

WORK PROGRAM FOR THE MIDDLE REACH RESTORATION PROJECT

MARCH 2007

A PROJECT OF THE LAGUNA DE SANTA ROSA FOUNDATION



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United States Fish and Wildlife Service, Sonoma County Community Foundation, City of Sebastopol,
Wildlife Conservation Board, City of Santa Rosa and many volunteers.**



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1. INTRODUCTION

The Middle Reach Restoration Project (MRRP) is a multi-year effort intended to restore up to 1.8 miles of riparian habitat (up to 26 acres) and 10 acres of upland oak savannah/grassland along the Laguna de Santa Rosa's east side between Highway 12 and Occidental Road. This section of channel is part of the Laguna's middle reach and includes both public and private lands. Landowners include City of Sebastopol (Meadowlark Field), Dei Dairy, City of Santa Rosa (Kelly Farm), Balletto Vineyard (Lower Balletto, Upper Balletto), and County of Sonoma (County field) (see map Appendix A).

The overarching goal of the project is to restore ecological function (i.e. wildlife habitat, channel shading to reduce water temperature and improve fish habitat, bank stability, filtration of overland flow, etc) to the area by increasing the spatial extent, connectivity and structural diversity within the two habitat types and to promote favorable growing conditions for endangered Sebastopol meadowfoam (*Limnanthes vinculans*). In the riparian zone, non-random planting of dense, moderate and open woody and grassy areas will provide maximum habitat benefit and mimic natural patterns. Similarly in the oak savannah/grassland, species composition and density are designed to emulate natural habitat. Control of invasive perennial pepperweed and other non-native species will be critical to all components of the project.

The primary tasks include 1) project management, 2) planning and material acquisition, 3) implementation, and 4) maintenance, monitoring and reporting. Implementation will be phased from 2006-2011 with major planting events occurring in 2007-2009.

This plan draws upon the recommendations and methods of other successful conservation and restoration organizations including Circuit Rider Productions (www.crpinc.org),

PRBO (www.prbo.org) and River Partners (www.riverpartners.org).

The project is funded by the California State Coastal Conservancy, U.S. Fish & Wildlife Service, Sonoma County Community Foundation, and the City of Sebastopol. In-kind contributions are provided by the City of Santa Rosa and Balletto Vineyards. Additional grant funds necessary to implement the full scope are anticipated from the California Wildlife Conservation Board.

2. PROJECT GOALS AND OBJECTIVES

Goal 1: Manage invasive non-native species within the restoration corridor.

Objectives:

- Reduce perennial pepperweed (*Lepidium latifolium*) cover by 75% within a 10-acre non-contiguous section of the project area using a combination of mowing and herbicide.
- Eradicate the large infestation of Himalayan blackberry (*Rubus discolor*) on the Balletto property using a combination of mechanical and herbicide methods.

- Plant grasses, sedges and appropriate woody species following control of invasive species.
- Implement a small-scale experiment to test the efficacy of multi-year tarping to control nascent pepperweed populations within and outside of the project area.
- Use weed mats, sheet mulching and mowing to suppress weeds directly adjacent to all plantings.

Goal 2: Increase total cover, density, width and structural diversity of riparian habitat along the Middle Reach of the Laguna de Santa Rosa.

Objectives:

- Establish structurally diverse riparian forest by planting locally appropriate native species associated with canopy, sub-canopy, understory, and herbaceous layer.
- Increase the density and width of existing riparian vegetation in appropriate locations.
- Achieve a 70% survival rate using irrigation and protective hardware to reduce mortality.
- Compare relative efficacy of various protective hardware treatments in reducing mortality to inform future plantings.
- Use knowledge of annual flooding patterns, micro-topography, and existing vegetation patterns to guide planting locations and choice of species.
- Ensure that native grasses and sedges are a central component in restoring areas prone to long-term floodwater inundation.

Goal 3: Increase avian diversity and abundance within the riparian corridor by providing a diverse assemblage of nesting and foraging opportunities.

Objectives:

- Mimic natural vegetation patterns by developing a non-random planting design that includes densely vegetated clumps, intermediately vegetated areas and open areas.
- Use established PRBO methods to measure changes in avian diversity.

Goal 4: Restore oak savannah/grassland habitat to historic densities in specified upland portions of the project area.

Objectives:

- Plant up to 10 acres of oak woodland on the City of Santa Rosa's Kelly Farm.
- Use a combination of container plants and acorns to achieve a 70% survival rate over the project period.

Goal 5: Increase the area and density of Sebastopol meadowfoam in the Lower Balletto field.

Objectives:

- Reduce pepperweed by 100% in areas occupied by and immediately adjacent to meadowfoam.
- Reduce density and cover of other weedy species through mowing.
- Enhance growing conditions by reducing thatch and competitors and by scarifying soil in meadowfoam area. Separate efforts are actively seeking funding from other sources to collect and preserve seed from this population, which will be benefited by an increased population size.

3. SPECIAL CONSIDERATIONS

Several issues will be taken into consideration before and during implementation of this project.

- Changes in hydrology due to land use and channel manipulations appear to have contributed to more frequent and longer duration flooding in the project area. Sustained flooding will prevent some areas from being planted with woody vegetation. All riparian plantings except willows will occur in mid-late spring to provide the greatest probability of survival. This timing is atypical of riparian restoration in California and mandates the use of irrigation.
- Dense pepperweed infestations must be controlled prior to planting.
- Valley oaks in the Santa Rosa plain have largely failed to produce large acorn crops for the past several years. This limits the source of planting material for the riparian and most significantly the oak savannah/grassland area. While alternate species can help offset low oak numbers in riparian zones, this is not possible in more upland areas. Consequently, the best approach would be to restore native grasslands in anticipation of future high oak production years.
- All restoration will be located so as to not conflict with the Sonoma County Agricultural Preservation and Open Space District (SCAPOS) planned trail alignment.
- Each funding source covers specific portions of the project area (Table 1).

Table 1. Funding source by parcel. (Does not include in-kind funding.)

	City of Sebastopol Meadowlark Field	Lower Balletto	Upper Balletto	Dei Islands	City of Santa Rosa Kelly Farm	County of Sonoma
CA Coastal Conservancy	✓	✓			✓	✓
USFWS		✓	✓	✓		
Sonoma County Community Foundation		✓		✓		
Wildlife Conservation Board	✓	✓	✓	✓	✓	✓
City of Sebastopol	✓					

4. SITE CONDITIONS

CURRENT LAND USE

Appendix B includes aerial photos of the site from 1942 and 2000. Agricultural conversion had already removed substantial riparian and oak savannah habitat by 1942, but the photos indicate a significant loss over the last 65 years as well. Appendix C

includes oblique aerial photos from January 2006, which provide a good indication of seasonal high flood levels. The pictures were taken in late January approximately 3 weeks after a major flood event.

Meadowlark Field

The Meadowlark Field is owned by the City of Sebastopol and designated as public parkland. An historical sketch of the Meadowlark Field (Cummings 2006) portrays a site subject to many land uses over the decades, some of which have negatively impacted its riparian and upland habitat. In 1925 the field was partially leveled for a landing strip, hangar and parking area, which was active until the early 1930s when it became a residence and a storage site for auto parts. In the 1970s the field began serving as the receiving ground for apple processing wastewater via irrigation. This continued until the early 1990s when the principal land use became grazing. Some level of grazing likely occurred sporadically throughout the decades. Around 2000, grazing was removed as the field was made into a public park. Walking trails follow the field's perimeter and provide entry to its center. Through this history and probably beginning much earlier, large valley oaks in the parcel's upland were either removed or died and portions of the riparian corridor were cleared or thinned.

Balletto Property

For the purpose of this plan the Balletto property is divided into two sections – Upper Balletto and Lower Balletto, with Duer creek acting as a natural demarcation line. Recent history of the property includes cattle grazing until 1996 when production switched to vegetable farming. This carried on until 1999 when much of Upper Balletto was planted to grapes. Lower Balletto continued to be disked until 2001 and has since been left fallow. In 2002 the Sonoma County Agricultural Preservation and Open Space District purchased conservation easements over the properties. Upper Balletto is protected under an Agricultural Conservation Easement with the exception of the riparian corridor, which is protected under a Forever Wild easement. All of Lower Balletto is also protected under a Forever Wild easement. Endangered Sebastopol meadowfoam exists on Lower Balletto. Planned restoration only covers the Forever Wild easement areas.

Dei Islands

The bulk of the Dei Dairy is located on the west side of the channel and is not part of the restoration area. However, roughly 2 ½ acres are located on the east side of the channel in the project areas and are referred to as the Dei Islands. These formerly grazed islands are now fallow and have the largest pepperweed infestation within the entire project area. Although no woody plantings are anticipated for the islands per landowner preference, pepperweed control began in 2006 and will continue through 2007 with the potential for native grass seeding following control activities.

County Field

The County Field consists of two parcels purchased by the County of Sonoma in the early 1990s to mitigate for the raising and widening of the Occidental Road Bridge. Mitigation included riparian plantings and seasonal wetland creation. Although there is no active

management at the site, such responsibility falls under the authority of the Sonoma County Department of Transportation and Public Works. Previous to its acquisition by the county the parcels were used for grazing and hay production. While 1942 aerial photos show a narrow but continuous riparian corridor along the length of the parcel, the current extent of riparian vegetation is limited despite a small increase in cover following the mitigation plantings. Regular and prolonged winter inundation will limit the extent and type of new riparian planting on this parcel.

