

4.0 RECOMMENDED CONSERVATION AND ENHANCEMENT PLAN

4.1 INTRODUCTION

The main strategy for success of the WSCEP program is to carry out resource enhancement projects that meet the pressing needs of natural resources while addressing and in some cases improving social and economic conditions for the local community. An initial set of recommended demonstration projects should show the community how an optimized planning process works to improve the Sloughs and minimize conflicts between land use and natural resources. The optimized planning process will simultaneously address the environmental needs of the Sloughs, the needs of private landowners, the economic needs of agriculture, the regulatory policies of resources agencies, and the requirements of grant and local government funding agencies. The strategy is to apply new planning and scientific information to land use as a means to identify projects that gain support from landowners and funding agencies, then implement them to demonstrate success. After the experience of demonstration projects, it is anticipated that the momentum of each success will build further progress, more projects and more success. The momentum to implement projects will be gained as support from landowners and the local community increases and conditions are measurably improved. In the end, the vision for the Sloughs with full implementation of the WSCEP is one where the quality of wildlife habitats, water, and the visual qualities of the Sloughs are appreciated and protected by the community.

The ultimate vision for the Sloughs is to improve conditions to the point where the natural ecological processes occur over a large enough area to allow them to become self-sustaining. The Sloughs' natural areas would be connected by corridors along slough and stream valleys rather than existing in isolated pockets. The connected areas would include a variety of landscape elements including wetlands on the valley floor and whole hillsides and hilltops, which serve many types of wildlife as habitat and breeding grounds. Native vegetation in the areas dedicated for natural ecosystem processes would be sustained to the point where it can out-compete exotic invasive species and maximize native wildlife habitat. For natural areas bounded by land use, the ultimate vision is that pollution is controlled within the land use either by source control to prevent pollution from entering the drainage system in the first place, or through pre-treatment, to remove as much as possible prior to discharge to natural waterways.

This Chapter describes the recommendations of the WSCEP and the recommended program for achieving the WSCEP goals stated in Chapter 1 and the vision outlined above. The recommendations are designed to reduce stressors identified as compromising the quality and vitality of natural resources in the Watsonville Sloughs Watershed. The program consists of five components:

- ❑ Habitat enhancement projects,
- ❑ Land acquisition strategies,
- ❑ Coordination and improvement of regulatory process and compliance,
- ❑ Support and coordination with other ongoing conservation programs, and
- ❑ Public access and education.

IMPLEMENT HABITAT ENHANCEMENT PROJECTS

Hydrologic Enhancement of Wetlands

The WSCEP recommendations include a diverse set of projects to be carried out with willing landowners. The projects include actions designed to reverse reclamation era actions that drained wetlands and modified their hydrology, including removal of fill and retrofits of pumps and drainage ditches. The deterioration of drainage systems has stagnated water circulation in wetlands systems and has become a threat to the integrity of agricultural lands. Many drainage systems were originally designed to be continuously maintained by dredging, a practice that is inefficient given funding and regulatory constraints. New drainage control facilities hold the opportunity to separate wetland habitat areas from the drainage system that services the agricultural fields, thereby improving agricultural land productivity, water quality and habitat function. Renovation of the Shell Road Pumps will benefit ecosystem conditions by improving water circulation and migratory pathways for aquatic species in Middle Watsonville Slough, and drainage conditions for farmers whose lands bound that reach.

Replacement of Exotic Invasive Vegetation

The potential habitat values of many areas in Watsonville Sloughs Watershed are being compromised by the extensive presence of exotic/invasive vegetation. A major initiative to replace exotic invasive plant species is needed to realize the habitat potential of the Sloughs, from hilltop to wetland. The WSCEP features these projects throughout the watershed. They are

critical to expanding and improving native wildlife habitat.

Water Quality Improvement

The WSCEP recognizes that the relationship of land use to natural habitats in the slough system needs to be defined to buffer habitat areas from polluted runoff. There are many serious pollution problems in the Watsonville Sloughs Watershed, most notably the excessive input of nutrients into waterways and the resulting eutrophication (loss of dissolved oxygen due to the overproduction of algae stimulated by excessive nutrients). The WSCEP recommendations include projects that separate and treat agricultural and urban runoff before it is discharged into natural waterways and habitats. It also provides the physical separation necessary to protect wetlands and adjacent habitats from disturbance.

LAND ACQUISITION STRATEGIES

The WSCEP provides direction for resource agencies and private non-profit groups for their land acquisition programs to direct conservation efforts to areas where it increases resource values the greatest amount per dollar spent. The WSCEP designates priority areas for acquisition based upon the goal to re-establish ecosystem food webs and to connect existing but isolated publicly owned habitat areas and establish migration corridors. The WSCEP provides mechanisms to be used during enhancement project planning to define appropriate lines between lands dedicated to resource management and conservation and lands dedicated to land use (agricultural or urban). There are several restoration opportunities available, however acquisition can only occur where there are willing sellers.

IMPROVEMENTS IN REGULATORY COMPLIANCE

The wetlands and other lands in the Watsonville Sloughs Watershed fall under a host of regulations of a number of agencies. Many conflicts occur between landowners and regulators in Santa Cruz County and state and federal agencies. Most of the conflicts revolve around endangered or sensitive species habitat and land use. The problems for landowners have been exacerbated as drainage systems have deteriorated. Other regulatory concerns are related to water quality problems and impending Total Maximum Daily Loads (TMDL) regulation.

The WSCEP should help reduce regulatory violations by providing the means for landowners to

have site specific requirements of sensitive resources built into the design of reliable drainage systems. Using site specific habitat requirements as a part of enhancement project design rather than as an afterthought of mitigation, landowners should be able to work within the rules that prevent harm to water quality and wildlife habitat. For example, certain areas known to be critical for wildlife breeding success could have seasonal guidelines established to alleviate impacts to wildlife and to the landowner who faces fines and expensive remediation. There is a substantial opportunity to implement WSCEP recommended projects that would improve drainage and reduce erosion on private lands while simultaneously benefiting wildlife and water quality. The WSCEP provides the missing factor for success: a science-based planning process to incorporate wildlife habitat and seasonal usage with the activities of landowners. This plan can provide the best information to landowner and regulatory agencies to identify management practices and projects that prevent or solve expensive conflicts.

The U.S. Fish and Wildlife Service's "Safe Harbors" program for endangered species may be applied to the Watsonville Sloughs Watershed to define habitat areas and to allow for potentially conflicting land use activities. The main requirement of Safe Harbors is that a specific management plan be implemented which will result in a net improvement in habitat and population of an endangered species. Once in place, a "Safe Harbors" contract would allow for "incidental take" of endangered species habitat in areas designated for specific land use activity. The Santa Cruz County Resource Conservation District has received a grant from the USFWS to conduct a pilot "Safe Harbors" project in the Watsonville Sloughs Watershed.

SUPPORT AND COORDINATE WSCEP WITH OTHER ONGOING CONSERVATION PROGRAMS

Implementation of the WSCEP will largely occur through existing organizations (non-profit, governmental and non-governmental agencies) already involved in resource conservation work in the Watsonville Sloughs Watershed. These groups and their specific programs include:

- ❑ The Santa Cruz County Resource Conservation District's Watsonville Sloughs Watershed Coordinator program and the Monterey Bay Wetlands Project,
- ❑ Local conservation organizations working to protect and restore habitat in the slough watershed,
- ❑ The City of Watsonville wetlands conservation and public trails program,

- ❑ The Coalition of Central Coast County Farm Bureaus Agricultural Water Quality Program to improve water quality discharge to the Monterey Bay Marine Sanctuary,
- ❑ The University of California at Santa Cruz research into nitrate discharge in the Pajaro Valley and efforts to reduce it through targeted reduced fertilizer applications,
- ❑ The County of Santa Cruz resource planning efforts, which include overseeing the preparation of the WSCEP, and
- ❑ The Pajaro Valley Water Management Agency water resources development projects on Harkins Slough.

All of these organizations are involved in efforts with private and public landowners to reduce pollution in the Sloughs through reduction in non-point source inputs from urban, agricultural and industrial areas. It is envisioned that the WSCEP will provide a common direction for resource agencies and conservation organizations and landowners.

