SONOMA COUNTY WATER AGENCY

FILE:CF/15-0-9 STREAM MAINTENANCE PROGRAM (2011)

NCRWQCB

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☐ Date

June 7, 2011

Mr. Stephen Bargeston
Mr. Kason Grady
North Coast Regional Water Quality Control Board
5550 Skylane Blvd Ste A
Santa Rosa Ca 95403-1072

Subject: Annual Notification for Sonoma County Water Agency's 2011 Stream Maintenance Projects: Supplemental Notification for City of Santa Rosa's Laguna Nutrient Offset Project

Dear messrs:

Enclosed is an Addendum for the Sonoma County Water Agency's (Water Agency) Stream Maintenance Program's (SMP) Annual Notification Report (ANR) for 2011 stream maintenance activities (Supplemental Notification). This document is intended to provide the pertinent information required under the Water Agency's programmatic permits for the SMP for the proposed Laguna Nutrient Offset Project (Project) described below.

Background

This Project would be implemented by the Water Agency for the 2011 maintenance season in partnership and under agreement with the City of Santa Rosa (City). This Project is in the process of being approved by the North Coast Regional Water Quality Control Board (NCRWQCB) under the Santa Rosa Nutrient Offset Program adopted by the Board with Resolution R1-2008-0061 for the City's Santa Rosa Subregional Water Reclamation Facility. The City is required under the resolution to offset nutrients entering the Laguna de Santa Rosa (Laguna) via wastewater discharge. The City conducted a preliminary evaluation of the efficacy of removing *Ludwigia* from the Laguna as a nutrient offset option, and concluded that *Ludwigia* removal could potentially provide some or all of the City's nutrient offset needs.

The prevalence of *Ludwigia* (two species are targeted *Ludwigia hexapetala* and *Ludwigia peploides montevidensis*) in the Laguna and its tributaries degrades ecosystem function by outcompeting existing vegetation and resulting in a monoculture that lowers dissolved oxygen in the water column (as annual growth dies back and decomposes), and reduces the overall area of open water habitat that may be used by waterfowl and shorebirds in the dry season; traps sediment, garbage and other debris that together act as a barrier to free flowing water and may result in increased frequency and duration of flooding; affects salmonid passage, and establishes dense cover that hampers mosquito abatement efforts. This project is targeting dense accumulations of *Ludwigia* in Water Agency flood control channels. Potential removal locations include *Ludwigia* blighted reaches of the Bellevue-Wilfred channel, the Laguna main channel near Stony Point Road, and Hinebaugh Creek.

404 Aviation Boulevard - Santa Rosa, CA 95403-9019 • (707) 526-5370 - Fax (707) 544-6123 - www.sonomacountywater.org/

Vegetation management, including *Ludwigia* removal, is a routine part of the Water Agency's work, and the project location is in Water Agency flood control channels. However, as the Water Agency would not otherwise perform *Ludwigia* removal in these particular reaches during the next three years. The Water Agency is proposing to partner with the City to perform the removal. The City is the sole source of funding for this project. Vegetation management in the project area will include removal of *Ludwigia* and other incidental vegetation blockages to achieve nutrient offset for the City, retain and/or enhance appropriate habitat, and improve hydraulic capacity. Vegetation management will be completed according to Stream Maintenance Program Manual (SMP Manual) best management practices (BMPs), as well as, complying with the associated terms and conditions of all the Water Agency's programmatic permits, biological opinions and any additional conditions levied on the Project by the NCRWQCB, or other regulators..

Contractor Selection

The Water Agency has prepared a Request for Qualifications (RFQ) and distributed it to allow local organizations to provide their qualifications to conduct this project. A contractor will be selected based on their submitted qualifications to perform the work.

Long Term Management Plans

The Water Agency is currently addressing sediment and *Ludwigia* colonization downstream of the proposed project area by removing sediment, increasing capacity, and conducting onsite restoration activities. The object of these efforts, in addition to restoring stream capacity and enhancing habitat is to reduce water backing up into Rohnert Park/ Cotati from the Laguna de Santa Rosa Flood Control Channel and tributaries during high flows and (key for these areas) to lower the summer water level. Lowering summer water levels will reduce the habitat available for *Ludwigia* to colonize. Establishing tree canopy helps reduce onsite density of the plant. Following the reduction of summer water levels, the Water Agency will evaluate whether sediment removal could achieve channel morphology in these areas to further reduce habitat available for *Ludwigia* colonization and will implement strategies to realize this goal. Essentially, the Water Agency is applying a two-pronged approach that includes follow-up management to:

1) Change habitat conditions that are supporting the plant through sediment management, canopy development, and installation of instream competitors, and,
2) Control regrowth (through limited, focused, backpack herbicide application)

To apply an approved herbicide in the manner will require the Water Agency to obtain a NPDES general permit for aquatic herbicide use. The Water Agency has begun the process to obtain this permit and anticipates being able to implement control measures this year following *Ludwigia* removal.

The current schedule to manage sediment and *Ludwigia* in the Project area will follow the removal of sediment blockages in down-stream reaches over the next three years. It is anticipated that the Water Agency will start sediment control in these channels in the 2014-15 time frame. Currently, the City's *Laguna Nutrient Offset Project* provides the Water Agency with an excellent opportunity to start managing *Ludwigia* through these stream reaches prior to conducting sediment removal to remove a large source of propagules from the system. This approach will also reduce the propagule pressure on freshly excavated and restored areas downstream.

Supplemental Notification Contents

The following information is provided in this notification packet:

- Project List and Locations
- Project Description
- Summary of Maintenance Project Size, Extent, and Potential Effects
- Mitigation and Monitoring Plan
- *Ludwigia* Disposal Plan

Also included is additional information to supplement this Notification specific to the terms and conditions of the California Department of Fish and Game's (CDFG) Master Lake/Streambed Alteration Agreement (MSLAA) but are also useful for other participating agencies to evaluate the proposed projects. These additional items include:

- Map identifying location of the Project in relation to known sensitive species/habitat as represented in the California Natural Diversity Database (CNDDB) as well as a map showing the Project in relation to known California Tiger Salamander occurrences. (Follows Section 3)
- Data on pre-construction surveys completed

The enclosed documents should fulfill the reporting requirements outlined the following permits obtained for the SMP:

- MSLAA-CDFG Notification Number 1600-2006-0254-3
- Consistency Determination Number 2080-2010-029-03, 8/6/10
- California Regional Water Quality Control Board, North Coast Region (NCRWQCB)
- Order No. R1-2009-0049
- National Marine Fisheries Service (NMFS, Russian River Biological Opinion, Zone 1A BO, Tracking No. F/SWR/2006/07316
- US Army Corps of Engineers, Permit No. 2009-00079N, Zone 1A
- US Fish and Wildlife Service (USFWS), Programmatic Biological Opinion for SMP, USFWS PBO Reference No. 81420-2009-F-0788-1

Sections 1 through 3 of this Annual Notification packet contain project descriptions, project maps, site photographs, and additional documentation and reference materials.

On-Site Mitigation

Sections 2, 4, 5 and 6 of this Supplemental Notification discuss incorporated mitigation actions and BMPs that will be implemented to reduce potential and offset direct impacts. The on-site watershed-based restoration proposed for this Project is consistent with the expressed goals of the Water Agency's SMP on-site (Tier 1) mitigation program to restore impacted habitats, but to also addresses larger watershed factors related to *Ludwigia* management and channel capacity. Details of the Tier 1 restoration approaches and methods are provided in Chapters 5 and 8, and Appendix E of the SMP Manual. Existing conditions at the Project sites are described in Section 3 of this Notification as well as a detailed descriptions of the sites are also contained in the *Channel Characterization Sheets* of Chapter 4 of the SMP Manual.

Vegetation removal under the SMP requires the direct replacement of any native and native analog (as defined in Appendix E -Vegetation Management and described in Section 4 of this Notification) removed trees (larger than 4 inches diameter at breast height (DBH)) removed in the course of the work. Additionally, under the SMP, a portion of the cost (10%) of sediment and bank repair projects contribute

to the Watershed Partnership Program (WPP) to account for the temporal loss of function while affected habitat is restored.

This Project is a vegetation management effort foreseen and evaluated under the Program EIR, however, given the size and potential disturbance resulting from project implementation, the City and Water Agency propose to replace trees removed per SMP mitigation standards as well as re-establishing instream species to offset temporal impacts. As the Project is a vegetation management project, direct Tier 1 restoration would not be required under existing SMP permits. As a result, instead of contributing towards the WPP, the City and Water Agency proposes that additional mitigation for this NOP be to restore (following SMP standards) the in-stream habitat affected by the removals.

Closing

This supplemental notification is initially being sent to the NCRWQCB for comment. This notification is intended to supplement information provided in the City's *Revised Proposal Laguna Nutrient Offset Project* (June 3, 2011). For reference, a copy of the City's *Revised Proposal Laguna Nutrient Offset Project* is included as Appendix A. The Water Agency invites the NCRWQCB to comment on planned maintenance activities, confirm activities, add additional requirements as needed and/or provide a notice to proceed with the *Laguna Nutrient Offset Project.* Following NCRWQCB approval (if confirmed), this packet will be distributed to the rest of the regulators on the Inter-Agency Workgroup. Please feel free to contact me, Keenan Foster (kfoster@scwa.ca.gov / (707) 547-1941), directly at SCWA, or contact my associate Jon Niehaus (jon@scwa.ca.gov / 707-521-1845).

Sincerely,

Keenan Foster

Keenan Foster
Sr. Environmental Specialist

Enclosures

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Draft Final

Sonoma County Water Agency
Stream Maintenance Program (SMP)

2011 Projects Supplemental Notification for City of Santa Rosa's Laguna Nutrient Offset Project

Prepared for:
The SMP Inter-Agency Working Group

Sonoma County Water Agency
404 Aviation Boulevard
Santa Rosa, CA 95406
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707/547-1941

June 2011

Sonoma County Water Agency Stream Maintenance Program

2011 Projects Supplemental Notification for Laguna Nutrient Offset Project

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SECTION

1. Project Description and Location

Laguna Nutrient Offset Project

The following project is anticipated for the 2011 maintenance season in partnership with the City of Santa Rosa (City). This Laguna Nutrient Offset Project (NOP) is under consideration by the North Coast Regional Water Quality Control Board (NCRWQCB) under the Santa Rosa Nutrient Offset Program adopted by the Board with Resolution R1-2008-0061 for the City's Santa Rosa Subregional Water Reclamation Facility.

The City is required under Resolution R1-2008-0061 to offset nutrients entering the Laguna de Santa Rosa (Laguna) via wastewater discharge. The City conducted a preliminary evaluation of the efficacy of removing the exotic species *Ludwigia* from Sonoma County Water Agency (Water Agency) flood control channels as a nutrient offset option, and concluded that *Ludwigia* removal could potentially provide some or all of the City's nutrient offset needs. The *Ludwigia* removal option received tentative support in a January 31, 2011, and a June 2, 2011 meeting between City representatives and Board staff. A current version of the Laguna Nutrient Offset Project proposal is included as Appendix A of this notification. Relevant project details have been incorporated from the City's proposal into the body of this notification.