Kelly Farm

Kelly Farm is owned by the City of Santa Rosa and is used primarily used for hay production and disposal of treated wastewater via irrigation. In addition to its agricultural value the farm provides a diversity of habitat values including riparian, wetland and oak savannah. The property is protected under an agricultural conservation easement held by SCAPOSD.

TOPOGRAPHY AND DRAINAGE

The elevation along the channel ranges between 50-60 feet. Elevation in the proposed oak savannah/grassland restoration area is between 60-70 feet and slopes westward. The only tributary Tributaries in the project area include Duer Creek, a modified stream course that crosses the Lower Balletto field and drains into the main Laguna channel, and an unnamed channel that drains the Upper Balletto agricultural area into the Laguna channel. Both tributaries are seasonal.

The site is characterized and strongly influenced by micro-topographic relief resulting in seasonal ponding and sometimes clear vegetation associations. Minor elevational differences and clay-rich soils cause some areas to hold water for weeks longer than adjacent areas. As a consequence, elevation and soil drainage may play a large role in survival of planted seedlings.

SOILS

Soils underlying existing and potential riparian forest in the project area are primarily of the Clear Lake clay series, which is nearly flat and subject to ponding in some of the sub-series (Appendix D). Typical of clay-rich soils, these areas exhibit significant shrink-swell activity. Warm weather beginning in early spring causes the soil to dry quickly and shrink or contract, resulting in heavy cracking and potential root shearing in developing seedlings. During winter flooding the soils reabsorb water and swell thereby closing the cracks, reducing drainage and encouraging prolonged inundation.

The soils in the vicinity of the oak savannah/grassland restoration area are primarily of the Clear Lake clay series with the distinction that their greater slope significantly reduces ponding.

Roughly 20% of the City of Sebastopol's Meadowlark Field is classified as Cortina very gravelly sandy loam. This apparently is mislabeled and should be described as a deep sandy loam (David W. Smith Consulting 1990). These soils may be derived from fill associated with earlier land uses such as the landing strip described above. It is likely

that these soils are more similar to the well-drained Blucher fine sandy loam that occupies the agricultural portion of Upper Balletto and the nearby Railroad Forest, one of the most intact riparian areas in the Laguna.

VEGETATION

i. Existing Riparian Vegetation

The existing forest throughout the Middle Reach lacks significant diversity, with a canopy composed largely of valley oak and ash. These species also occupy the sub-canopy and are joined by red willow (*Salix laevigata*) and arroyo willow (*S. lasiolepis*). Prominent shrubs include California rose (*Rosa californica*) and both native and non-native blackberry (*Rubus ursinus* and *R. discolor*). Ground cover is a mix of native and non-native plants including curly dock (*Rumex crispus*), cocklebur (*Xanthium strumarium*), basket sedge (*Carex barbarae*), creeping wild rye (*Leymus triticoides*) and various other graminoids. In at least one section of the Meadowlark Field riparian area the ground cover is nearly 100% basket sedge. The wettest areas include both native and non-native water plantain (*Alisma plantago-aquatica* and *A. lanceolatum*) and cattails (*Typha latifolia*). Non-native perennial pepperweed (*Lepidium latifolium*) covers extensive areas and its control is a major task of the project. Prickly lettuce (*Lactuca serriola*) also covers significant acreages.

ii. Oak savannah/grassland

Woody vegetation in the Kelly Farm restoration area is limited to three mature valley oaks. Because the site has been actively farmed for hay until 2006, ground cover is primarily non-native pasture grass, field mustard (*Brassica rapa*) and small patches of non-native Himalayan blackberry.

5. DESCRIPTION OF TASKS

TASK 1. PROJECT MANAGEMENT

The Project Manager will serve as the primary representative of the project and will be responsible for coordinating and overseeing all activities on the site. Project Manager will supervise the work of technicians, subcontractors and volunteers; provide public outreach when appropriate; and prepare all reports and invoices. Project Management will commence with the onset of the project and last throughout its duration.

Key Personnel: Executive Director, Restoration Program Director

Deliverable: Status reports accompanying all invoices, final report at end of project.

TASK 2. PLANNING AND MATERIAL ACQUISITION

This document comprises the restoration plan covering all aspects of the project. The plan provides detailed descriptions of the first year planting (Appendix E) with updates to be incorporated at the end of the first planting season based on lessons learned (e.g. relative survival of species at varying elevations, irrigation schedules, planting density and composition, efficacy of protective hardware, etc). Prior to implementation of the plan each landowner will have the opportunity to review it and will then be asked to sign a letter of agreement between the Laguna Foundation and Coastal Conservancy.

Assuming the Wildlife Conservation Board (WCB) provides support for the project, the letter will be referenced in the grant agreement between the Laguna Foundation and the WCB. The letter commits the landowners to refrain from actions that will impair or otherwise destroy the restoration work.

Major material acquisitions will likely include: 1 All Terrain Vehicle with trailer, 1 water tank and hose(s), 1 backpack sprayer, 1 high weed mower, 1 string trimmer, protective and safety gear, 1 storage container, irrigation supplies, plants, restoration hardware (weed mats, collars, screens, etc), and other tools and supplies as needed.

Key Personnel: Restoration Program Director, Stewardship Director, Research Director, Biological Technicians

Subcontractor(s): Circuit Rider Productions for review of planting and irrigation plan

Deliverable: Restoration Plan

TASK 3. IMPLEMENTATION

Implementation is divided into the following subtasks: 1) invasive species control, 2) irrigation, 3) seasonal wetland management, and 3) site preparation and planting.

Key Personnel: Restoration Program Director, Stewardship Director, Research Director, Biological Technician(s)

Subcontractor(s): Circuit Rider Productions; Herbicide Applicator (to be determined).

Subtask 3.1. Pepperweed Control

Although there are a host of non-native species throughout the project area, perennial pepperweed (*Lepidium latifolium*) poses the greatest threat to ecosystem function and project success, and will therefore be the primary focus of management efforts. However, approximately ½ acre of Himalayan blackberry will also be controlled in the project area.

Ideally pepperweed management would have begun several years prior to large-scale planting. Recognizing that this is not the case, initial planting will be restricted to areas not infested with pepperweed. To the maximum extent possible under budget and timeline constraints, pepperweed areas will be planted with native woody and herbaceous species once control is achieved. It is recognized that complete control of pepperweed in the project area is not feasible. Rather, the project aims for a reduction of 75% of infested area and to continue ongoing management afterward based on an early detection / rapid response approach. The subtasks below describe the methodology for pepperweed control. All herbicide application will be made by or under the supervision of Certified Pesticide Applicators. Appendix F provides a more detailed methodology. Though developed for the Sebastopol properties specifically, the methods apply to the entire project area. Appendix F also provides a map of the full extent of pepperweed in the project area.

Subtask 3.1.1 Initial Mapping

The Laguna Foundation completed pepperweed mapping within the project area and on the adjacent Laguna Wetlands Preserve in 2006. The total mapped area of pepperweed is approximately 10 acres (see map Appendix F).

Subtask 3.1.2 Sebastopol Meadowlark Field and Wetlands Preserve

The City of Sebastopol has strict rules prohibiting the use of herbicides on its public lands. However, the City granted an exception to the rule because of the rapid spread of pepperweed in the Meadowlark Field and Wetlands Preserve. The Laguna Foundation worked closely with the City Council in 2006 and 2007 to prepare a plan for treating the pepperweed (Appendix F).

Subtask 3.1.3 Balletto, Dei and County Parcels

The remainder of the project area will also follow the plan in Appendix F with the exception that large monocultures of pepperweed will be treated via broadcast application from an ATV. This follows pesticide control recommendation #060810A. Exceptions to the Pesticide Control Recommendation are noted in the text of plan.

Subtask 3.1.4 Monitoring

A monitoring plan is provided under subtask 4.2.1

Subtask 3.1.5 Non-chemical control

In the interest of finding alternatives to herbicide in controlling pepperweed, the City of Sebastopol provided funding for a small-scale evaluation of mechanical removal/tarping to control incipient populations lacking well-established root systems. The Foundation will prepare an evaluation design under separate cover. Although the limited funding combined with a small project area is not sufficient for a well-replicated experimental study, much can be learned even through a simplified design. The evaluation will follow a protocol developed for a similar study in the Central Valley by The Nature Conservancy.

Subtask 3.1.6 Himalayan blackberry control

Himalayan blackberry occurs primarily in the lower Balletto field. The large patch will be removed using standard practices: mechanical removal followed by stump treatment with herbicide.

Subtask 3.2 Irrigation

The project area experiences sharply contrasting and extreme growing conditions in the winter and summer. Typical winters bring significant and prolonged flooding that can cause plants to drown, be damaged by floating debris, and/or have root crowns covered by sediment deposition. Spring is often brief as the cool, wet winter climate transitions quickly to dry hot summer-like conditions with threat of desiccation. Past projects within the area show that most plants will not survive without supplemental water. This is especially true in the low-lying Laguna floodplain where plants cannot be installed until after floodwaters have receded in spring. While it is expected that irrigation will be the primary means of water delivery, hand watering may be used in logistically challenging areas such as the County property where infrastructure is lacking and vandalism poses a threat to equipment and hardware. The watering schedule will be roughly 1 gallon per week during the months May-October for up to three years, depending on weather, location and funding.