PUBLIC ACCESS AND EDUCATION

Public understanding of the Watsonville Sloughs ecosystem as a community asset is on the rise. To foster further awareness, the WSCEP and local agencies have identified a trails system to improve access for passive recreation and environmental education. The Watsonville Sloughs trail system listed in the enhancement projects below is being undertaken by the City of Watsonville. The Trail system can also be a key link to future non-automobile transportation as part of regional trail systems.

Public understanding of the Sloughs' natural resources can be achieved through ongoing coordination with public schools in the Pajaro Valley area and through interpretative programs, which can be expanded through improved public access. There is interest and opportunities to develop an interpretive center for Native American Culture and its important relationship with the Slough ecosystem. The Pajaro Valley Unified School District and the Watsonville Wetlands Watch are currently planning for the proposed Watsonville Sloughs Resource Education Center at the planned new high school off Harkins Slough Road, including development of wetlands science curriculum.

Another avenue of public education involves landowners who become part of an enhancement project planning process. Problem identification workshops were conducted in 2000 as a part of

the WSCEP development process. Landowners expressed the desire to become involved in development of projects and management plans to address resource and regulatory problems on their lands or in their community. This landowner involvement will involve “fact finding” and educational workshops as part of the planning process in order to gain support for specific projects. Similarly, public interest groups were involved in the development of the WSCEP and will likely become participants in enhancement project planning workshops.

4.2 RECOMMENDED ENHANCEMENT PROJECTS

When implemented, the recommended habitat enhancement projects will help relieve environmental stressors, buffer wetlands and sensitive areas from land use impacts, and help restore a functional ecosystem within the Sloughs. The habitat enhancement projects are designed to accomplish much of the five plan components described above.

The following are descriptions of the habitat enhancement recommendations for each geographic region in the Watsonville Sloughs Watershed. The recommendations were converted into specific projects displayed at the end of this section in **Table 4-1**. The environmental stressors described by geographic area in Chapter 3 are displayed in **Table 4-2** with the corresponding habitat enhancement project(s) designed to reduce stressors.

UPPER WATSONVILLE SLOUGH

The Upper Watsonville Slough Planning Area is mostly contained within the City of Watsonville’s jurisdiction and extends from its headwaters above Main Street to the low gradient drainage ditch/channel at Highway 1. The lower portion of the Slough below Ford Street is under consideration by the City of Watsonville for expansion of wetlands and development of adjacent land.

The recommendations for Upper Watsonville Slough include the following elements:

- ❑ Enhance degraded historic wetland areas upstream of the westerly end of Ford Street by removal of fill, most notably in the old City of Watsonville Dump, and removal of hydraulic constrictions at Manabe Driveway. It is assumed that the Harkins Slough Road Crossing would be replaced with a less constricted structure under separate plans by the City of Watsonville and that wetlands downstream of the westerly end of Ford Street

would be restored under development and annexation plans now under consideration by the City of Watsonville.

- ❑ Selectively enhance freshwater marsh areas and the Slough channel to improve water circulation, remove remnants of reclamation, stabilize channel banks and improve hydrologic conditions for native vegetation communities.
- ❑ Revegetate the areas between the freshwater wetlands and riparian areas with native plant communities in transitional and upland settings. This would create fully native plant communities from the edges of wetlands up hillslopes to the hilltops of urban cover.
- ❑ Rehabilitate areas on hillslopes covered in fill or trash to support native vegetation.
- ❑ Install stormwater treatment facilities at the major outfalls draining urban areas in order to remove pollutants.

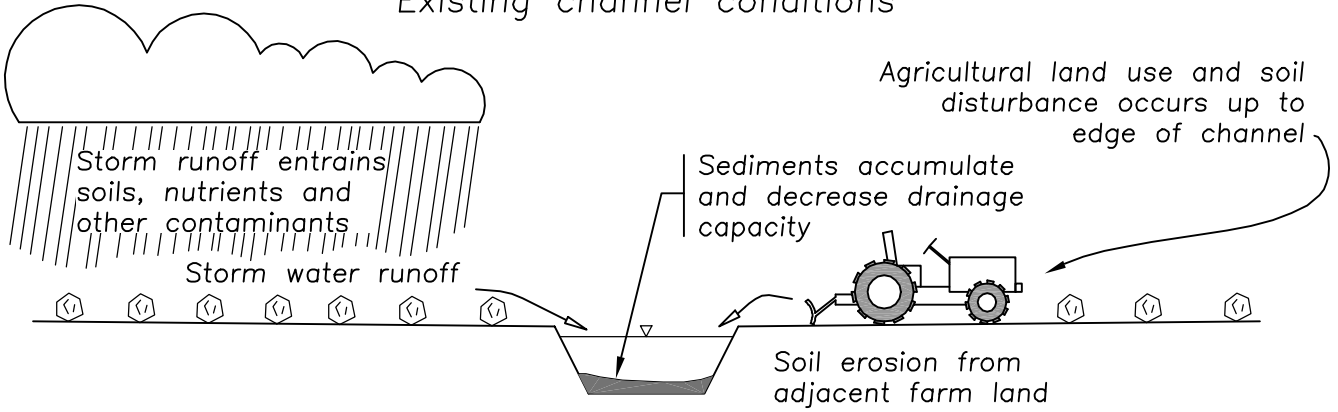
MIDDLE WATSONVILLE SLOUGH

Middle Watsonville Slough extends from the Shell Road Pump to Highway 1. It is surrounded by predominantly agricultural lands, with a small industrial development on Lee Road. The Slough is generally a straight ditch in the flat, northern edge of the Pajaro River floodplain

The recommendations for Middle Watsonville Slough include the following elements:

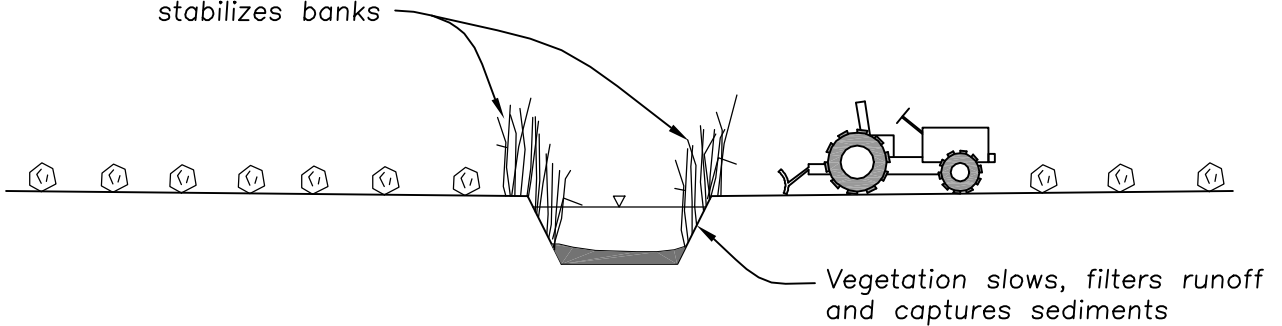
- ❑ Reconstruct the Slough and agricultural drainage system into two separate channels: a dedicated agricultural drainage ditch and a protected waterway (**Figure 4-1**). This treatment would be used from Lee Road to the existing levee along the south side of the slough between San Andreas Road and Shell Road. The agricultural drainage system would include pre-treatment wetlands to remove nutrients prior to discharge to the protected waterway of the Slough. The new system could include an expanded marsh plain with the protected waterway. The specific design would depend upon the hydraulic criteria for the ditch and land availability (which would be subject to negotiation with multiple landowners).
- ❑ Enhance areas of degraded native vegetation with the removal of exotic species and by regrading land to remove fill and remnants of reclamation. Revegetate new marsh areas, interior levee slopes and the hillslope rising to the north with native transitional and upland species.
- ❑ Restructure the slough channel to obtain natural variability in pattern and depth (pools and shallows). Excavate the marsh plain to create backwater channels and variable