The Laguna de Santa Rosa Foundation (LF) conducted a *Ludwigia* removal project in the Laguna and Water Agency drainage channels from 2005 to 2007. The City, in partnership with the LF and the Water Agency, identified some of the former *Ludwigia* removal sites as the location of the currently proposed NOP. Removal locations include reaches of the Bellevue-Wilfred channel, the Laguna main channel near Stony Point Road, and Hinebaugh Creek. These are displayed in Drawing 1 (MAP ID #724-A).

Vegetation management, including *Ludwigia* removal, is a routine part of the Water Agency's work, and the project location is entirely within Water Agency channels. The Water Agency is currently developing an approach to Ludwigia Management through these reaches that involves modification of the environmental conditions supporting the plant. This approach involves removing sediment to reduce the backwater effect (propagating upstream from sediment blockages) through these channels in the summer thereby reducing available habitat for the weed as well as planting riparian trees to provide shading. However, the Water Agency will not be reaching the areas proposed for this NOP until the work of removing sediment (to modify the hydrology) is completed downstream (estimated 3 years). The NOP provides an opportunity to begin addressing *Ludwigia* management in advance of the hydrologic changes anticipated by Water Agency sediment removal activities downstream. The Water Agency is partnering with the City to perform the proposed removal and the City is the sole source of funding for this project.

During the 2011 maintenance season, vegetation management in the project area will include removal of *Ludwigia* and other incidental vegetation blockages and related

sediment to achieve nutrient offset for the City, retain or enhance appropriate habitat, and improve hydraulic capacity. Vegetation management will be completed according to requirements and Best Management Practices (BMPs) detailed in the Stream Maintenance Program Manual (SMP Manual) as well as the associated terms and conditions of all programmatic permits, biological opinions, and any additional conditions levied on the NOP by the NCRWQCB, or other regulators.

The NOP is scheduled to occur in the summer of 2011 prior to the City's 2011-2012 discharge season, during which the zero nutrient discharge limit required by the city's permit is scheduled to take effect. Therefore, any credit for nutrients removed by the Project would be banked and then applied to offset the discharge of nutrients for the three discharge seasons beginning with the 2011-2012 discharge season as described in Resolution R1-2008-0061.

The prevalence of *Ludwigia* in the Laguna de Santa Rosa and its tributaries degrades ecosystem function. Within the project area, *Ludwigia* has the following effects:

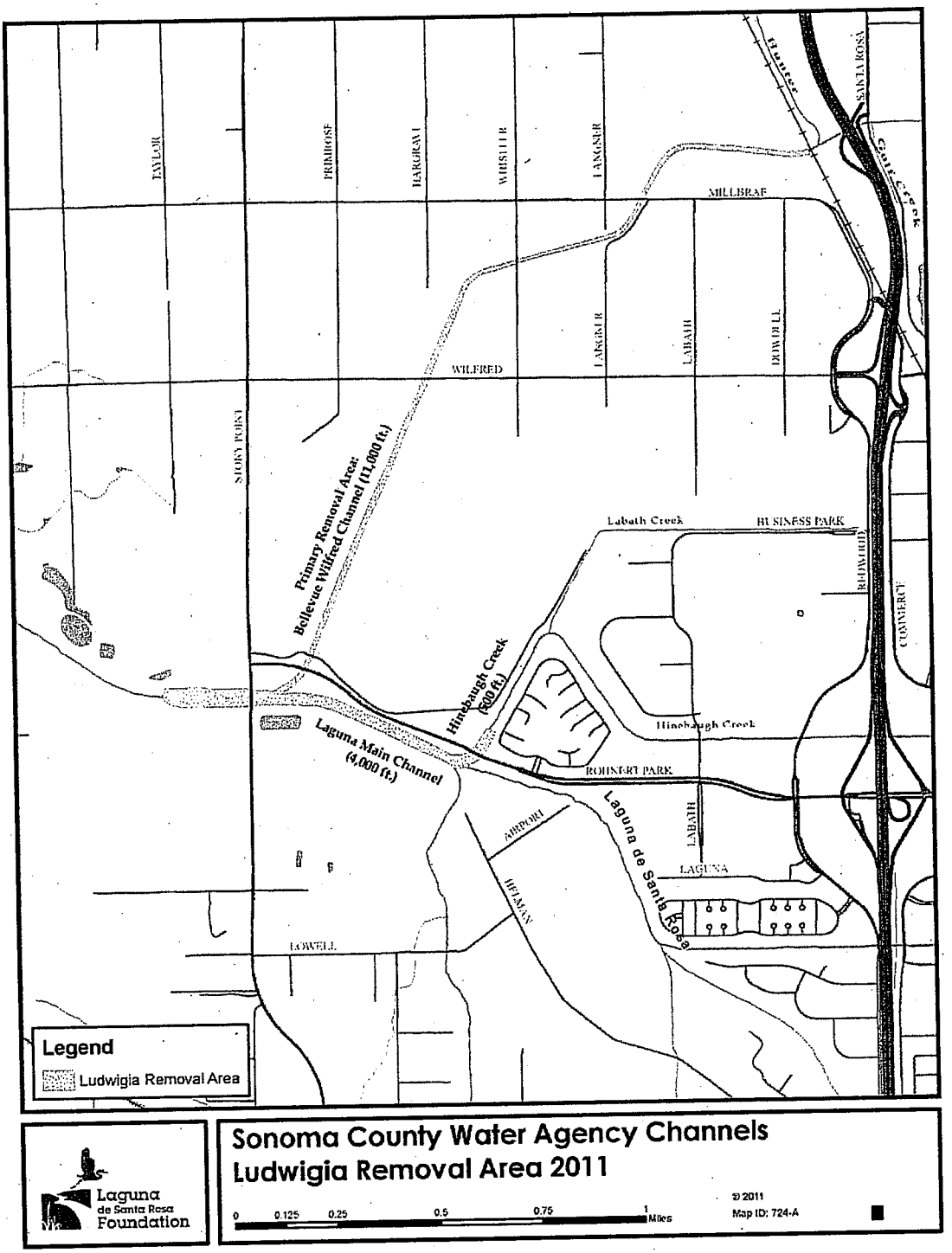
- Outcompetes native vegetation resulting in a monoculture that forms dense mats over the entire channel surface and extends up the banks;
- Lowers dissolved oxygen in the water column as annual growth dies back and decomposes. This can directly impact salmonids and other fish and invertebrates;
- Reduces the overall area of open water habitat that may be used by waterfowl and shorebirds;
- Restricts movement capabilities of other aquatic species (fish, river otter, mink, etc.);
- Traps sediment, garbage and other debris that together act as a barrier to free flowing water and may result in increased frequency and duration of flooding; and
- Establishes dense cover that hampers mosquito abatement efforts. May contribute to enhanced production of mosquitoes that can carry West Nile Virus.

Ludwigia removal will occur west of Rohnert Park in Sonoma County near the intersection of Rohnert Park Expressway and Stony Point Road. Drawing 1 below indicates the location and extent of the proposed project. Target areas for *Ludwigia* removal are:

1. The 11,000-ft. Bellevue-Wilfred flood control channel, which runs from Millbrae Avenue to its confluence with the Laguna. The channel is a straight trapezoidal channel averaging 75 feet in width. It is fed year-round by urban and agricultural runoff to an average 1–3 foot depth in the dry season.

2. A 4,000-ft. section of the Laguna main channel from approximately 600 feet west of Stony Point Road to its confluence with Gossage Creek in Rohnert Park. The channel was straightened in the 1960s and widened in the 1990s to an average 120-foot width.

3. A 500-ft. section of Hinebaugh Creek. Though not naturally perennial, Hinebaugh retains water year round from urban runoff. Average depth is 3 feet.



Drawing 1. Laguna Nutrient Offset Project Area.

The project location is displayed in Drawing 1 (MAP ID #724-A). All three areas are owned and managed by the Water Agency. Substrates are primarily silt with some sand. Taken together the removal site is approximately 30,000 linear feet (15,000 feet each bank) and encompasses approximately 33 acres. *Ludwigia* cover at the site has been as high as 90% in recent years. All three reaches have scattered willows and alders established along the toe.

The project will adhere to all the SMP Best Management Practices; Table 1.1 below identifies applicable BMPs for the NOP.

Table 1-1: Best Management Practices for Vegetation Management

BMP	Name	Ludwigia Removal
General Impact Avoidance and Minimization		
GEN-1	Work Window	X
GEN-2	Staging and Stockpiling of Materials	X
GEN-3	Channel Access	X
Air Quality Protection		
AQ-1	Dust Management	X
AQ-2	Enhanced Dust Management	X
Biological Resources Protection		
BR-1	Area of Disturbance	X
BR-2	Pre-maintenance Educational Training	X
BR-5	Fish and Amphibian Species Relocation Plan	X
BR-6	On-Call Wildlife Biologist	X
BR-7	Special Status Plants	X
BR-8	Nesting Migratory Bird and Raptor Pre-maintenance Surveys	X
BR-12	California Tiger Salamander Avoidance and Impact Minimization Measures for Sediment and Debris Removal	X
BR-14	California Tiger Salamander Avoidance and Impact Minimization Measures for Vegetation Management	X
BR-15	Foothill Yellow-legged Frog Avoidance and Impact Minimization Measures for Ground-Disturbing Activities	X
BR-16	Foothill Yellow-legged Frog Avoidance and Impact Minimization Measures for Vegetation Management	X
BR-17	Western Pond Turtle Pre-maintenance Surveys for Ground-Disturbing Activities	X
BR-18	Zone 1A Salmonid Avoidance and Impact Minimization Measures	X
Cultural Resources Protection		
CR-5	Staff Cultural Resources Training	X
	Hazardous Materials Safety	
HAZ-1	Spill Prevention and Response Plan	X
HAZ-2	Equipment and Vehicle Maintenance	X
HAZ-3	Equipment and Vehicle Cleaning	X
HAZ-4	Refueling	X
HAZ-5	On-Site Hazardous Materials Management	X
HAZ-6	Existing Hazardous Sites or Waste	X
HAZ-7	Fire Prevention	X
Vegetation Management		

BMP	Name	Ludwigia Removal
VEG-1	Removal of Existing Vegetation	X
VEG-2	Use of Herbicides	X
VEG-3	Planting and Revegetation After Soil Disturbance	X
Water Quality and Channel Protection		
WQ-1	Apply Erosion Control Fabric to or Hydroseeding of Exposed Soils	X
Good Neighbor Policies		
GN-1	Work Site Housekeeping	X
GN-2	Public Outreach	X
GN-3	Noise Control	X
GN-4	Traffic Flow, Pedestrians, and Safety Measures	X
GN-5	Odors	X

Table 1-3. 2011 Project Area for *Ludwigia* Nutrient Offset Project

Project Site	Creek/ Channel	Tributary To	SMP Reach	USGS Quad Township, Range, Section	Latitude/ Longitude
***Ludwigia* Nutrient Offset Project**					
Bellevue-Willfred downstream of Stony Point Rd.	Bellevue-Willfred	Laguna de Santa Rosa	1–4	Cotati Quad T6N, R8W Section14, 15 and 22	38.362071,-122.734294
Laguna de Santa Rosa from Stony Point Rd. to Gossage Creek	Laguna de Santa Rosa	Russian River	1 and 2	Cotati Quad T6N, R8W Section 22	38.351235,-122.736182
Hinebaugh Creek 500 feet upstream of confluence with the Laguna de Santa Rosa	Hinebaugh Creek	Laguna de Santa Rosa	1	Cotati Quad T6N, R8W Section 22	38°20'57.84"N 122°43'51.53" W

Table 1-4. 2011 Vegetation Management Activities for *Ludwigia* Nutrient Offset Project

Creek	Vegetation Management Activity			
	Willow Pruning	*Blackberry Hand Removal*	*Blackberry Mowing*	*Exotics Removal*
Zone 1A				
Upper Laguna Subbasin				
Bellevue-Wilfred 1	✓			✓
Bellevue-Wilfred 2	✓			✓
Bellevue-Wilfred 3	✓			✓
Bellevue-Wilfred 4	✓			✓
Laguna 1	✓			✓
Laguna 2	✓			✓
Hinebaugh 1	✓			✓

2. Project Design

This project is anticipated to involve only incidental sediment removal and therefore will not alter the existing channel topography. As a result, design drawings are not included. Representative site conditions are captured in Photo 1 below as well as photographs included in Section 3, *Site Surveys for Special-Status Plants.* A description of the methods of *Ludwigia* removal and removal equipment follows.