Subtask 3.2.1 Sebastopol Meadowlark Field

The Meadowlark Field is a site of several earlier restoration projects including a 1999 planting by Circuit Rider and by consultants Prunuske Chatham in 2001 and 2005. Prunuske Chatham installed irrigation infrastructure to service the south, east and north quadrants of the field. Irrigation water was derived from a municipal hookup on the adjacent Chevron station property. If a new agreement can be reached with the Chevron station owners, the existing infrastructure will be repaired and used again, assuming system repair and maintenance costs are not too great. It may be feasible to extend the infrastructure to service the entire field. This will be determined in spring/summer 2007. Any plantings that cannot be serviced by irrigation will be hand-watered.

Subtask 3.2.2 Lower Balletto and Kelly Farm

In fall 2006 subsurface irrigation lines were installed in the Lower Balletto field to prepare for spring 2007 planting (see map Appendix E). In spring 2007 the main line will be attached to a wastewater turnout on the Kelly Farm and filters will be installed. Feeder hoses and emitters will be installed after planting in spring 2007. The Laguna Foundation received approval from the North Coast Regional Water Quality Control Board to use wastewater in the project areas for irrigation. However, irrigation will be operated manually via on/off valves for each irrigation event as a precaution to minimize the chance of undetected leaks. Because the Lower Balletto Field experiences significant and prolonged winter flooding, feeder lines and emitters may have to be removed and reinstalled each year.

In 2007 a second subsurface mainline will be installed on Kelly Farm to provide water to plantings in the oak savannah restoration area. Feeder hoses and emitters will be installed after plants are in the ground.

Subtask 3.2.3 Upper Balletto

Based on the high materials and labor costs and associated ground disturbance, surface irrigation will be used on the Balletto property instead of subsurface lines. This is dependent upon the presence of a cost-effective water source, such as the existing well on the property. The feasibility of using the well will be investigated in summer 2007.

Subtask 3.2.4 County of Sonoma Field

The County field may require hand watering because of the high cost of installing a well and the threat of vandalism posed by regular and unregulated public access. In anticipation of hand watering and the significant flooding on this parcel the most appropriate species are likely to be willows, rose, and sedge in the lower sections with limited oak and ash on higher ground.

Subtask 3.3 Seasonal wetland management

Small populations of the state and federally endangered Sebastopol meadowfoam (*Limnanthes vinculans*) are present on the Lower Balletto field, and have been declining for at least five years. The primary reason for decline was previously thought to be competition from annual grasses and other species following the change in land use from grazing and farming to fallow pasture. The original scope of work for this project included design and creation of vernal pools on the site to enhance habitat for the vernal

pool endemic and to discourage further encroachment by competitors. However further site analysis by vernal pool expert Larry Stromberg revealed the site to be unsuitable for pool creation due to prolonged flooding.

Observations of the population suggest that the annual deposition of sediment and dried algal mats accompanied by the ongoing presence of thatch inhibit *L. vinculans* germination and may be a chief contributor to population decline. The Laguna Foundation will undertake annual weed control, thatch removal, and soil surface scarification to enhance conditions for meadowfoam regeneration as well as that of other vernal pool species present such as *Downingia concolor*.

Subtask 3.4 Planting

Appendix A provides an overview of potential planting areas throughout the entire project area. Annual planting plans will be developed each year and will be based on plant availability, status of irrigation,¹ and lessons learned from previous years. The spring 2007 planting plan is provided in Appendix E. General protocols are presented below.

In each year, the majority of planting will occur in spring so that newly establishing plants are not immediately subject to harsh flooding. The exceptions are willow sprigging and upland oak planting which will occur in winter.²

Site preparation prior to planting will include at a minimum:

- Mowing within one week of expected planting dates
- Installation of color coded flags associated with each species that will guide field crews on specific installation locations (Table 2)

In addition to irrigation, measures taken to maximize survivorship at the time of installation will include:

- Installation of weed mats (Propex or other)
- Installation of collars and rodent protection

¹ Irrigation on Lower Balletto was installed in fall 2006. Details for irrigation installation at other sites have not been finalized.

² As mentioned in Section 3, if acorn crops continue to fail, the oak savannah/grassland planting area on Kelly Farm may initially be better suited to grassland restoration which could later be planted with oaks. Grass seeding would occur in the fall.

Table 2. Species to be used in restoration.

Common Name	Species Name	Code	Location
Oregon ash	<i>Fraxinus latifolia</i>	FRLA	Riparian
Valley oak	<i>Quercus lobata</i>	QULO	Riparian and oak savannah
Valley oak	<i>Quercus lobata</i> - upland	QULO-u	Oak savannah
Valley oak	<i>Quercus lobata</i> ssp. <i>garryana</i>	QULO-g	Riparian and oak savannah
Box elder	<i>Acer negundo</i>	ACNE	Riparian
Arroyo willow	<i>Salix lasiolepis</i>	SALA	Riparian
Red willow	<i>Salix laevigata</i>	SALE	Riparian
Coyote brush	<i>Baccharis pilularis</i>	BAPI	Riparian and oak savannah
CA wild rose	<i>Rosa californica</i>	ROCA	Riparian and oak savannah
Hawthorn	<i>Crataegus douglasii</i>	CRDO	Riparian
Blue elderberry	<i>Sambucus mexicana</i>	SAME	Riparian
Snowberry	<i>Symphoricarpos albus</i>	SYAL	Riparian
CA blackberry	<i>Rubus ursinus</i>	RUUR	Riparian

Subtask 3.5. Sign installation

Interpretive signage identifying the site, significance, and funders will be erected in a conspicuous and appropriate location within the project area.

TASK 4. MAINTENANCE, MONITORING AND REPORTING

Restoration success will be evaluated through monitoring of pepperweed control, survivorship of plantings and avian use in riparian areas. All planted areas will be maintained through the growing season for three years.

Key Personnel: Restoration Program Director, Research Director, Biological Technician(s)

Deliverable: Progress reports with all invoices, detailed annual reports

Subtask 4.1 Maintenance

Plantings and associated irrigation will require regular and ongoing maintenance following the first planting in 2007. The following is a list of the minimum maintenance tasks.

- Turning irrigation on and off during each watering event. This will avoid a potential wastewater leak into the Laguna, which could result in fines and/or force shut down the project.
- All surface lines will be checked weekly for rodent damage. Irrigation hoses are often targeted by rodents as they hold valuable water. Additionally, any reduction in water supply will threaten planting success.
- Mowing between plants to keep weeds down will occur 2-3 times during the growing season, depending on location and need.
- Hand pulling of weeds that establish inside of the weed mat area.
- Removal of feeder irrigation lines before winter rains, and re-installation following the final flood event of the season.³

³ This may not be necessary. Lines will be left in place during the first winter and evaluated the following spring.

- Clearing of sediments from weed mats prior to each growing season. This will help reduce establishment of weeds (and seed bank) on top of the weed mats.
- Repair of damaged browse control hardware following flooding events.
- Repair of irrigation piping and risers as needed.

Subtask 4.2. Monitoring

Subtask 4.2.1 Pepperweed monitoring

Qualitative photo monitoring and limited quantitative plot monitoring will be used to assess project success in achieving the goal of 75% control of pepperweed. (This is separate from the study of non-chemical pepperweed control.)

- Qualitative monitoring

Photo monitoring will occur in spring of each year prior to herbicide application. Photo monitoring points have been established to capture a subset of pepperweed infestation areas.

- Quantitative monitoring

Quadrat monitoring will occur on the Meadowlark Field prior to the first year of spraying and again two years later.⁴ Any patches that received herbicide application in 2006 will be excluded from the monitoring because no baseline data were collected. Five pepperweed patches will be chosen randomly. A standard vegetation assessment method will be employed (e.g. point intercept, quadrat sampling, etc). Data will be collected on all vegetation occurring within the plots.

Monitoring results will be used to determine when 75% control has been achieved and the site can be planted with native species. Because of the short duration of the project, some of the treated areas may be planted with native species before complete control is achieved. In these areas the resprouting pepperweed will have to be controlled using a backpack sprayer, paint-on application, or through manual removal. Weed mats around individual plantings in these areas will assist in discouraging pepperweed and other weed growth immediately adjacent to plantings. Alternatively, some areas may not be able to be planted if some level of control is not achieved within the project period.

Subtask 4.2.2 Survivorship monitoring

Survivorship of installed plants will be monitored at the beginning and end of each growing season. At the end of the second year of planting (fall 2008) dead plants will be replaced in order to achieve the goal of 70% survival.

Subtask 4.2.4 Avian monitoring

Relative efficacy of various protective hardware and weed suppression methods will also be evaluated budget permitting. We will examine differences in survivorship between and among species using Tubex tree shelters vs. wire mesh. Weed suppression will be compared between cardboard sheet mulch vs. Propex weed mats.

⁴ Quadrat monitoring cannot be done in the remainder of the project area because spraying began in 2006.

Subtask 4.2.4 Avian monitoring

Beginning in fall 2006 the Laguna Foundation established a bird monitoring program using volunteers to monitor bird species diversity (composition and abundance). The protocol will follow the “Area Search” method detailed by the Point Reyes Bird Observatory (<http://www.prbo.org/cadc/songbird/as.php>). The monitoring program will compare existing intact riparian forest and planted areas. Because avian response to restoration will occur over years or decades, differences between existing and restored areas may not be evident within the project time period.

