federal and state habitat conservation easement programs.

2.2 Establish baseline conditions and design restoration projects to be implemented

2.2.1 Develop geographical information system (GIS) based maps of the sites.

2.2.2 Design restoration projects to be implemented.

2.3 Native plant propagation

2.3.1 Collect seeds from Project area and propagate native plants to be used in Project implementation.

2.3.2 Propagate native plants at Moss Landing Marine Lab, Watershed Institute and local school's greenhouses.

2.4 Implement Project

2.4.1 Procure signed landowner agreements allowing access to perform restoration implementation and monitoring on the properties.

2.4.2 Keep grazing animal out by fencing the easement.

2.4.3 Implement a range of BMPs at participating properties.

2.4.4 Plug the ditched waterway to allow water to spread over the natural low area.

2.4.5 Establish native plants while simultaneously controlling noxious weeds.

2.5 Demonstrate the value of restoring wet ecosystems in the rural residential landscape to landowners and other stakeholders

2.5.1 Conduct a minimum of two (2) workshops a year.

2.5.2 Involve numerous landowners with whom we currently cooperate on watershed management and water quality monitoring projects.

2.5.3 Present monitoring results and ongoing status of restoration at conferences and meetings at least 2 (two) times a year.

2.6 Monitor Water Quality

2.6.1 Measure streamflow and conduct water quality sampling above and below the restoration site. Measurements will be taken before and after implementation of the restoration project, and during a range of flow conditions. Analysis will include suspended sediments, nutrients (primarily nitrates), dissolved oxygen, trash/debris/floatables, pH, and salinity/TDS/chlorides

2.6.2 Measure ground water salinity and nutrients from central locations.

2.6.3 Submit a written report analyzing and summarizing all water quality data collected.

2.7 Conduct Vegetation Surveys

2.7.1 Obtain annual aerial photographs of each waterway and incorporate into GIS database.

2.7.2 Conduct annual on the ground vegetation surveys at each site to monitor diversity, population densities, and extent of native cover.

2.7.3 Map wetland vegetation, location of plantings, and areas seeded with GPS. Update these maps annually.

2.7.4 Maintain plant species list for each site.

2.7.5 Submit a written report analyzing and summarizing all vegetation survey data collected.

2.8 Conduct Pre, During and Post Photo Documentation in Accordance with SWRCB Guidelines

2.8.1 Annotated Photos demonstrating management measure implementation and project effectiveness. Photos will be taken before, during, and after implementation, and annually thereafter.

2.9 Conduct Faunal Surveys

2.9.1 Conduct quarterly surveys of mammal, reptile, and amphibian species present.

2.9.2 Contact the California Department of Fish and Game and the Watershed Institute about adding these sites to the rapid bioassessment survey to ensure regional consistency of data quality and to maximize information content.

2.9.3 Maintain species list for each site.

2.9.4 Submit a written report analyzing and summarizing all faunal survey data collec*ted*

2.10 Draft and Final Project Reports

2.10.1 Prepare and submit to the Grant Manager a draft Project Report for review and comment that includes and addresses the following narrative sections and items:

a. A summary of the Project, describing Project purpose, scope and goals, activities completed, techniques used and partners involved.

b. A report of all monitoring and management practices or management measures implemented, together with their corresponding locations. The report shall be in a format that enables the Grant Manager to find the physical location of each implemented practice or measure and/or monitoring event in a quick and efficient manner. Acceptable formats include, but are not limited to:

   - Map of locations – The map of practices or measures implemented shall consist of dots placed on a USGS 7.5-minute quadrangle map at the implementation location. Lead lines shall be connected to a text box description of the practice or measure. The dots shall have a small enough diameter to enable the Grant Manager to locate the measure or practice within a 50-foot radius.

   - Project coding system – The project coding system shall explain the product coding used to describe each implemented practice or measure, together with its corresponding latitude and longitude.

c. Describe Project performance, including benefits, successes and shortcomings, consistent with the PAEP. Enumerate specific quantifiable environmental changes and results of the Project. As appropriate, include 1) behavioral results such as the amount of management practices or measures implemented, 2) estimates or measurements of the amount of pollutants prevented from reaching surface or ground water, and 3) documented changes in water quality based on monitoring.

d. Identify lessons learned in carrying out the Project. Describe what worked and what did not work, and how similar efforts could be utilized within the Project area, as well as in other watersheds.

e. Describe the extent of outreach that has been conducted and if there are plans to further promote the results of the Project to achieve additional implementation.

f. Describe the Project's funding. Include the projected cost and actual cost of the Project, how much of the grant funds were spent, and how much funding was put into the Project from sources other than CWA Section 319(h). Identify funding sources that have been "leveraged" by the Project and plans for funding future activities.

g. Identify planned or potential follow-up activity, such as any additional steps necessary to achieve the water quality objectives, Total Maximum Daily Loads (TMDL) or local watershed plans.

h. Include appropriate photos and graphics.

i. A list of items submitted as outlined in the Table of Items for Review.

j. Any additional information that is deemed appropriate by the Project Director or Grant Manager.

2.10.2 Prepare a final Project Report that addresses, to the extent feasible, comments made by the Grant Manager on the draft final Project Report. Submit one (1) reproducible master, two (2) copies, and an electronic copy of the final.

E. Category of Project Activities or Tasks*: Indicate which of the following categories your activities correspond to.*

1) *Planning, Research, Monitoring and Assessment*
2) *Education, Outreach, and Capacity -building*
3) *Habitat Restoration*
4) *Load Reduction*

Planning, Research, Monitoring and Assessment:

Tasks 2.6, 2.7, 2.8, 2.9, and 2.10.

Education, Outreach, and Capacity Building:

Tasks 2.1, 2.3.2, and 2.5.

Habitat Restoration:

Tasks 2.2, 2.3, and 2.4.

Load Reduction:

Tasks 2.2, 2.3, and 2.4.

II. Project Goals & Desired Outcomes

The goals of this project are:

8. Educate landowners and the public as to the importance of wetland habitats and their functions
9. Ensure ongoing and widespread implementation of the management measures long after the project period has ended
10. Educate landowners about the federal and state habitat conservation easement programs
11. Restore wet corridors (wetland and upland habitat) in the upper watersheds of the Moro Cojo and Tembladero Sloughs
12. Reduce non-point source pollution entering and exiting the watershed, particularly sediments, nutrients, and pesticides
13. Increase coverage of native vegetation
14. Increase habitat for invertebrates and vertebrates associated with wetland habitats

The desired outcomes of this project are:

1. Increased knowledge amongst landowners in the watershed as to the importance of wetland habitats and functions
2. Restore wet corridors within a continually increasing number of parcels
3. Widespread knowledge of and enrollment in the conservation easement programs
4. Restoration of a minimum of 12 parcels in the watersheds
5. Increase in BMP/restoration implementation in the watersheds
6. Reduction in nutrients, sediments, and pesticides entering the watershed or leaving into Moss Landing Harbor and Monterey Bay
7. Increased native wetland, riparian, and upland vegetation in the watershed
8. Increased native wetland habitat

Table 1: Project Performance Measures for Planning, Research, Monitoring, or Assessment Activities in *Restoring Natural Water Systems in Rural Residential Landscapes*

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
1. Educate landowners and the public as to the importance of wetland habitats and their functions	1. Increased knowledge amongst landowners in the watershed as to the importance of wetland habitats and functions	1. No. of groups and individuals that have participated in education and outreach programs 2. No. of workshops, conferences, and meeting presentations	1. No. of landowners contacted and participating in project 2. Broad/Increased understanding about non-point source pollution, wetlands, and the local watershed	1. Documentation of the activities listed	1. Minimum of 2 workshops per year 2. Present monitoring results and ongoing status of restoration at conferences and meetings at least 2 times per year
2. Ensure ongoing and widespread implementation of the management measures long after the project period has ended	1. Restore wet corridors within a continually increasing number of parcels	1. No. of landowners contacted and participating in project	1. No. of landowners participating in the project beyond the original participants	1. Documentation of the activities listed	1. Minimum of 10 landowners participating in project at the end of the project period. 2. 10% yearly increase in participation during the project period.
3. Educate landowners about the federal and state habitat conservation easement programs	1. Widespread knowledge of and enrollment in the conservation easement programs	1. No. of landowners contacted and participating in project	1. No. of landowners contacted and participating in project 2. % increase in landowners participating in conservation easement programs	1. Documentation of the activities listed	1. 10% yearly increase in participation during the project period.
4. Restore wet corridors (wetland and upland habitat) in the upper watersheds of the Moro Cojo and Tembladero Sloughs	1. Restoration of a minimum of 12 parcels in the watersheds	1. No. of landowner agreements granting access to perform restoration/BMP implementation and monitoring 2. No. of acres of land restored 3. No. of linear wet corridor restored	1. % of each watershed segment restored Reestablishment of riparian vegetation	1. Documentation of the activities listed 2. GIS/GPS 3. Aerial Photography 4. Photopoint monitoring (http://www.waterboards.ca.gov/nps/docs/cwtguidance/4214sop.doc)	1. Minimum of 10 parcels with restored wet corridors at the end of the project period

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
5. Reduce non-point source pollution entering and exiting the watershed, particularly sediments, nutrients, and pesticides	1. Increase in BMP/restoration implementation in the project area 2. Reduction in nutrients, sediments, and pesticides entering the watershed or leaving into Moss Landing Harbor and Monterey Bay	1. No. of landowner agreements granting access to perform restoration/BMP implementation and monitoring 2. No. of acres of land restored 3. No. of linear wet corridor restored	1. % reduction in sediment, nutrients, and pesticides	1. Individual methods described in the project's Quality Assurance Project Plan	1. 50% reduction in water quality indicators (sediment, nutrients, pesticides) from the reach upstream to the reach downstream of the restored area. 2. 10% yearly increase in acres and length of land restored. 3. 10% yearly increase number of landowners participating in the project.
6. Increase coverage of native vegetation	1. Increased native wetland, riparian, and upland vegetation in the watershed	1. Amount of native habitat restored 2. No. of acres of land restored 3. No. of linear wet corridor restored	1. % increase in native vegetation 2. % decrease in invasive species 3. % increase in native species diversity	For example: http://www.dfg.ca.gov/hcpb/species/stds_gdl/survmonitr.shtml Photopoint monitoring (http://www.waterboards.ca.gov/nps/docs/cwtguidance/4214sop.doc) Species surveys	1. 100% increase in native vegetation on restored sites 2. Minimum 50% decrease in invasive species on restored sites 3. 50% increase in native species diversity on restored sites
7. Increase habitat for invertebrates and vertebrates associated with wetland habitats	1. Increased native wetland habitat	1. Amount of native habitat restored 2. No. of acres of land restored 3. No. of linear wet corridor restored	1. % increase in native species diversity 2. Improvement in habitat condition 3. % increase in vertebrate and invertebrate diversity	For example: http://www.dfg.ca.gov/hcpb/species/stds_gdl/survmonitr.shtml Photopoint monitoring (http://www.waterboards.ca.gov/nps/docs/cwtguidance/4214sop.doc) Species surveys	1. 50% increase in species diversity on restored sites

1.3 Monitoring Plan (MP)

Preface

This Monitoring Plan is largely copied from the Monitoring Plan prepared for Grant #01-140-553-0, Implementation of the Moro Cojo Slough Management and Enhancement Plan: Restoration of the Core of the Watershed, prepared by Coastal Conservation and Research.

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I. State the water quality problem

Baseline data

Our project will establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape, which involves many more landowners than the rural agricultural setting. Each parcel contains a relatively small section of the natural wet corridor. Our project will implement a portion of the County adopted Moro Cojo Slough Management and Enhancement Plan (Habitat Restoration Group, 1996). This project will provide information about the physical state of several wetland sites in the Moro Cojo and Tembladero Slough watersheds. These watersheds have been shown to have high levels of pesticides (Regional Water Quality Control Board Central Coast Region, 1997; State Water Resources Control Board, 1999), sediments, and nutrients (AMBAG 1996; Regional Water Quality Control Board Central Coast Region 1997; State Water Resources Control Board 1999; Watershed Institute 1996).

This project will monitor the impact restored and enhanced wetland and adjacent upland habitats have on reducing non-point source pollution. We will monitor water quality as well as the flora and fauna in these sites. This project will also develop restoration and enhancement plans for implementation for a minimum of 12 (twelve) parcels within the upper Moro Cojo and Tembladero Slough watersheds. Water quality will be used to determine the ability of wetlands to serve as biological filters for non-point source pollution. The presence of native flora and fauna will be monitored over time and used as a gauge for wetland health.

Potential sources

The primary source of non-point pollution (nutrients and pesticides) is presumed to be a result of runoff from surrounding homes, with grazing animals (primarily cattle, horses, and goats) and roadside run-off contributing to the increased levels of pollutants.

II. Propose Solution (Project Implementation and/or Watershed Level Monitoring)

This project will monitor current levels of nutrients and pesticides in the upper Moro Cojo and Tembladero Slough Watersheds (Figure 1), implement wetland restoration and enhancement projects (Figure 2), and monitor the ability of wetlands to reduce non-point source pollution. This project will also develop and implement restoration and enhancement plans for implementation for participating

landowners. Water quality will be used to determine the ability of wetlands to serve as biological filters for non-point source pollution. The presence of native flora and fauna will be monitored over time and used as a gauge for wetland health. The implementation of nutrient and pesticide monitoring and wetland enhancement will allow us to gauge the effectiveness of wetlands to serve as biological filters for reducing nutrient and pesticide concentrations. We will monitor nutrient concentrations (nitrate, ammonia, and phosphorous) and pesticide concentrations (pyrethroids, organophosphates, and organochlorines) at inflow and outflow sites. Our data will be of interest and use to local landowners and state agencies in their efforts to document and reduce non-point source pollution into the Moss Landing Harbor and Monterey Bay.

III. Objectives

A) To assess the effects of wetland habitat on reducing nutrient, turbidity, and pesticide runoff from surrounding rural residential lands.

B) Enhance wetland habitat throughout the Moro Cojo and Tembladero Slough Watersheds

C) Document species diversity in enhanced/created wetland habitats

D) Applicability of anticipated results and limitation/disadvantages of our design

IV. Sampling Design

We reiterate our objectives (A-C) and provide a detailed description of our survey designs. We also discuss the applicability of our anticipated results and the limitation/disadvantages of our design (D).

A) To assess the effects of wetland habitat on reducing nutrient, turbidity, and pesticide runoff from surrounding rural residential lands.

To test the effectiveness of wetlands to reduce nutrient and pollution concentrations we will examine nutrient, turbidity, and pesticide concentrations at the inflow and outflow of selected restored reaches; a minimum of 10 samples at 2 sites. Sampling will be incorporated into a large-scale existing project. T-tests will be used to examine mean differences in concentrations at each sampling interval. Nutrient and turbidity samples will be recorded two times per month at each site. Samples will be collected twice monthly throughout the project period. To evaluate trends we will use a Seasonal Kendall test to test for gradual changes in observations taken throughout the study.

Pesticide samples will be taken less frequently due to the high costs of analyses. Sampling events for pesticides will be based on weather conditions. We will collect pesticide samples at the end of the dry season as well as during the first significant rain event. This sampling strategy will allow us to capture variation in pesticide concentrations among seasons. Furthermore, it is likely that pesticide and nutrient accumulation during the growing season has the greatest opportunity to be entrained in runoff. Samples will be analyzed for multiple current and legacy pesticides using broad spectrum GCMS scans (see appendices I-III for specific pesticides that will be tested for).

We will use a T-test to test for differences in nutrient (Nitrate, ammonia, and phosphorus) and pesticide concentrations as well as turbidity levels and water quality parameters (pH, dissolved oxygen, conductivity, temperature, and salinity) between inflow and outflow locations at the restored reaches. Our sampling schedule will consist of samples taken every other Tuesday; however, we will vary our schedule in order to take advantage of rain events. These sampling events will be based entirely upon rain events and will take place in order to quantify potential spikes in run-off.

B) To enhance wetland habitat throughout the Moro Cojo and Tembladero Slough Watersheds

We will work towards implementing portions of the Moro Cojo Slough Management and Enhancement Plan. Restoration will continue in the areas where restoration efforts have been implemented over the past 6 years as well as new regions in the watershed. Effects of wetland enhancement and restoration will be gauged by measuring nonpoint pollution concentrations at inflow and outflow sites (Section *A* above) as well as monitoring species diversity (Section *C* below).

C) Document species diversity in enhanced/created wetland habitats

We will monitor species diversity (flora and fauna) at each site. Measuring species diversity serves as a surrogate for wetland health and function. Diversity will be quantified simply as the number of species present (or species richness). Our goal is to detect which species are using the sites and document changes in the pattern of species presence/absence at each site over time.