Existing channel conditions

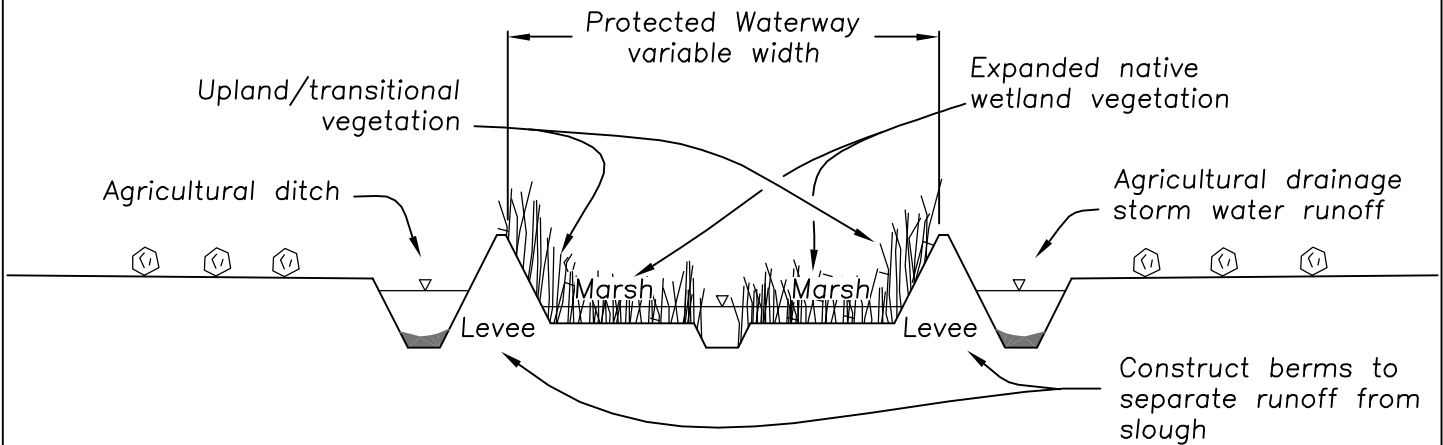


Vegetation buffer to existing channel conditions.
(existing practice in some areas)

Native vegetation filters runoff from agricultural field and stabilizes banks



Separate agricultural runoff and expand marsh/floodplain in main channel.



Not drawn to scale

Figure 4-1: Schematic drawing of Potential drainage system Improvements in agricultural areas for Middle and Upper reaches of Watsonville and Lower Harkins Sloughs.

topography to support a range of vegetation from freshwater marsh and riparian forest to transitional and upland species.

- ❑ Renovate the Shell Pump Station to improve its potential for preventing incursion of saltwater. The renovations would allow for a higher pump capacity and instantaneous, variable operation of gates and pumps that allow exchange during periods of excess freshwater, but provide flood protection when saltwater and/or high tidal stages are present.

LOWER WATSONVILLE SLOUGH

The Lower Watsonville Slough is the reach below the Shell Road Pump and includes the Pajaro Dunes development below Shell Road, the levee/drainage pump system on the east side of Watsonville Slough from Beach Road to the mouth, and the publicly owned land between Sunset Beach and Beach Road.

The recommendations for Lower Watsonville Slough would involve implementing enhancement projects including:

- ❑ Remove exotic vegetation cover and plant native vegetation in existing marsh and adjacent transition and upland areas, as well as on the levee along the eastern side of the Slough.
- ❑ Work with Pajaro Dunes development to manage marsh areas between the access road and Slough to enhance resources.
- ❑ Remove fill berms and antiquated drainage structures throughout the wetlands to improve marsh hydrology for native vegetation. Create islands for waterfowl refugia.
- ❑ Re-contour and construct the levee along the east side of the slough from Beach Road to the mouth to develop more favorable terrain for native vegetation. Revegetate levee with native species and re-route agricultural drainage to pre-treatment wetland. Construct trail on top of levee to connect Pajaro River levee trail to Beach Road.

UPPER STRUVE/UPPER WEST BRANCH STRUVE SLOUGHS ABOVE HIGHWAY 1

The headwaters of Struve Slough and West Branch Struve Slough originate just south of the Watsonville Municipal Airport and extend to Highway 1. The drainage area is predominantly dense urban residential and commercial development on hilltops and hillslopes, with open space

and wetland areas increasing in width and area towards Highway 1.

The recommendations for Upper Struve/Upper West Branch Struve Sloughs include the following elements:

- ❑ Remove or modify hydraulic structures to restore pre-reclamation hydrology and improve water circulation including the Main Street crossing. The City of Watsonville is planning the replacement of the Harkins Slough Road crossing with a span structure.
- ❑ Restore native vegetation communities through the removal of exotic vegetation and the planting of degraded wetlands and hillslope areas with native plants. Existing urban runoff pre-treatment basins could be modified to enhance hydrology and soil conditions for native plant communities.
- ❑ Conduct selective dredging to create ponds and improve water circulation, to remove remnants of reclamation and to diversify aquatic habitats.
- ❑ Add urban stormwater runoff pre-treatment systems at drainage outfalls where they do not currently exist. These could be created wetlands or a combination of catch basins, detention structures and filters. The precise design would depend upon many engineering factors, but this recommendation assumes the need to improve urban runoff quality will be realized.

LOWER STRUVE/WEST BRANCH STRUVE SLOUGHS

This Planning Area includes all of Struve Slough and West Branch Struve Slough downstream of Highway 1 to its confluence with Watsonville Slough just upstream of the UPRR crossing. The recommendations for Lower Struve/West Branch Struve Sloughs would involve implementing enhancement projects including:

- ❑ Restore native vegetation cover in all areas by removing exotics, improving hydrology and soil conditions in degraded areas and planting appropriate native species. This would occur over the entire Planning Area, much of which is publicly owned.
- ❑ Improve the Lee Road crossing by replacing with a span structure to improve water circulation. Conduct selective dredging to remove remnants of reclamation activities and to improve water circulation and water quality.
- ❑ The lower reach of Struve Slough and its confluence with Watsonville Slough between Lee Road and the UPRR crossing would be reconfigured to reconstruct the decaying

drainage system and restore the marsh plain. The precise plan would depend on consultation with private landowners and growers, but would include the improvements described in the Middle Watsonville Slough Planning Area.

GALLIGHAN SLOUGH

Gallighan Slough extends from its headwaters at Highway 1 to Harkins Slough. The Slough flows through the middle of the watershed past the County landfill and then enters Lower Harkins Slough below the Harkins Slough Road crossing. The recommendations for Gallighan Slough include the following elements:

- ❑ Upgrade the stormwater drainage system along Buena Vista Road from San Andreas Road to Highway 1 to reduce erosion and sediment supply to Gallighan Slough. Install adequate culverts to pass large floods and stabilize roadside ditches, road cuts and road fill areas with riprap and/or native vegetation if feasible. Use pre-treatment facilities to remove sediment before discharge to waterways.
- ❑ Restore native vegetation habitat in areas of public ownership and negotiate to expand into areas of private ownership. Ensure that the final disposition of the landfills is to restore native vegetation appropriate to its location in the landscape.
- ❑ Expand programs to encourage landowners to reduce erosion and sediment discharge from private lands through education and by providing technical assistance.

HANSON SLOUGH

Hanson Slough drains a relatively small basin situated between Lower Harkins and Lower Struve Sloughs. Harkins Slough Road transverses the upper watershed area and land use is predominately agriculture and grazing. The drainage originates above Harkins Slough Road and flows to Watsonville Slough.

The recommendations for Hanson Slough include the following elements:

- ❑ Improve and expand native vegetation cover to increase abundance and diversity of plant communities, and also as a means to create sediment-filtering buffers along waterways (an expansion of the Watershed Institute's riparian restoration and water quality project).

The area converted to native plant communities would be determined through consultations with landowners.

- ❑ Develop a grazing and runoff management plan to improve water quality. The plan would include a manure management plan and grazing methods to eliminate sediment and nutrient pollution delivered to the waterway.
- ❑ Restore the hydrologic function of Hanson Slough and its tributaries to reduce erosion and improve aquatic habitat and the water quality of runoff leaving the basin.

UPPER HARKINS SLOUGH (LARKIN VALLEY)

Upper Harkins Slough is the longest waterway in the Watsonville Sloughs system extending from Highway 1 seven miles inland through Larkin Valley. In the upper watershed area above Highway 1 (Figure 3-12) Harkins Slough flows as a stream within Larkin Valley, a narrow, linear valley surrounded by moderately steep hillslopes and tributary valleys. A significant amount of this watershed is undeveloped land providing groundwater recharge, relatively absent in much of the remaining areas of Watsonville Sloughs Watershed.