Subtask 4.3. Reporting

Subtask 4.3.1 Progress Reports

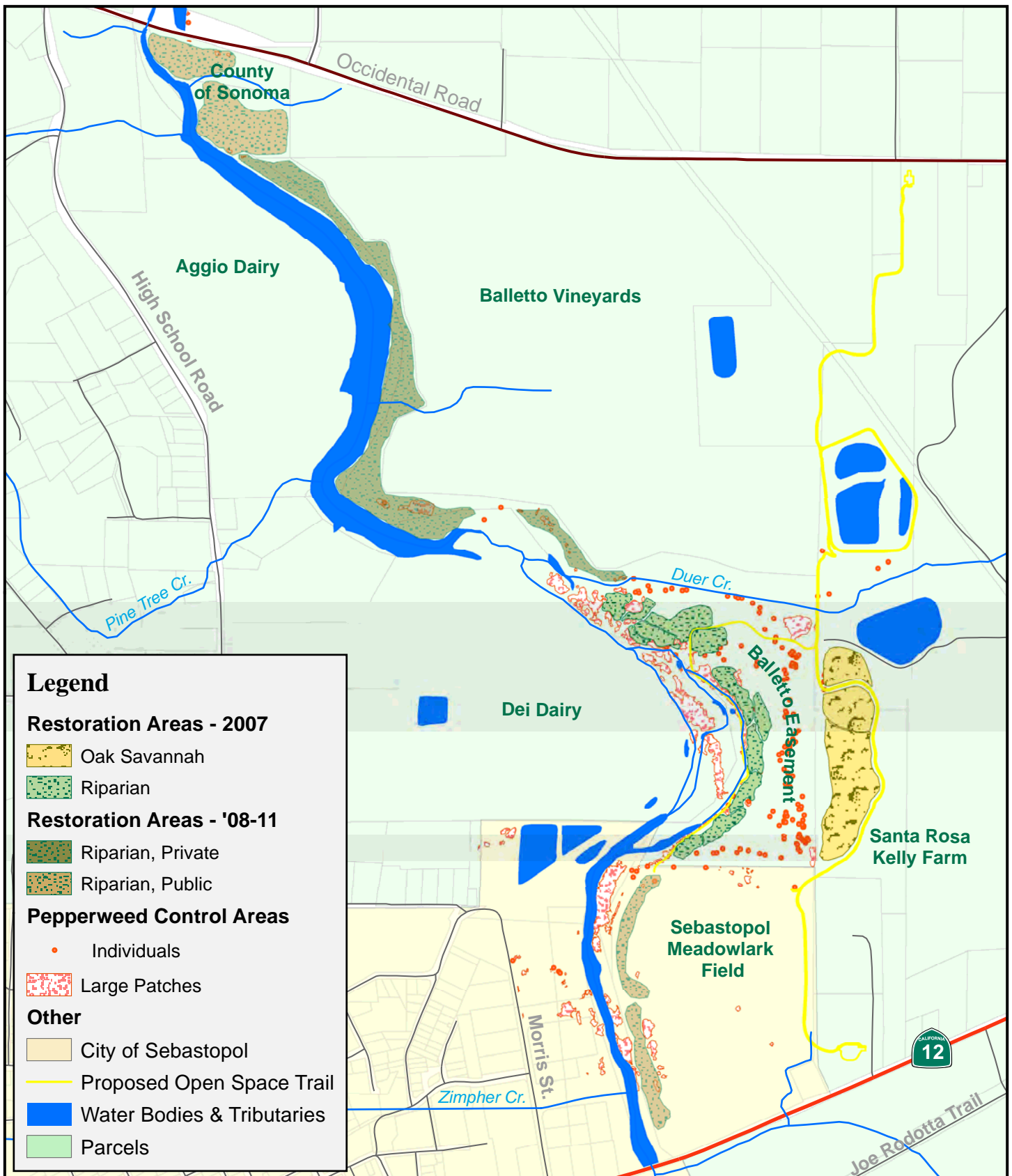
Progress reports will be submitted with each monthly invoice.

Subtask 4.3.2 Final Report

A final report will be submitted at the end of the project period.

Appendices

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Appendix A

Middle Reach Restoration Project

Map ID: 373-A
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0 0.05 0.1 0.2 0.3 0.4 0.5 Miles





County of
Sonoma

Upper
Balletto

Lower
Balletto

Santa Rosa
Kelly Farm

Sebastopol
Meadowlark
Field

Appendix B(1). Aerial photo of the Middle Reach Restoration Project Area, Photo Date: 2000.



**Appendix B(2). Aerial
photo of the Middle Reach
Restoration Project Area.
Photo Date: June 1942.**



1



2



3

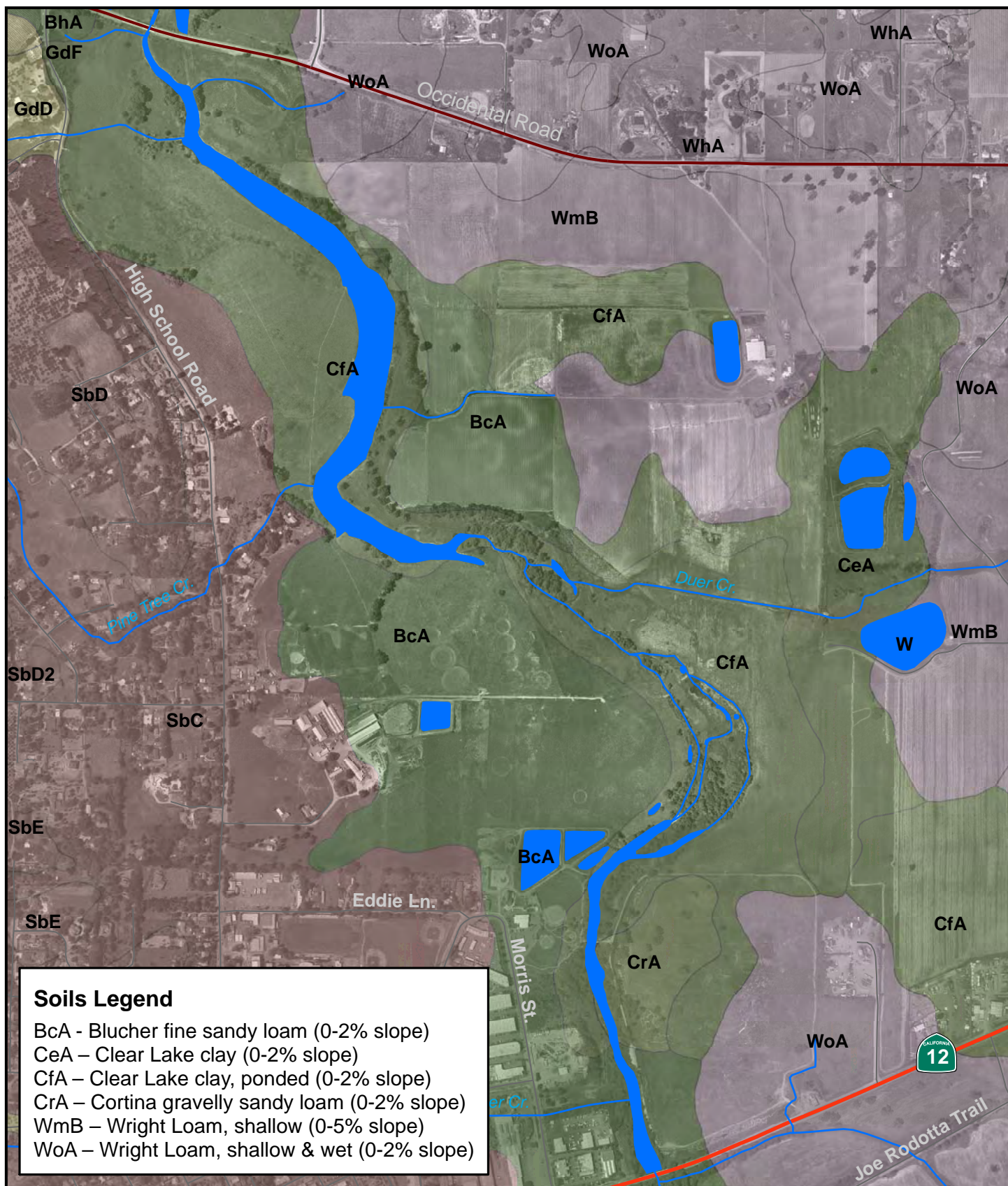


4



5

Appendix C. Oblique aerial photos taken after flooding in late January 2006. 1) Meadowlark Field, 2) Lower Balletto field, 3) Lower Balletto and Upper Balletto, 4) Upper Balletto, and 5) County parcel.