Photo 1. Site Conditions in Laguna De Santa Rosa view upstream toward Rohnert Park. Date of photograph. May 2011

2a. Site Preparation

As for the 2005-2007 *Ludwigia* removal project, staging areas for heavy equipment parking and offloading harvested vegetation are anticipated to be established on a 2-acre property adjacent to the project location, owned by the Federated Indians of the Graton Rancheria (APN# 046-021-039). Mobilization and demobilization at the project site may require the use of a crane for launching and retrieving equipment from the waterway. If so, a path may be cleared. For the 2005–2007 project there were areas where willows and other channel-side vegetation were cleared to enable unloading of harvested biomass. Similarly, for the NOP imited site access pruning and willow removal is anticipated to be required.

Prior to removal work, a floating boom with an attached silt curtain will be erected across the channel to help confine short-term increases in turbidity to the immediate work area. The silt curtain also captures fragments of *Ludwigia* which could otherwise float downstream and potentially establish the plant in new locations. Removal work will progress from upstream to downstream thus allowing existing vegetation to filter turbid water as it moves downstream.

2b. Removal Method

Mechanical removal will be carried out using an excavator with a 70-foot. Boom (Figure 1). This type of excavator is very efficient in sites where water is present and can reach up to 62.5 feet. Instead of a general use bucket the boom will have a modified "skeleton" bucket attached. This custom slotted bucket has tines which allow water and excess sediment to drain out before loading plant biomass into trucks for disposal.

Figure 1. Excavator with 70 ft. boom. Photo provided by Clean Lakes, Inc.

In areas where the long-reach excavator cannot access *Ludwigia* patches (e.g., in the Laguna main channel on both sides of Stony Point bridge), the plant may be gathered via the use of an aquatic harvester. The harvester is designed to collect floating and submerged vegetation to a depth of five feet below the waterline (Figure 2).

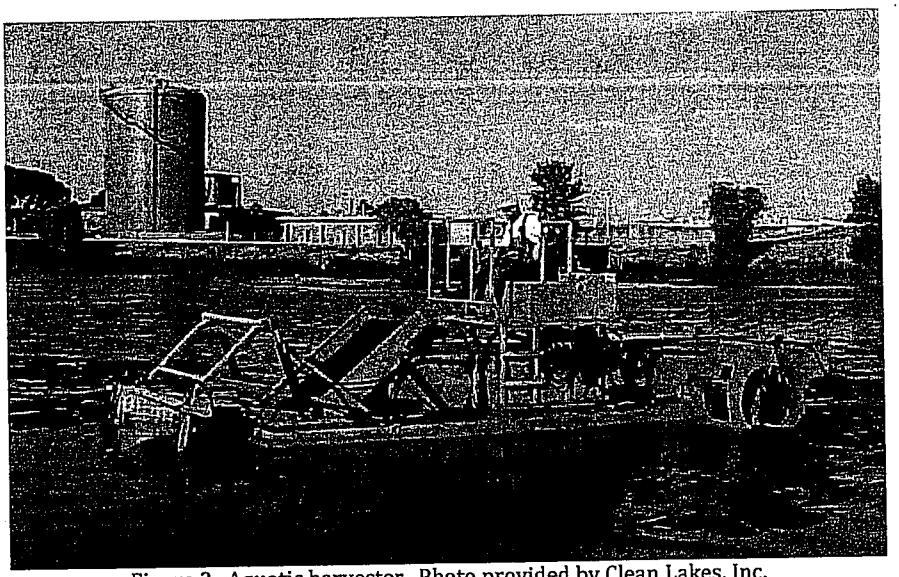


Figure 2. Aquatic harvester. Photo provided by Clean Lakes, Inc.

Harvested vegetation will be offloaded in designated staging areas. The *Ludwigia* removed will either be stockpiled along the side of channel access roads, placed over the fence directly into the storage field, or directly loaded and hauled to the storage area via truck, then loaded into dump trucks for transport to the disposal site (Figures 3 and 4).

Figure 3. Loading *Ludwigia* for disposal. Photo provided by Clean Lakes, Inc.

Figure 4. Loading *Ludwigia* for disposal. Photo provided by Clean Lakes, Inc.

Significant amounts of trash are expected to be intermingled with the biomass. Debris removed from the channels and harvested vegetation during the 2005-2007 *Ludwigia* removal project included car parts, furniture and other items. This refuse was collected and placed in debris boxes for transport to the landfill. Approximately 30 cubic yards of debris was removed from the channels over the 2005–2007 *Ludwigia* removal project term.

Harvested biomass and sediment will be transported to the disposal location. Trucks loaded with biomass and sediment will stand for at least 10 minutes before transport to allow any excess water to drain. The biomass will be dried and trash will be removed from the material during or after drying. Depending on the coarseness of the material, biomass may also be shredded in a tub grinder. Dried vegetation can be disked into the soil or shredded and disked into the soil.

2c. Transport Method and Route

Biomass will be transported in 10 cubic yard dump trucks. Where possible, drivers will avoid use of public roads by accessing staging area and worksites via the Water Agency maintenance roadways alongside channels where work is conducted. After drying, biomass will be transported to the City's Kelly, Brown, or Alpha Farm, approximately 6 miles away, via Stony Point Road north to Todd Road, Todd Road west to Llano Road, and Llano Road north to Hwy 12 west. The Water Agency's contractor will assume responsibility for cleanup of incidental spills of sediment or biomass along public roadways.

2d. *Ludwigia* Disposal Location

The disposal location is the City of Santa Rosa's Kelly Farm, 5344 Occidental Rd. APN #s 060-010- 005, 027, 028, 030, 032 & 060-020-001, 081, 082, 084, 085. The disposal location is upland and will not directly discharge water, sediment, or *Ludwigia* to surface waterbodies. The disposal location will be evaluated by qualified biologists for the potential of these areas to support wetlands and a preliminary wetland assessment will be

prepared that documents conditions at the disposal sites. This assessment shall be provided to the Inter-Agency Work Group (IAWG) (SMP regulators) prior to the onset of work. SMP regulators include representatives from the California Department of Fish and Game (CDFG), Regional Water Quality Control Board (RWQCB), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers.

3. Potential Impacts

Within the project area, *Ludwigia* is the dominant vegetation (to the exclusion of virtually every other plant species). Largely, the effect of removing the accumulated biomass from the channels should help to improve water quality conditions downstream of the project area by removing large sources of decaying vegetative matter that contribute to very low dissolved oxygen levels in the summer.

There are scattered occurrences of arroyo willow (*Salix lasiolepis*), cattail (*Typha latifolia*), tule (*Scirpus* sp.), and smartweed (*Polygonum persicaria*) that will be removed during implementation of the project. However, native species contribute less than a few percent of the overall cover through the project reaches and removal of the *Ludwigia* and subsequent management actions (in-stream planting, and annual small scale herbicide control) should provide an opportunity for native wetland species to establish.

All potential removal locations have at least some low-density channel-side vegetation (largely willows). For the 2005–2007 *Ludwigia* removal project, there were areas where willows and other vegetation were cleared to enable equipment access. The proposed project may require similar clearing. Any necessary vegetation removal will be replaced following standard SMP practices (native and analog tree replacement, Appendix E. SMP Manual).

The 2005–2007 Ludwigia removal project produced spikes in turbidity during mechanical removal of *Ludwigia*. Monitoring showed that turbidity decreased to background levels within 24–48 hours after activity ceased. Besides implementing all of the applicable Water Agency SMP BMPs for this activity, three additional BMPs will be utilized to minimize and contain turbidity:

- Control pace of work at all times to minimize stirring of sediments;
- Work in an upstream to downstream direction to allow existing *Ludwigia* to act as a filter of turbid waters; and
- Deploy silt curtain at the downstream end of the project area to prevent turbid water from leaving the site.

3a. Listed Species

As indicated in Table 3-1, there are three species listed under the Federal Endangered Species Act that could potentially be present in the project area: California tiger salamander (CTS), Coho salmon, and Chinook salmon. The SMP Manual and its associated Biological Opinions (BO) from the USFWS and NMFS describe the necessary avoidance and minimization measures required for these species to provide incidental take authorization.

The proposed Project will follow SMP guidelines to maintain compliance with these measures. Additionally, western pond turtle (CDFG species of special concern) occurs occasionally in these reaches. BR-17 (Chapter 7 of the SMP Manual) will be implemented to avoid affecting this species.

Table 3-1: Habitat Potential for Listed Species by Reach

Reach	Listed Species								
	California Freshwater Shrimp	California Red-legged Frog	California Tiger Salamander	Foothill Yellow-legged Frog	Western Pond Turtle	Central California Coast Steelhead	Central California Coast Coho	California Coastal Chinook	Plants
Localized Scale									
Laguna 1	U	U	3	U	P	O (M)	U	U	P
Laguna 2	U	U	2(3647.6); 3(2929.1)	U	P	O (M)	U	U	P
Bellevue-Wilfred 1	U	U	2(1428.5); 3(2559.1)	U	P	U	U	U	P
Bellevue-Wilfred 2	U	U	2	U	P	U	U	U	U
Bellevue-Wilfred 3	U	U	2	U	P	U	U	U	U
Bellevue-Wilfred 4	U	U	1(91.3); 2(2293.9)	U	P	U	U	U	U
Hinebaugh 1	U	U	2(1430.2) 3(3450.5)	U	P/O	P/M	U	U	U

Codes: U-unexpected, P-potential, O- occasional, M- migratory corridor. 1,2,3- CTS distance ranks.