Plants—We will conduct seasonal on the ground vegetation surveys at each site in order to monitor plant diversity. Surveys will be focused on documenting species richness and thus will be conducted over the entire site rather than conducting small scale quadrat samples. We will also take annual aerial photographs of each site. We will georeference aerial images and use GIS to map vegetation and planting areas. Photo monitoring stations will be established at each site from fixed ground points to document

habitat development and vegetation patterns. Photos will be taken quarterly throughout the duration of the project.

Birds—We will conduct a minimum of three variable surveys for birds present at each reach, seasonally during the project period. Surveys will be conducted in the am hours.

Amphibians, reptiles, and mammals—We will conduct quarterly presence/absence surveys for amphibians, reptiles, and mammals at each reach using ocular, cover board, and time constrained searches.

Invertebrates—We will conduct quarterly surveys of aquatic invertebrates at each reach. Surveys will be conducted using a standardized dip net survey. The goal of our surveys will be to record species richness rather than density or abundance. Thus, sampling will take place throughout the water body at locations that maximize variation in habitat heterogeneity.

D) Applicability of anticipated results and limitation/disadvantages of our design

We anticipate that our project will enhance freshwater conditions in the Moro Cojo Slough, thus working towards achieving the objectives of the preferred goal of the Moro Cojo Slough Management and Enhancement Plan. In working towards achieving this goal our project will document how wetlands affect species diversity and serve as biological filters for non-point source pollution from surrounding upland habitats. The major disadvantage of our design is the temporal component. Although we will monitor water quality at multiple sites throughout the duration of this study, because of the relatively short time period of this project we may not detect the full effects of wetlands on non-point source pollution and enhanced species diversity. Wetland and surrounding upland habitats that will be restored during this project take time to mature (often many years) and the enhanced benefit of habitat creation/enhancement may not be fully realized until well after the termination of this project (December 31, 2008).

Figure 1. Overview of the Moro Cojo and Tembladero Slough Watersheds. Dotted-red line represents approximate watershed boundaries.

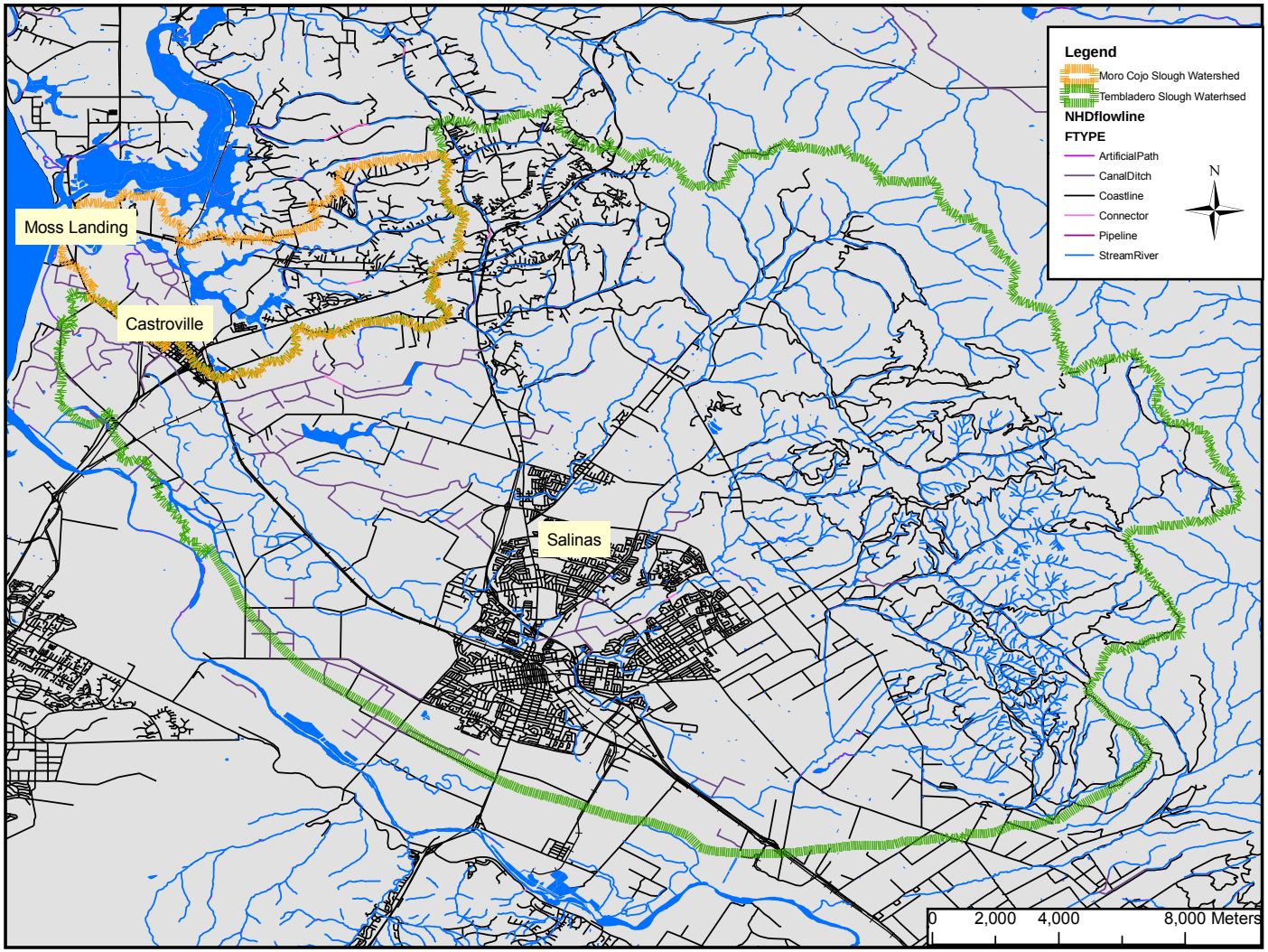
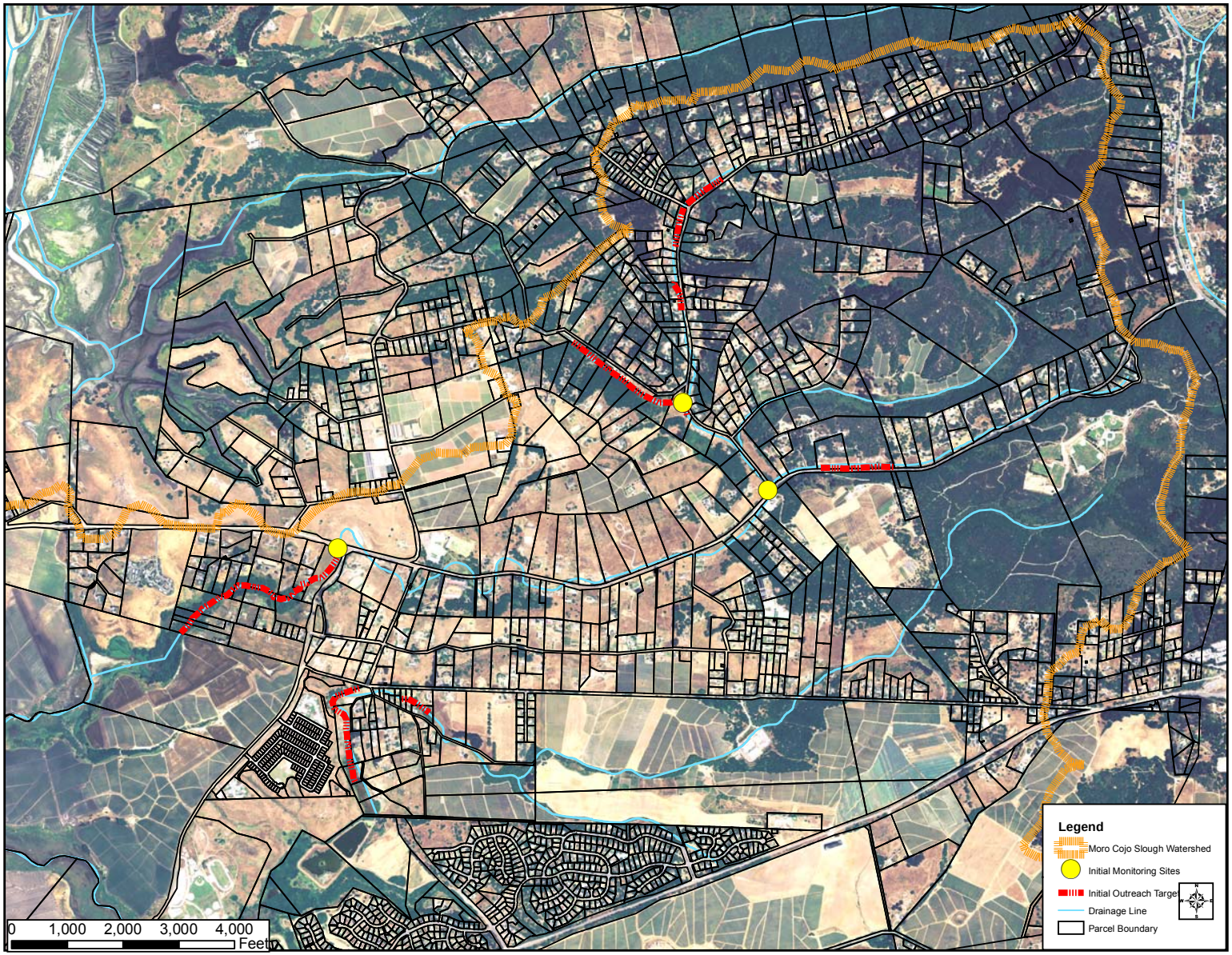


Figure 2. Map of parcels selected for initial landowner education and outreach, with current monitoring locations.



Appendix I. EPA 8141 pesticides that will be analyzed.

MDL Report
EPA 8141A

Code: $8141
Units: ug/L

Analyte	PQL	MDL	CL
Azinphosmethyl	5.0	0.488	31-145
Bolstar	0.5	0.0716	47-118
Chlorpyrifos	0.5	0.00259	45-124
Coumaphos	1.0	0.13	50-140
Demeton (Total)	1.0	0.08	17-107
Diazinon	0.5	0.00353	45-116
Dichlorvos	1.0	0.02	47-154
Dimethoate	0.5	0.08	63-147
Disulfoton	0.5	0.02	46-129
EPN	0.5	0.03	48-165
Ethoprop	0.5	0.0235	49-120
Fensulfothion	2.5	0.16	21-180
Fenthion	0.5	0.02	46-142
Malathion	0.5	0.05	61-136
Merphos	0.5	0.06	31-164
Mevinphos	3.5	0.0716	53-143
Naled	2.5	0.271	9-155
Parathion, ethyl	0.5	0.02	54-148
Parathion, methyl	0.5	0.0755	39-126
Phorate	0.5	0.0722	44-117
Ronnel	0.5	0.03	47-132
Stirophos	0.5	0.06	25-177
Sulfotep	0.5	0.02	49-138
Tokuthion	0.5	0.0216	26-143
Trichloronate	0.5	0.05	49-141
Surrogate: Tributylphosphate	56-129		56-129
Surrogate: Triphenylphosphate	52-121		52-121

Appendix II. EPA 8081A pesticides that will be analyzed.

MDL Report
EPA 8081A

Code: $8081
Units: ug/L

Analyte	PQL	MDL	CL
4,4'-DDE	0.05	0.004	64-120
4,4'-DDT	0.05	0.007	61-126
4,4'-TDE/DDD	0.05	0.003	67-116
a-BHC	0.05	0.005	45-125
a-Chlordane	0.05	0.007	63-112
Aldrin	0.05	0.009	46-117
b-BHC	0.05	0.008	59-116
d-BHC	0.05	0.005	30-130
Dieldrin	0.05	0.005	67-117
Endosulfan I	0.05	0.005	66-114
Endosulfan II	0.05	0.004	66-113
Endosulfan sulfate	0.05	0.005	63-109
Endrin	0.05	0.007	57-127
Endrin aldehyde	0.05	0.009	56-114
Endrin ketone	0.05	0.006	53-119
g-BHC (Lindane)	0.05	0.005	57-128
g-Chlordane	0.05	0.006	61-115
Heptachlor	0.05	0.008	46-121
Heptachlor epoxide	0.05	0.007	62-117
Methoxychlor	0.05	0.008	62-121
Toxaphene	1.0	0.38	33-117
Surrogate: DECA	27-110		27-110
Surrogate: TCmX	24-114		24-114

Appendix III. EPA 8081A pyrethyroid pesticides that will be analyzed.

MDL Report
EPA 8081A

Code: $81PY
Units: ug/L

Analyte	PQL	MDL	CL
Bifenthrin	0.02	0.006	65-135
Cyfluthrin	0.03	0.003	65-135
Cypermethrin	0.10	0.004	65-135
Esfenvalerate/Fenvalerate	0.02	0.002	65-135
Lambda cyhalothrin	0.02	0.001	65-135
Permethrin	0.02	0.009	65-135

V. References

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1.4 Quality Assurance Project Plan (QAPP)

1. Title and Approval Sheets

CREATIVE ENVIRONMENTAL CONSERVATION
QUALITY ASSURANCE PROJECT PLAN

For

PROJECT NAME: Restoring Natural Water Systems in Rural Residential Landscapes

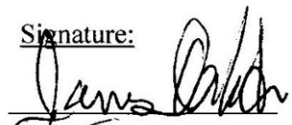
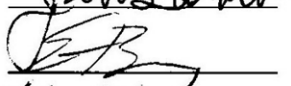
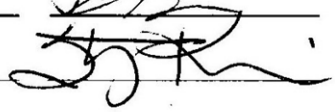
Proposal Identification Number: 05-104-533-0

Date: March 28, 2007

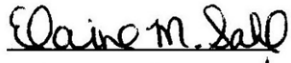
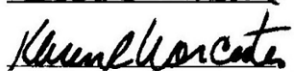
NAME OF RESPONSIBLE ORGANIZATION : Creative Environmental Conservation
P.O. Box 228
Moss Landing, CA 95039

APPROVAL SIGNATURES
(Add or delete signature lines as needed)

GRANT ORGANIZATION:

Title:	Name:	Signature:	Date*:
Contractor Project Manager	James Oakden		2/16/07
Contractor QA Officer	Ethan Barnes		2/21/07
Laboratory Director	Stacy Kim		16 Feb 07

REGIONAL BOARD (SWRCB**):

Title:	Name:	Signature:	Date*:
Grant Manager	Elaine Sahl		3/5/07
QA Officer	Karen Worcester		3/5/07

** This is a contractual document. The signature dates indicate the earliest date when the project can start.*

** If the QAPP is being prepared under the jurisdiction of the State Water Resources Control Board (SWRCB) rather than a Regional Board, substitute the appropriate SWRCB information for the RWQCB information.

Preface

Funds for this Project were provided in full or in part through Agreement number 05-104-553-0 with the State Water Resources Control Board (SWRCB) by a federal grant (Cooperative Agreement No. C9-96906801-0) from the United States Environmental Protection Agency (USEPA) to the SWRCB to implement California's Nonpoint Source Program pursuant to CWA Section 319 (h). This QAPP is largely copied from the QAPP prepared for Grant #01-140-553-0, Implementation of the Moro Cojo Slough Management and Enhancement Plan: Restoration of the Core of the Watershed, prepared by Coastal Conservation and Research.

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Group A: Project Management

3. Distribution List

Title:	Name (Affiliation):	Tel. No.:	# Copies
Contractor Project Manager	James Oakden (CEC)	831-771-4426	1
QA Officer, Grant Contact	Ethan Barnes (CEC)	559-664-8330	1
Laboratory Director	Stacy Kim (MLML)	831-771-4426	1
Field Activities	Sue Shaw (MLML)	*831-771-4495*	1
Data Manager, Monitoring Manager	Kamille Hammerstrom (MLML)	*831-771-4424*	1
Technical Manager	John Oliver (MLML)	*831-771-4445*	1
Technical Manager	Peter Slattery (MLML)	*831-771-4430*	1
Grant Manager	Elaine Sahl (CCRWQCB)	*805-542-4645*	Original
Program Analyst	Lola Barba (CCRWQCB)	916-341-5638	1
Board QA Officer	Karen Worcester (CCRWQCB)	805-549-3333	1

Once approved, this QA plan will be available to any interested party by requesting a copy from CEC.

4. Project/Task Organization

4.1 Involved parties and roles

The project will be carried out by a partnership between Creative Environmental Conservation (CEC), Moss Landing Marine Laboratories (MLML), the Watershed Institute at California State University Monterey Bay, Monterey County (Supervisor Lou Calcagno), and Coastal Conservation and Research. The project team will work in close collaboration with numerous landowners throughout the watershed. CEC will act as lead organization for the grant with MLML helping with monitoring and other technical issues. Over the past 15 years, this partnership has been implementing watershed restoration throughout the region. CEC and MLML played an important role in the development of the Northern Salinas Valley Watershed Restoration Plan and the Moro Cojo Slough Wetland Management Plan. Supervisor Lou Calcagno will be the leader in developing and implementing a property tax incentive program to restore natural water systems.