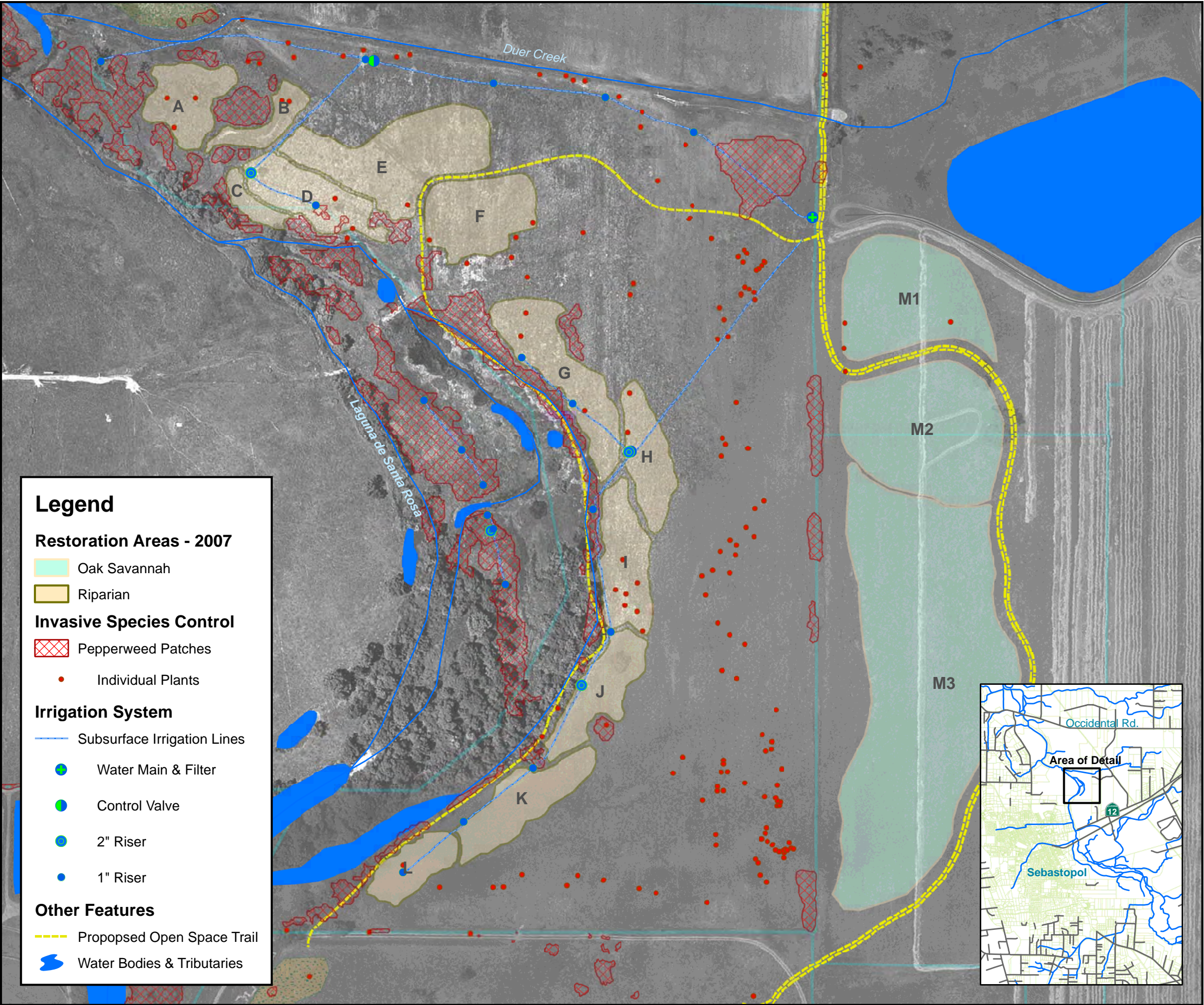
Appendix D

Middle Reach Soil Types

Map ID: 373-A
© 2007

0 0.05 0.1 0.2 0.3 0.4 0.5 Miles





Appendix E

Middle Reach Restoration Project 2007 Planting and Weed Control Plan

Project Funding and Support Provided by:



The City of Sebastopol
and Balletto Vineyards



Map ID: 373-A © 2007
Cartography by Patrick Band

0 137.5 275 550 825 Feet

Planting Installation Notes:

1. Approximately 2,150 plants will be installed in riparian planting polygons A-L in Spring 2007 by Circuit Rider Productions and the Laguna de Santa Rosa Foundation. Plant material will be locally derived.
2. Holes for all plants in treepot containers will be dug with an auger. Holes for smaller containers will be hand dug.
3. Planting areas have been selected for micro-topography and hydrology, and are offset from known pepperweed patches, the Laguna Channel, and the future SCAPOSD trail.
4. Planting areas will be mowed 1-2 weeks prior to planting. Thatch will be left in place to serve as additional weed control.
5. Individual plant locations will be marked on-site using color-coded flags corresponding to each species and have specific protective hardware installed for weed suppression and browse control (see table). Flags shall remain at each plating spot after installation until each plant has been marked using GPS.
6. At time of installation planting pot size will be noted on flag with permanent marker for GPS data collection.
7. Watering of plantings will occur immediately after installation, with full irrigation in place within 3-5 days.
8. Plants will require regular irrigation from April-October. Surface irrigation lines will be connected to risers and extended to each plant and fitted with lines and emitters. Water for this section will originate from the Kelly Farm wastewater turnout. Gate valves will be installed to reduce potential for leaks while system is not in use.

Pepperweed Control Notes:

1. Pepperweed throughout the planting area, including outlying populations, will be treated with herbicide prior to planting (April 2007).
2. Both northern and southern Dei Islands will be sprayed with Telar in May 2007 by backpack sprayer.
3. Adjacent to Sebastopol meadowfoam, populations will be sprayed with Telar using a backpack sprayer after meadowfoam has gone to seed (probably late May 2007). Pepperweed within meadowfoam patches will be hand cut and painted with Telar, and compared with 2006 cut-and-paint to estimate efficacy.
4. All pepperweed immediately adjacent to the main channel and the seasonal channel around the Dei Island will be mowed in June 2007 at the flowerbud stage, allowed to regrow to flowerbud stage (probably mid-July) and then sprayed with aquatically formulated glyphosate using a backpack sprayer.
5. All spraying will follow the Pepperweed Implementation Plan

Plant List & ID																
Species Name (Abbreviation)	Common Name	Flag ID	Container Type	Spacing (OC)	Species per Polygon (see reverse for locaton ID)											
Canopy					A	B	C	D	E	F	G	H	I	J	K	L
Fraxinus latifolia (FRLA)	Oregon Ash	Pink	Deepot	12’			20	11		20	10		20	30	20	15
Quercus lobata (QULO)	Valley Oak	Orange	D-16 / DP / TP	12’	75	20		80	195	126	103	90	50	40	20	25
Juglans hindsil (JUHI)	Black Walnut	Purple	D-16 / DP / TP	12’						6	8			6		
Sub-canopy																
Acer negundo (ACNE)	Box Elder	Red	SuperCell / DP	12’	15	14					25		25	28	20	5
Salix lasiolepis (SALS)	Arroyo Willow	Green	Deepot	12’		16		10		10	20					
Salix laevigata (SALE)	Red Willow	Lime	Deepot	12’		10	10						14			
Shrubs																
Baccharis pilularis (BAPI)	Coyote Bush	Silver	SuperCell / DP	12’				24	80	20		36	30	10		
Rosa californica (ROCA)	CA Wild Rose	White	Rosepot / Treeband	4’	20	30	50	10	10	20			15		24	20
Crataegus douglasii (CRDO)	Hawthorne Bush	Brown	Deepot	12’	35			10	20		20				15	
Sambucus mexicana (SAME)	Blue Elderberry	Black	Deepot	12’										20	72	25
Symphoricarpos albus (SYAL)	Snowberry	Clear	Treeband	12’	8		16				20		30	20	20	16
Ground Cover																
Rubus ursinus (RUUR)	CA Blackberry	Fl. Orange Hatch	Treeband	4’							10					20
Lonicera hispidula (LOHI)	CA Honeysuckle	-None-	Supercell / Rosepot	4’												

Weed & Browse Prevention Treatments				
Polygon ID	Oak (Treepot)	Oak (Deepot)	Ash	Box Elder
A	0 (0)	75 (10)	0 (0)	15 (7)
D	80 (80)	0 (0)	11 (5)	0 (0)
E	120 (120)	75 (10)	0 (0)	0 (0)
G	40 (40)	63 (10)	10 (5)	25 (10)
K	0 (0)	20 (5)	20 (10)	20 (10)
L	0 (0)	25 (5)	15 (12)	5 (2)
Total:	240 (240)	258 (40)	56 (27)	65 (31)

Treatment Notes:

1. Table identifies number of individuals of given species (in parentheses) that will receive sheet-mulch and wire browse guard protection, and will be identified per flagging system.
2. All Oaks in Treepot containers will receive Tubex tree shelters, and not wire mesh browse guards.
3. Remaining individuals listed above will receive standard Propex and wire mesh protections.
4. For individuals and species not listed, trees are to receive Propex and wire mesh, while shrubs and ground cover plants are to receive only Propex weed mats, and no browse protection.

Flagging Notes:

1. Each planting location is identified by a flag, broken down into one color for each unique species..
2. To assist in identifying unique protection treatments, those plantings or species with non-standard (mulch) weed prevention will have an additonal marker stapled to the flag.
3. When approaching a hole and flag, identify the species needed, and the treatment desired. Once complete, install the plant, and prepare the required treatment.
4. Oaks in treepot containers will be planted by volunteers, supervised by Laguna Foundation staff. These plantings will utilize the Tubex tree shelter, as treepots are too large for standard mesh browse guards..

**Pepperweed Management Implementation Plan
City of Sebastopol Laguna de Santa Rosa Preserve**

Prepared by the Laguna de Santa Rosa Foundation
February 2007

1. Introduction

This implementation plan is a companion document to the Perennial Pepperweed (*Lepidium latifolium*) Management Plan prepared by the Laguna Foundation in September 2006. This plan provides specific direction for management of pepperweed on the City of Sebastopol's Meadowlark Field (east side of main channel) and the Laguna de Santa Rosa preserve (west side of main channel). Hereafter the sites are referred to collectively as the Laguna Wetlands Preserve.

2. Implementation Plan

2.1. Map established populations of pepperweed

The Laguna Foundation mapped 3.11 acres of pepperweed on the Laguna Wetlands Preserve in spring and summer 2006 (Figure 1).