Removal work will be conducted between June 15th and October 31st to avoid potential take of listed salmonid species that may pass through the project area during fall spawning and spring migration season. Since nutrient content of *Ludwigia* is highest in spring months (Brenda Grewell, USDA, pers. comm.), the project will commence as soon after June 15 as permitting and contractor availability allow. Removal and disposal work is timed to occur outside of salmonid migration, so impacts to salmonid species will be avoided.

The SMP offsets adverse effects to the Sonoma County Distinct Population Segment of CTS by implementing approved BMPs during the work effort and by purchasing CTS wetland credits from a USFWS and CDFG approved mitigation bank. The required mitigation is based on the Santa Rosa Plain Programmatic Biological Opinion and distance from known occurrences. The area requiring mitigation is calculated based on disturbance above the ordinary high water mark. Areas below the ordinary high water mark in Water Agency flood control channels are not considered CTS habitat due to the presence of fish predators and hydrologic considerations. For the NOP, this notification assumes that the majority of the work will be accomplished below the ordinary high water mark and as such will not require any compensatory mitigation. Additionally, per the Vegetation Management BMP for CTS, areas of high density gopher burrows will be flagged for avoidance to reduce any impacts to upland habitat (aestivating) for CTS. As the existing access roads are anticipated

to be used as the work platform, associated impacts to upland CTS habitat would be considered negligible.

Table 3-2. 2011 Projects Requiring Compensatory Mitigation for CTS

Project Site	Area Disturbed (above OHWM)	Compensatory Mitigation Required (as per FWS BO)	
		Ratio	Total required (sq.ft.)
Reach Scale Ludwigia Removal			
Hinebaugh 1	0	1:1, or 0.2:1	0
Laguna 1	0	0.2:1	0
Laguna 2	0	1:1, and/or 0.2:1	0
Bellevue-Wilfred 1	0	1:1, and/or 0.2:1	0
Bellevue-Wilfred 2	0	1:1	0
Bellevue-Wilfred 3	0	1:1	0
Bellevue-Wilfred 4	0	2:1, and/or 1:1	0
Project Totals	**0 sq. ft. (0 acres)**		**0 sq. ft. (0 acres)**

Site Surveys for Presence of Special-Status Plants

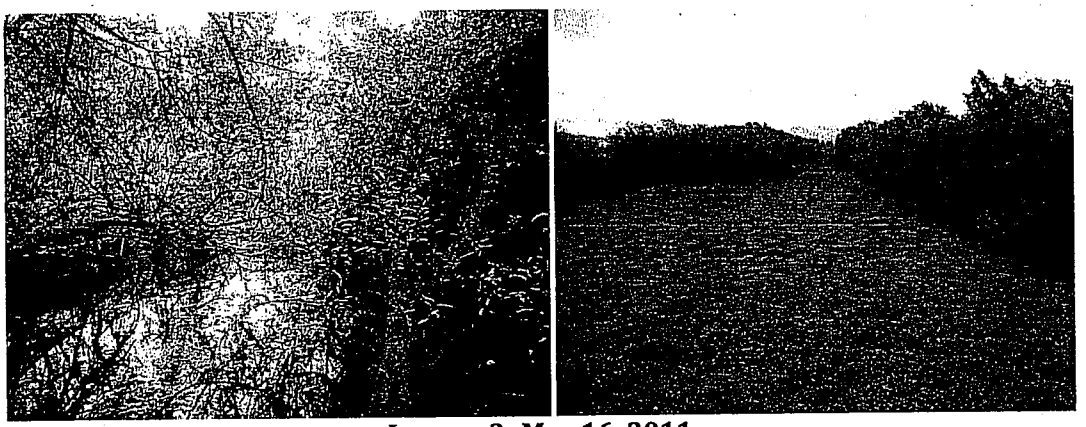
A qualified botanist is required to conduct appropriately-timed botanical surveys for special-status species for projects located in areas where state and federally-listed plant species have been identified as potentially occurring (Tables 3-1, 3-3 and see SMP Manual Table 7-3). For this Notification all the reaches (except Hinebaugh) have the potential to provide habitat for state and federally-listed plant species. If any special status plants are observed during surveys, the project will either be redesigned to avoid effects or these plants will be flagged and/or fenced off to avoid them to the maximum extent possible. If not special status plants are observed, the project will be implemented as designed and no further measures will be put in place for protection of special status plants and results of the surveys will be appended to the SMP Annual Report.

The following six listed plants are known to occur within the SMP Program: Sonoma alopecurus (*Alopecurus aequalis sonomensis*) (alopecurus), Sonoma sunshine (*Blennosperma bakeri*), Sonoma white sedge (*Carex albida*) (white sedge), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*) (meadowfoam), and many-flowered navarretia (*Navarretia leucocephalis plieantha*) (navarretia).

In accordance with BMP BR-7: *Special Status Plants* of the SMP Manual, the Laguna de Santa Rosa Foundation, conducted a survey for special-status plants on May 16, 2011, during the special status species blooming season. The recommended blooming season for state and federally-listed plants in the SMP program area is May-June. The Laguna de Santa Rosa Creek Reaches 1 and 2, the Bellevue-Wilfred Channel Reaches 1, 2, 3 and 4, as well as the Hinebaugh Creek channel (500 feet of the channel on the north side of Rohnert Park Expressway) project sites were evaluated for potential federally-listed plants during the recommended blooming season. This survey did not document the presence of special-status plants or likely suitable habitat.

Laguna Reaches 1 and 2. Suitable habitat (vernal pools, vernal swales) are not present at sediment removal locations within the project work areas. Project work will predominately be accomplished below the ordinary high water mark in willow scrub and/or perennial emergent wetland habitat, precluding the presence of vernal pool species associated with intermittent wetland. No special status species or suitable habitat was observed inside or adjacent to the project footprint. Potential habitat for special status species occurs on the south side of the property easement where there is seasonal ponding associated with fragmented swales and low lying areas. During the survey on May 16, 2011, the neighboring dairy operation was actively harvesting grass for animal feed, thus mowing the entire area up to the fence line. No special status species were observed or were likely to have been present before harvesting. The land is actively seeded, cultivated, and harvested. The emergent habitat in and adjacent to the project footprint was not suitable to support Sonoma white sedge or Sonoma *alopecurus.* The emergent habitat was overwhelmingly dominated by *Ludwigia* with areas of cattail (*Typha* sp.). Potential impacts to native species would most likely consist of selectively thinning, trimming, or removing willows to facilitate better access by machinery. No critical habitat for federally-listed plant species will be affected by this potential activity.

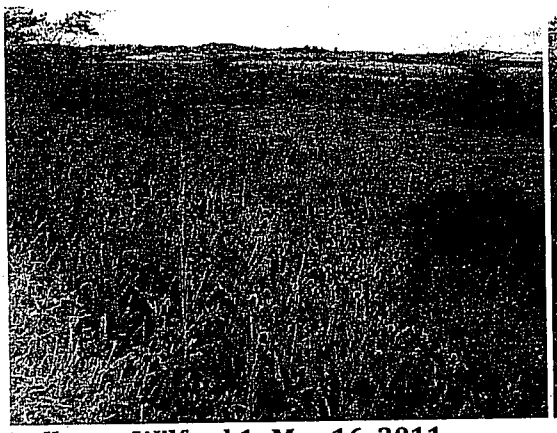
Laguna 1 -May 16, 2011



Laguna 2 -May 16, 2011

Bellevue-Wilfred Channel Reaches 1 through 4. Suitable habitat (vernal pools, vernal swales) are not present at sediment removal locations within the project work areas.

Project work will predominately be accomplished below the ordinary high water mark in mixed riparian, willow scrub, and/or perennial emergent wetland habitat, precluding the presence of vernal pool species associated with intermittent wetland. No special status species or suitable habitat was observed inside the project footprint. The emergent vegetation is dominated by *Ludwigia* and cattail (*Typha* sp.), and the channel banks are dominated by non-native invasive species such as Himalayan blackberry (*Rubus discolor*), poison hemlock (*Conium maculatum*), teasel (*Dipsacus sativus*), curly dock (*Rumex crispus*), perennial pepperweed (*Lepidium latifolium*), and Harding grass (*Phalaris aquatica*). Native riparian tree and shrub species are spaced such that the work areas should be easily accessed by project machinery with little to no impact to existing trees and shrubs. Drainage ditches running along the fence lines of the access roads contained some facultative and/or obligate wetland species *Rumex crispus, Chenopodium album, Glyceria declinata*, and a couple of patches of *Pleuropogon californicus*. These ditches were heavily disturbed and did not contain any federally-listed plant species.



Bellevue-Wilfred 1 -May 16, 2011

Bellevue-Wilfred 2 -May 16, 2011

Bellevue-Wilfred 3 -May 16, 2011

Bellevue-Wilfred 4 -May 16, 2011

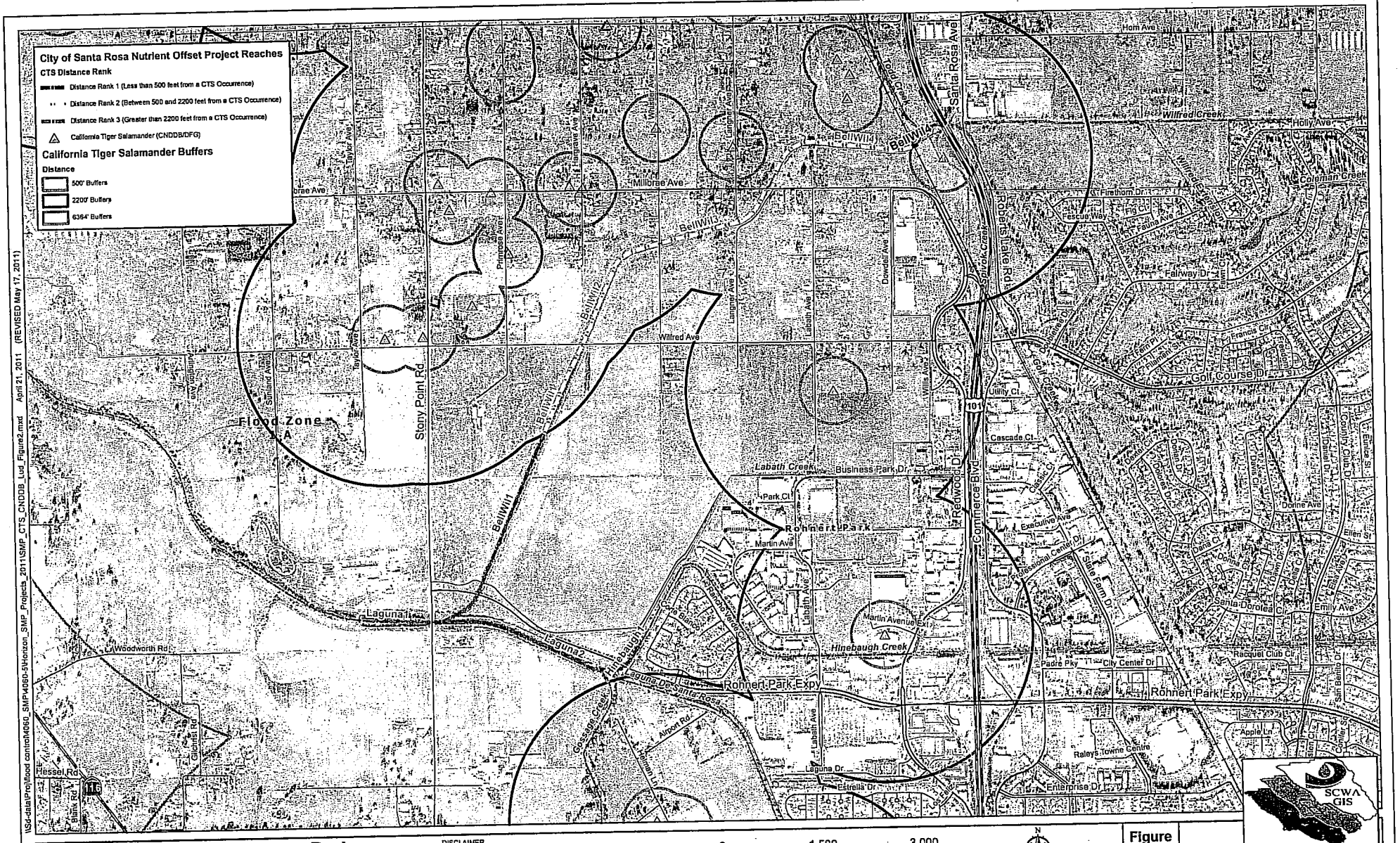
Hinebaugh Creek Reach 1. Suitable habitat (vernal pools, vernal swales) are not present at sediment removal locations within the project work areas. Project work will predominately be performed below the ordinary high water mark in mixed riparian and/or perennial emergent wetland habitat, precluding the presence of vernal pool species