The Watershed Institute is another important partner. Its primary mission is to protect and enhance the watersheds of the Monterey Bay region through education, restoration, research, and policy development. Since 1994, the Institute has initiated riparian, wetland, and native plant community restoration on over 400 acres of land, focusing most of that work in the lower Salinas River Watershed (including major restoration projects in Moro Cojo Slough and Natividad Creek Park). The Watershed Institute's Central Coast Watershed Studies (CCoWS) team has conducted hydrology, water quality, and habitat research for SWRCB and other agencies throughout the Salinas and Monterey Bay watersheds. The team has made over 1,500 visits to 100 sites, amassing a database of 7,000 measurements of water quality, and has produced analyses of these data that link land use practices to water quality. CCoWS is currently assisting Region 3 in TMDL development for the Salinas River and other nearby waterbodies.

Table 1. Personnel responsibilities

Name	***Organizational Affiliation***	***Title***	***Contact Information***
Elaine Sahl	*SWRCB*	*Contract Manager*	*805-542-4645* *ESahl@waterboards.ca.gov*
Lola Barba	*SWRCB*	*Program Analyst*	*916-341-5638* *lbarba@waterboards.ca.gov*
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Ethan Barnes	CEC	*Grant Contact*	*559-664-8330* *ethanb1@comcast.net*
Kamille Hammerstrom	MLML	*Data Manger*	*831-771-4424* *khammerstrom@mlml.calstate.edu*
Sue Shaw *Stacy Kim* *John Oliver* *Peter Slattery*	MLML	*Technical Manager 1* *(Field Activities)* *Technical Manager 2* *(Lab)* *Technical Manager 3* *Technical Manger 4*	*831-771-4495* *awiskand@mlml.calstate.edu* *831-771-4426* *skim@ mlml.calstate.edu* *831-771-4445* *oliver@ mlml.calstate.edu* *831-771-443* *pslattery@mlml.calstate.edu*
Kamille Hammerstrom	MLML	*Monitoring Manager*	*831-771-4424* *khammerstrom@mlml.calstate.edu*
Ethan Barnes	*CEC*	*QA Officer*	*559-664-8330* *ethanb1@comcast.net*

4.2 Quality assurance officer role

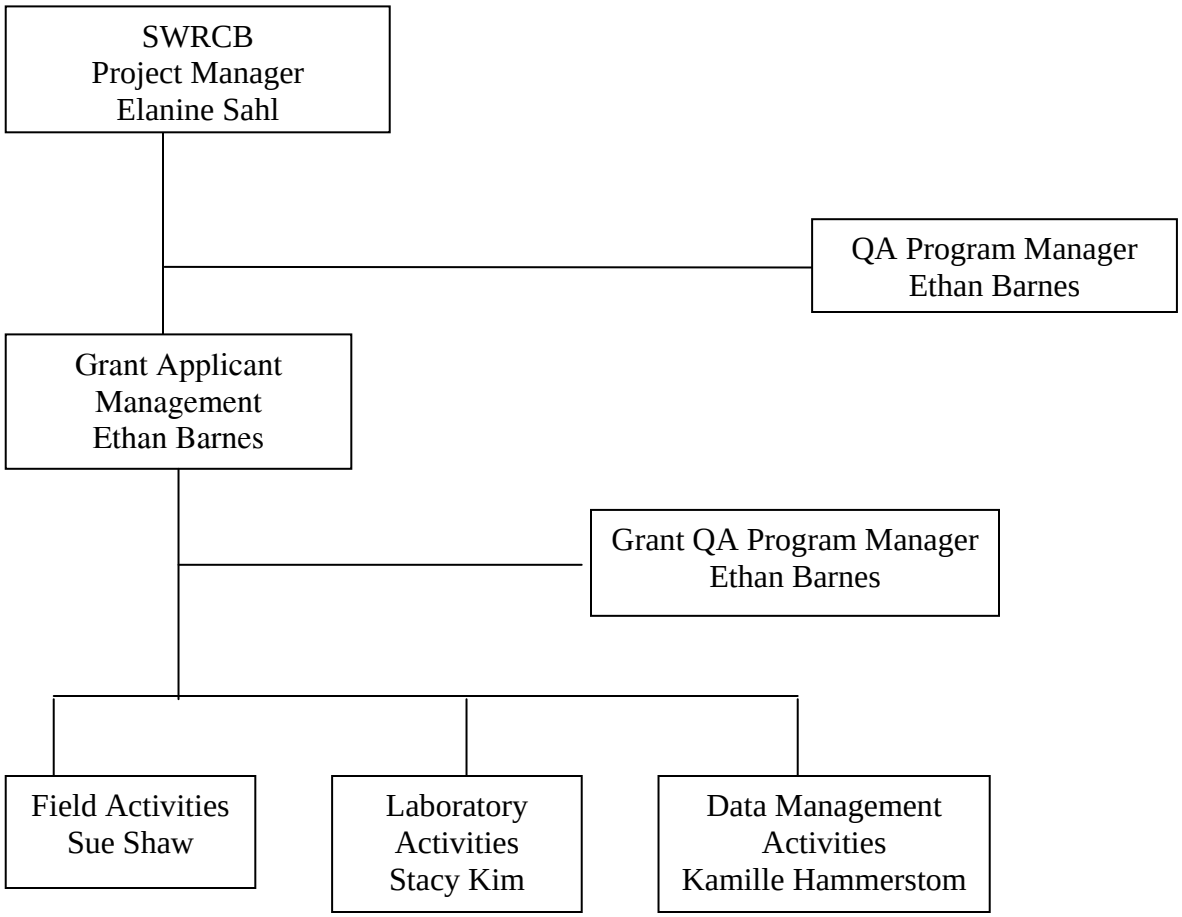
The Quality Assurance Officer for this project is Ethan Barnes of Creative Environmental Conservation (CEC). He will review reports and documents prior to submittal, as well as restoration plans prior to implementation.

4.3 Persons responsible for QAPP update and maintenance.

Changes and updates to this QAPP may be made after a review of the evidence for changes made by CEC's Project Manager and Director with the concurrence of both the CCRWQCB Contract Manager, Elaine Sahl, and QA Officer, Ethan Barnes. The CEC monitoring manager will be responsible for making the changes, submitting drafts for review, preparing a final copy, and submitting the final for signature.

4.4 Organizational chart and responsibilities

Figure 1. Organizational chart.



4.5 Technical advisors.

At this point, there are no identified technical advisors that are related to the project in a purely advisory role.

5. Problem Definition/Background

5.1 Problem statement.

The human disturbance landscape can be divided into urban and rural settings. The opportunity for restoring the core of our natural water system is much greater in the rural landscape. Rural residential developments are common interfaces between the dense urban and primarily agricultural land uses in the Salinas Valley and throughout much of California. So far, the most successful efforts to restore our natural water systems in the Monterey Bay area have been in agricultural landscapes in Moro Cojo Slough and the Carr Lake complex, which is surrounded by the City of Salinas. The rural residential interfaces involve many more landowners than the normal rural agricultural setting. Each parcel includes a relatively small section of the natural wet corridor. This proposal focuses on the water systems in the upper watersheds of the Moro Cojo and Tembladero Sloughs in the Prunedale Hills. The first target area involves a series of highly degraded, but restorable small creeks (Walker, Paradise, and Castroville Creeks) flowing into Moro Cojo Slough from the adjacent Prunedale Hills. This historically rich system of connected creeks, marshes, and small lakes is completely confined to ditches, which keep the wet corridors dry and highly degraded. Unvegetated wet corridors and steep, unstable slopes lead to increased erosion and habitat loss. These hills contain many small farms, mostly growing strawberries, embedded within the rural residential neighborhoods. In addition, they harbor thousands of large grazing animals. Cattle, horses, and goats are the most abundant. Therefore, they receive significant non-point sources of agricultural pollution.

The Salinas Valley is an excellent example of the worldwide freshwater problem (National Research Council 1992, Mitsch and Gosselink 1993, Wilson 1993, Runnels 1995, Gordon 1996). The movement of water from the land to the sea is radically modified from natural conditions. Water is drained into ditches adjoining fields, into central collecting ditches which were once productive creeks, into the Salinas River which is now a flood control ditch, and finally into Monterey Bay. Thousands of acres of wetlands are ditched and dried, reducing flood and natural water quality control and the groundwater recharge necessary to forestall saltwater intrusion. Freshwater ecosystems are endangered (Gordon 1996). The valley's water quality is among the worst in the state: there are particularly high levels of pesticides (Ladd et al. 1984, Watkins et al. 1983, Oliver et al. 1997). Almost all water flowing through the valley's wet corridors is laden with sediment. The Salinas Valley is facing a severe lack of water caused by decades of over pumping water supply wells, which is the primary cause of the extensive salt water intrusion into Monterey Bay area aquifers (Greene 1970, Johnson 1983). This is the most significant intrusion along the west coast.

Nonpoint source pollutants to receiving waters include nutrients, pesticides, pathogens, and excessive sediment. Elevated levels of contamination from persistent pesticides such as DDT, PCBs, dieldrin, and endosulfan have been reported from sediment and/or shellfish tissue for Moro Cojo Slough, Tembladero Slough, and Moss Landing Harbor. These sites are candidates for the Toxic Hot Spot List, and these waterways drain into the Monterey Bay National Marine Sanctuary. Moro Cojo and Tembladero Sloughs have been identified as impaired water bodies and are listed as such on the State Water Resources Control Board approved list of water bodies that do not meet water quality standards (Section 303d of the Clean Water Act 1972), due to problems associated with pesticides and sedimentation. Three Total Maximum Daily Load (TMDL) action plans (low dissolved oxygen, pesticides, and sedimentation/siltation) are scheduled for this watershed to address high levels of nickel, dieldrin, total DDT, toxaphene, and PCBs present in Moro Cojo Slough along with measurable levels of dacthal, endosulphan, and heptachlor epoxide. Tembladero Slough is also scheduled for three TMDLs (fecal coliform, nutrients, and pesticides). At the receiving end of the watershed is Moss Landing Harbor, a State listed Toxic Hot Spot, also on the 303(d) list and scheduled for three TMDLs (pathogens, pesticides, and sedimentation/siltation). In the

harbor, deep water, sparse aquatic vegetation, and very high chemical concentrations combine to produce a setting where biological and physical processes that would degrade many of these toxins cannot function. Pesticides detected in exceedence levels at the Harbor include PCBs, tributyltin, dieldrin, total DDT, chlordane, toxaphene, and nickel, among others.

A fundamental solution to these problems is the restoration of watershed function and native wetland habitats. Our goal is to reduce nonpoint source pollution in the Moro Cojo and Tembladero Slough Watersheds – particularly excessive sediments, nutrients, and pesticides –thereby improving near-shore coastal waters of Moss Landing Harbor and the Monterey Bay. Our strategy is to: 1) address pollutants at the source, and 2) restore the natural function of the watershed to filter pollutants, reduce erosion and sedimentation, increase groundwater recharge, and restore wildlife habitat. Naturally vegetated wet corridors are amongst the best pollution filters known, physically filtering sediment and contaminants from surface water, and capturing and degrading many chemical toxins (Hammer and Bastian 1989). Restored watersheds also retain water and reduce the hydrographic peak to natural levels, increasing the feasibility of vegetating the channel below, since the downstream channels will be less likely to become overwhelmed with accelerated runoff. Similarly, streamside riparian vegetation will reduce the amount of sediment entering the channels. Watershed restoration is the best action we can take to protect and restore biological diversity in Monterey Bay. Since we have lost over 90% of the wetland habitats in Monterey Bay by past land use actions and the few surviving systems are highly modified or degraded, the wetland habitat itself is endangered. The proposed project will have a highly positive impact on the survival and growth of populations of many endangered and threatened species.

The proposed project will reduce and help sustain lower nps pollution by establishing and maintaining vegetated water management systems that improve water quality from runoff in the project area. Almost the entire core of the lower Moro Cojo watershed is currently in the process of being restored, and this project is the next step. Work will be conducted in coordination with local watershed groups, such as the Watershed Institute. Water quality monitoring is an integral component of our proposed project, providing the data to demonstrate the effectiveness of the management practices to landowners, to enable improvement of these practices, and to show how the practices contribute to watershed management goals such as CCoWS' TMDL development recommendations.

The Central Coast RWQCB has designated the Salinas Watershed as its first priority watershed in its Watershed Management Initiative Chapter. The proposed project implements the priorities in both the California Watershed Management Initiative and the California Wetlands Conservation Policy. Furthermore, our project implements the State's Nonpoint Source Plan through the installation and demonstration of agricultural management measures (1A, 1G), hydromodification management measures (5.3, 5.4), and through measures to protect and restore wetlands and riparian areas, and to install vegetated treatment systems (6A-D). Our proposed project will help implement the Monterey Bay National Marine Sanctuary's Agriculture and Rural Lands Action Plan (1999), specifically Strategy 2-3 ("Increase agency staff time to provide technical field support and prevention efforts") and Strategy 3-2 ("Increase grower and public awareness of watershed-based management"). Our proposal will implement several of the management practices specifically mentioned in the Toxic Hot Spot Plan and the Moro Cojo Slough Management and Enhancement Plan (Habitat Restoration Group, 1997) such as re-vegetating drainageways, vegetating buffer areas between creek drainages and agricultural activities, riparian enhancement, sediment basins, and erosion control practices to reduce the movement of contaminant laden sediments into the Harbor. Impounding freshwater runoff in shallow ponds constructed on the former floodplain, allows even persistent pesticides such as DDT to be broken down by sunlight, nitrates to be extracted from the water by wetland plants, and denitrification processes in wetland substrates to release non-toxic forms of nitrogen. The Northern Salinas Valley Watershed Restoration Plan (AMBAG, Watershed Institute, and MLML, 1997) emphasizes parcel-by-parcel restoration of wet corridors for restoring and protecting water resources. The Moss Landing Harbor District pays an average of $1 million every three years (and considerably more during high storm event years) to dredge and dump its highly contaminated sediments would stand much to gain from a reduction in sediment and pesticide transport from the watershed, one of the anticipated benefits of our proposed project. The coastal ecosystem will also benefit from cleaner waters and a healthier benthic environment.

5.2 Decisions or outcomes

This project will provide information about the physical state of multiple wetland sites throughout the middle and upper Moro Cojo and Tembladero Slough watersheds. It will monitor the impact wetlands have on reducing non-point source pollution and will restore and enhance wetland and adjacent upland habitats. We will monitor several water quality parameters (described below in detail) as well as the flora and fauna in these sites. This project will also develop restoration and enhancement plans for implementation as sites become available within the watershed. Water quality will be used to determine the ability of wetlands to serve as biological filters for non-point source pollution. The presence of native flora and fauna will be monitored over time and used as a gauge for wetland health.

Intended usage of data

The data will be used by CEC for general watershed assessment purposes. This assessment of this data will be useful in providing information for watershed management and pollution prevention. Data will be compiled and maintained at Moss Landing Marine Laboratory, 8272 Moss Landing Road, Moss Landing, CA 95039. The information will be shared with the State Water Resources Control Board, the Central Coast Regional Water Quality Control Board, and upon request to other state, federal, and local agencies and organizations. The data will be made available to the public for purposes of watershed education.

5.4 Water quality or regulatory criteria

Since a major goal of this project is to measure the effectiveness of wetlands in reducing impacts on water quality, the determination of 'effectiveness' shall be cognizant of various applicable water quality criteria and the presence of native flora and fauna. However, the exceedance of water quality criteria will not indicate the failure of a management practice. Water quality criteria (turbidity, pH, nutrients, dissolved oxygen, salinity, and pesticides) to be used as references for data to be collected were compiled from several sources and are described below for each analyte. Water samples will be collected at multiple points within the Moro Cojo watershed. Two water quality samples will be collected at established sampling points at each of the five restoration sites located throughout the lower, middle, and upper Moro Cojo watershed, for each month of the project period. Three sites are established in the upper watershed (see the Monitoring Plan). We will also analyze at least 700 additional water samples in sample arrays specific to each site in order to quantify restoration and natural vegetation impacts on water quality.