2.2. Herbicide application recommendation

All of the mapped pepperweed patches shown in Figure 1 should be treated with herbicide.¹ If resources do not allow control over the entire acreage, priority should be given to outlying and upstream patches.

Two herbicides are recommended to control pepperweed, Telar[®] and Aquamaster[®].² Studies have shown that Telar (active ingredient chlorsulfuron) is the most effective. Because the use of Telar is restricted in areas directly adjacent to water, Aquamaster (active ingredient glyphosate) should be used near the channel. For the purpose of this plan the area near water is defined as any area below the bank slope, the point at which the floodplain angles significantly toward the channel (Figure 2). All applications should be made with a 4-gallon backpack sprayer according to the Pest Control Recommendations provided in Appendix 1³ and under the supervision of a certified pesticide applicator.

Clarifications and suggested adjustments to the pest control recommendations are provided below.

¹ If the City chooses to pursue a study of non-herbicide control in addition to the chemical treatment, several of the small patches will be designated as either mechanical removal/tarping patches or as controls where no work is done.

² Aquamaster is a commercial product containing the active ingredient glyphosate and which is registered for aquatic use. There are many other commercial products with the active ingredient glyphosate that are also registered for use in and around water.

³ Pest control recommendations were prepared by Scott Johnson, Pest Control Advisor for the Wilbur Ellis Company in Sacramento, CA.

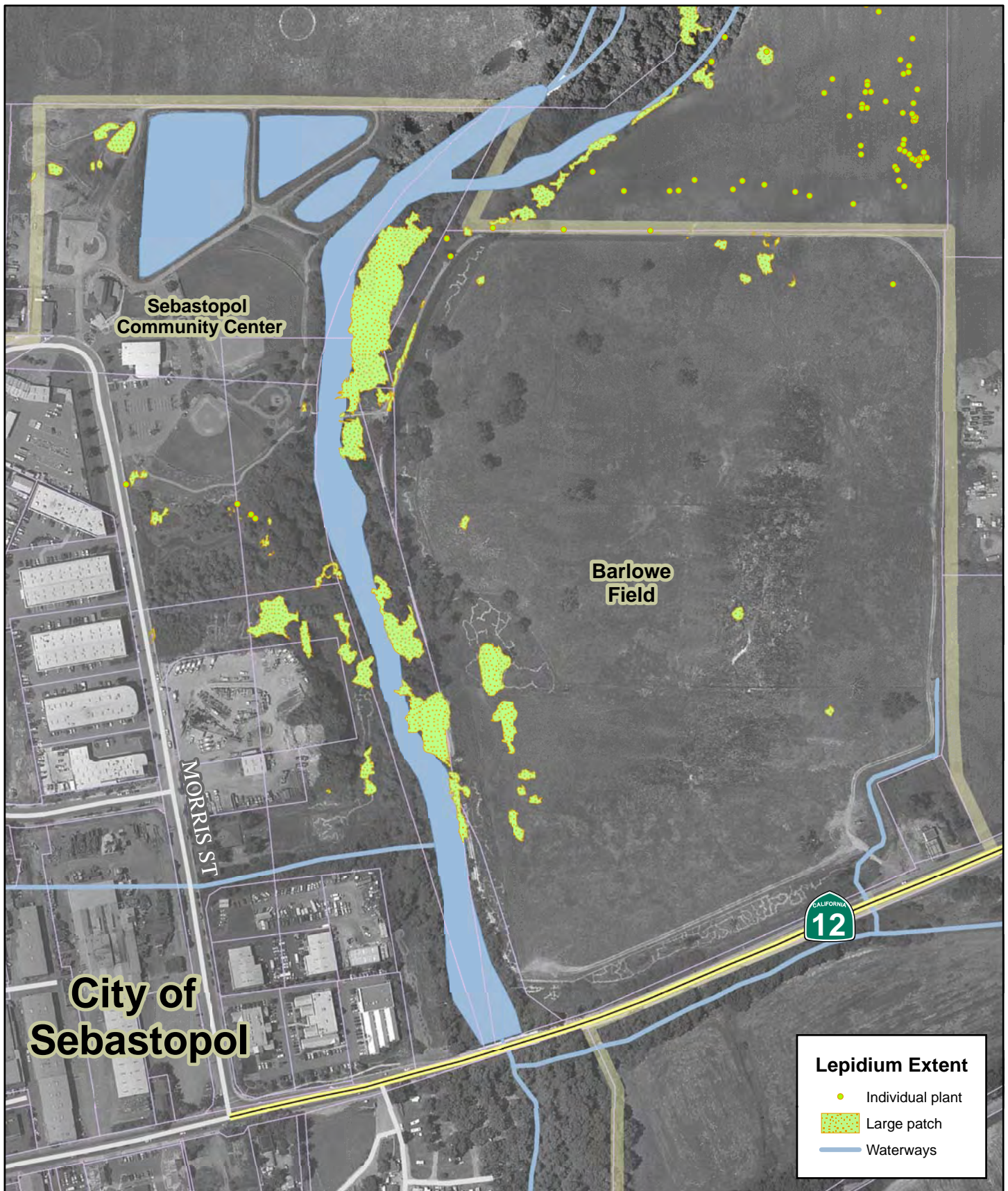


Figure 1: Perennial Pepperweed
City of Sebastopol Wetland Preserve

2.2.1 Pest Control Recommendations # 060810A and #060909A (Telar)

- The two recommendations are identical except for the method of application. Pest control recommendation #060810A assumes a broadcast application with a 100-gallon tank while recommendation #060909A is prepared for a 4-gallon backpack sprayer. All applications on the Laguna Wetlands Preserve will be made according to #060909A to ensure precise application. Telar will only be sprayed at or above the bank slope (Figure 2).
- It will be difficult to measure the small volume of materials recommended for the backpack sprayer. Therefore the certified pest control advisor may choose to pre-mix a larger volume (per recommendation #060810A) and then add it to the backpack sprayer. However, it will be essential to follow the directions exactly in mixing and to make sure that the liquids are properly mixed before transferring them to the backpack sprayer. If not, the efficacy of the application could be compromised.
- Both recommendations suggest the addition of Edict SC[®] herbicide to enhance control. Because there are no readily available published studies on the efficacy of this addition in treating pepperweed, the Laguna Foundation does not recommend adding it to the mix. However, addition of the Syl-Tac[®] surfactant and blue dye are necessary.
- As these recommendations were written in summer 2006, they refer to summer application periods. The same recommendation can and should be used for spring application. Application should occur while the plants are at the basal rosette stage (see photos, Appendix 2). This life stage is relatively short and once temperatures are consistently warmer the plants will begin to bolt. Although this is typically in April, some field reconnaissance will be necessary to determine when the rosettes are present.
- Both recommendations suggest fall applications at a higher volume (2 ounces/acre vs. 1 ounce/acre). The Laguna Foundation supports a fall application to new, previously missed, or resprouting pepperweed plants but at the 1 ounce/acre rate rather than 2 ounce/acre and only to actively growing pepperweed plants. Dead or dying plants should not be treated.

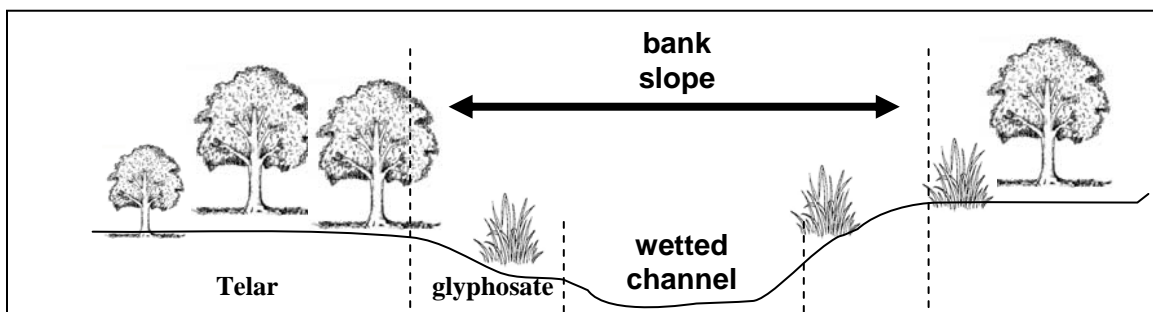


Figure 2. Illustration showing appropriate zones for using Telar and glyphosate to treat *Lepidium latifolium*. Telar should be applied at or above the bank slope, the point at which the relatively flat floodplain angles downward toward the wetted channel. Using the bank slope as a cutoff point is more effective than arbitrarily assigning a buffer that may or may not be appropriate at individual locations.

2.2.2 Pest Control Recommendation #060810D (Aquamaster)

- The recommendation is prepared for a 4-gallon backpack sprayer. All applications on the Sebastopol properties will be made according to #060810D to ensure precise application. Aquamaster should be used below the bank slope (Figure 2).
- Use of the buffer and drift retardant will be up to the applicator. However, the surfactant and blue dye are necessary.
- Published studies have shown that maximum efficacy in controlling pepperweed with glyphosate is achieved by the schedule and methods presented below. This will require some field reconnaissance.
 - Allow pepperweed to grow to the flowerbud stage (typically in June, see photo in Appendix 2);
 - Mow plants at flowerbud stage and allow to regrow;
 - Treat plants with Aquamaster once the regrowing plants reach flowerbud stage again.