associated with intermittent wetland. No special status species or suitable habitat was observed inside or adjacent to the project footprint. Native riparian tree and shrub species are fairly diverse, dense and mature. However, the extent of *Ludwigia* is not great in this section of stream, so impacts to native riparian should be minimal with proper care taken during the removal process.

Hinebaugh 1 -May 16, 2011

Table 3-3. 2011 Projects on Reaches requiring Listed Plant Species Surveys

Location	Target Species for Survey
Reach Scale & Localized Sediment	
Laguna 1	Sebastopol meadowfoam, Burke's goldfields, Sonoma sunshine, many-flowered navarretia
Laguna 2	Sebastopol meadowfoam, Burke's goldfields, Sonoma sunshine, many-flowered navarretia
Bellevue-Wilfred 1	Sebastopol meadowfoam, Burke's goldfields, Sonoma sunshine, many-flowered navarretia



Potential Occurrence and Distance Ranks for California Tiger Salamander
2011 Field Season, Santa Rosa Nutrient Offset Project

DISCLAIMER
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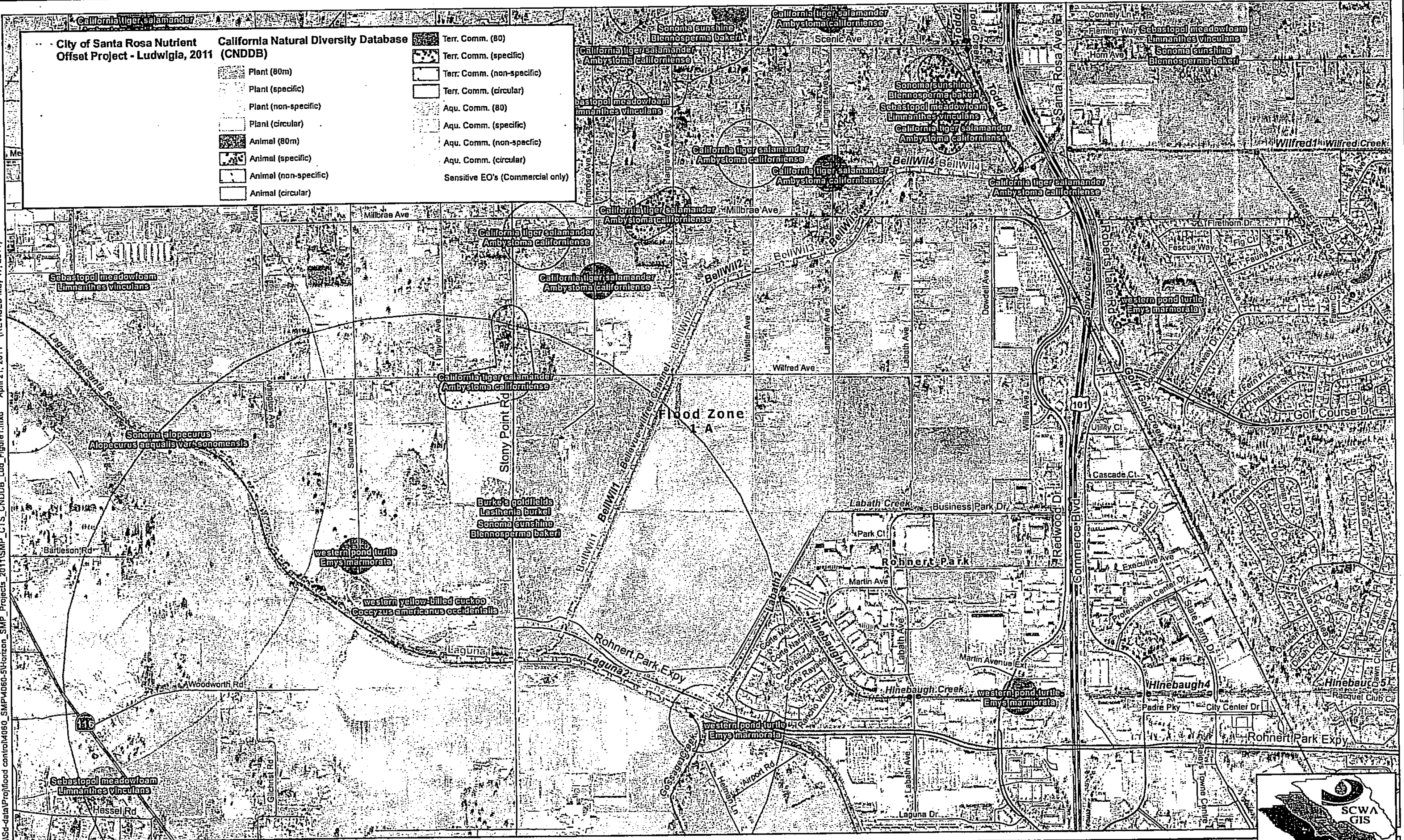
0 1,500 3,000 Feet

Figure 2

\\Sd-data\Proj\flood control\M060_SMP\M060-SMP_Projects_2011\SMP_CTS_CNDDB_Lud_Figure2.mxd April 21, 2011 (REVISED May 17, 2011)



\\Sd-data\Proj\flood control\4060_SMP\4060-5\Horizon_SMP_Projects_2011\SMP_CTS_CNDDB_Lud_Figure1.mxd April 21, 2011 (REVISED May 17, 2011)

Stream Maintenance Program Projects
2011 Field Season, Santa Rosa Nutrient Offset Project
Project Location and CNDDB Data

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Figure 1

4. Mitigation Plan

The Sonoma County Water Agency is currently addressing sediment and *Ludwigia* colonization downstream of the NOP area by removing sediment, increasing capacity, and conducting onsite restoration activities required under the SMP and programmatic permits. The object of these efforts in addition to restoring stream capacity and enhancing habitat is to reduce water backing up into Rohnert Park/ Cotati from the Laguna de Santa Rosa Flood Control Channel and tributaries during high flows and (key for these areas to address *Ludwigia* colonization) to lower the summer water level. Lower water levels will reduce the habitat available for *Ludwigia* to colonize. Following the reduction of summer water levels, the Water Agency would evaluate what channel morphology associated with sediment removal in these areas would further reduce habitat available for *Ludwigia* colonization and implement strategies to realize this goal. Currently, the Water Agency is applying a two pronged approach that includes follow-up management to:

1. Change habitat conditions that are supporting the plant and,
2. Control regrowth (through limited, focused, backpack herbicide application).

To apply an approved herbicide in this manner will require the Water Agency to obtain a NPDES general permit for aquatic herbicide use. The Water Agency has begun the process to obtain this permit and anticipates being able to implement control measures this year following *Ludwigia* removal. The NOP provides the Water Agency with an opportunity to start managing *Ludwigia* through these stream reaches prior to conducting sediment removal by removing a large source of propagules from the system (that are colonizing sediment removal projects downstream).

The *Ludwigia* Nutrient Offset Project is a mitigation project, undertaken to offset nutrients entering the Laguna via discharges from the City's Delta Pond. *Ludwigia* infestation has numerous ecologically detrimental impacts, as described in Section 1. Because of the restorative nature of *Ludwigia* removal, the project is to a certain extent self-mitigating.

Vegetation management (particularly exotic removal) under the SMP does not require any mitigation beyond the direct replacement of any native and native analog trees (larger than 4 inches DBH (diameter at breast height)) removed in the course of the work. However, sediment and bank repair projects do contribute annually to the Watershed Partnership Program (WPP). Under the WPP (10% of sediment removal and bank repair annual costs), the Water Agency funds additional projects in the watershed to reduce sedimentation and enhance riparian habitat to account for the temporal loss of function while affected habitat is restored.

This NOP is a vegetation management effort foreseen and evaluated under the Program EIR, however, given the size and potential disturbance resulting from project implementation, the NOP proposes to replace trees removed per SMP mitigation standards as well as re-establishing instream species to offset temporal impacts. As the NOP is a vegetation management project, direct Tier 1 restoration would not be required under existing SMP permits. As a result, instead of contributing towards the WPP, the Water Agency proposes that additional mitigation for this NOP be to restore (following SMP standards) the in-stream habitat affected by the removals. Proposed mitigation for native and analog tree species, as well as in-stream restoration is described in Section 4a and 4b below.

4a. Tree Mitigation

This notification assumes that any native tree or native analog tree (Appendix E, of the SMP Manual) larger than 4 inches diameter at breast height would be replaced (at the specified replacement ratios identified below, in suitable locations) and monitored for five years. To clarify the mitigation requirements for the vegetation removal activities of the SMP, the following three vegetation classes have been identified:

Class 1: *Native Riparian Vegetation* - native vegetation (except for those species listed under Class 2, below) shall be retained wherever possible, and pruned or thinned where necessary so as to foster the development of a riparian canopy. Examples of native riparian vegetation include: alder, Maple, Oregon ash, red willow, shining willow, Fremont's poplar, and oaks as appropriate. The removal of such native vegetation will be avoided to the greatest extent possible. Where such native vegetation has to be removed due to flood management considerations, the following limitations and mitigation shall apply:

- The removal of native vegetation with any single stem greater than 4" diameter at breast height (dbh) will be monitored, recorded, and mitigated at a 2:1 ratio, whereby 2 trees are replaced for every tree removed. Replacement trees shall include, but not be limited to, suitable riparian species such as alder, willow, Oregon ash, etc.