The WSCEP recognizes a need to coordinate the activities and desires of the multiple landowners in the Larkin Valley area. The specific information needed is not available. The overall aim of the recommendations is to decrease erosion and entrainment of nutrients from unmanaged manure and septic systems and includes the following elements as next steps:

- ❑ Establish a Management Plan to coordinate land use practices in Upper Harkins Slough for drainage maintenance and management of riparian, wetlands and sensitive species habitats. The Plan would coordinate land use activities on multiple properties such that impacts to vegetation and wildlife resources can be minimized by the timing and methods of maintenance.
- ❑ Conduct a pilot drainage improvement project to demonstrate planning, engineering, resource enhancement and maintenance techniques that could be applied to waterways.
- ❑ Develop a native vegetation enhancement and education program for local landowners to improve native vegetation stands. Provide ways for grant money to be used on private land to improve native vegetation.
- ❑ Develop manure management plans for livestock operations to minimize entrainment of nutrients into waterways.

- ❑ Develop a plan to upgrade deficient septic systems.

LOWER HARKINS SLOUGH

Lower Harkins Slough extends from Highway 1 to the northern edge of the Pajaro Valley floodplain where it meets Watsonville Slough. The area is mostly fallow agricultural and grazing land with sparse buildings associated with present or past agricultural uses (cattle grazing and dairy operations) and concentrated public and private residences. Significant areas of the adjoining hillslopes are publicly owned, in conservation easement, or not actively cultivated or grazed.

The areas of Lower Harkins Slough and West Branch Struve Slough linked via a restored Middle Watsonville Slough represents the best area for a large contiguous wetland ecosystem restoration and should be considered a priority. Much of the land on the valley floor is in wetlands and/or under public ownership.

The recommendations for Lower Harkins Slough include the following elements:

- ❑ Remove the hydraulic constriction at Harkins Slough Road by removing the crossing or installing an open span crossing to improve water circulation.
- ❑ Selectively dredge wetland areas to remove reclamation era fill and structures and to improve aquatic habitat diversity and water circulation.
- ❑ Enhance native vegetation in available areas (public lands and those subject to consultation with private landowners). Restore native plant communities in the wetlands, transitional areas and uplands.

BEACH ROAD DITCH

The land use surrounding Beach Road Ditch is exclusively active agricultural cultivation. On the south side of the road, Beach Road Ditch extends the length of Beach Road from Lee Road to its discharge into Lower Watsonville Slough estuary.

The recommendations for the Beach Road Ditch involve the following elements:

- ❑ Widen existing agricultural drainage ditches.

- ❑ Plant and encourage vegetative growth within the wetlands beginning in the spring months, especially wetland vegetation capable of uptaking large amount of nutrients, such as bulrush and cattails. Prior to winter storms, selectively harvest a portion of the vegetation to ensure proper flood capacity during high flows and minimal vegetation growing periods (winter).
- ❑ Provide a pre-treatment pond prior to discharge into estuary.

Table 4-1 shows a matrix of the recommended projects, which includes the following actions applied to specific sites within each Planning Area:

- ❑ Remove fill from wetlands and restore wetland hydrology, soils and vegetation.
- ❑ Install Erosion and Drainage Control Facilities to reduce sediment generation.
- ❑ Remove exotic vegetation and restore native plant communities.
- ❑ Install drainage facilities to separate agricultural runoff from wetland areas.
- ❑ Modify flood control pump stations to improve aquatic habitat and water circulation.
- ❑ Establish buffers between agricultural areas and waterways to reduce pollution discharge.
- ❑ Install urban and agriculture runoff treatment facilities to improve water quality discharged to wetlands.
- ❑ Create treatment wetlands for improving water quality discharged to natural sloughs.
- ❑ Improve roadside drainage systems in order to reduce sediment generation and to reduce concentrated peak flows.
- ❑ Create trails, viewpoints and other recreational and education opportunities.

The recommended projects shown in **Table 4-1** are described in conceptual form. Implementation of projects will depend upon the availability of funding and interested landowners. Further refinement of project details will be developed in collaboration with landowners. For some projects, there is also a need to develop master plans to work up specific engineering, regulatory and other planning details prior to development of construction plans and specifications. Several of these projects have reached a level of development where their implementation has either begun or could occur quickly. **Table 4-1** does not represent an all-inclusive set of recommended projects and will change over time as projects are implemented, as new projects and programs are identified, additional input is received and new opportunities arise.

WATSONVILLE SLOUGHS WATERSHED CONSERVATION AND ENHANCEMENT PLAN

TABLE 4.1

RECOMMENDED PROJECTS LIST

Cost Estimates: Low = less than \$150,000
 Medium = Over \$150,00 to \$400,000
 High = Over \$400,000

This matrix is a dynamic document that will change over time as projects ripen, costs become known, and land and funding become available.

Planning Area	Project Code	Project Name	Project Area	Anticipated Project Partners (Lead Agency in BOLD)	Description (number of acres to be treated)	Estimated Cost	Projected Funding Date
Watershed Wide	WSW-1	Erosion Control & Habitat Restoration	Watershed wide	Resource Conservation District	Central Monterey Bay Wetlands Project - Work with landowners to facilitate adoption of erosion control practices, repair gully sites to protect water quality. Extent estimated at 8300 acres (13.0 sq miles)	medium to high	Begun 1999. Ongoing pending future funding
	WSW-2	Permit Coordination Program	Watershed wide	Resource Conservation District , Santa Cruz County, Natural Resource Conservation Service	Facilitate restoration demonstration projects using permit coordination or safe harbor agreements and conduct long term monitoring. Extent affected by permit issues estimated at 6200 acres (9.7 sq miles)	medium to high	Pending funding - Summer 2002
	WSW-3	Non-native invasive plant eradication	Watershed wide	Resource Conservation District	Non-native, noxious weed eradication replacement with native vegetation	low, on a per project basis	Ongoing
	WSW-4	Habitat Protection	Watershed wide	Resource Conservation District, Santa Cruz County	Installation of wetland buffers & setbacks. Extent estimated at 904 acres (1.4 sq miles)	medium	
	WSW-5	Farm Bureau Agricultural Water Quality Program	Watershed wide	Santa Cruz County Farm Bureau RWQCB, U.C. Cooperative Extension, landowners, farm managers	Implements Monterey Bay Sanctuary Water Quality Protection Plan's Agricultural Action Plan; establishes local watershed working groups to develop and implement water quality improvement plans	Low to medium	Began in 2000; additional funding needed to support the County Program Coordinator position and for water quality monitoring materials and analysis
Upper Watsonville Slough	UW-1	Wetlands Restoration, Site A	1930's City dump site (east of Ramsey Park (from Main St. to Manabe Drive)	City of Watsonville	Remove fill from 45 acres, restore to wetland; reveg slopes; install urban stormwater runoff treatments	high	Prop13 preproposal submitted, if successful funds avail 10/2003
	UW-2	Upper Watsonville Slough, Trails Master Plan	Main Street to Errington Road	City of Watsonville	Correct Drainage Problems on Hillslopes; install urban stormwater runoff treatments; construct trail system from Ramsy Park to Errington Road; revegetate slopes	medium	2004
	UW-3	M&F Farms - Wetland Restoration Project	Manabe Drive to Highway 1	City of Watsonville , County of Santa Cruz	Restore approx. 30 acres of wetlands; improve slough corridor to Hwy 1; revegetate with natives; install urban runoff; treatments; install trail system	medium	Project linked to future annexation proposal, possibly 2004, Funding from development fees
	UW-4	Urban Wetland Enhancement	Freedom Blvd to Main Street	City of Watsonville	Restore wetland vegetation and hydrology along 5,000 linear feet; buffer urban uses and stormwater runoff on 68 acres	medium	Unknown
Middle Watsonville Slough	MW-1	Middle Watsonville Slough Drainage and Wetlands Enhancement Plan	Highway 1 to San Andreas Road	SCC Resource Conservation District, Santa Cruz County , City of Watsonville, Land Trust of Santa Cruz County	Construct berm to separate ag. drainage from protected waterwa expand and restore freshwater wetlands and adjacent uplands to the north; reestablish native vegetation along 9400 linear feet; install urban and agricultural stormwater runoff and ag tailwater treatments; establish authorities for maintenance; provide erosion control technical assistance on private lands	high	Prop 13 preproposal submitted for funding, if successful, funds avail. 10/2003, Needs engineering feasibility study including geotech and hydrologic study
	MW-1.5	Middle Watsonville Slough Drainage and Wetlands Enhancement Plan	San Andreas Road to Shell Road	SCC Resource Conservation District, Santa Cruz County , Land Trust of Santa Cruz County	Construct berm to separate ag. drainage from protected waterwa expand and restore freshwater wetlands and adjacent uplands to the north; reestablish native vegetation along 7300 linear feet; install urban stormwater runoff treatments; establish authorities for maintenance; provide erosion control technical assistance on private lands	high	Needs engineering feasibility study including geotech and hydrologic study
	MW-2	Shell Road Pump Retrofit Project	Shell Road Pump Station	Santa Cruz County PublicWorks	Renovate pumps to prevent leaking of saltwater; improve efficiency at high stage and to allow for instantaneous, variable operation allowing water exchange during freshwater periods to create transitional habitat zones	high	2004 pending design report for Middle WS
	MW-3	Shell Road Wetland Enhancement Project	Fallow area between bluff and Watsonville Slough	Resource Conservation District	Remove exotic vegetation; regrade to restore hydrology; revegetate with natives on 12 acres; buffer adjacent land uses; work with landowners to explore conservation easement	medium	2004 pending consultation and planning with landowners
	MW-4	Middle Watsonville Slough Hillslope Enhancement Project	Hillslopes along the north side of Watsonville Slough from Shell Rd to Lee Road	Resource Conservation District	Install agricultural management measures; remove exotic vegetation; replace with natives on 49 acres; develop and implement Conservation Plans	low	2004 pending consultant with landowners, SCCRCDFunding for vegetation management, pending (\$50-\$100,000)
Headwaters: Freedom Blvd to Hwy 1 See Figure 3-7							