3. Study of alternative to herbicide use

The Perennial pepperweed (*Lepidium latifolium*) Management Plan, prepared by the Laguna Foundation in September 2006 describes a method for experimentally evaluating the effectiveness of manual or mechanical removal followed by extended tarping. Although a preliminary design for the study is presented in the 2006 plan, it would have to be thoroughly evaluated and detailed if funding is made available. It should be noted that to accurately evaluate the effect of tarping, several “control” plots would have to be established. Control plots receive neither chemical nor non-chemical treatments. This presents an obvious risk of further spread but is necessary to comprehensively understand whether the effects of the removal/tarping are the cause of the observed effect or if some external factor has caused the effect (e.g. weather). The Laguna Foundation strongly supports this type of applied research.

4. Monitoring

Regardless of whether the tarping study is funded, it is important to monitor the results of the herbicide application to determine treatment efficacy. Evaluation of changes in patch size and density will be observed through annual photo monitoring, mapping of patch size, and stem density counts within a subset of the patches. Although true evaluation would require “control” plots, as described in Section 3, these are not proposed because of the cost of monitoring relative to the likelihood of yielding new information.

5. Restoration

In spring 2008 the Laguna Foundation will begin planting native species on the Sebastopol properties as part of its larger restoration project that extends north to Occidental Road. Although initial planting will occur in uninfested areas, the proposed monitoring of the herbicide treatments will inform when and how best to plant in the pepperweed patches. The extreme competitiveness of pepperweed makes it advisable to achieve significant control before planting.

6. Schedule

	2007			2008			2009	
	spring	summer	Fall ¹	spring	summer	fall*	Spring ¹	Summer ¹
Telar application	X		X	X		X	X	
Mowing and Aquamaster application		X			X			X
Monitoring	X	X		X	X		X	
Proposed study	X	X		X			X	

¹Herbicide application necessary only if active REgrowth is present.

7. Three-year budget⁴

	Laguna Foundation ¹	City of Sebastopol	Total
Initial mapping and planning	\$6,000		\$8,000
Telar application	\$5,000	\$5,000	\$10,000
Mowing and Aquamaster application	\$7,500	\$7,500	\$15,000
Monitoring	\$4,500	\$4,500	\$9,000
Proposed study		\$15,000 + in kind labor	\$15,000
Total	\$23,000	\$32,000 +in kind labor	\$55,000

¹The Laguna Foundation contribution is made possible with a grant from the California State Coastal Conservancy.

⁴ This budget does not include the cost of installing and maintaining plants, which will begin in 2008 as part of the Laguna Foundation's middle reach restoration project. The estimated cost is \$40,000 to be paid through a grant from the California State Coastal Conservancy.



WILBUR-ELLIS COMPANY PEST CONTROL RECOMMENDATION

No. 060810A

OPERATOR: Laguna de Santa Rosa Foundation CONTACT: Julian Meisler
ADDRESS: PO Box 7886; Santa Rosa, CA 95407-7886
COUNTY: Sonoma PERMIT/ID #: NA -- Contract applicator will report use
SITE: Various non-crop sites ACRES: Variable PESTS: Broadleaf Weeds, especially *Lepidium*
LOCATION: Laguna de Santa Rosa Preserve where Perennial Pepperweed is present, per project maps.

MATERIAL(ADD IN ORDER LISTED)	RATE PER ACRE	RATE PER 100 GAL	VOLUME PER ACRE
(1) Telar Herbicide	1 dry ounce	4.0 dry ounces	}
(2) Edict SC Herbicide (<i>enhances Telar control</i>)	1.4 liquid ounces	5.6 liquid ounces	} 25 gallons
(3) Syl-Tac Adjuvant	4 liquid ounces	1.0 pint	
(4) Hi-Light Blue Spray Pattern Indicator*	8 liquid ounces	2.0 pints	

HAZARDS AND/OR RESTRICTIONS:

- OBSERVE ALL LABEL PRECAUTIONS. DO NOT ALLOW DRIFT FROM TREATMENT AREA.
- KEEP OUT OF LAKES, PONDS, STREAMS, AND OTHER BODIES OF WATER
- APPLY ONLY UNDER CALM CONDITIONS (WIND NO GREATER THAN 10 MPH)
- RE-ENTRY: DO NOT ENTER UNTIL SPRAY SOLUTION HAS DRIED

QAL: Contract Applicator DATE: Summer 2006 METHOD: Broadcast ground application

COMMENTS: ***Summer Lepidium spray*** — Fill tank half full of water. Mix Telar into water first. Add more water and then Edict SC and Syl-Tac, allowing each product to mix well before adding the next. Finally (if desired) Hi-Light Blue Spray Pattern Indicator should be added last to help evaluate spray deposition. Thoroughly mix and agitate the spray solution. Apply uniformly over the treatment area with an overall broadcast spray. ****Areas where broadcast application is not possible may be spot-sprayed “to wet”. *Apply another 2 ounces per acre of Telar after first fall 2006 fall rains to maintain broadleaf weed control and to aid release of native grass species, per Recommendation 060810B. For aquatic areas use either Recommendation 060810C (Habitat) or Recommendation 060810D (AquaMaster).***

*Add Hi-Light Blue Colorant when appropriate to increase spray deposition and to mitigate drift hazard. Hi-Light also aids in assessing spray pattern and nozzle wear.

I hereby certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Criteria for determining need for treatment: Pest is present.

Advisor's Signature:

Scott A. Johnson PCA License No. 5099 Date: 08/10/2006
Wilbur-Ellis Company; P.O. Box 15289; Sacramento, CA 95851-0289

WILBUR-ELLIS COMPANY
P.O. BOX 15289
SACRAMENTO, CA 95851-0289
PHONE: (916) 991-9808 FAX: (916) 991-1837



WILBUR-ELLIS COMPANY PEST CONTROL RECOMMENDATION

No. 060909A

OPERATOR: Laguna de Santa Rosa Foundation CONTACT: Julian Meisler
ADDRESS: PO Box 7886; Santa Rosa, CA 95407-7886
COUNTY: Sonoma PERMIT/ID #: NA -- Contract applicator will report use
SITE: Various non-crop sites ACRES: Variable PESTS: Broadleaf Weeds, especially *Lepidium*
LOCATION: Laguna de Santa Rosa Preserve where Perennial Pepperweed is present, per project maps.

MATERIAL(ADD IN ORDER LISTED)	RATE PER 4-GAL BACKPACK	RATE PER ACRE	VOLUME PER ACRE
(1) Telar Herbicide	4.54 grams	1 dry ounce	}
(2) Edict SC Herbicide (<i>enhances Telar control</i>)	6.6 ml	1.4 liquid ounces	} 25 gallons
(3) Syl-Tac Adjuvant	18.9 ml	4 liquid ounces	
(4) Hi-Light Blue Spray Pattern Indicator*	38.9 ml	8 liquid ounces	J

HAZARDS AND/OR RESTRICTIONS:

- OBSERVE ALL LABEL PRECAUTIONS. DO NOT ALLOW DRIFT FROM TREATMENT AREA.
- KEEP OUT OF LAKES, PONDS, STREAMS, AND OTHER BODIES OF WATER
- APPLY ONLY UNDER CALM CONDITIONS (WIND NO GREATER THAN 10 MPH)
- RE-ENTRY: DO NOT ENTER UNTIL SPRAY SOLUTION HAS DRIED

QAL: Contract Applicator DATE: Summer/Fall 2006 METHOD: Broadcast ground application

COMMENTS: ***Summer Lepidium spray*** — Fill tank half full of water. Mix Telar into water first. Add more water and then Edict SC and Syl-Tac, allowing each product to mix well before adding the next. Finally (if desired) Hi-Light Blue Spray Pattern Indicator should be added last to help evaluate spray deposition. Thoroughly mix and agitate the spray solution. Apply uniformly over the treatment area with an overall broadcast spray. **Areas where broadcast application is not possible may be spot-sprayed “to wet”. ***Apply another 2 ounces per acre of Telar after first fall 2006 fall rains to maintain broadleaf weed control and to aid release of native grass species, per Recommendation 060909B. For aquatic areas use either Recommendation 060909C (Habitat) or Recommendation 060909D (AquaMaster).***

*Add Hi-Light Blue Colorant when appropriate to increase spray deposition and to mitigate drift hazard. Hi-Light also aids in assessing spray pattern and nozzle wear.

I hereby certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Criteria for determining need for treatment: Pest is present.

Advisor's Signature:

Scott A. Johnson PCA License No. 5099 Date: 09/09/2006
Wilbur-Ellis Company; P.O. Box 15289; Sacramento, CA 95851-0289

WILBUR-ELLIS COMPANY
P.O. BOX 15289
SACRAMENTO, CA 95851-0289
PHONE: (916) 991-9808 FAX: (916) 991-1837

**WILBUR-ELLIS COMPANY PEST CONTROL RECOMMENDATION**

No. 060909D

OPERATOR: Laguna de Santa Rosa Foundation CONTACT: Julian Meisler *Alternative aquatic treatment*

ADDRESS: PO Box 7886; Santa Rosa, CA 95407-7886

COUNTY: Sonoma PERMIT/ID #: NA -- Contract applicator will report use

SITE: Various non-crop sites ACRES: Variable PESTS: Weeds, especially riparian *Lepidium*LOCATION: Various **aquatic** or riparian sites on 2 miles of Laguna de Santa Rosa, per project maps.