Class 2: *Problematic In-Channel Vegetation:* Class 2 vegetation is identified as particularly problematic for flood management purposes. These species inhibit and prevent the establishment of a native riparian canopy and limit the beneficial uses that can be achieved in the riparian zone. Impact avoidance and minimization approaches applied for the removal and thinning of these species is described in the SMP Manual. This class of vegetation includes the following species:

Acacia (*Acacia* ssp.)

Brooms (*Spartium* and *Genista* spp.)

English and Algerian ivy (*Hedera helix, H. canariensis*)

Giant reed (*Arundo donax*)

Himalaya blackberry (*Rubus discolor*)

Lombardy poplar (*Populous nigra 'Italicia'*)

Periwinkle (*Vinca major.*)

Rattlebox (*Sesbania punicea)*

Sweet fennel (*Foeniculum vulgare*)

Tree of heaven (*Ailanthus altissima*)

Arroyo willow (*Salix lasiolepis*)

Cattails (*Typha* sp.)

Eucalyptus (*Eucalyptus* ssp.)

Harding grass (*Phalaris aquatica*)

Indian bean (*Catalpa bignoniodes*)

Pampas grass (*Cotaderia selloana*, and *C. jubata*)

Privet (*Ligustrum* sp.)

Red clusterberry (*Contoneaster* sp.)

Tamarisk (Tamarix spp.)

Water primrose (*Ludwigia peploides montevidensis*)

White poplar (*Populus alba*)

Class 3: *Other Non Native Vegetation:* Class 3 vegetation consists of non-native species that are not listed under Class 2, above. Examples of Class 3 vegetation include: various landscaping Ash species (green ash, raywood ash), London plane (Sycamore), and Carolina poplar. While these species are not as ecologically preferred as Class 1 vegetation, it is acknowledged that they may provide beneficial uses. Where such vegetation has to be removed due to flood management considerations, the following limitations and mitigation shall apply:

- The removal of Class 3 vegetation with any single stem greater than 4" dbh (diameter at breast height) will be monitored, recorded, and mitigated at a 1.5:1 ratio.

When replacing Class 1 and Class 3 trees, replacement trees shall consist of native riparian species such as alder, red willow, yellow willow, Oregon ash, big leaf maple, or other suitable species. The mitigation replacement of trees will occur along one of the reaches under maintenance with the greatest need of riparian canopy. The number of removed trees will be reported in the annual summary report of maintenance activities and the replacement of trees as mitigation will be reported through the annual maintenance reports as well. Similar to the requirements for on-site and off-site mitigation and restoration activities, the performance criteria for replacement planting for vegetation mitigation shall be 75% success, and mitigation plantings shall be monitored for 5 years. Replacement trees will be installed along the project channels and include a mix of the species identified in Table 4-1 below:

Table 4-1. Tree Mitigation List *Ludwigia* Control Project

Species common name	Latin name
Big-leaf maple	*Acer macrophyllum*
Oregon ash	*Fraxinus latifolia*
Box elder	*Acer negundo*
White alder	*Alnus rhombifolia*
Oregon ash	*Fraxinus latifolia*
Yellow willow	*Salix lucida* ssp. *lasiandra*
Red willow	*Salix laevigata*

4b. In-Stream Habitat Mitigation

Additionally, to offset the temporal loss of in-stream vegetation resulting from implementation of the project, in-stream planting will be conducted following SMP restoration techniques. This involves installing appropriate in-stream graminoids along the toe of the slope following removal of *Ludwigia* from the water column. These species will be installed at the toe of slope (hinge point) at ten foot intervals along both sides of the affected flood control channels. Suitable species for this location in the watershed and the dimensions of the flood channels include California rice grass (*Leersia oryzoides*), rushes

(*Juncus balticus, J. effusus, and J. patens*), small-fruited bulrush (*Scirpus microcarpus*), tule (*Scirpus californicus, S. acutus occidentalis*), common spikerush (*Eleocharis macrostachya*), and Santa Barbara sedge (*Carex barbarae*).

These species provide appropriate habitat for in-stream wildlife (including, fish, amphibians, reptiles and invertebrates) as well as exhibit a phenology or growth habit (deciduous, flexible, present a minimal cross section to flows) compatible with maintaining capacity and minimizing sediment capture during high flows. Once installed these spreading species will aggressively propagate along the channel and provide a native mix of emergent wetland habitat resistant to weed colonization. Total length of affected channel is anticipated to be approximately 14,500 feet. This effort is anticipated to require installation of approximately 2,900 plants. Approximately 1/3 of the total plants would be an even mix of *Scirpus* and *Carex* species, 1/3 would be *Leersia oryzoides*, and 1/3 would be *Juncus* and *Eleocharis* species. Similar to the requirements for on-site and off-site mitigation and restoration activities, the performance criteria for instream planting for vegetation mitigation is identified as 75% success. As rhizomatous species can be difficult to inventory because of their spreading habit, cover measurements (line intercept method, point method, quadrange sampling) will be taken to estimate, density and cover and evaluate success for the target in-stream species over a 5 year establishment period. Additionally, these measurements will be used to track the effectiveness of herbicide applications following *Ludwigia* removal.

5. Sediment Disposal Plan

5a. Sediment Sampling and Testing

Sediment sampling beyond that described in Section 6 will not be conducted for this project.

5b. Sediment Disposal

Any incidental sediment removed as a part of this project will be disposed of with the *Ludwigia* biomass as described in Section 2.

6. Monitoring Plan

Monitoring associated with the NOP includes four activity specific efforts described below:

- Water quality sampling during project implementation
- Ludwigia re-growth monitoring,
- mitigation planting monitoring, and,
- Ludwigia nutrient content and quantity monitoring

Two of these elements (water quality sampling and *Ludwigia* nutrient content and quantity sampling) are not required under the SMP but rather are associated with requirements in the RWQCB's Resolution R1-2008-0061, for the City's nutrient offset program. It is anticipated that elements and requirements of the NOP monitoring program could be

additionally conditioned by RWQCB staff, and/or the IAWG. Specific project details related to this NOP beyond the scope of the Water Agency's SMP (including nutrient content calculations and margin of safety considerations) are described in Appendix A.

6a. Water Quality Monitoring

Beginning approximately one week prior to commencement of harvesting, the City will monitor water quality conditions using data loggers placed at strategic locations or via hand held units.
Parameters for water quality monitoring will include:

- Temperature
- Turbidity
- pH
- Dissolved oxygen

During mechanical removal, dissolved oxygen, turbidity, pH, and temperature readings will be taken via grab samples daily, data loggers, or hand held units, depending on accessibility and movement of machinery. Water quality monitoring will continue after harvesting until stable or baseline conditions have been achieved. Water quality parameters will be evaluated in as near real-time as practical. If significant adverse changes in water quality conditions are observed the field crew will confer with the Regional Board, Water Agency, City, and the selected contractor and make changes to the harvesting, or, if necessary halt harvesting, until water quality conditions are restored.

In addition, samples for chlorophyll *a* analysis (an indicator of phytoplankton abundance) will be collected before and after the project to help determine whether a shift from macrophyte dominance to phytoplankton dominance has occurred.

6b. Re-Growth Monitoring

Photo monitoring and vegetation monitoring will be used to provide an assessment of the effectiveness of the removal and to monitor site conditions Photo points and vegetation transects will be established throughout the project area. Photos will be taken and vegetation will be monitored before and after mechanical removal. Transects will be arranged to capture variability including factors such as water depth, species diversity, and geomorphic conditions. Follow-up monitoring of plant density at site(s) from which *Ludwigia* is removed will be conducted using standard plant density and cover estimating methods (line intercept, point intercept, quadrangle sampling) at the site(s) from which *Ludwigia* is removed and control sites for five years after harvesting. The number of transects required for this effort will be developed using a species-area curve methodology.

6c. Mitigation Restoration Monitoring

As described in Section 4, mitigation for the NOP following removal of *Ludwigia* will include replacing any native or analog tree per SMP standards as well as installing native in-stream species to help speed re-colonization of the affected areas. Essentially, Tier 1 mitigation (onsite restoration) is proposed for the NOP. Performance criteria for

instream planting are identified as 75% success. As described earlier under Section 6b Regrowth Monitoring, cover measurements will be taken to document colonization of target species.

6d. *Ludwigia* Monitoring

Monitoring of *Ludwigia* removal will occur for the purpose of determining the quantity of nutrients removed and additional monitoring is expected to be a condition of permits issued for the project to verify permitting requirements are attained. Monitoring will measure parameters necessary to determine the nutrient load removed from the Laguna as follows:

- *Ludwigia* Nutrient Content: The nutrient content of *Ludwigia* may vary. To capture variability in nutrient value and accurately determine the quantity of nutrients removed by this project, samples will be collected throughout the project period. Samples of both shoots and leaves will be collected from all removal locations and the quantity of each tissue type will be assessed. *Ludwigia* samples will be analyzed by the Laguna Environmental Laboratory (LEL) for total nitrogen, phosphorus, and moisture.

- Sediment Nutrient Content: If significant quantities of sediment are removed, representative sediment samples will be collected and analyzed by LEL for total nitrogen, total phosphorus, and moisture.

- *Ludwigia* Quantity: The volume, mass, and area of vegetation removed will be estimated at the time of removal as described in the City's revised Ludwigia NOP Proposal.

6e. NOP-SMP Reporting

Following implementation of tree and in-stream mitigation efforts an as-built report will be prepared for inclusion in the Water Agency's Annual Monitoring Report (AMR) for 2011 SMP activities. The report will include all reporting requirements as defined in the SMP. Annual NOP reports will be prepared and included in the SMP AMR for the next five years (2011-2016). These reports are due to the IAWG before December 31st 2011.

7. Project Termination

Analysis of nutrients removed will be calculated after collection of *Ludwigia* samples to determine the effectiveness of the project. Harvesting will continue until any one of the following conditions has been met:

1. Sufficient *Ludwigia* has been removed to meet the nutrient offset needs for a median discharge season;
2. Funds allocated for *Ludwigia* removal have been exhausted;
3. The City determines that *Ludwigia* harvesting is not sufficiently cost effective to be continued.

Appendix A

City of Santa Rosa
Revised Proposal
Laguna Nutrient Offset Project

REVISED PROPOSAL

LAGUNA NUTRIENT OFFSET PROJECT

Revised June 3, 2011

INTRODUCTION

This document describes the Laguna Nutrient Offset Project (Project) and is intended for consideration by the North Coast Regional Water Quality Control Board (Board) as a basis for Project approval under the Santa Rosa Nutrient Offset Program adopted by the Board with Resolution R1-2008-0061. This proposal is organized according to the Nutrient Offset Program information requirements identified in Attachment 1 to Resolution R1-2008-0061.