5.4.1 Turbidity

Water quality objectives for turbidity levels are not defined numerically by the Central Coast Regional Water Quality Control Board (CCRWQCB); Hager and Watson (2005) reviewed the literature on suspended sediment impacts to fish and aquatic invertebrates. Noting the absence of definitive studies for Central Coast aquatic ecosystems, the following reference points were suggested - based primarily on rainbow trout and invertebrates and representing the most applicable objectives available:

Up to 2 NTU or 10 mg/L: not likely to adversely affect fish and invertebrates
Up to 20 NTU or 100 mg/L: potential change in behavior and / or slight decrease in survival
Up to 200 NTU or 1,000 mg/L: stress, physiological changes, and potentially lethal effects

5.4.2 pH

The pH range for the Moro Cojo was selected based on the most protective beneficial uses assigned to it by the Central Coast Region Basin Plan (CCRWQCB, 1984). Water quality objectives in the Basin Plan satisfy State and federal requirements to protect waters for the beneficial uses they have been assigned. The most stringent of the beneficial uses that list pH values are Water Contact Recreation (REC-1) with a pH range of 6.5-8.3 and Warm Fresh Water Habitat (WARM) with a range of 7.0-8.5. In the California EPA Central Valley Regional Water Quality Control Board document A Compilation of Water Quality Goals, the USEPA national recommended ambient water quality criteria for freshwater aquatic life protection is cited as an instantaneous value of 6.5 – 9.0 (Marshack, 2003). The combination of these values results in a range of 7.0-8.3 that is acceptable to protect present and future beneficial uses of the Moro Cojo.

5.4.3 Nutrients

Water quality values that will be used for comparison of observed nutrient concentrations in this project are taken from the following two sources:

1. A study by San Jose State University and Merritt Smith Consulting (1994) examined nutrient problems and sources in the Pajaro River and Llagas Creek, within the neighboring Pajaro River Watershed. The authors estimated nutrient objectives based on mean concentrations observed at relatively un-impacted sites for nitrate (NO3--N) to be 0.12 mg/L and for phosphate (PO43-–P) to be 0.025 mg/L (SJSU & Merritt Smith, 1994).

2. In the document A Compilation of Water Quality Goals prepared by Marshack (2003) values are provided for the 30-day chronic toxicity values of total allowable ammonia nitrogen for different temperature, pH and salinity values. One-hour maximum concentrations are also provided. Ammonia toxicity is affected particularly by pH and temperature by an increase in the ratio of toxic unionized ammonia (NH3) to ammonium (NH4+) within total ammonia (NH3 + NH4+) as either of these parameters increases. The unionized ammonia value is also addressed in the Central Coast Regional Water Quality Control Board Basin Plan (1994). This is a calculated value from total ammonia, pH, and temperature. Salinity isn't as strong a factor in this equilibrium (CCAMP, 2005). The criteria maximum concentration vary for different species and are dependent upon changes in water chemistry attributes (see USEPA, 1999).

5.4.4 Pesticides

Organophosphates, pyrethroids, and organochlorines will be investigated at multiple sites throughout lower, middle, and Upper Moro Cojo watershed. Observed pesticide concentrations will be recorded. Observed pesticide concentrations will be compared to Criterion Maximum Concentration (CMC) and Criterion Continuous Concentration (CCC) criteria whenever available and applicable. These criteria are explained in the following acute and chronic toxicity sections. Chlorpyrifos (O,O-diethyl-O-(3,4,6-trichloro-2-pyridinyl) phosphorothioate) and diazinon (O,O-diethyl-O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate) are both organophosphate pesticides that are widely used in both agricultural and urban applications. Chlorpyrifos is a broad-spectrum organophosphate insecticide and diazinon is a nonsystemic organophosphate insecticide (EXTOXNET, 2002). They are used in the Salinas Valley on lettuce, artichokes, greenhouse transplants, strawberries, broccoli, cauliflower (chlorpyrifos), and outdoor flowers (diazinon). Common names for chlorpyrifos are Dursban and Lorsban and for diazinon are Basudin and Neocidol (Marshack, 2003). Two examples of organophosphate pesticides that may be present are chlorpyrifos and diazinon. Their LC50 values, CMC, and CCC values are provided in Table 2. Two examples of pyrethroid pesticides used in Monterey County that may show up in test results are provided in Table 3.

Table 2. LC50 criteria maximum concentration and criterion continuous concentration values for Chlropyrifos and Diasinon.

	Rainbow trout 96-hr LC50	C. dubia 96-Hr LC50	CMC	CCC
Chlorpyrifos	3 µg/L *	53 ppt **	0.02 µg/L ***	0.014 µg/L ***
Diazinon	16 µg /L *(check units)	320 ppt **	0.08 µg/L ***	0.05 µg/L ***

*(Montgomery 1997) ** Baily et al, 1997 *** Siepmann and Finlayson, 2000; 1 µg/L = 1 ppb

Table 3. LC50 for pyrethroid pesticides

	Rainbow trout 48-Hr LC50	Fathead Minnow 96-Hr LC50	Daphnia Magna LC50
Permethrin	5.4 µg/L *	--	.075 ppb**
Esfenvalerate	--	0.69 µg/L*	0.24 ppb**

*Montgomery, 1997 **DPR, 2004; 1 µg/L = 1 ppb

Observed organophosphate pesticide concentrations will be compared to LC50 values, Criterion Maximum Concentration (CMC), and Criterion Continuous Concentration (CCC) criteria whenever available and applicable. These criteria are explained in the following acute and chronic toxicity sections. Observed pyrethroid pesticide concentrations will be compared to available LC50 values (Table 3).

Acute Toxicity (Chlorpyrifos and Diazinon as examples)

Both chlorpyrifos and diazinon are considered moderately toxic (EXTOXNET, 2002). The LD50 and LC50 for a chemical is the lethal dose (LD) or lethal concentration (LC) that has been found in controlled experiments to kill 50% of a large number of test animals (LC50 is for aquatic organisms). The lower the LD50 or LC50, the more toxic the chemical. It is an acute toxicity test that refers to the immediate (hours to a few days) effects of a pesticide when the subject is exposed to a particular dose. Chlorpyrifos exhibits greater toxicity than diazinon. The data from a study designed to evaluate the joint acute toxicity of chlorpyrifos and diazinon suggest that chlorpyrifos (53 µg/L) may be 3 to 10 times more toxic than diazinon (320 µg/L) to the water flea Ceriodaphnia dubia, a frequently used test organism for LC50 determination (Bailey et al. 1997). The data from this joint acute toxicity study suggested that diazinon and chlorpyrifos also exhibit additive toxicity when present together (Bailey et al, 1997).

The most commonly used guideline for toxicity in California for short-term exposure is the Criterion Maximum Concentration (CMC) (Siepmann & Finlayson, 2000). The CMC is the EPA national water quality criteria recommendation for the highest in-stream concentration of a toxicant or an effluent to which organisms can be exposed for a brief period of time without causing an acute effect (USEPA, 1991). It is calculated as a 1-hour average (Marshack, 2003) and is a concentration that should not be exceeded more than once every 3 years. Since there are no criteria available for instantaneous maximum values of chlorpyrifos or diazinon (Marshack, 2003), the CMC will serve as the closest available criteria for comparison.

Chronic Toxicity (Chlorpyrifos and Diazinon as examples)

Chronic toxicity refers to the toxicity due to long-term or repeated exposure to a compound and results in the same effects as acute exposure including delayed symptoms. The guideline for longer-term exposure is the Criterion Continuous Concentration (CCC) (USEPA, 1991). The CCC is the 4-day average concentration of a pollutant in ambient water that should not be exceeded more than once every 3 days (Table 2).

Although concentration will not be measured and averaged over any period of timie for this project, it is still worthwhile to note whether measured values reach the CCC levels. If so, at least there is a chance they are being exceeded.

6. Project/Task Description

General Overview of Monitoring

6.1 Work statement and produced products.

Wetlands are known to reduce pollutant levels in drainage waters by filtering particulates and biologically degrading pollutants (Moore et al. 2002, Milam et al. 2004). The degree to which wetlands can be used to improve water quality is specific to the individual watersheds and dependent upon land use and the plant communities and habitat heterogeneity of the area (Picard et al. 2005). This project will develop an incentive program targeted at rural residential landowners, enhance and restore wetland and upland habitats within the Moro Cojo Watershed, develop plans for restoration efforts, monitor flora and fauna within the project area, and examine the ability of wetland habitats to serve as biological filters for non-point source pollution. The monitoring portion of this project will include data collection, analyses, and reporting as discussed in the following sections. Project constraints are also addressed and the schedule of deliverables is included.

6.2 Project schedule

Table 4. Project schedule timeline

ITEM	DESCRIPTION	GRANT FUNDING	DUE DATE
EXHIBIT A – SCOPE OF WORK			
1.0	PROJECT ASSESSMENT AND EVALUATION PLAN, MONITORING PLAN, QUALITY ASSURANCE PROJECT PLAN		
1.1	GPS Locations		June 2006
1.2	Project Assessment and Evaluation Plan (PAEP)		June 2006
1.3	Monitoring Plan (MP)		June 2006
1.4	Quality Assurance Project Plan (QAPP)		June 2006
2.0	WORK TO BE PERFORMED BY GRANTEE		
2.1	Conduct Education & Outreach to Landowners		
2.1.1	List of landowners contacted, minimum of twelve (12)		June 2006
2.1.2	List of participants		June 2006
2.2	Establish Baseline Conditions and Design Restoration Projects to be Implemented		
2.2.1	Submit Existing Condition Base Maps		September, 2007
2.2.2	Submit Restoration Project Designs		December, 2007
2.3	Native Plant propagation		
2.3.1	List of Plant Species Collected for propagation		December, 2007
2.3.2	Number of plants propagated by species		April, 2008
2.4	Implement Project		
2.4.1	Documentation of landowner agreements		January 2008 thru September 2008
2.4.3	List of BMPs implemented and quantify area covered by each BMP		Ongoing
2.4.5	List and number of native plants at each restoration site		Ongoing
2.5	Demonstrate the Value of Restoring Wet Ecosystems in the Rural Residential Landscape to Landowners and other Stakeholders		
2.5.1	Workshop Agenda and list of attendees		September, 2008
2.5.3	Meeting Agenda and copy of monitoring presentation		September, 2008
2.6	Monitor Water Quality		
2.6.3	Water Quality Report		October, 2008
2.7	Conduct Vegetation Surveys		
2.7.5	Vegetation Survey Report		October, 2008
2.8	Conduct Pre, During and Post Photo Documentation		

ITEM	DESCRIPTION	GRANT FUNDING	DUE DATE
2.8.1	Annotated Photo documentation of restoration sites		Ongoing
2.9	Conduct Faunal Surveys		
2.9.4	Faunal survey report		October, 2008
2.10	Draft and Final Project Reports		
2.10.1	Draft Project Report		November 1, 2008
2.10.2	Final Project Report		December 1, 2008
EXHIBIT B – INVOICING, BUDGET DETAIL AND REPORTING PROVISIONS			
1.1	Invoice		Quarterly
5.0	REPORTS		
5.1	Progress Reports by the twentieth (20^{th}) of the month following the end of the calendar quarter (March, June, September, and December)		Quarterly
5.1.1	Pollution Load Reduction Report		Annually
5.1.2	Protection/Restoration/Creation of Streams, Shorelines, or Wetlands Report		Annually
5.1.3	Stream Reach Codes Report		Quarterly
5.3	Grant Summary Form		Day 90
5.4	Natural Resource Projects Inventory (NRPI) Project Survey Form		Before final invoice
EXHIBIT C – SWRCB GENERAL CONDITIONS			
6	Copy of final CEQA/NEPA documentation Any activity in the scope of work subject to CEQA cannot begin prior to receipt of environmental clearance from the SWRCB		February 2008
21	Signed cover sheets for all permits		July 2008
EXHIBIT D – GRANT PROGRAM TERMS & CONDITIONS			
1	Lobbying Certification		With final report
2	MBE/WBE Documentation		Quarterly

6.3 Analysis methods and instruments

Analysis methods and instruments are detailed in the above in section 13.

6.4 Geographical setting

The Moro Cojo and Tembladero Slough Watersheds are depicted in Appendix I. Our initial target areas and monitoring sites are depicted in Appendix II.

6.5 Constraints

The major constraint for wetland creation of this project is time. It may take many years for wetland plant community establishment, nutrient retention and wildlife enhancement to reach optimal functioning, or "maturation" (Mitsch and Gosselink 2000). In general, monitoring runs are also constrained by factors such as the timing of rainfall events, personnel availability and accessibility to sample sites. These will be evaluated on a case-by-case basis. Another potential constraint to this project may be obtaining initial landowner cooperation for site restoration. Cooperation among landowners at each site will be evaluated and documented.

7. Quality Objectives and Criteria for Measurement Data

The following sections describe the method quality objectives (MQOs) for field measurements and sample collection and analysis. All MQOs will comply with SWAMP requirements and/or suggestions.

For every sample run, one site will be randomly chosen as the QAQC site: all duplicate measurements and samples will be taken from this site. This will ensure clarity and continuity in data management and reporting.

The following sections describe the method quality objectives (MQOs) for field measurements and sample collection and analysis. All MQOs will comply with SWAMP requirements and/or suggestions. Previously collected data, if used, must also conform to the following criteria.

7.1 How MQO's will be determined

7.1.1 Temperature, pH, dissolved oxygen, conductivity, and salinity

These water quality measurements will be made in the field (see Table 5) with a YSI 556 handheld data logger. To ensure precision, the first field measurement of each sample run will be duplicated three times. While there is no SWAMP requirement for the precision of these parameters, we suggest + 0.5 or 5% for all save dissolved oxygen, + 0.5 or 10%. Accuracy will be as follows: dissolved oxygen + 0.5 mg/L, temperature + 0.5 oC, conductivity + 0.5 %, and pH + 0.5 units. The YSI 556 MPS will be calibrated before entering the field according to directions provided by the manufacturer. All data will be recorded on a standardized data form (Appendix III).

Table 5. Method quality objectives for field measurements.

Group	*Parameter*	*Accuracy*	*Precision*	*Recovery*	*Completeness*
e.g. Field Testing	Dissolved Oxygen	± 0.5 mg/L	No SWAMP requirement – suggest ± 0.5 or 10%	NA	No SWAMP requirement – suggest 90%
Field Testing	Temperature	± 0.5 °C	No SWAMP requirement – suggest ± 0.5 or 5%	NA	No SWAMP requirement – suggest 90%
Field Testing	Conductivity	± 5%	No SWAMP requirement – suggest ± 5%	NA	No SWAMP requirement – suggest 90%
Field Testing	pH	± 0.5 units	No SWAMP requirement – suggest ± 0.5 or 5%	NA	No SWAMP requirement – suggest 90%
Field Testing	Salinity	± 0.1ppt	No SWAMP requirement – suggest ± 0.5 or 5%	NA	No SWAMP requirement
Field Testing	Turbidity	No SWAMP requirement – suggest ± 10% or 0.1, whichever is greater	No SWAMP requirement – suggest ± 10% or 0.1, whichever is greater	NA	No SWAMP requirement – suggest 90%

7.1.2 Nutrients

During sample collection, field duplicates will be taken to define the precision of the samples at representing the water body. Duplicates will be collected at 5% of samples with at least one per sample run.

In the laboratory, standard solutions, reagent or method blanks, bottle blanks, replicates, and spikes will be run with the samples to assess the accuracy and precision of the laboratory method and techniques. Dissolved nutrients will be analyzed using a HACH Odyssey DR/2500 Spectrophotometer. All analyses are done according the manufacturer's instructions and specifications for each individual analysis.

The accuracy of the spectrophotometer will be checked against standard solutions of known concentrations. These standards are obtained from HACH and include a low range, middle range, and high range concentration. Accuracy will be assessed by the percent error between the known concentration of the standard, and the reading or measured value from the spectrophotometer. The acceptable % error for each method is presented in Table 6.

% Error = |(measured value-standard value)/standard value|

The manual for the spectrophotometer suggests running reagent blanks (or method blanks) to compensate for the contribution of the reagents to the final reading. The procedure is performed with RO (water purified by reverse osmosis) water in place of the sample. The reading of this RO water is then recorded on a Central Coast Watershed Studies Nutrient QC Evaluation Form and zeroed out of the instrument (Appendix IV).

The bottle blank consists of RO water in a re-used, cleaned, and acid washed sample bottle. To ensure no contamination from the sample bottle, method blanks must not detect any nutrients.

One sample (preferably one of the duplicates) is chosen as the QC sample. This sample will be used for both replication and spiking. Using the same sample for all QC will ensure clarity and continuity in data management and reporting.

A replicate on a least one sample per set, or 5% of samples will ensure precision. This is done by running the QC sample in the beginning of the sample run, and running another sample from the same bottle again at the end of the sample run. Calculating the % difference between the replicates will assess precision:

% Difference = |(replicate 1 - replicate 2) / average of replicates|

Sample spikes will ensure the accuracy of laboratory results. At least one sample spike will be conducted per sample run. Sample spikes are made with a 1:1 ratio of the QC sample and standard solution. The percent recovery from this spike will be used to assess the accuracy of the method and technique:

% Recovery = (measured spike value / expected spike value) * 100

where the expected spike value is the average of the sample value and standard concentration.