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Planning Area	Project Code	Project Name	Project Area	Anticipated Project Partners (Lead Agency in BOLD)	Description (number of acres to be treated)	Estimated Cost	Projected Funding Date
Lower Watsonville Slough Shell Road to Pajaro River	LW-1	Palm Beach Wetland Enhancement Project	Marsh area between Shell Road and Palm Beach parking lot	Resource Conservation District, Santa Cruz County, CA Dept Parks & Recreation	Remove reclamation berms; remove exotic vegetation and revegetate with natives on 4 acres	Low	2004
	LW-2	Lower Watsonville Slough Levee and Marsh Habitat Enhancement	Levee and marsh east of the estuary from Beach Road south to the mouth of the Pajaro River	Resource Conservation District, Santa Cruz County, Friends of Pajaro Dunes	Regrade levee; modify Ag. drainage system along 6230 feet; remove fill to restore marsh hydrology for 19 acres; revegetate levee to slough with natives.	Medium	2003 pending landowner consultation
	LW-3	Pajaro Dunes Marsh Enhancement Project	From the center of the estuary to Rio Boca Road	Pajaro Dunes H.O. Assn. , Resource Conservation District, Friends of Pajaro Dunes	Remove reclamation fill to restore hydrology; revegetate with natives on 32 acres	Low to medium	2003 - 2006 pending consultation with landowners and Homeowners Association
	LW-4	Shorebirds Lagoon Enhancement	Shorebirds Lagoon at Pajaro Dunes	Pajaro Dunes North H.O. Assn. , Friends of Pajaro Dunes	Remove exotic vegetation; revegetate with natives on 5 acres		
	LW-5	Pajaro Dunes	Lot next to PD firestation	Pajaro Dunes North H.O. Assn. , Friends of Pajaro Dunes	Lot (wetland restoration on <0.5 acres)		
	LW-6	Pajaro Dunes	Wetland swale restoration	Pajaro Dunes H.O. Assn. , Friends of Pajaro Dunes	Removal of underutilized parking area at Avocet Circle and Plover Circle; restore original wetland swale on <0.5 acres		
	LW-7	Sunset Beach wetland Restoration	Upper lagoon North of Pajaro Dunes	State Parks	Remove exotic vegetation; excavate 1000 cu yds for dune erosion repair		
Hanson Slough, Entire reach, See Figure 3-11	HS-1	Hanson Slough Water Quality and Habitat Enhancement	Uplands, swales and waterways of Hanson Slough	Santa Cruz Resource Conservation District Affected landowners and managers, Open Space Alliance	Develop buffers between uplands, swales and waterways; revegetate to natives to 55 acres; construct channel improvement to reduce erosion; develop grazing management plan for uplands	medium	2003-? pending landowner consultations
Lower Harkins Slough From Hwy. 1 to confluence with Watsonville Slough, See Figure 3-13	LHK-1	Lower Harkins Slough Wetlands Enhancement Phase 1	Harkins Slough from confluence at Watsonville Slough upstream to UPRR crossing	Resource Conservation District, Santa Cruz County, PVWMA, Land Trust of Santa Cruz County	Protect waterway along 7070 linear feet; retrofit Ag drainage system; restore marsh in waterway and uplands	high	2003-05 pending landowner consultation
	LHK-2	Lower Harkins Slough Wetlands Enhancement Phase 2	Middle of Harkins Slough from UPRR to Highway 1	Resource Conservation District, US FWS and CDFG , Farm Services Agency, Open Space Alliance	Acquire Marsh (236 acres) and uplands (199 acres) areas; restore marsh hydrology in waterway; remove exotic vegetation; revegetate with natives	high	2003-05 pending landowner consultations
	LHK-3	Harkins Slough Road Closure	Harkins Slough Road	SC County Public Works , Open Space Alliance	Rebuild or remove Harkins Slough Road to reduce hydraulic obstruction	medium	
Upper Harkins Slough Entire subwatershed - Larkin Valley, See Figure 3-12	UHK-1	Upper Harkins Slough Habitat and Drainage Master Plan	Harkins Slough from Highway 1 to headwaters	Resource Conservation District, Santa Cruz County	Develop management plan to reconcile drainage and erosion problems with regulatory issues; develop master project plan	medium	2002-2003 pending funding
	UHK-2	Upper Harkins Slough Drainage and Erosion Demonstration Project	Corner of Senda Ladera and Larkin Valley Road	Resource Conservation District, Santa Cruz County, Property Owner	Plan and construct drainage and erosion control demonstration project for 9-acre equestrian property	low	2002-2003 pending landowner consultation and funding
	UHK-3	Larkin Valley Manure Management Plan	Harkins Slough Highway 1 to headwaters	Santa Cruz County Resource Conservation District	Develop landowner education project for manure management to prevent nutrient runoff to Harkins Slough	low	2003
	UHK-4	Larkin Valley Septic System Retrofit Project	Harkins Slough Highway 1 to headwaters	Santa Cruz County	Develop a plan to upgrade septic systems or tie into municipal system in order to reduce nutrient input to Slough	low	2004
West Branch and Lower Struve Slough Entire reach of West Branch and Struve Slough between Hwy 1 and confluence with Watsonville Slough, See Figure 3-9	LS-1	Lower Struve Slough Habitat Enhancement Project	Marsh to Hilltops from below Lee Road Crossing to Highway 1	Dept. of Fish and Game , Resource Conservation District, Watsonville Wetlands Watch	Remove reclamation fill and channels; restore wetland hydrology on 101 acres; remove exotic vegetation from marsh and hillslope areas; revegetate with natives; buffer industrial land & runoff from marsh on 108 acres	medium to high	dependent upon CDFG funding and planning schedule
	LS-2	Lee Road crossing Retrofit	Lee Road Crossing over Struve Slough	Santa Cruz County	Rebuild or remove Lee Road to reduce hydraulic obstruction	medium	2003
	LS-3	Wetlands Education Resource Center	Site at New Millennium High School	Pajaro Valley Unified School District, City of Watsonville , Watsonville Wetlands Watch	Establish the Wetlands Education Resource Center	medium to high, \$400k	2004
	LS-4	Tar Plant Hill	Tar Plant Hill - northeast of Hwy 1	Watsonville Wetlands Watch	Ensure protection of Tar Plant Hill	medium to high	2002 - 2003
	LS-5	CDFG Watsonville Slough Ecological Reserve Management Plan	CDFG Ecological Preserve along West Branch and Lower Struve Slough 109 acres	California Department of Fish and Game	Develop management plan to define projects to maximize natural resources in the WSER		

WATSONVILLE SLOUGHS WATERSHED CONSERVATION AND ENHANCEMENT PLAN

TABLE 4.1

RECOMMENDED PROJECTS LIST

Cost Estimates: Low = less than \$150,000
 Medium = Over \$150,00 to \$400,000
 High = Over \$400,000

This matrix is a dynamic document that will change over time as projects ripen, costs become known, and land and funding become available.