PROJECT LOCATION

The Project area includes the Laguna de Santa Rosa (Laguna) main channel and its tributaries. Specifically, this project involves *Ludwigia* removal west of Rohnert Park in Sonoma County near the intersection of Rohnert Park Expressway and Stony Point Road. These sites were chosen because they allow work to proceed in heavily impacted channels (and therefore remove the most *Ludwigia*) while refining the methodology for other future locations. Working upstream down reduces propagule pressure into the treatment area both during the treatment and in future years. Target areas for *Ludwigia* removal are:

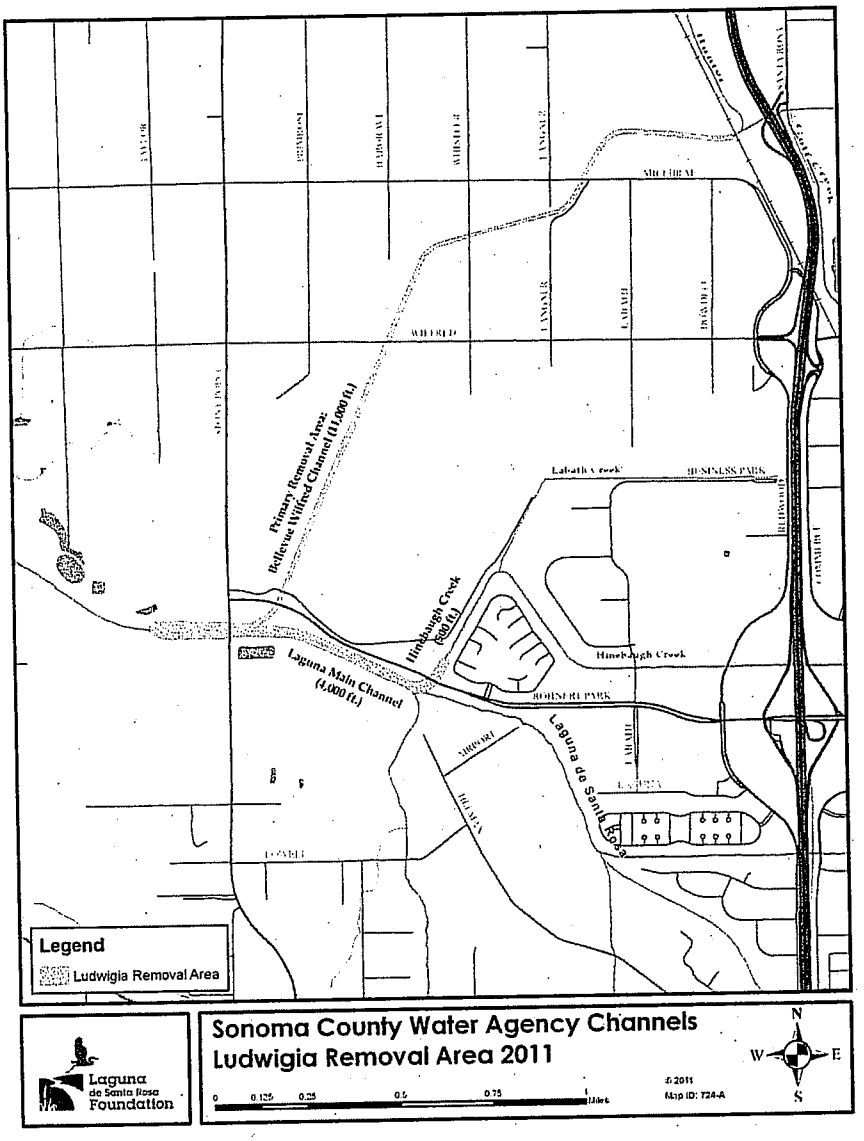
- The 11,000-ft. Bellevue-Wilfred (BW) flood control channel, which runs from Millbrae Avenue to its confluence with the Laguna. The BW channel is a straight trapezoidal channel averaging 75 feet in width. It is fed year-round by urban and agricultural runoff to an average 1–3 foot depth in the dry season.

- A 4,000-ft. section of the Laguna main channel from approximately 200 meters west of Stony Point Road to its confluence with Hinebaugh Creek in Rohnert Park. The channel was straightened in the 1960s and widened in the 1990s to an average 120-foot width.

- A 500-ft. section of Hinebaugh Creek from upstream of the Rohnert Park Expressway to the Laguna confluence.

These locations are shown in **Figure 1**.

Figure 1. Location of *Ludwigia* Removal Area for 2011 Project



PROJECT DETAILS

BACKGROUND

The City of Santa Rosa (City) conducted a preliminary evaluation of the efficacy of *Ludwigia* removal as a nutrient offset option. This evaluation concluded that *Ludwigia* removal could potentially provide some or all of the City's wastewater discharge offset needs. *Ludwigia* removal as a nutrient offset option received tentative support from Board Staff in a January 31, 2011 meeting between City representatives and Board Staff. Therefore the City decided to proceed with developing and implementing a *Ludwigia* removal project to offset potential 2011-2012 nutrient discharge. The Laguna de Santa Rosa Foundation (LF) conducted a *Ludwigia* removal project in the Laguna and Sonoma County Water Agency (SCWA) drainage channels from 2005–2007 (Meisler 2008). Because *Ludwigia* management is consistent with LF's restoration goals and because of LF's prior experience in *Ludwigia* removal, the City is partnering with the LF and SCWA to conduct the Project.

This proposal for nutrient offset credit applies to 2011 only.

Implicit in the methods described in this Proposal is the concept of adaptive management. This Proposal relies heavily on the experiences gleaned from previous *Ludwigia* harvesting conducted in the Laguna and it is expected that most, if not all, potential problems have been anticipated. However, because of the need to adapt to unexpected circumstances, other methods in addition to those outlined in this document may be used as determined based on field conditions. For example if it is determined that harvesting is creating unacceptable water quality conditions, changes to the methodology will be made to ameliorate the problem.

RESPONSIBLE PARTIES

This project will operate in partnership between the City of Santa Rosa (City), the Sonoma County Water Agency, and the Laguna de Santa Rosa Foundation (Laguna Foundation). The City is the sole source of funding for this project.

Keenan Foster, Project Manager
Sonoma County Water Agency
404 Aviation Boulevard, Santa Rosa, CA 95403
(707) 526-5370

Hattie Brown or Catherine Cumberland
Laguna de Santa Rosa Foundation
900 Sanford Rd., Santa Rosa, CA 95401
(707) 527-9277

Lynn Small
City of Santa Rosa
4300 Llano Road
Santa Rosa, CA 95407
(707) 543-3359

TIMING OF REMOVAL.

Ludwigia removal will be conducted during the 2011 dry season subject to terms and conditions of SCWA's Stream Maintenance Program (SMP) permits.

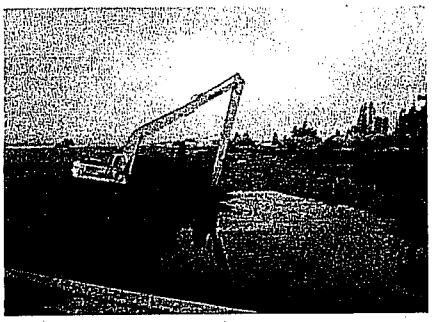
SITE PREPARATION

Staging areas for heavy equipment parking and offloading harvested vegetation are expected to be established in advance. Mobilization and demobilization at the project site may require use of a crane for launching and retrieving equipment from the waterway. If so, a path may need to be cleared. For the 2005 project, clearing of willows and other shoreline vegetation was required to enable unloading of harvested vegetation.

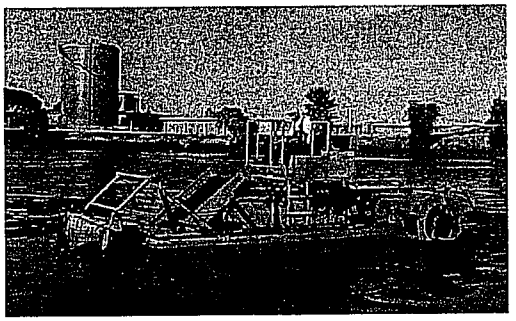
Prior to removal work, a floating boom with an attached silt curtain will be erected across the channel to help confine short-term increases in turbidity to the immediate work area. The silt curtain also captures fragments of *Ludwigia* which could otherwise float downstream and potentially establish the plant in new locations. Removal work is expected to progress from upstream to downstream thus allowing existing vegetation to filter turbid water as it moves downstream.

REMOVAL METHOD

Mechanical removal is expected to be carried out using an excavator with a 70-ft. boom. This type of excavator is very efficient in sites where water is present and can reach up to 62.5 feet. Instead of a general use bucket the boom will have a modified "skeleton" bucket attached. This custom slotted bucket has tines which allow water and excess sediment to drain out before loading plant biomass into trucks for disposal.



In areas where the long-reach excavator cannot access *Ludwigia* patches (e.g., in the Laguna main channel on both sides of Stony Point bridge), the plant may be gathered via the use of an aquatic harvester. The harvester is designed to collect floating and submerged vegetation to a depth of five feet below the waterline:



The *Ludwigia* removed will either be stockpiled temporarily along the side of channel access roads, placed temporarily in an adjacent storage field, or loaded and hauled to the storage area via truck, then loaded into dump trucks for transport to the permanent disposal site:

If stockpiled, *Ludwigia* will be left to dry for approximately two weeks. After drying, a tub grinder may be used to shred the material. Biomass can be shredded directly into trucks and hauled for immediate disposal, or composted on-site in piles for later transport to the disposal location.

Non bio-degradable trash from stockpiled *Ludwigia* will be removed to the fullest practical extent and disposed of properly.

TRANSPORT METHOD AND ROUTE

Biomass will be transported in dump trucks. Where possible, drivers will avoid use of public roads by accessing staging area and worksites via SCWA maintenance roadways alongside channels where work is conducted. Trucks loaded with wet biomass will stand for at least 10 minutes before transport to allow any excess water to drain. Alternatively, biomass will be first dried at the removal site prior to disposal. If necessary, biomass will also be shredded prior to transport. Biomass will be transported to the City's Kelly Farm for disposal via Stony Point Road north to Todd Road, and Todd Road west to Llano Road and Highway 12 west to Kelly Farm. Contractor will assume responsibility for cleanup of incidental spills of sediment or biomass along public roadways.

DISPOSAL LOCATION(S)

Biomass will be taken to a disposal location where it will be spread and ultimately disked into soil. Possible disposal locations include:

- City of Santa Rosa's Kelly Farm, 5344 Occidental Rd. APN #s 060-010- 005, 027, 028, 030, 032 & 060-020-001, 081, 082, 084, 085.
- City of Santa Rosa's Brown Farm, 2200 Llano Rd. APN #'s 060-060-059 and -060.

All sites are upland and will not directly discharge water, sediment, or *Ludwigia* to surface waterbodies. City farms have an on-going monitoring program and a program to insure application of nutrients at agronomic rates and this addition of nutrients will be a component of the annual nutrient load evaluation.

ROLES AND RESPONSIBILITIES

Roles of the City, LF and SCWA are as follows:

- City. Provide funding, leadership in the planning and reporting phases, water quality and *Ludwigia* nutrient monitoring during field operations, preparation of this proposal, and RWQCB liaison to obtain nutrient offset credit approval.