Table 6 illustrates the HACH nutrient analysis methods, the SWAMP MQO requirements for precision and spike recovery and the completeness goals that will be utilized in this project.

Table 6. MQOs for nutrient analyses. There are no SWAMP requirements for completeness.

Parameter	Method	Resolution	Accuracy of the Method (95% Conf. Limits of Distribution)	SWAMP Precision Requirement	SWAMP Recovery Requirement	SWAMP Suggested Completeness	Acceptable % Error for Standards
Total Ammonia-Nitrogen (NH_3-N)	HACH Method 10023 LR	0.02 - 2.50 mg/L	0.96-1.04 mg/L for a 1.00 mg/L standard	Laboratory replicate within ±25%	Matrix Spike 80% - 120%	90%	10%
Ortho-phosphate (PO_4^{3-})	HACH Method 8048	0.06 - 5.00 mg/L	2.89-3.11 mg/L for a 3.00 mg/L standard	Laboratory replicate within ±25%	Matrix Spike 80% - 120%	90%	4%
Nitrate-Nitrogen (NO_3^--N)	HACH Method 10020 HR	0.2 – 30.0 mg/L	9.5-10.5 mg/L for a 10.0 mg/L standard	Laboratory replicate within ±25%	Matrix Spike 80% - 120%	90%	4%

7.1.3 Turbidity MQOs

Turbidity samples will be analyzed using a HACH 2100P portable turbidimeter, SM2130B. To ensure precision, the first field measurement of each sample run will be duplicated three times. The scheduled calibration for the turbidimeter is once every three months according to manufacturer protocol. As another accuracy check, Gelex factory standards are used before each series of measurements are

taken. If the reported measurement is within the Gelex standard range, samples are then measured according to protocol. If the results are out of range, the turbidimeter will be re-calibrated prior to analysis of samples. While there is no SWAMP requirement for the precision or accuracy of this parameter, we suggest + 10% or 0.1, whichever is greater. MQOs are depicted in Table 5.

7.1.4 Pesticide MQOs

Samples will be sent the CDF Water Pollution Control Laboratory in Rancho Cordova for Gas Chromatography with a Mass Spectrometer (GC/MS). This is the lead SWAMP laboratory. Tables 7, 8, and 9 list the Minimum Detection Limits (MDS), Target Reporting Limits (TRL), and recovery percentages for the analyses that will be utilized.

Table 7. MQOs for Organochlorides. Source: CDFG WPCL Rancho Cordova.

Analysis/EPA Method #	MDL	TRL	Recovery
Organochlorines 8081A	Weight corrected	Weight corrected	%
Sediment Sample – 50% moisture	ng/g (ppb)	ng/g (ppb)	
Aldrin	0.52	2.0	50–150
Chlordane, cis	1.43	2.0	50–150
Chlordane, trans	0.81	2.0	50–150
Chlordene, alpha	0.55	1.0	50–150
Chlordene, gamma	0.51	1.0	50–150
Chlorpyrifos	1.67	2.0	50–150
Dacthal	1.26	2.0	50–150
DCBP, p,p'	1.6	2.0	50–150
DDD, o,p'	1.54	2.0	50–150
DDD, p,p'	1.8	2.0	50–150
DDE, o,p'	1.34	4.0	50–150
DDE, p,p'	1.15	4.0	50–150
DDMU, p,p'	2.41	6.0	50–150
DDT, o,p'	2.03	6.0	50–150
DDT, p,p'	4.94	10.0	50–150
Diazinon	13.52	40.0	50–150
Dieldrin	0.84	1.0	50–150
Endosulfin I	2.16	4.0	50–150
Endosulfin II	5.44	10.0	50–150
Endosulfan sulfate	5.44	10.0	50–150
Endrin	1.88	4.0	50–150
HCH, alpha	0.95	1.0	50–150
HCH, beta	1.23	2.0	50–150
HCH, delta	0.72	4.0	50–150
HCH, gamma	0.68	1.0	50–150
Heptachlor	1.03	2.0	50–150
Heptachlor epoxide	1.01	2.0	50–150
Hexachlorobenzene	0.22	0.6	50–150
Methoxychlor	2.96	6.0	50–150
Mirex	1.89	3.0	50–150
Nonachlor, cis	1.96	2.0	50–150
Nonachlor, trans	0.78	2.0	50–150
Oxadiazon	1.87	2.0	50–150
Oxychlordane	0.74	2.0	50–150
Parathion, ethyl	1.68	4.0	50–150
Parathion, methyl	3.04	8.0	50–150
Tedion	1.47	4.0	50–150

Table 8. DQOs for Organophosphate Pesticides. Source CDFG WPCL Rancho Cordova.

Analysis/EPA Method #	MDL	TRL	Recovery
Organophosphates 8141A	(µg/L)	(µg/L)	%
Aspon	0.03	0.05	85–105
Azinphos ethyl	0.03	0.05	95–110
Azinphos methyl	0.03	0.05	50–90
Bolstar (Sulprofos)	0.03	0.05	80–95
Carbophenothion	0.03	0.05	90–100
Chlorfenvinphos	0.03	0.05	80–100
Chlorpyrifos	0.02	0.05	80–100
Chlorpyrifos methyl	0.02	0.05	95–110
Ciodrin (Crotoxyphos)	0.03	0.05	90–110
Coumaphos	0.04	0.05	50–90
Demeton (Total)	0.04	0.05	30–80
Diazinon	0.01	0.02	95–110
Dichlofenthion	0.03	0.05	95–105
Dichlorvos	0.03	0.05	85–105
Dicrotophos	0.03	0.05	20–70
Dimethoate	0.03	0.05	90–100
Dioxathion	0.03	0.05	50–90
Disulfoton	0.10	0.05	80–95
Ethion	0.02	0.05	80–105
Ethoprop	0.03	0.05	80–100
Famphur	0.03	0.05	90–105
Fenchlorphos (Ronnel)	0.03	0.05	90–105
Fenitrothion	0.03	0.05	90–110
Fensulfothion	0.03	0.05	40–80
Fenthion	0.03	0.05	80–100
Fonofos (Dyfonate)	0.02	0.05	85–110
Leptophos	0.03	0.05	80–110
Malathion	0.03	0.05	95–105
Merphos	0.03	0.05	85–110
Methidathion	0.03	0.05	95–105
Mevinphos (Phosdrin)	0.03	0.05	80–90
Molinate	0.10	0.20	65–100
Naled (Dibrom)	0.03	0.05	40–80
Parathion, ethyl	0.03	0.05	85–110
Parathion, methyl	0.01	0.05	90–105
Phorate	0.03	0.05	80–95
Phosmet	0.03	0.05	80–100
Phosphamidon	0.03	0.05	85–100
Sulfotep	0.03	0.05	95–110
Terbufos	0.03	0.05	85–100
Tetrachlorvinphos	0.03	0.05	85–105
Thiobencarb	0.10	0.20	90–110
Thionazin	0.04	0.05	95–110
Tokuthion	0.03	0.05	85–105
Trichlorfon	0.03	0.05	90–115
Trichloronate	0.03	0.05	80–105
Triphenyl phosphate (surrogate)	0.03	0.05	90–105

Table 9. DQOs for Pyrethroids. Source: CDFG WPCL Rancho Cordova.

Analysis/EPA Method #	MDL	TRL	Recovery
Pyrethroids 8081	(ng/L)	(ng/L)	%
Bifenthrin	1.16	5	75–125
Cyfluthrin	3.99	5	75–125
Cypermethrin	5.46	10	75–125
Esfenvalerate/fenvalerate	1.19	5	75–125
Lambda-cyhalothrin	1.99	5	75–125
Permethrin	2.32	20	75–125

7.2 Completeness, precision, bias, representativeness, and comparability

Completeness is the ratio of usable data or samples to the total amount of data collected.

C = 1 – (# failing acceptability criteria/total # collected) * 100

Failures = Holding time violations, laboratory errors, samples spilled or broken, equipment not calibrated properly, or quality control violations.

The objective for completeness in this project for all parameters is the SWAMP suggested level of 90%.

Representativeness is the extent to which measurements actually represent the true environmental condition of a water body. Our sampling regimes will include multiple sampling events during wet and dry periods. The design is set up to capture the heterogeneity in water quality as it relates to storm events. Multiple efforts are expended to capture the pre dand post storm water conditions. In addition, sampling happens multiple times during the event to identify the peak discharge. A detailed hydrograph is then constructed to calculate the total load of measured constituents that moved through the sampling location during the storm event. Field duplicates show if any variability exists between samples taken in the same location at the same time.

Precision describes how well repeated measurements agree. The evaluation of precision described here relates to repeated measurements taken by either different field crew members on the same sample (at quality control sessions) or the same crew member analyzing replicate samples.

Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. To determine bias, we will use reference materials and analyze spiked matrix samples.

“Comparability is the degree to which data can be compared directly to similar studies” (USEPA, 1996). Since the data in this study will be assessed against SWAMP QA/QC requirements in order to be used in analyses, it will be comparable to other studies also adhering to SWAMP guidelines. Field sampling and laboratory methods used in this study are also based on common practice in environmental science, such as is documented in the Standard Methods for the Examination of Water and Wastewater (APHA, 1998) and by Harrington and Born (2000). Data and results, therefore, should be comparable to similar studies that have been performed. The ultimate goal is for data and results to be comparable across similar studies, both past and future.

8. Special Training Needs/Certification

All personnel and students participating in fieldwork and/or laboratory analyses will need to be trained in the tasks they will assist with, if they were not trained prior to this project. The QA Officer is responsible for overseeing training. The following sections discuss potential laboratory and field training needs.

8.1 Laboratory training

Staff training on laboratory safety procedures is provided by the Safety Officer at MLML and is a requirement prior to laboratory use. It is our responsibility to assure that all technicians performing laboratory work have attended a safety training session. The laboratory manager or a senior technician will oversee laboratory analyses and technicians will be knowledgeable of all equipment and tests before analyzing samples independently. This will include both training with the laboratory manager and/or an experienced technician as well as the study of instrument and procedure manuals. To ensure adequate quality in data acquisition, collection briefings will be conducted before each sampling event.

8.2 Field training

The monitoring manager will oversee field activities and staff training for field procedures. The monitoring manager or a senior technician is responsible for safety in the field and staff and students will not undertake any field activity without prior training.

8.3 Training documentation

Documentation of lab safety training is kept on file by the Laboratory Manger and Safety Officer at MLML. Accidents and incidents will be reported to the Laboratory Manager and fully documented.

9. Documents And Records

CEC is responsible for maintaining all reports and records. CEC will collect records for sample collection, field analyses, and laboratory analyses. Samples sent to CDFG WPCL Rancho Cordova will include a Chain of Custody form. CDFG WPCL Rancho Cordova generates records for sample receipt and storage, analyses, and reporting. All field results will be recorded at the time of completion, using the field data sheets. Data sheets will be reviewed for outliers and omissions before leaving the sample site. Field data sheets are archived for three years from the time they were collected. If data entry is ever performed at another location, duplicate data sheets will be used, with the originals remaining at MLML. Hard copies of all data as well as computer back-up disks are maintained at MLML. All voucher collections, completed data quality control forms and maintenance logs will also be kept at the MLML. The maintenance log details the dates of equipment inspection, battery replacement and calibrations, as well as the dates reagents and standards are replaced. CEC will store records on an existing database of field measurements from previous studies at MLML. All data collected as part of this project will be input into this database and backed up on CD. A new master version database file shall be copied and renamed each time modifications are made. The data file names shall contain the last date on which they were significantly modified. The Data Manager, Kamille Hammerstrom, maintains this database and will also maintain the database of information collected in this project. All records generated by this project will be stored at MLML. CDFG WPCL Rancho Cordova records pertinent to this project will be maintained at their lab. Copies of all records held by CDFG WPCL Rancho Cordova will be provided to CEC and stored in the project file.

Copies of the QAPP will be distributed as described in 3. Distribution List, and to all other interested parties. Any future versions will also be distributed to this group. This will be the responsibility of Ethan Barnes. All versions of the QAPP that are distributed will be maintained on the Moss Landing Marine Laboratory main server and backed up on CD.

The raw data, summaries, and results of analyses preformed with the data will be presented in both the quarterly progress reports and the final report. Copies of maintenance logs, analysis logs, assessment records, QC checks, and any other relevant records will be included in the data report package. All grant

required monitoring deliverables will be passed on to the State Board Contract Manager, Elaine Sahl, at project completion. In addition to the database, copies of all documents, records and all original field books will be maintained permanently at Moss Landing Marine Laboratories. Requests for access to information archives should be made to Jim Oakden.

Group B: Data Generation and Acquisition

10. Sampling Process Design

Sample points will be selected at sites before and after restoration practices. If sampling sites become inaccessible for any reason we will work to gain access to the site; however, if sites remain inaccessible we will select a new site that meets the criteria of our study. Sampling will take place throughout the year to encompass seasonal variation and natural variability within the watershed. All samples that will be sent to off-site laboratories will be sampled and stored as described below in sampling methods and analyses. All samples are critical.

To test the effectiveness of wetlands to reduce nutrient and pollution concentrations we will examine nutrient, turbidity, and pesticide concentrations at the inflow and outflow of selected restored reaches; a minimum of 10 samples at 2 sites. These 2 sites will be selected from the first properties who's landowners agree to participate in the project. Samples will be taken at the upstream and downstream ends of the property's wet corridor. In addition, 3 additional sites discussed in the Monitoring Plan will be monitored along the upper Moro Cojo Slough watershed for comparison purposes. They will be located by field crews through map and photopoint documentation. Sample sites will be selected based on safety, permission to access site, and representativeness of the upper watershed. Sampling will be incorporated into a large-scale existing project. T-tests will be used to examine mean differences in concentrations at each sampling interval. Nutrient and turbidity samples will be recorded two times per month at each site. Samples will be collected twice monthly throughout the project period. Further logistics are discussed in 12. Sample Handling and Custody. To evaluate trends we will use a Seasonal Kendall test to test for gradual changes in observations taken throughout the study.

> Pesticide samples will be taken less frequently due to the high costs of analyses. Sampling events for pesticides will be based on weather conditions. We will collect pesticide samples at the end of the dry season as well as during the first significant rain event. This sampling strategy will allow us to capture variation in pesticide concentrations among seasons. Furthermore, it is likely that pesticide and nutrient accumulation during the growing season has the greatest opportunity to be entrained in runoff. Samples will be analyzed for multiple current and legacy pesticides using broad spectrum GCMS scans (see appendices I-III for specific pesticides that will be tested for).

We will use a T-test to test for differences in nutrient (Nitrate, ammonia, and phosphorus) and pesticide concentrations as well as turbidity levels and water quality parameters (pH, dissolved oxygen, conductivity, temperature, and salinity) between inflow and outflow locations at the restored reaches. Our sampling schedule will consist of samples taken every other Tuesday; however, we will vary our schedule in order to take advantage of rain events. These sampling events will be based entirely upon rain events and will take place in order to quantify potential spikes in run-off (natural variability). Sample bias and misrepresentation will be minimized by adequate training of field sampling crews and laboratory technicians, as well as adequate QA as described in section 7. Quality objectives and criteria for measurement data.

11. Sampling Methods

The following sections outline general sampling methods and protocols that will be used by to ensure consistency in collection of field data and samples. Quality control of sample collection for chemical

analyses include thoroughly training field personnel in the proper use of sample collection implements and follow pre-established criteria for distinguishing acceptable samples, avoid potential sources of contamination, use of proper and pre-cleaned sample containers, and proper holding and collection timing. Potential sources of bias and misrepresentation and how their contribution will be minimized are discussed in 7. Quality criteria and objectives for measurement data.

11.1 SOPs

Field personnel will adhere to recommended SWAMP sample collection protocols (available online: http://www.swrcb.ca.gov/swamp/docs/) or approved and documented alternative protocols, in order to insure the collection of representative, uncomtaminated water and sediment samples for analysis in the laboratory. If protocols are altered in any way, the changes will be documented.

11.2 Site preparation

Once sites are determined several generalized tasks are performed. We will make a site visit to learn about the current land use (baseline conditions), restoration work that will be entailed, and determine the sampling regime to best evaluate their effectiveness. The baseline conditions will be photo documented and the general land use described.

11.3 Field notes

A record of each field visit shall be made in a numbered Rite-in-the-Rain field book. The following information will be included:

- Names of field party
- Date and time of visit, using AM/PM notation or military time (to reduce possible ambiguity)
- Site visited
- Site observations and notes, including descriptions of relevant water conditions and weather at the time of sample collection
- Present and recent weather conditions
- Type of sample/s collected
- Sample collection or measurement time
- Other comments

11.4 Field measurements: temperature, pH, dissolved oxygen, salinity

All samples will be analyzed in the field for Temperature (oC), pH, Conductivity/Salinity, and Dissolved Oxygen using a YSI 556 multi-probe meter. Samples will be taken from the middle of the water flow.