Planning Area	Project Code	Project Name	Project Area	Anticipated Project Partners (Lead Agency in BOLD)	Description (number of acres to be treated)	Estimated Cost	Projected Funding Date
Upper Struve Slough Headwaters to Hwy 1, See Figure 3-9	US-1	Struve Slough Trail Project Phase 1	Struve Slough from Pennsylvania Ave. to Main Street	City of Watsonville	Construct trail along 3900 linear feet; install urban runoff treatment measures; remove exotic vegetation from hillslopes and revegetate with natives on 5.5 acres (60 ft buffer)	low	2002
	US-2	Struve Slough Trail Project Phase 2	Struve Slough from Main Street to Highway 1	City of Watsonville	Construct trail system on hillslopes along both sides of slough along 13600 linear feet; install urban runoff treatment measures; remove exotic vegetation from hillslopes and revegetate with natives on 19 acres (60 ft buffer)	medium	2003
	US-3	Struve Slough Wetlands Enhancement Project	Headwaters of Struve Slough to Highway 1	City of Watsonville Resource Conservation District, Community Alliance of Family Farmers, Watsonville Wetlands Watch	Remove reclamation fill and channels; construct ponds to restore hydrology on 69 acres of wetlands; remove exotic vegetation from 57 acres of hillslopes; revegetate with natives	medium	2004
Gallighan Slough Entire subwatershed, See Figure 3-10	GS-1	Buena Vista Road Erosion Control Project	Buena Vista Road from Hacienda to San Andreas Road	SC County Public Works , Resource Conservation District	Construct drainage improvements to reduce gully erosion; work with adjacent landowners to rectify discharge from private lands; examine drainage around County landfill. Extent: 1370 acres (entire planning area)	medium	2004
	GS-2	Gallighan Slough Hydrologic Enhancement Project	Gallighan Slough from Harkins Slough to San Andreas Road	Resource Conservation District, Santa Cruz County	Restore Gallighan Slough through 5400 linear feet of channel reconstruction, removal of spoils; revegetate with natives	medium	2004 dependent upon landowner consultations
	GS-3	Gallighan Slough Hillslope Habitat Enhancement Project	Gallighan Slough Watershed	Resource Conservation District	Install erosion control management measures; remove exotics and revegetate with natives. Extent: 1370 acres (entire planning area)	medium	2004 phased dependent upon landowner consultations
	GS-4	Buena Vista Acquisition Project	Upper Gallighan Slough Watershed	Trust for Public Lands, Dept of Fish and Game	Acquire 289 acres of Maritime Chapparrel and Buena Vista Pond	high	
Beach Road Ditch	BR-1	Beach Road Ditch Water Quality Improvement Project	Beach Road corridor from the Watsonville City limits to Palm Beach	Resource Conservation District, SC County Public Works	Construct treatment wetland corridor along 15,000 linear feet (2.8 miles) of Beach Rd and improve drainage system from adjacent farms	high	2004 phased dependent upon landowner consultations

4.3 INITIAL HABITAT ENHANCEMENT PROJECTS

Five projects were selected for further detailed conceptual design within the WSCEP planning process. The criteria used to select these included:

- ❑ The project is feasible to construct.
- ❑ The project is within the list of recommended WSCEP projects or is similar and will help achieve the goals of the WSCEP.
- ❑ Landowners have expressed a willingness to participate.
- ❑ There are project proponents to secure funding, handle contracting for design, environmental review (CEQA) and permitting, and construction.
- ❑ The project provides demonstration or educational values.

The following five projects have been identified as priority projects:

1. Planning and Engineering Feasibility Assessment for the Enhancement of Watsonville Slough between Highway 1 and Shell Road
2. Upper Harkins Slough Riparian Habitat and Drainage Management Plan (lead: Santa Cruz County Planning Department)
3. Conceptual Stream Stabilization Plan for Jones/Lees Property (lead: Santa Cruz County Planning Department and Lees)
4. Watsonville Sloughs Trails Master Plan (lead: City of Watsonville)
5. City of Watsonville Wetlands Restoration Project (lead: City of Watsonville)

PLANNING AND ENGINEERING FEASIBILITY ASSESSMENT FOR THE ENHANCEMENT OF WATSONVILLE SLOUGH BETWEEN HIGHWAY 1 AND SHELL ROAD

The Middle Watsonville Slough has three major projects, identified in **Table 4-1** as MW-1, MW-1.5 and MW- 2 that are ready for more detailed engineering design. This project has multiple landowners interested in re-designing and operating the present Watsonville Slough drainage system between Lee Road and Shell Road and includes renovation of the Shell Road Pumps. The project would ultimately buffer 16,700 feet (3.2 miles) of waterway between Highway 1 and

Shell Road from agricultural runoff. Conceptual cross section drawings of various settings and scenarios are presented in **Figure 4-1**.

The next step in this project is to develop a planning and engineering feasibility study and engage the landowners, the local drainage agency and resource agencies in the development of the specific design of the project as well as long-term maintenance and permitting requirements. There is a need to develop basic performance criteria for the project (channel capacity, wetland restoration design, drainage facilities, etc.). The hydrology of Watsonville Slough needs to be further quantified in order to set design flows for the project. Several aspects of the project require information regarding geotechnical properties of soils.

The proposed scope of work is presented in detail in Technical Appendix I.

UPPER HARKINS SLOUGH RIPARIAN HABITAT AND DRAINAGE MANAGEMENT PLAN

The juxtaposition of land uses and the presence of endangered and sensitive species habitats in Upper Harkins Slough have created significant challenges for effective resource management. Future development may create further problems and perhaps some opportunities to resolve resource management conflicts. The WSCEP proposes development of a management plan directed at the unique issues and problems of Larkin Valley as a high priority. The management planning process will develop information needed to find solutions to resource management problems. The management plan will allow for development of effective projects and maintenance measures to prevent erosion and reduce flooding. It will also emphasize public education regarding manure management to help reduce nutrient loading and pollution. A scope of work for the development of the plan is included in Technical Appendix J.

CONCEPTUAL STREAM STABILIZATION PLAN FOR JONES/LEES PROPERTY

Upper Harkins Slough (also called Larkin Valley Creek) flows through the Lees property, which is situated at the northern end of Larkin Valley. High runoff in 1998 eroded the Harkins Slough channel from a former grassy swale into a deep gully that continues to erode and supply excessive sediment loads downstream. The gully has reduced the productivity of the horse pasture and access across the gully for horses is difficult. A second gully has formed on the same property

since 2000 and is releasing excessive sediment.

The proposed project is to stabilize the gullies into properly sized channels, revegetate them with native species, and manage them as riparian wetland areas buffered from land uses. The project will include development of a maintenance and operations agreement with the landowner to allow use of the land but prevent conflicts with sensitive resources. The Jones/Lees property erosion control plan is presented in Technical Appendix K.

WATSONVILLE SLOUGHS TRAIL MASTER PLAN

The City of Watsonville has prepared a trail master plan to develop a walking trail system from Upper Watsonville and Struve Sloughs to the vicinity of Highway 1. The proposed trails are sited on land owned by the City and within City limits. The City's project includes removal of invasive vegetation and replacement with native species. The Trails Master Plan is currently undergoing environmental review and is included in the WSCEP as Technical Appendix H.

CITY OF WATSONVILLE WETLANDS RESTORATION PROJECT

The City of Watsonville has identified a wetlands restoration project in Upper Watsonville Slough just north of the Harkins Slough Road Crossing and east of Ramsey Park. The project involves removal of fill from a 45-acre wetland area, restoration of original topography, and revegetation with appropriate native species. The City has applied for grant funding to the Regional Water Quality Control Board. Further details of the conceptual plan are found in Technical Appendix L.