MATERIAL(ADD IN ORDER LISTED)	RATE/4 GAL BACKPACK	RATE PER 100 GAL	VOLUME PER ACRE
(1) Tri-Fol Buffer/Acidifier	0.5 ounce	8 ounces	} Variable
(2) AquaMaster Herbicide	4.5 ounces	3.0 quarts	Spot
(3) Competitor Surfactant	5.2 ounces	4.0 quarts	} Treatment
(4) In-Place (Drift Retardant)*	2 ounces	1.5 pints	As
(5) Hi-Light Blue Colorant	1 ounce	2.0 pints	} Needed

HAZARDS AND/OR RESTRICTIONS:

- OBSERVE ALL LABEL PRECAUTIONS
- DO NOT ALLOW DRIFT FROM TREATMENT AREA
- DO NOT APPLY WITHIN 1/4 MILE OF A POTABLE WATER INTAKE
- APPLY ONLY UNDER CALM CONDITIONS (WIND NO GREATER THAN 10MPH)
- DO NOT GRAZE ANIMALS FOR 14 DAYS AFTER TREATMENT
- RE-ENTRY: DO NOT ENTER UNTIL SPRAY SOLUTION HAS DRIED

QAL: Contract Applicator DATE: As needed in 2006-2007 METHOD: Directed Ground Spray

COMMENTS: Fill tank half full of water, add Tri-Fol (if water pH exceeds 7.0) and mix. Then add pre-mixed AquaMaster/In-Place and mix. Add remainder of water, then mix in Competitor and Hi-Light. Spray actively growing target weeds "to wet". Avoid drift or overspray onto desirable foliage, as damage may occur. For brush control, increase AquaMaster rate to 6 quarts per 100 gallons mix (1.5- percent solution).

*Add In-Place when appropriate to increase spray deposition and to mitigate drift hazard.

I hereby certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Criteria for determining need for treatment: Pest is present.

Advisor's Signature:

Scott A. Johnson PCA License No. 5099 Date: 09/09/2006
Wilbur-Ellis Company; P.O. Box 15289; Sacramento, CA 95851-0289

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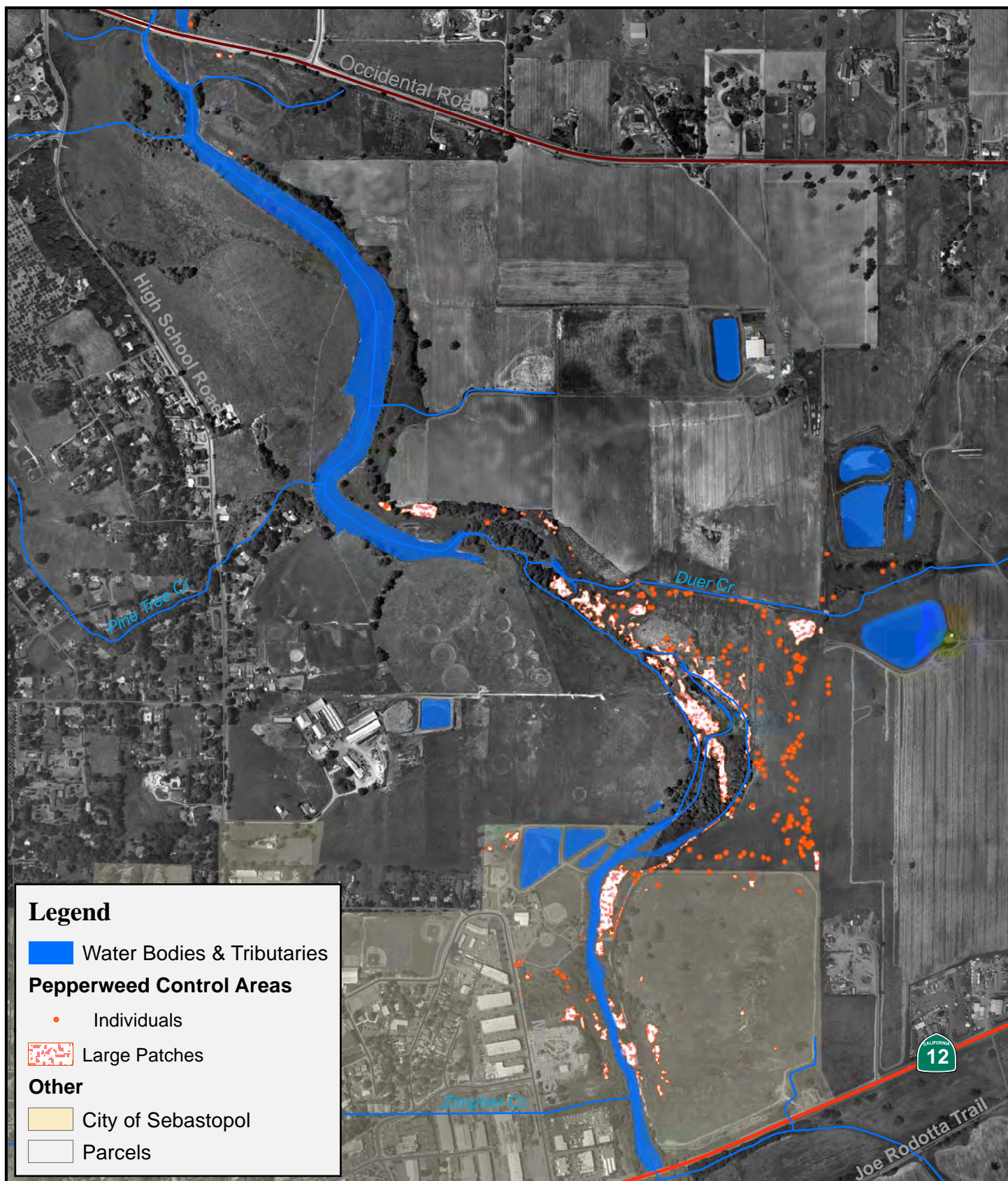
Appendix 2. Life stages of perennial pepperweed



Basal rosette of *Lepidium latifolium*. Plants can be found at this stage in early spring. Telaar provides the best control of *L. latifolium* at this life stage. (Photos by Santa Margarita-San Luis Rey Weed Management Area)



Pre-flowering *Lepidium latifolium*. This life stage occurs in early to mid-summer and is the most effective time to treat with Aquamaster or other glyphosate-based herbicides registered for aquatic use. Ideally the plant should be mowed at this stage and then allowed to regrow to the same life stage before treating with Aquamaster. Although highly labor intensive, it has been shown to be the most effective treatment. (Photos by Santa Margarita-San Luis Rey Weed Management Area)



Middle Reach Pepperweed Extent '06

Map ID: 375-A
© 2007

0 0.05 0.1 0.2 0.3 0.4 0.5 Miles



Appendix G. Timeline

[illegible]

Appendix H
Overall budget by funder

TASK	Personnel						
	Coastal Conservancy	WCB*	USFWS	Sonoma Community Foundation	City of Sebastopol	Other	Total by Task
Task 1:Project Management	\$ 12,781	\$ 12,781	\$ 4,793	\$ 1,598	\$ 959	\$ 639	\$33,550
Task 2: Planning	\$ 14,229	\$ 14,229	\$ 5,336	\$ 1,779	\$ 1,067	\$ 711	\$37,350
Task 3: Implementation	\$ 53,400	\$ 53,400	\$ 20,025	\$ 6,675	\$ 4,005	\$ 2,670	\$140,175
Task 4: Monitoring, Maintenance and Reporting	\$ 27,781	\$ 27,781	\$ 10,418	\$ 3,473	\$ 2,084	\$ 1,389	\$72,925
TOTAL	\$ 108,190	\$ 108,190	\$ 40,571	\$ 13,524	\$ 8,114	\$ 5,410	\$ 284,000

TASK	Direct Expenses						
	Coastal Conservancy	WCB*	USFWS	Sonoma Community Foundation	City of Sebastopol	Other	Total by Task
Task 1:Project Management	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Task 2: Planning	\$ 1,905	\$ 1,905	\$ 714	\$ 238	\$ 143	\$ 95	\$ 5,000
Task 3: Implementation	\$ 84,571	\$ 84,571	\$ 31,714	\$ 10,571	\$ 6,343	\$ 4,229	\$ 222,000
Task 4: Monitoring, Maintenance and Reporting	\$ 5,333	\$ 5,333	\$ 2,000	\$ 667	\$ 400	\$ 267	\$ 14,000
Total Estimated Expenses	\$91,810	\$91,810	\$34,429	\$11,476	\$6,886	\$4,590	\$241,000

TASK	Coastal Conservancy	WCB*	USFWS	Sonoma Community Foundation	City of Sebastopol	Other	Total by Task
Task 1:Project Management	\$ 12,781	\$ 12,781	\$ 4,793	\$ 1,598	\$ 959	\$ 639	\$33,550
Task 2: Planning	\$ 16,133	\$ 16,133	\$ 6,050	\$ 2,017	\$ 1,210	\$ 807	\$42,350
Task 3: Implementation	\$ 137,971	\$ 137,971	\$ 51,739	\$ 17,246	\$ 10,348	\$ 6,899	\$362,175
Task 4: Monitoring, Maintenance and Reporting	\$ 33,114	\$ 33,114	\$ 12,418	\$ 4,139	\$ 2,484	\$ 1,656	\$86,925
TOTAL	\$ 200,000	\$ 200,000	\$ 75,000	\$ 25,000	\$ 15,000	\$ 10,000	\$ 525,000

* Wildlife Conservation Board (WCB) funding not yet secured. Expected August 2007.