11.5 Nutrient samples

Nutrient samples will be collected in 125 mL plastic bottles. These are cleaned with LiquinoxTM and acid washed between uses. Nutrient samples will be taken as grab samples directly from just below the surface of the water body.
When sampling for nutrients, the following methods will apply:

- Use sample bottles that have been cleaned in Liquinox™ or similar phosphate free detergent and acid rinsed.
- Rinse sample bottle & cap in sample water 3 times prior to taking sample.
- Technicians wear latex gloves to prevent contamination of the sampling container and for health safety.
- Insert the sample bottle just below the water surface with the mouth of the bottle facing upstream & fill bottle. Take caution not to disturb bottom sediment.

- Temperature and pH will be measured at the time of sample collection with a YSI 556.
- If Orthophosphate will be analyzed for, the samples will be immediately filtered in the field using syringes with 0.45 um Millex filters into scintillation vials.
- Samples will be stored in a cooler with ice packs for return to Moss Landing Marine Laboratories for analysis in their facilities. Preservation methods are discussed in 12. Sample Handling and Custody.

11.6 Pesticide samples

At each site, a water sample from the middle of the flow, a few centimeters below the surface, will be collected into a pre-cleaned 1-liter amber glass jar. Duplicate water samples (1 per sampling run or no less en 5% of samples) will be obtained in the same manner and collected sequentially. Bottom sediment samples will be obtained only during dry-season monitoring events. These samples will be collected using a sediment sampling dredge, a benthic claw, or a Teflon sampling scoop and then placed into a stainless steel bowl and mixed with a stainless steel spoon. An aliquot of this mixture will be placed into an amber glass jar, with duplicates (1 per sampling run) obtained from the same mixture. All equipment is cleaned thoroughly between samples to avoid cross contamination.

Samples will be immediately placed in a cooler and transported to the Moss Landing Marine Laboratory where they will be refrigerated at 4ºC until shipping. Pesticide samples will be sent to the CDFG Water Pollution Control Laboratory in Rancho Cordova immediately for analysis.

12. Sample Handling and Custody

A laboratory log of all samples brought into the Moss Landing Marine Laboratory lab shall be kept. This will track each sample through its processing. In the field samples will be kept in a cooler with ice in order to ensure samples remain cool before reaching the laboratory. All samples remaining after successful completion will be disposed of properly.

The Chain of Custody (COC) form is a QA/QC legal form that is used to track samples on their way to outside laboratories not affiliated with Moss Landing Marine Laboratory. COC forms shall be used for all samples transferred to outside laboratories (Appendix VI&VII). The outside laboratory shall provide COC forms prior to the sample exchange. Kamille Hammerstrom (monitoring and data manager), Sue Shaw (field activities), Stacy Kim (laboratory analysis), and Ethan Barnes (QA officer) are responsible for the custody information.

12.1 Nutrient samples

If orthophosphate is to be analyzed for, immediate filtration of samples will be competed in the field with Millex (0.45 um) syringe driven filter units. Samples will be transported into a cooler with ice packs.

Once containers are filled they will be labeled and stored as described in Table 7. Upon arrival to the laboratory, the samples will be refrigerated to 4°C and processed within 48 hours. If samples are not to be analyzed within 48 hours of collection, they should be immediately frozen for later analysis. In the case of frozen samples, they should be analyzed within one month of collection.

All samples should be placed in plastic Ziplock bags with the sample collection date/time and campaign title written on the bag. If samples are to be frozen, the date of initial freezing should be noted on the bag. Standard CCoWs laboratory methods include keeping a log of current samples within the refrigerator/freezer will be kept taped to the door of the cooler and updated as the status of samples changes. This Central Coast Watershed Studies form, Sample Storage Management Log, will be saved

to file when full. Sample preservation status will be recorded on the Nutrient QC Evaluation Form (Appendix V)

Samples shall be brought to room temperature before analysis. This may be done by thawing overnight or by a warm-water bath. However, if a bath is used, care must be taken to not raise the sample temperature above room temperature at any time. Overnight thawing is preferred.

Table 10. Nutrient sample handling.

Parameter	*Container*	*Volume*	*Initial Preservation*	*Holding Time*
Nitrate + Nitrite ($NO_3 + NO_2$)	Polyethylene bottles	150 ml	Cool to 4°C	48 hours at 4°C, dark
Ammonia (NH_3)	Polyethylene bottles	500 ml	Cool to 4°C	28 days at 4°C, dark
Ortho-phosphate (OPO_4)	Polyethylene bottles	150 ml	Cool to 4°C	48 hours at 4°C, dark

12.2 Pesticide samples

Pesticide samples will be transported in a cooler with ice packs, stored in the refrigerator at 4°C, and shipped within 3 days to the CDFG Water Pollution Control Laboratory in Rancho Cordova.

12.3 Corrective Actions

Primary responsibility for dealing with failures in sampling will lie with the field sampling staff and Sue Shaw (Field Activities Technical Manager). Deviations from protocols are documented in field notes. If monitoring equipment fails, the problem will be reported in the field notes and no suspect data will be utilized. Actions will be taken to replace or repair equipment prior to the next field use. If the performance requirements for specific samples are not met, the sample will be re-collected. If contamination of a sample container is suspected, a clean container will be used.

13. Analytical Methods

This section describes and refers to the field and laboratory procedures used to analyze dissolved nutrients in water samples. There will be no in situ monitoring. Field procedure SOPs are discussed in 11. Sampling Methods. Specific method performance criteria are discussed in 7. Quality Objectives and Criteria for Measurement Data. For a detailed explanation of test methods and specifications, see Watson et al., 2005. The field or laboratory supervisor has the primary responsibility for responding to a failure of the analytic systems, and will consult with the project manager to reach solutions consistent with the measurement objectives. If a problem is resolvable by the field technician or lab analyst who encounters it, they will document the problem in their field notes or laboratory record and complete the analysis. If the problem is not resolvable it will be conveyed to the responsible supervisor who will decide if the failure compromised the sample result which will be reported. The problem will be documented in the data report sent to the project manager.

Table 11. Summary of nutrient test ranges, method descriptions, and standard solutions.

Constituent	HACH Method	Method Description	Test Range (mg/L)	STANDARDS		
				Low	Mid	High
NO_3^--N	10020	chromotropic acid method Test 'N Tube	0.2 – 30.0	0.5	10	25
PO_4^{3-}	8048	ascorbic acid method; PhosVer 3 Test 'N Tube	0.06 – 5.00	0.05	1	5
NH_3-N	10023	salicylate method; AmVer Test 'N Tube	0.02 – 2.50	0.05	1	2.5

Remaining sample may be disposed of when analysis is completed and all analytical quality assurance/quality control procedures are reviewed and accepted. Used sample that has been processed with reagent is a regulated hazardous waste and disposed of according to MLMLs Safety Program. Pesticide samples are disposed of by CDFG Water Pollution Control Laboratory in Rancho Cordova in accordance with applicable laws. Laboratory turnaround time is discussed in 12. Sample handling and custody.

13.1 Dissolved nutrients

Between collection and analysis, nutrient samples are filtered through a 0.45 µm syringe driven filter before they are frozen. Syringes are thoroughly cleaned between samples, and the used filters are disposed of.

The HACH Odyssey DR/2500 Spectrophotometer will be used for nutrient analysis. All the manufacturer's specifications and instructions are followed step by step with the addition of some QAQC measures described in section 7 (standard solutions, reagent or method blanks, bottle blanks, replicates, and spikes). Table 8 summarizes the test ranges and concentrations of standard solutions used for the accuracy assessment of the spectrophotometer. If any standards should fall outside the limits presented in Table 8, the procedures are rechecked and the standard is run again.

Procedures for the all tests are detailed in the HACH Odyssey DR/2500 Spectrophotometer Procedure Manual (te/dk 04/01 2ed) under the above-mentioned methods. A sample run is a group of samples that are analyzed as one batch, usually 10 to 20 samples per batch. If samples are frozen, they are removed from the freezer and set out to thaw to room temperature prior to analysis. Everything from a nutrient sample run (date and time of sample collection, date of preservation, lab date, analysts, blank values, measured standard values, spike values, replicate values, sample data values, etc.) is recorded on a laboratory template.

Should the concentration of a sample fall under the range of the test, the data value will be reported as "non-detect". If the test indicates an over-range value, then a 3:1 dilution of the sample will be performed

and the sample will be retested. Although our detection limits are higher than SWAMP's we do not see this as a problem. The objective is to measure excessive nutrient loads and we will be able to detect levels above levels above 0.2 for NO3--N, 0.06 for PO43 , and 0.02 for NH3-N. The nutrient levels in the study area are high, therefore we do not anticipate non detect measurements. We are confident that this level of detection is more than efficient considering the goal of our study. In addition, detecting very low levels of these nutrients will not have a significant effect on load calculations.

13.2 Turbidity

Turbidity will be analyzed using a using a HACH 2100P portable turbidimeter, SM2130B. Samples are analyzed according to directions outlined in the factory manual. The automatic range setting measures turbidity from 0.01 to 1000 NTU.

13.3 Pesticides

Water samples will be transported in a cooler with ice packs, stored in the refrigerator at 4°C, and shipped within 3 days to the CDFG Water Pollution Control Laboratory in Rancho Cordova for pesticide analysis using GC/MS . Of the currently used pesticides, chlorpyrifos and diazinon have been identified as being responsible for toxicity of crustaceans in a number of stream water samples (Siepmann & Finlayson, 2000; Hunt et al., 2003) and are present in biologically effective quantities in sediments and tissues (Hunt et al. 2003, Kozlowski et al. 2004). For this reason, and because of an increased use in the study area, chlorpyrifos and diazinon will be monitored.

13.4 Field measurements: temperature, pH, dissolved oxygen, salinity

All samples will be analyzed in the field for Temperature (^{o}C), pH, Conductivity/Salinity, and Dissolved Oxygen using a YSI 556 multi-probe meter. Samples will be analyzed according to directions outlined in the factory manual.

14. Quality Control

The following section summarizes quality control measures taken to ensure data quality. Most of this information has already been presented in previous sections. Field personnel will strictly adhere to the sampling protocols to ensure the collection of representative, uncontaminated sediment and water samples. The key aspects of quality control associated with chemistry sample collection are as follows 1) field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable samples in accordance with pre-established criteria, 2) field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination (e.g. unclean surfaces, for cooling), 3) samplers and utensils which come into contact with the samples will be pre-cleaned and made of non-contaminating materials (e.g., glass, high quality stainless steel, polycarbonate and/or Teflon) and will be used only once per sampling station, 4) requirements for sample collection, preservation and holding times will be adhered to.

For every sample run, one site will be randomly chosen as the QAQC site: all duplicate measurements and samples will be taken from this site. This will ensure clarity and continuity in data management and reporting. Control limits, formulas for calculation of quality control sample performance, and corrective actions are further disscussed in 7. Quality Objectives and Criteria for Measurement Data. If control limits are exceeded, calculations and instruments will be checked, and a repeat analysis may be done to confirm results. If the cause is unusually high concentrations of analytes, sample in-homogeneity, or poor laboratory precision the laboratory will stop analysis and eliminate the source of the imprecision.

14.1 Field measurements

- Temperature, pH, dissolved oxygen, and salinity: 3 replicate measurements once per sampling run. All measurements will be taken at the middle of the channel where the flow is greatest. In doing so this ensures that water samples are relatively well mixed compared to sites along the edges.

14.2 Nutrient samples

Sample collection:

- Field duplicate: 1 per sample run or 5% of samples (2 bottles, random site selection)

Laboratory analysis:

- Method/Reagent blanks: 1 per sample run
- Standards/Controls: 3 per sample run, per analysis
- Bottle blank: 1 per sample run
- Sample replicates: at least 1 per sample run or 5% of samples
- Sample spikes: at least 1 set per sample run or 5% of samples

14.3 Turbidity

- Field duplicate: 1 per sample run or 5% of samples (this is taken from the duplicate suspended sediment sample)
- Turbidity: 3 replicate measurements

14.4 Pesticide samples

- Field duplicate: 1 per sampling event or 5% of the annual samples, whichever is more frequent.
- Samples will be sent to CDFG Water Pollution Control Laboratory in Rancho Cordova for laboratory analysis. All laboratory QA/QC for GCMS analysis will be handled by the lab (see section 7.14 Pesticide MQOs and Appendix VII) and will be included in laboratory reports.

15. Instrument/Equipment Testing, Inspection, and Maintenance

All equipment used in this project will be inspected by management upon arrival from the supplier. Factory manuals, specifications, and instructions will be kept on file at MLML. Prior to each sampling run, all equipment will be visually inspected for proper function, replacement of parts, and batteries. All field sampling and laboratory equipment will be maintained in working condition. Backup equipment or common spare parts will be available to quickly make repairs or replacements. Following each sampling run, field equipment will be cleaned and stored until future use.

All field equipment with manufacture-recommended maintenance schedules will receive preventative maintenance according to that schedule. Other equipment only occasionally used will be inspected for spare part, cleanliness, battery strength, etc. at least monthly and prior to being taken to the field. In the field, extra parts and supplies will be carried to attend to any malfunctions. Spare parts which should be available include batteries, tubes, light bulbs, and glassware, among other items. After field use all equipment will be re-checked for possible maintenance.

Laboratory equipment with manufacturer recommended maintenance will be followed as a minimum requirement. Backup equipment may not be possible for some equipment, but common replacement parts will be available including batteries, tubes, light bulbs, electrical condiuts, etc.

A log book will be maintained for each type of field and laboratory equipment and all preventative or corrective maintenance will be recorded. A total maintenance history will be available for inspection during an audit. The field and laboratory crews will be responsible for testing, inspection and maintenance of their equipment, supervised by Sue Shaw (field) and Stacy Kim (laboratory).

16. Instrument/Equipment Calibration and Frequency

The scheduling of the calibration and maintenance of equipment varies according to the amount of use and manufacturer's requirements. We will follow the manufacture guidelines for the appropriate calibration and testing methods and intervals for all equipment. The HACH Odyssey DR/2500 Spectrophotometer and YSI 556 multi-probe meter will be calibrated before each use. Calibrations for pesticide analysis will be conducted by CDFG Water Pollution Control Laboratory in Rancho Cordova and documentation will be provided to the project manager. Calibration records will be kept in the maintenance log at Moss Landing Marine Laboratories, where it can be easily accessed before and after equipment use. Calibrations that are performed by monitors in the field are recorded on the field data sheets, also archived at the above location. If deficiencies are detected at any time, the equipment will not be used and a replacement will be used instead or repairs will be made.

17. Inspection/Acceptance of Supplies and Consumables

Critical supplies and consumables will be purchased from Fisher Scientific as needed, and include the following:

General Supplies

- 1.25 mL plastic bottles
- Liquinox
- Acid wash
- Latex gloves
- Pipettes, beakers, graduated cylinders, and other assorted glassware
- Amber glass bottles (for pesticide samples)
- Ziplock bags
- Polyethylene bottles

- Thermometer

YSI 556

- YSI Conductivity solutions 3161, 3163, 3165, 3167, 3168, 3169
- YSI pH 4.00, 7.00, and 10.00 Buff er Solu tions : 3821, 3822, 3823
- Oxygen membranes

HACH Odyssey DR/2500 Spectrophotometer:

- Millex (0.45 um) syringe driven filter units

NH3-N (10023)

- Low Range Test 'N Tube™ Nitrogen-Ammonia AmVer™
- Funnel, micro, poly
- Pipet, TenSette®, 1.0–10.0 mL
- Pipet Tips, for TenSette® Pipet 19700-10
- Sample Cells, 10-20-25 mL, w/cap
- Test Tube Rack
- Nitrogen Ammonia Standard Solution, 1.0-mg/L NH3–N
- Nitrogen Ammonia Standard Solution,
- 10-mL Voluette® Ampule, 50-mg/L NH3–N
- Water, deionized

NO3--N Test (10020)

- Test 'N Tube NitraVer® X Nitrate Reagent Set
- Funnel, micro, poly
- Pipet, TenSette®, 0.1 to 1.0 mL
- Pipet Tips, for 19700-01 TenSette® Pipet
- Sample Cells, 10-mL, w/cap
- Test Tube Rack, cooling
- Nitrate Nitrogen Standard Solution, 10-mg/L N
- Nitrate Nitrogen Standard Solution, Voluette® Ampule, 500-mg/L
- Water, deionized

PO43 (8048)

- PhosVer® 3 Phosphate Reagent Powder Pillows, 10-mL or PhosVer® 3 Phosphate Reagent AccuVac® Ampuls
- Beaker, 50-mL.
- Sample Cells, 10-mL, w/cap
- Stopper for 18-mm tube
- Phosphate Standard Solution, 10-mL Voluette® Ampul, 50-mg/L as PO4
- Phosphate Standard Solution, 50-mg/L as PO4
- Phosphate Standard Solution, 1-mg/L as PO4

- Water, deionized

HACH 2100P portable turbidimeter

- Formazin or StablCal Stabilized Formazin for calibration
- Set of StablCal Primary Standards in sealed vials, one each of:
- <0.1 NTU*
- 20 NTU
- 100 NTU
- 800 NTU
- Reagent grade hydrazine sulfate (N2H4•H2SO4)
- Distilled water
- Hexamethylenetetramine
- Standardization Kit containing Gelex Secondary Standards (0-10, 0-100 and 0-1000 ranges) plus nine sample cells with caps.
- Silicone Oil, 15-mL (0.5 oz) dropping bottle

Upon arrival to Moss Landing Marine Laboratory, shipments will be checked to be certain the packing slip is complete and matches the materials ordered (supplies or equipment). Sampling equipment will be inspected for broken or missing parts, and will be tested to ensure proper operation. Standard supplies will be stored in designated areas. Reagents are replaced before they exceed the manufacturer's recommended shelf life.