- LF. Project planning support, ecosystem management perspective, technical advice, follow-up monitoring, and implementation of mitigation. Also management of field operations and implementation of BMPs if selected as the SCWA contractor

- SCWA. Project permitting and CEQA coverage pursuant to terms and conditions of its SMP, and oversight on field operations and implementation of required compensatory mitigation.

QUANTITY OF N AND P REMOVED

The City is entitled to credit for bioavailable nutrients removed. Bioavailability is defined here as those nutrients that have the potential to be used by algae and rooted aquatic plants (macrophytes) for growth. The quantity of nutrients removed or controlled by *Ludwigia* and removal activities will be determined using specific protocols described in this section.

LUDWIGIA REMOVAL

Ludwigia contains nutrients that are mineralized upon plant decay; therefore removing *Ludwigia* removes nutrients that would stimulate additional plant growth. Mineralization, or the conversion of organic nitrogen and phosphorus to nitrate via ammonium species, and bioavailable phosphorus occurs in decomposition of aquatic vegetation such as *Ludwigia*. Therefore, nutrient offset credit for *Ludwigia* removal is appropriate. This section describes the procedure that will be used to estimate nutrient offset credit for *Ludwigia* that is removed.

Offset credit is mass of N and P, with the nutrient mass removed calculated as follows (the example given is for N, but the calculations will be the same for N and P):

$$\text{Total N removed} = \sum(WWLl*NLl*BFLl)+(WWLsh*NLs*BFLsh)+(WWS*NS*BFS)$$

Where: WWLl = total wet weight of *Ludwigia* leaves removed
NLl = nitrogen content of *Ludwigia* leaves per unit wet weight
BFLl = bioavailability factor of *Ludwigia* leaves
WWLsh = total weight of *Ludwigia* shoots (non-leaf biomass) removed
NLsh = nitrogen content of *Ludwigia* shoots per unit wet weight
BFs = bioavailability factor of *Ludwigia* shoots
WWS = total weight of sediment (non-leaf biomass) removed
NS = nitrogen content of sediment per unit wet weight
BFS = bioavailability factor of sediment

The methodology for determining each of these factors is as follows:

WWLl, WWLsh, WWS. Harvesting likely will be conducted using a long-reach excavator equipped with a skeleton basket that will strain the vegetation and result in very little sediment or water removal although in some locations a harvester may be needed. The removed material may be stockpiled for several days nearby before disposal by dump truck. The total wet weight of

Ludwigia leaves removed, *Ludwigia* shoots, and whatever sediment is present will be measured immediately prior to disposal by weighing at least four dump trucks in full and empty condition. This will be used as an estimate of the weight removed of subsequent full truck loads. Although attempts will be made always to remove full truck loads, this may not always be possible. Therefore, the truck volume will also be measured (or the information will be obtained from the contractor). The ratio full truck weight to truck volume will be used to estimate the weight of a partial truck load. At least four composite samples of harvested material will be collected at the time of disposal and taken to the Laguna Environmental Laboratory. In the lab, the percent composition by wet weight of *Ludwigia* leaves, *Ludwigia* shoots, and sediment will be determined so that the composition of the total wet weight can be estimated.

NLl, NLsh, NS. The nitrogen (and phosphorus) content of each of the three types of harvested material will be determined in each of the field samples.

BFLl, BFLsh, BFS. Research conducted by Dr. Brenda Grewell (UC Davis) indicates early *Ludwigia* leaves (leaves measured early in the growth season) have zero N and P left by <100 days and, extrapolating from the graphs she provided, late leaves (leaves measured late in the growing season) have zero N and P left by about less than 150 days. Therefore, leaves decay within a year and 100 percent of the leaf biomass is bioavailable (BFLl = 1). However, Dr. Grewell's work indicates that within about 170 days (the study was not conducted for a full year) *Ludwigia* shoots have lost only about 20 percent of their N and 60 percent of their P. Therefore the BFLsh for nitrogen will be 0.2 and for P it will be 0.6. At this time, the City is not seeking offset credit for nutrients contained in removed sediment. Therefore, the BFS is = 0 for purposes of the 2011 Project.

MARGIN OF SAFETY

According to the Resolution, the Santa Rosa Nutrient Offset Program should include a MOS to address uncertainty in offsets. Uncertainty within credit estimation methods can be attributed to input parameter variability, over-simplification, assumptions made in the absence of data, variations in laboratory analyses or sampling methods, and/or stochastic variability in the environment affecting averaged non-point source loading assumptions.

For this project, some of the parameters that enter into the calculation of offset credit are measurements of the entire "population" (such as number of truck loads) and thus are not subject to variance and do not require a MOS. Some of the parameters involve measurements of a sample of the entire population and have associated uncertainty, and this uncertainty should be reflected in the MOS. Table 1 summarizes parameters that are used in the offset calculation and classifies them as to whether they are "sample" parameters (thus a component of the calculated MOS) or "population" parameters (not a component of the calculated MOS). To account for uncertainty represented by sample parameters, the City will use the sample mean +/- one standard error (SE) associated with sample parameters for a MOS. Whether the SE is subtracted or added depends on the parameter, whichever is most conservative (i.e. reduces the offset credit) will be used.

Table 1. Parameters that are used in the offset calculation.	
Sample Parameters	**Population Parameters**
Weight of harvested material per dump truck	Dump truck empty weight
Percent composition of harvested material	Dump truck volume
Nutrient content of the harvested material	Number of dump truck loads removed
Bioavailability factor	

Further MOS is attained by not taking credit for nutrients in sediment removed, nutrients lost through further decay of shoot material (past the 170 days of the Grewell study) and nutrients released by the anoxia resulting from decayed *Ludwigia*. In addition, the nutrients removed in this project are directly available in the parts of the Laguna that are most impaired, whereas, the nutrients that are being offset (nutrients in the City's effluent) occur in winter when unavailable to stimulate growth and at a location downstream of the parts of the Laguna most impaired.

MONITORING PLAN

WATER QUALITY MONITORING

Beginning approximately one week prior to commencement of harvesting, the City will monitor water quality conditions using data loggers placed at strategic locations or via hand held units.

Parameters for water quality monitoring will include:

- Temperature
- Turbidity
- pH
- Dissolved oxygen

During mechanical removal, dissolved oxygen, turbidity, pH, and temperature readings will be taken via grab samples daily, data loggers, or hand held units, depending on accessibility and movement of machinery. Water quality monitoring will continue after harvesting until stable or baseline conditions have been achieved. Water quality parameters will be evaluated in as near real-time as practical. If significant adverse changes in water quality conditions are observed the field crew will contact SCWA and the City/Merritt Smith Consulting (Dave Smith or Marcie Commins) who, in consultation the selected SCWA contractor, will make changes to the harvesting, or, if necessary halt harvesting, until water quality conditions are restored.

In addition, samples for chlorophyll *a* analysis (an indicator of phytoplankton abundance) will be collected before and after the project to help determine whether a shift from macrophyte dominance to phytoplankton dominance has occurred

PROJECT AREA MONITORING

Photo monitoring and vegetation monitoring will be used to provide a qualitative assessment of the project. Photo points and vegetation transects will be established throughout the project area.

Photos will be taken and vegetation will be monitored before after mechanical removal. Transects will be arranged to capture variability including factors such as water depth and others as identified.

Follow-up monitoring of plant coverage at site(s) from which *Ludwigia* is removed will be conducted using standard plant coverage estimating methods possibly including line intercept, point intercept, and quadrat sampling methods.

POTENTIAL IMPACTS AND MITIGATION

The Nutrient Offset Project is a mitigation project, undertaken to offset nutrients entering the Laguna via discharges from the City's Delta Pond. *Ludwigia* infestation has numerous ecologically detrimental impacts. Because of the restorative nature of *Ludwigia* removal, the project is to a certain extent self-mitigating. Potential impacts to water quality and biota and associated mitigation are discussed in the SCWA Stream Maintenance Program (SMP) 2011 Projects Supplemental Notification for City of Santa Rosa's Nutrient Reduction Strategy submitted concurrent with this proposal. Mitigation includes all of the Best Management Practices (BMP's) listed in the SMP which cover General Impact Avoidance and Minimization; Air Quality Protection; Biological Resources Protection; Cultural Resources Protection; Hazardous Materials Safety; Vegetation Management; Water Quality and Channel Protection (Apply Erosion Control Fabric to or Hydroseeding of Exposed Soils; Good Neighbor Policies; Public Outreach; Noise Control; Traffic Flow, Pedestrians, and Safety Measures; and Odor Control. Tree mitigation includes the provision that any native tree or native analog tree (Appendix E, of the SMP Manual) larger than 4 inches diameter at breast height would be replaced (at the specified replacement ratios identified below, in suitable locations) and monitored for five years. To offset the temporal loss of in-stream vegetation resulting from implementation of the project, in-stream planting will be conducted following SMP restoration techniques. This involves installing appropriate in-stream graminoids along the toe of the slope following removal of *Ludwigia* from the water column.

BEST MANAGEMENT PRACTICES TO CONTROL TRUBIDITY IMPACTS

Three additional BMP's will be utilized to minimize and contain turbidity:

- Control pace of work at all times to minimize stirring of sediments;
- Work in an upstream to downstream direction to allow existing *Ludwigia* to act as a filter of turbid waters; and
- Deploy silt curtain at the downstream end of the project area to prevent turbid water from leaving the site. This will also capture *Ludwigia* propagules and prevent downstream spread of *Ludwigia* resulting from harvesting.

EXPECTED LIFE OF PROJECT

The Project is scheduled to occur in the summer of 2011 prior to the 2011-2012 discharge season, during which the zero nutrient discharge limit is scheduled to take effect. Therefore, any credit for nutrients removed by the Project would be banked and then applied to offset the discharge of nutrients for the three discharge seasons beginning with the 2011-2012 discharge season as described in Resolution R1-20080061.

REPORTING PLAN

The nutrient offset credit derived from Laguna Nutrient Offset Project removal will be calculated using an estimate of the bioavailable nutrients as described in the Quantity of N and P Removed section above. This information will generally be available in fall 2011 and prior to the 2011-2012 discharge season. By spring 2012 and after the 2011-12 discharge season, the quantity of nutrients discharged and the quantity of nutrients removed (as calculated the fall 2011), will be tabulated and reported on or before July 1st, 2012 consistent with the Nutrient Offset Policy (see Section 5 of Attachment 1 to Resolution R1-2008-0061). Follow-up monitoring of vegetation coverage will be reported annually by the Laguna Foundation under contract to the City.

CEQA COMPLIANCE

The City conferred with key permitting agencies (i.e., DFG and RWQCB) and determined that permitting of the project under SCWA's Stream Maintenance Program (SMP) is the preferred permitting approach. The SMP EIR upon which the SMP permits are based covers the proposed activity. The SMP EIR and permits include measures to avoid or mitigate water quality impacts.

REFERENCES

Meisler, Julian. 2008. *Ludwigia* Control Project Final Report.