Table 4-2 presents an analysis of the anticipated benefits of the recommended projects by Planning Area in terms of relief of stressors. In general, there is a potentially considerable improvement in conditions for natural resources. However, the degree of urbanization and development in the watershed precludes full elimination, except potentially in some isolated areas. The objective should be to minimize land use impacts, and this will take an ongoing effort.

Table 4-2: Relation of Recommended Projects to Environmental Stressors

Planning Area and Stressors	Management Recommendations
KEY→	See Table 4-1 for details
Upper Watsonville Slough	
Surrounding land use is extensively urban and industrial, posing limitations on habitat enhancement.	WSW (all) UW (all)
Water circulation is constricted by hydraulic structures at Main Street, Harkins Slough Road and Ford Street and the flat channel gradient downstream of Main Street.	UW-3
Water quality conditions are degraded by poor circulation, nutrient input, urban and agricultural pollution, and the lack of riparian or wetland vegetation within the Slough downstream of Ford Street.	UW-1,3,4
Vegetation resources are degraded due to loss of area to urban cover and agricultural uses, invasion of exotic species, and clearing of vegetation associated with maintenance of former wetland areas and waterways.	UW-1,2,4 WSW-3
Wildlife resources are limited by urban land use cover, cleared agricultural land, poor water quality, invasive exotic species (e.g. bullfrog), and lack of native vegetation cover for forage and habitat.	UW (all) WSW-3,4
Middle Watsonville Slough	
Land use encroachment constricts the Slough to a drainage ditch in most areas, limiting habitat and introducing pollutants (sediment, nutrients and urban runoff).	MW (all) WSW-1,3,4
Water circulation is poor due to flat channel gradient and hydraulic constrictions such as the Shell Road Pump and reaches, which are choked with sediment.	MW-1,1.5,2
Nutrient and other contaminant loading from both surrounding and upstream land uses significantly degrade water quality and limit aquatic habitat quality.	MW-1,1.5,2 WSW-1,4
Native vegetation is limited to small pockets mixed with exotic species.	MW-1,1.5,3,4 WSW-1,3
The aquatic habitats for invertebrates and fish are compromised as a result of poor water quality and vegetative conditions.	MW-1,1.5 WSW-1,4
Lower Watsonville Slough	
Reclamation has degraded salt marsh habitat. The extent of the salt marsh is confined by Pajaro Dunes development to the west, the flood control levee to the east, and the Shell Road Pump Station inland.	MW-3 LW-(all)
The Shell Road Pump Station has abruptly eliminated the natural brackish transition. This barrier also prevents and limits the inland migration of aquatic flora and fauna.	MW-2
Concentrated agricultural runoff is discharged directly into the Slough from Beach Road Ditch and at the Shell Road Pump Station. This increases nutrient delivery and algal production and reduces dissolved oxygen concentrations, especially during periods when the lagoon mouth is closed.	MW-1.5 (benefits at Shell Road, but not Beach Road)

Planning Area and Stressors	Management Recommendations
KEY→	See Table 4-1 for details
The polluted estuarine waters of Watsonville Slough exposes Federal and State listed anadromous fish to potentially toxic waters.	All measures involving control of soil erosion urban and agricultural runoff. WSW-(all)
The quality of native plant communities and wildlife habitat is degraded by exotic, invasive vegetation and the fill and structural remains of past dredging and reclamation attempts.	LW-(all) WSW-1,3,5
Upper Struve Slough	
Poor drainage in the Sloughs between Pennsylvania Drive and Main Street results in poor water circulation.	US-3
Water quality in the Sloughs is influenced by urban runoff and non-point source pollution.	US-3 WSW-1,4
The removal of native vegetation and wildlife habitat is compounded by expansion of urban tolerant wildlife species such as raccoons, opossum, starlings, and domestic cats.	US-(all) WSW-3,4
Lower Struve/ West Branch Struve Sloughs	
Extensive urban and commercial development from upstream areas transports pollutants to aquatic habitats in Lower Struve and West Branch Struve Sloughs.	US-(all) WSW-1,4
Water quality is affected by runoff and intermixing with agricultural drainage, especially by recently cultivated agricultural fields of the lower reaches of the Planning Area.	LS-1 WSW-1,4
Harkins Slough Road and Lee Road are hydraulic barriers that reduce water circulation and affect water quality.	LS-2 Harkins Sl. Bridge project (City of Watsonville)
Land subsidence within the lower reaches present challenges to providing future drainage for agriculture.	0
Native vegetation cover in wetlands, transitional areas and uplands is degraded by invasive exotic species and the remnants of past agricultural and reclamation activities.	LS-1 WSW-3,4
Wildlife habitat is compromised by exotic vegetation cover and poor water quality from low circulation and pollutant loading.	LS-1 WSW-3,4
Gallighan Slough	
High sediment loads originate from eroding agricultural fields, roads and some surrounding areas.	GS-(all) WSW-1
High sediment loads enter the slough from poorly designed and maintained road and drainage ditches along Buena Vista Road from San Andreas Road to the County Landfill.	GS-1,3 WSW-1
Native vegetation is impacted by cleared land and roads and degraded lands.	GS-3 WSW-3
Wildlife habitat has been fragmented by roads and cleared areas. Excessive sediment input and migratory barriers affect aquatic habitat.	GS-(all) WSW-4
Hanson Slough	
Water quality is degraded by land uses including the intensive grazing operations in the upper watershed exposing soils to nitrate loading, surface erosion, removal of native vegetation cover, and compacting of soils within the waterway	HS-1

Planning Area and Stressors	Management Recommendations
KEY→	See Table 4-1 for details
Upper Harkins Slough	
High animal waste concentration carried into the waterway contributes to the nutrient contamination of the Slough.	UHK-1 WSW-4
Despite some patches of riparian forest along the waterway, native vegetation cover is sparse in the upper watershed and areas below Harkins Slough Road, decreasing overall diversity and abundance.	UHK-1
Wildlife habitat is limited and degraded by present land uses, a lack of native vegetation cover and apparent degraded water quality.	UHK-1
The riparian habitat and wetlands along many reaches of the Slough have been exposed by land clearing and/or erosion. These degraded reaches fragment valuable areas of riparian vegetation and aquatic habitat. In addition, channel erosion produces sediment during high flows.	UHK-1 WSW-1
Leaky septic systems and livestock manure are chronic sources of nutrients to the groundwater and waterways.	UHK-1 WSW-4
Erosion occurring in cleared areas or areas disturbed by grazing or development contribute an excessive sediment supply to local and downstream reaches. This reduces aquatic habitat quality and clogs waterways causing flooding.	UHK-1 WSW-1
Lower Harkins Slough	
Lower Harkins Slough receives contaminants generated in the upper watersheds of Larkin Valley and Gallighan Slough. The main pollutant types are sediment from roads and agriculture, nutrients from septic systems, livestock manure and fertilizer, and a variety of pollutants from landfill runoff.	GS-(all) UHK-1 LHK-1,2 WSW-1,4
Poor water circulation and the progressive expansion of seasonal lakes are due to the combined effects of hydraulic constrictions (UPRR, Harkins Slough Road and Highway 1) and land subsidence. Winter inundation of recently cultivated agricultural fields will decrease the water quality of overlying waters.	LHK-3
Vegetation resources in the wetlands, transitional areas and uplands are degraded by land uses that leave degraded conditions and result in large areas dominated by exotic invasive species.	LHK-1,2 WSW-1,3,4
Terrestrial and aquatic wildlife are limited by poor water circulation, lack of native vegetation cover and migration barriers at road crossings (UPRR, Harkins Slough Road, Ranport Road and Highway 1 culverts).	LHK-3
Beach Road Ditch	
Concentrated, untreated, and potentially toxic agricultural drainage is eventually released into Watsonville Slough at two specific locations.	BR-1
Wildlife and aquatic habitat is relatively non-existent.	BR-1

4.4 LAND ACQUISITION STRATEGY

Making land available for resource management and conservation may involve many instruments including acquiring fee title, conservation easements, or acquisition and sell back with easements and/or restrictions. All land acquisition recommendations assume that such acquisitions involve only willing landowners.