18. Non-Direct Measurements (Existing Data)

Existing data will be used for planning purposes only (for example, which test to try first, high range or low range, etc.), and will not be incorporated into the analysis portion of this project.

19. Data Management

19.1 Protocols

Field data sheets are checked and signed in the field by field team leader, who will identify any results where holding times have been exceeded, sample identification information is incorrect, samples were inappropriately handled, or calibration information is missing or inadequate. Such data will be marked as unacceptable by the monitoring leader and will not be entered into the electronic database.

Independent laboratories will report their results to the data manager, who will verify sample identification information, review the chain-of-custody forms and quality assurance data, and identify the data appropriately in the database. These data are also reviewed by the technical advisors quarterly.

The data manager will review the field sheets and enter the data deemed acceptable by the technical advisors. Upon entering the data the data manager will sign and archive the field data sheets. Data will be entered into a spreadsheet (MS Excel) or a database (MS Access) in a way that will be compatible with EPA's STORET and the Regional WQCB's database guidelines. Following initial data entry the data manager will review electronic data, compare to the original data sheets and correct entry errors. After

performing data checks, and ensuring that data quality objectives have been met, data analysis will be performed.

Raw data will be provided to the State WQCB and Regional WQCB in electronic form at least once every two years. All quality assurance data, including duplicates, blanks, matrix spikes, and laboratory control samples will be included in the data delivery.

Further protocols for data management:

- The primary data storage shall be on a central university server.
- Format will be compatible with EPA's STORET and the Surface Water Ambient Monitoring Program (SWAMP).
- Periodically, all electronic data shall be backed up on CD (at least every 6 months). Backup CDs shall be stored at an off-site location for at least 3 years.
- A new master version of the *MS Access* and/or *Excel* database file shall be copied and renamed each time modifications are made.
- The data file names shall contain the last date on which they were significantly modified.
- Previous versions (with earlier dates) shall be maintained on the server as intermediate backups until they are backed up to CD (see above).
- All initial data from field books shall be entered into the appropriate database on the day following field sample collection, or as soon as is reasonably possible.
- After laboratory analysis is complete, all results should be entered into the database record for that particular field monitoring campaign as soon as is reasonably possible.
- All laboratory data sheets will be stored at Moss Landing Marine Laboratory for at least 3 years.
- MLML shall keep all original field books permanently on file.
    - Primary water quality data shall be maintained at Moss Landing Marine Laboratory.
- The *MS Access* or *Excel* database shall be a relational database, with tables for:
    - Site codes
    - Site visit information (e.g. date/time, container ID, sample type)
- Training documentation, database-related SOPs and other documentation needed for maintaining compliance with the SWAMP database formats is available at: http://mpsl.mlml.calstate.edu/swdbase.htm.

Group C: Assessment and Oversight

20. Assessments & Response Actions

20.1 Assessment

Project activities such as field techniques, laboratory procedures, and data management will be assessed as follows:

- Initial training will be followed by QA/QC procedures outlined at every field sampling event.
- The monitoring manager and primary research technician will oversee all fieldwork, field training, and ensure that field equipment is inspected and calibrated as scheduled. Each sampling run will be assigned a team leader responsible for assuring that procedures are followed and that data is accurately recorded.
- The laboratory manager will oversee laboratory analysis, training and is also responsible for ensuring that calibrations of laboratory equipment are performed as scheduled when and where applicable.

Following each monitoring run, a quality control checklist will be followed to keep track of when tasks are completed. Assessments will be recorded by the responsible individual and will be reported to the grant manager for inclusion in the quarterly progress reports. If problems are detected, such as failure to meet accuracy and precision objectives, immediate action will be taken (see below).

20.2 Response actions

Any problem encountered during data and/or equipment assessment may lead to the following responses:

- Equipment calibration prior to scheduled date
- Equipment repair
- Supplemental training for team members
- Consultation with CEC Project Director
- Re-evaluation of methods

Corrective actions will be recorded by the responsible individual and will be reported to the grant manager for inclusion in the quarterly progress reports and final report.

21. Reports to Management

21.1 Progress reports

Progress reports will be submitted to the CCRWQCB Contract Manager, Bill Hoffman, quarterly on the twentieth (20th) of March, June, September, and December, beginning June 20th, 2006 by the project director. Reports will include descriptions of activities undertaken, accomplishments of milestones, any problems encountered in the performance of the work, and delivery of any intermediate products. Raw data will be made available to the data users per their request.

21.2 Final report

The draft and final project reports will be written by the Project Director. Two copies of the draft report will be submitted to the Contract Manager for review and comment. The final report will be submitted to the Contract Manager via one reproducible master and two hardcopies of the final report. An electronic (PDF and CD) copy will also be provided.

Group D: Data Validation and Usability

22. Data Review, Verification, and Validation Requirements

22.1 Data requirements

Data generated by project activities will be reviewed against the MQOs discussed in 7 Quality Objectives and Criteria and following SWAMP procedures. Based on this review, data will be separated into three categories:

1. Meets all MQOs
2. Fails precision or recovery criteria
3. Fails to meet accuracy criteria

Data meeting all applied method quality objectives, but with incomplete QA/QC practices will be set aside until it can be determined if the data quality has been compromised.

When data does not meet all MQOs it will be flagged in the database. The use of any data with limitations that is deemed usable will be clearly identified and addressed in the final report.

23. Verification and Validation Methods

All data will be reviewed and verified in the following manner. SOPs for field data, chemistry data, and toxicity data verification are available online at: http://mpsl.mlml.calstate.edu/swsops.htm.

23.1 Field work & data entry

- Field books will be reviewed following each sampling run to make sure all samples were collected and information was accurately recorded.
- A random sub-sample of *Excel* or *Access* entries will be compared to original field books.

23.2 Review of the database

- The monitoring manager (Kamille Hammerstrom) will review the water quality master database by comparing entries to the original field books. This check is scheduled to follow each monitoring campaign.
- The monitoring manager (Kamille Hammerstrom) will query each sampling run of data by analyte to look for any gaps and outliers. Data will also be reviewed in graphic format.
- Following data analysis, data will be reviewed by the Project Director (Jim Oakden) and quality assurance manager (Ethan Barnes).
- Any detected data errors will be flagged in the database and categorized within the three categories discussed previously above for the benefit of the database user.
- Any issues that arise and the manner of resolution will be discussed in the reporting process.

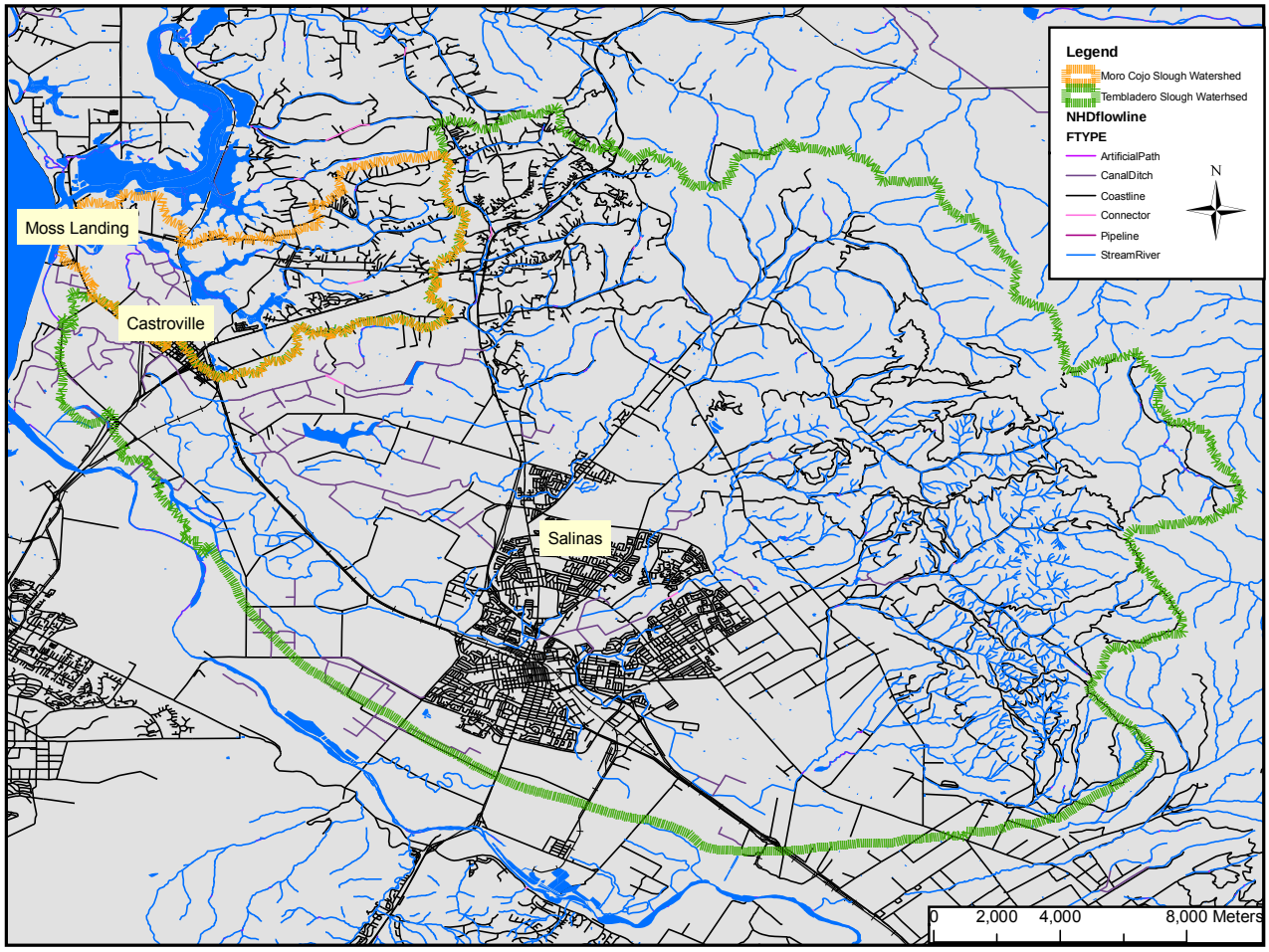
23.3 Calibration and MQOs

- Equipment will be checked before each sampling run to ensure equipment is currently calibrated before data collection.

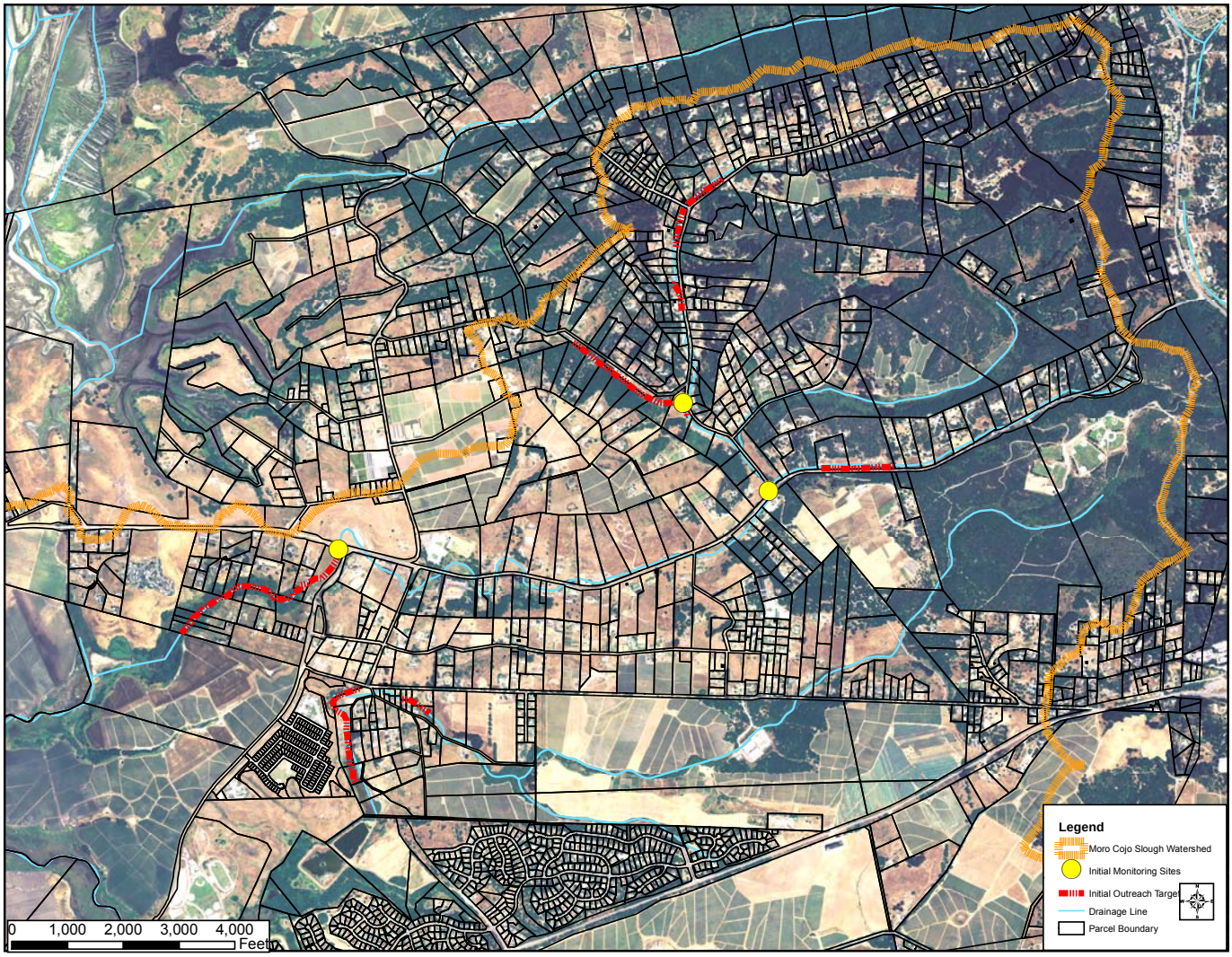
24. Reconciliation with User Requirements

Procedures for evaluation of the uncertainty of validated data are discussed in previous sections. Any data limitations will be reported to the user through the reporting process and through flags in the database The data will be used in conjunction with data collected in an ongoing project spanning the region, and to assist in the meeting of water quality objectives.

Appendix I. Overview of the Moro Cojo Slough and Tembladero Slough Watersheds.



Appendix II. Map of parcels selected for initial landowner education and outreach and initial monitoring locations.



Appendix III. Site data form for field measurements.

Coastal Conservation & Research
Water Quality Monitoring
Field Sampling Data Sheet

Site Name: **Date:**

Location: **Observer:**

Data Collector:

Latitude: **Longitude:**

Temp: **C** **ppm**

O2: **mg/L**

Conductivity: **uS** **ppt**

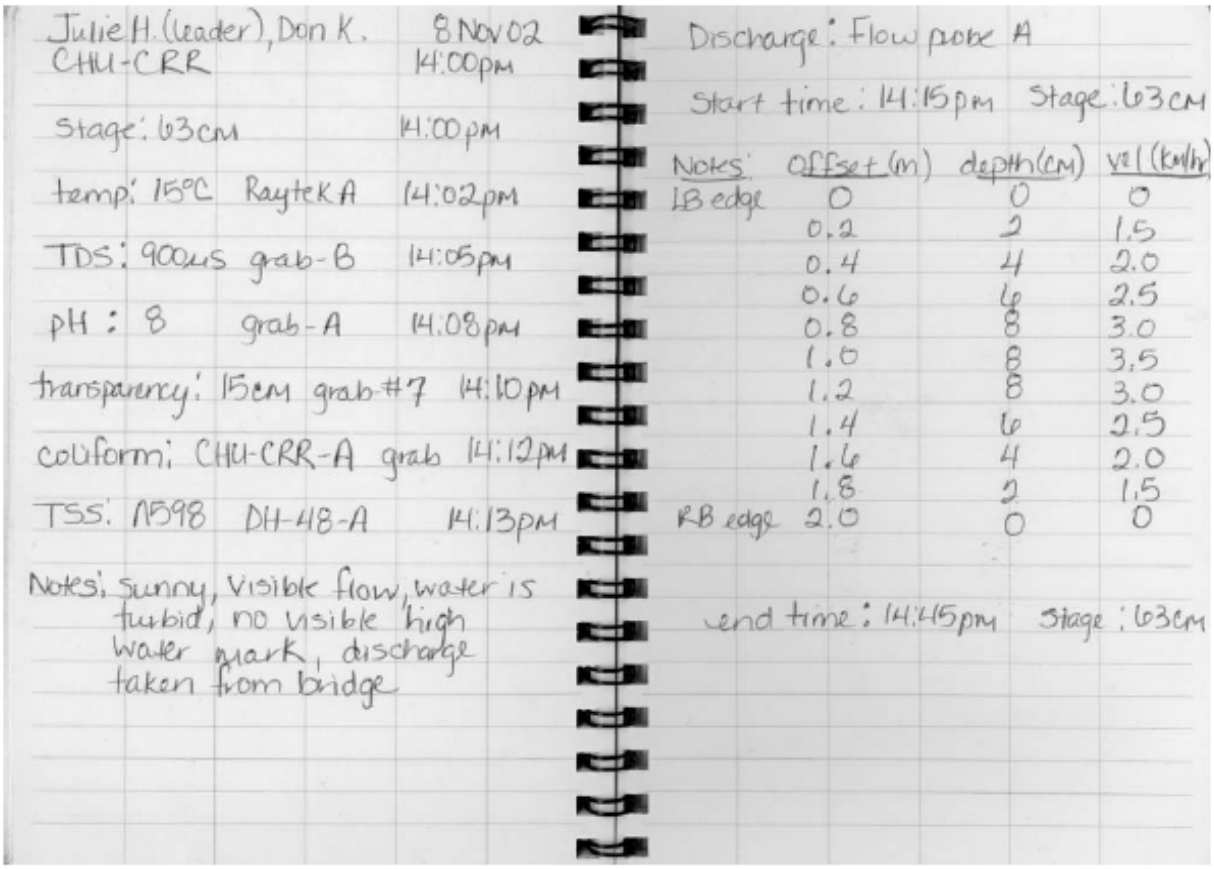
pH: **pH**

Salinity: **uS**

Weather Conditions:

Comments:

Appendix IV. Sample Field Book Entry.



Julie H. (leader), Don K. 8 Nov 02
CHU-CRR 14:00pm

Stage: 63cm 14:00pm

temp: 15°C RayteK A 14:02pm

TDS: 900uS grab-B 14:05pm

pH: 8 grab-A 14:08pm

transparency: 15cm grab #7 14:10pm

coliform: CHU-CRR-A grab 14:12pm

TSS: N598 DH-48-A 14:13pm

Notes: sunny, visible flow, water is turbid, no visible high water mark, discharge taken from bridge

Discharge: Flow probe A

Start time: 14:15pm Stage: 63cm

Notes:	Offset (m)	depth (cm)	vel (km/hr)
LB edge	0	0	0
	0.2	2	1.5
	0.4	4	2.0
	0.6	6	2.5
	0.8	8	3.0
	1.0	8	3.5
	1.2	8	3.0
	1.4	6	2.5
	1.6	4	2.0
	1.8	2	1.5
RB edge	2.0	0	0

end time: 14:45pm Stage: 63cm

Appendix V. Central Coastal Watershed Studies QC evaluation form for nutrients.

Nutrient Sample Run Data

Nutrient Test Type:				
Campaign:				
Date/Time of Collection:				
Field Book #:				
Date of Preservation:				
Test Date:				
Analysts:				
Analysis Method:				
Detection Limit:				

Blank Value:	

Calibrators *			
	#1	#2	#3
Standard Value:			
Measured Value:			
** % difference:			

Spike		% Recovery ***		**Replicates**	
sample # spiked:				sample ID	Value (mg/L)
sample original value:					
standard & amount added:					
expected spike value:					
actual spike value:					

* Standards that should be used for calibrators (mg/L):				** Acceptable % difference
	#1	#2	#3	
NO3-N (method10020 HR):	0.5	10	25	10%
NH3-N (method 10023 LR):	0.5	1	2.5	4%
PO4 (method 8048):	0.5	1	5	4%

** % difference = absolute value [(measured value - standard value) / standard value]

*** 1:1 ratio of QAQC sample and a standard

expected spike value = average of sample value & spike concentration

% recovery = measured spike value / expected spike value * 100

Acceptible values: 80 - 120% (SWAMP Requirements)

see 'nutrient_QAQC_calculation_template.xls' (on the CCoWS server at :\admin\lab+field\Templates_Forms\nutrient_templates) for QAQC calculations.

Appendix VI. Central Coast Watershed Studies Nutrient chain of custody form.

Central Coast Watershed Studies

Sample Chain of Custody

Client Name:	
Collected by:	
Relinquished by:	Date / time:
Received by:	Date / time:

Frozen on Arrival? Y N

Date samples placed in freezer / preserved:

ANALYSIS

Sample Description / ID / Site	Collection Date	Collection Time	NO3-N	NH4-N	PO4

Notes:

Appendix VII. Data Acceptability Criteria for Synthetic Organic Compounds in Water: PCB's, PAH's, Pesticides (CDFG Water Pollution Control Laboratory in Rancho Cordova).

Sample Type	Objective	Frequency of Analysis	Recommended Control Limits	Recommended Corrective Action
Internal/External Calibration				
Calibration Standards (3-5 standards over the expected range of sample target analyte conc., with the lowest conc. Std at or near the MDL).	Full calibration: Establish relationship between instrument response and target analyte conc.	Follow manufacturer's or procedures in specific analytical protocols. A min. 3 point calib.: Each set up, major disruption, and when routine calib check exceeds specific control limits.	Linear regression, r>0.995 or %RSD <10%.	Determine cause and take appropriate corrective action. Recalibrate and reanalyze all suspect samples or flag all suspect data.
Calibration Verification				
Calibration Check Standards (minimum of one mid-range standard prepared independently from initial calibration standards).	Verify calibration.	After initial calibration or recalibration. Every 10 samples.	%R = 75-125%.	Determine cause and take appropriate corrective action. Recalibrate and reanalyze all suspect samples or flag all suspect data.
Method Detection Limit Determination				
Spiked matrix samples (analyte-free water samples to which known amounts of target analytes have been added; one spike for each target analyte at 3-***10*** times the estimated MDL).	Establish or confirm MDL for analyte of interest.	Seven replicate analyses prior to use of method, or 5 replicates at 3 concentrations with 1 level close to estimated RL. Re-evaluation of MDL annually.	Determined by program manager.	Redetermine MDL.
Accuracy and Precision Assessment				
Reference materials (SRMs or CRMs, covering the range of expected target analyte conc) if available.	Assess method performance (initial method validation and routine accuracy assessment).	Method validation: As many as required to assess accuracy and precision of method before routine analysis of samples. Routine accuracy assessment: one (preferably blind) per 20 samples or one batch.	Measured value <95% confidence intervals, if certified. Otherwise, %Recovery = 50-150%.	Failure of any of the accuracy and precision control limits require the following: Determine cause and take appropriate corrective action. Recalibrate and reanalyze all suspect samples or flag all suspect data.
Matrix spikes (field water samples to which known amounts of target analytes have been added: 0.5 to***10*** times the concentration of the analyte of interest or ***10*** times the MQL).	Assess matrix effects and accuracy (%Recovery) routinely.	One per 20 samples or one per batch, whichever is more frequent.	%Recovery = 50-150% or Control Limits based on 3x the standard deviation of laboratory's actual method recoveries.	See Reference Materials Corrective Action. Zero percent recovery requires rejection of all suspect data.
Matrix spike replicates (replicate aliquots of matrix spike samples; 0.5 to***10*** times the concentration of the analyte of interest or ***10*** times the MQL).	Assess method precision routinely.	One duplicate per 20 samples or one per batch, whichever is more frequent.	RPD <25% for duplicates.	See Reference Materials Corrective Action.
Blind Field Replicate (replicate aliquots of water field samples).	Assess method precision routinely. Assess total variability (i.e., population variability, field or sampling variability, and analytical method variability.)	5% annual rate (5% of total number of field samples per analytical procedure per year, rounded up to nearest whole number).	RPD <25% for duplicates.	Determine cause and take appropriate corrective action. Recalibrate and reanalyze all suspect samples or flag all suspect data.
Contamination Assessment				
Laboratory Blanks (method, processing, bottle, reagent).	Assess contamination from equipment, reagents, etc.	One method blank per 20 samples or one per batch, whichever is more frequent. At least one bottle blank per batch. One reagent blank prior to use of a new batch of reagent and whenever method blank exceeds control limits.	Blanks <MDL for target analytes.	Determine cause of problem (e.g., contaminated reagents, equipment), remove sources of contamination, and reanalyze all suspect samples or flag all suspect data.
Field Blanks (travel blanks, equipment blanks).	Assess contamination from equipment, from air, from surrounding environment, etc.	Random performance evaluation during field audit; field blanks <MDL for analyte of interest. If acceptable performance, no field blanks required for one year. If non-acceptable, 5% field blanks must be conducted during the year until next field audit.	Blanks <MDL for target analytes.	Determine cause of problem (e.g., equipment contamination, improper cleaning, exposure to airborne contaminants, etc.), remove sources of contamination, and reanalyze all suspect samples or flag all suspect data.

Routine Monitoring of Method Performance for Organic Analysis				
Surrogate Spikes (Prepared from chemicals of similar structure to target analytes not in target list or isotopically labelled target analyte).	Assess method performance and estimate recovery of target analytes analyzed by GC or GC/MS. Determine RRF's of organic target analytes quanitated by isotope dilution techniques.	In every calibration standard, sample, and blank analyzed for organics by GC or istope dilution GC-MS; added to samples prior to extraction.	Determined by program manager.	Determine cause of problem (e.g., incomplete extraction or digestion, contamination, inaccurate preparation of internal standard), take appropriate corrective action, and reanalyze all suspect samples or flag all suspect data.
External QA Assessment				
Accuracy-based performance evaluation samples submitted to new laboratories by SWAMP QA Program.	Initial demonstration of laboratory capability.	Once prior to routine analysis of field samples.	Determined by study manager.	Determine cause of problem and reanalyze sample. Do not begin analysis of field samples until laboratory initial capability is clearly demonstrated.
Mandatory interlaboratory exercises overseen by 3rd party external ("referee") SWAMP QA Program officials for all SWAMP participant laboratories.	Ongoing demonstration of laboratory capability.	One exercise per year.	Determined by study manager.	Determine cause of problem and reanalyze sample. Further corrective action to be determined by QA manager.
Voluntary, but encouraged, participation in NOAA-NIST intercalibration studies and CA-ELAP annual performance evaluations, as appropriate.	Ongoing demonstration of laboratory capability.	One exercise per year.	Determined by study manager.	Determine cause of problem and reanalyze sample. Further corrective action to be determined by QA manager.
General Provisions				
Acceptable Data Set: CCV Recoveries must be within control limits, & either SRM or Spiked Matrix recoveries must also be within control limits.				

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Section 5.4 Natural Resource Projects Inventory

A) Project Information

1. Project Title: Restoring Natural Water Systems in Rural Residential Landscapes

2. Project Type: Conservation, Exotic Species Removal, Habitat, Mitigation, On-The-Ground Restoration, Water Quality

3. Project Purpose/Goals: The goals of this project are:

1. Educate landowners and the public as to the importance of wetland habitats and their functions
2. Ensure ongoing and widespread implementation of the management measures long after the project period has ended
3. Educate landowners about the federal and state habitat conservation easement programs
4. Restore wet corridors (wetland and upland habitat) in the upper watersheds of the Moro Cojo and Tembladero Sloughs
5. Reduce non-point source pollution entering and exiting the watershed, particularly sediments, nutrients, and pesticides
6. Increase coverage of native vegetation
7. Increase habitat for invertebrates and vertebrates associated with wetland habitats

4. Project Abstract (brief description of project): The low quality and quantity of freshwater is the most serious environmental problem in California and most of the world.

In the Salinas Valley and much of California, the natural water systems flow through three major landscapes: urban, agriculture, and rural residential regions. This project will establish the first demonstration experiment of wet ecosystem recovery for the rural residential landscape, which involves many more landowners than the rural agricultural setting

The Project focuses on the water systems in the upper watersheds of the Moro Cojo and Tembladero Sloughs in the Prunedale Hills. The first target area involves a series of highly degraded, but restorable small creeks (Walker, Paradise, and Castroville Creeks) flowing into the slough from the adjacent Prunedale Hills. This historically rich system of connected creeks, marshes, and small lakes is completely confined to ditches, which keep the wet corridors dry and highly degraded

. The restoration methods are well tested and consist primarily of fencing the easement, plugging the ditch to allow water to spread over the natural wet area, and establishing native plants while controlling exotic weeds. Monitoring will consist of water quality measurements, vegetation surveys, photographic documentation, and faunal surveys.

5. Watershed Plan Name:
6. Website URL:

B) Funding Programs
Funding Info 1

Agency: State Water Resources Control Board
Program: Agricultural Water Quality Grant Program
Source: State
Amount: 495,000

C) Contact Information
1. Project Contact

James Oakden
Project Director
Creative Environmental Conservation
PO Box 355
Moss Landing, CA 95039
Email: joakden@gmail.com
Webpage:
Phone: 831/479-0277
Fax:

2. Secondary Project Contact

Kevin O'Connor
Project Manager
Moss Landing Marine Labs
8272 Moss Landing Road
Moss Landing, CA 95039
Email:
Webpage:
Phone: (831) 771-4495
Fax:

D) Data Availability
1. Project Data Available? Yes
Project Data: Geographic Information System (GIS), Reptiles, Vegetation Maps, Water Pollutants/Pesticides, Water/pH
2. Publicly Available Reports:

E) Project Time Frame
Start Date: 3/1/2006 **End Date:** 12/31/2008

F) Participant and Funding Information Creative Environmental Conservation Lead Agency Susan Wagner Landowner Lou Calcagno Landowner

G) Geographical Information

1. Size of project: 3 Square Miles
2. Counties included in project: Monterey
3a) Location Description: Area between the Moro Cojo Slough and Elkhorn Slough in Moss Landing/Castroville.
3b) Latitude and Longitude of project center-point
3c) Township / Range / Section:

H) Resource Issues **Resource Issues:** Agriculture, Exotic Species, Grazing, Riparian Enhancement, Vegetation, Water Quality, Weed Control, Wetlands, Wildlife Habitat
Water Quality Issues: Pesticides, PH, Pollutants-Pesticides, Salinity, Temperature

I) California NPS Program Plan **Management Measures:**

J) Habitat Habitats in the project area: Estuarine, Lacustrine, Perennial Grassland

K) Species Does this project target the protection/conservation of specific species? Does this project try to introduce or eradicate a species as part of restoration or conservation efforts? Jaumea carnosa (Fleshy Jaumea): Targeted for Introduction Frankenia Salina (Alkali Heath): Targeted for Introduction Quercus agrifolia (Coast Live Oak): Targeted for Introduction Deschampsia cespitosa (Hair Grass): Targeted for Introduction Hordeum brachyanterum (Meadow Barley): Targeted for Introduction Bromus carinatus (California Brome): Targeted for Introduction

L) Project Methods 1. Methods Coastal Oak Woodland - 51 Acres - Planted oaks
Estuarine - 23 Acres - Planted wetland plants, blocked grazing animals with fence
Lacustrine - 1 Acres - improved water flow
Perennial Grassland - 6 Acres - planted perennial grass seeds
2. Fertilizer Fertilizer not used.
3. Irrigation Irrigation was **Supplemental/As Needed** Irrigation frequency and method: **weekly, hard drip line**

M) Control Methods **Chemical Controls: Cultural Controls: Fire Controls: Mechanical/Manual Controls:** Hand Pulling, Mowing / Weed Eater **Grazing Controls: Biocontrol Agents: Other Controls:**

N) Project Progress
1. Have the project goals listed in Section "A" been attained? Partially
2. Performance Standards
3. Monitoring
4. Problems **What problems have you encountered with this project?**

O) Project Status and Needs
1. Current phases of the project: Writing Report
2. Current needs for the project:

P) Comments **Additional Comments:** none

Section 6 - Copy of final CEQA/NEPA documentation

We did not require CEQA/NEPA documentation because none of the projects included elements which required that clearance.