The realization of full ecosystem restoration would require an extensive area of open space dedicated to ecosystem process and wildlife habitat. Accomplishment of this would undoubtedly involve incremental steps over a long period of time through the work of conservation organizations with willing landowners. There is a substantial opportunity to create a large open space area west of Highway 1 by connecting the publicly owned lands of West Branch Struve Slough with the publicly owned lands in Harkins Slough via a restored Middle Watsonville Slough. This would include the valley floor of Harkins Slough and the hillslopes and hilltops east of Harkins Slough, north of Middle Watsonville Slough and ultimately connect to Ellicott Slough National Wildlife Refuge located adjacent to the western edge of the Watsonville Sloughs Watershed.

The WSCEP recommendations for land acquisition are to acquire lands that:

- ❑ Protect, and where possible, restore high quality habitat such as marsh, riparian, grasslands, maritime chaparral and oak woodlands.
- ❑ Protect existing high quality habitat.
- ❑ Provide connected corridors among similar habitats as well as continuity among habitats that naturally occur in association.
- ❑ Demonstrate compatibility of habitat enhancement and agriculture or other land uses.

Specifically the acquisition needs by habitat type are:

- ❑ Preserve the existing expanse of maritime chaparral occurring south of Highway 1 and between upper areas of Gallighan Slough and Ellicott NWR.
- ❑ Restore riparian and wetland on valley floor areas linking Upper Harkins Slough to Lower Harkins Slough to Watsonville Slough.
- ❑ Restore wetlands and riparian areas within and grasslands surrounding Hanson Slough.

- ❑ Preserve the varied grasslands and oak woodland habitats occurring in the intervening hillslopes between the valley floors of West Branch Struve Slough and Gallighan Slough.
- ❑ Create riparian buffer areas along all riparian corridors in the watershed.
- ❑ Create buffer areas adjacent to all marsh areas within the watershed.

4.5 WATERSHED-WIDE WATER POLLUTION PREVENTION AND CONSERVATION STRATEGY

The WSCEP has a focused effort to solve water pollution problems primarily through implementation of enhancement projects. Many water pollution discharge problems result from a lack of buffer space between pollution sources and receiving waters. The following is a general discussion of water pollution problems and generalized approaches that should be implemented by organizations and landowners in the watershed.

POLLUTION FROM URBAN STORMWATER RUNOFF

The main urban and industrial pollution problems are metals, oils and greases, pesticides from domestic sources, and nutrients. Where urban or industrial areas bound the Sloughs, the WSCEP recommends control of pollution sources. It also recommends installation of stormwater pre-treatment facilities that are effective and economical to maintain. The best control method is not to allow pollutants into the storm drain system from the start, and this requires public education and enforcement of pollution laws through discharge permitting. Once entrained in stormwater, there are a number of discharge pre-treatment methods such as retention basins, pre-treatment wetlands and active treatment (routing to active treatment facilities). Some of these facilities have been installed within the commercial areas of Watsonville, however it unknown how well they function. The WSCEP provides projects to upgrade existing stormwater treatment facilities and construct new ones.

POLLUTION FROM RURAL RESIDENTIAL AREAS

Pollution from rural residential lands primarily in Larkin Valley (Upper Harkins Slough) is a major concern with regard to discharge of sediment and nutrients to the Sloughs. The nutrients are from livestock manure and domestic septic systems entrained in stormwater runoff and

shallow groundwater. Excessive sediment discharge results from poor road drainage, overgrazing, a lack of stabilizing vegetation along channels in some locations, and recent channel instability resulting from geomorphic processes. New development has created new drainage problems and erosion hazards that have a cumulative effect as well.

The WSCEP proposes the development of a site-specific management plan for Upper Harkins Slough in Larkin Valley in order to address landowner and agency concerns and to develop community based solutions.

POLLUTION FROM AGRICULTURAL LANDS

Potential pollution problems from agricultural lands include sediment and nutrients. Much of the problem results from a lack of buffer space and stabilizing vegetation between the Sloughs and agricultural lands and the fact that the waterways are used as agricultural drains.

The WSCEP enhancement projects will address this issue by reconstructing drainage systems that separate agricultural runoff from the natural waterway and constructing treatment ponds and wetlands.

USE OF BUFFERS BETWEEN LAND USES AND WETLANDS

Preservation of buffer land between land uses and natural areas is an essential component of WSCEP recommended projects. Wetland areas on the valley floor are bounded by transitional seasonal wetlands and upland hillslopes that provide wildlife cover and areas to forage and nest. It is anticipated that many areas east of Highway 1 will be subject to development and conversion of rural land to urban uses to provide needed housing (i.e. Buena Vista Annexation). Through implementation of the WSCEP projects, it is hoped that cooperative efforts of agencies and landowners will result in the preservation and enhancement of significant areas between the valley floor wetland/riparian habitats and developed areas. Existing zoning and other ordinances, as well as federal regulations protecting endangered species, have considerable influence on these decisions. However, the WSCEP seeks to find solutions that meet multiple needs without regulatory actions and perhaps provide solutions, such as “Safe Harbors” agreements that enhance wildlife and help landowners. It is noteworthy that the City of Watsonville is developing management measures for many wetland and hillslope lands, including native vegetation

conversion projects, wetland restoration projects, and stormwater improvements.

4.6 IMPLEMENTATION AND FUNDING STRATEGY

The following implementation strategies are designed to encourage agencies and landowners in the development and implementation of WSCEP projects.

DEVELOP AND IMPLEMENT ENHANCEMENT PROJECTS WITH WILLING LANDOWNERS AND AN APPROPRIATE LEAD ORGANIZATION (AGENCY OR NON-PROFIT)

Many funding agencies require a governmental agency and/or non-profit organization to manage grant funding and project implementation. Most commonly, the proposed WSCEP resource enhancement projects will require a non-profit or governmental lead agency working with a willing landowner, coordinating project implementation, and handling contracts, grants, and environmental review.

DEMONSTRATE SUCCESS THROUGH IMPLEMENTATION OF PILOT PROJECTS SUCH AS THE PRIORITY PROJECTS DESCRIBED ABOVE IN ORDER TO EXPAND PARTICIPATION IN RESOURCE ENHANCEMENT PROJECTS

Implementation of initial projects will demonstrate how projects incorporate multiple objectives (e.g. habitat requirements of wildlife, uses desired by landowners). The five WSCEP initial projects described above are targeted to achieve results in a variety of settings with different issues and stakeholder groups. Success of the initial projects should attract greater interest in other projects by private landowners and will help define the planning process for obtaining permits and regulatory approval. They will also demonstrate the valuable role of scientific and engineering data in designing an “optimum” project that meets the needs of landowners and other stakeholders.

DIRECT RESOURCE, REGULATORY AND FUNDING AGENCIES TOWARDS ACHIEVING THE WSCEP GOALS AND INTEGRATE WSCEP RECOMMENDATIONS INTO PERMITTING AND ENVIRONMENTAL REVIEW

The involvement of regulatory agencies in the development of WSCEP and their future involvement as stakeholders in science-based planning and engineering studies should help resolve specific resource management and regulatory issues. In the case of the agricultural and rural residential community, the WSCEP can help define and resolve endangered species management issues and perhaps implement “Safe Harbors” agreements that allow for incidental take when an overall management strategy is in place. Development of new habitat areas and enhancement of existing areas can aid in offsetting the impacts of activities related to drainage and land use in and near sensitive resources. Implementation of the WSCEP watershed-wide should help coordinate and streamline regulatory process.

ENCOURAGE COORDINATION OF IMPORTANT LAND USE PROJECTS IN THE PLANNING AREAS WITH WSCEP RECOMMENDATIONS

Several other important projects are underway in the Watsonville Sloughs Watershed that should integrate the WSCEP into their planning and design process:

- ❑ Construction of third Watsonville high school.
- ❑ Bridge replacements along Harkins Slough Road.
- ❑ Renovation of the Redman House and surrounding fields as the Pajaro Valley Agricultural History and Education Center.
- ❑ Establishment of an Ohlone Village.
- ❑ Establishment of an Environmental Studies Center.
- ❑ The proposed Buena Vista Annexation.
- ❑ Pajaro Valley Water Management Agency Water Supply Projects.

The following provides guidance for consistency with WSCEP goals:

- ❑ Site stormwater systems should be designed to have minimum impact on water quality. This would include effective source control to prevent fertilizers and pesticides from

entering the Sloughs and using permeable pavements, active treatment systems and passive systems involving use of native vegetation buffers.

- ❑ Adequate physical buffers should be incorporated to create sufficient room for transitional habitats on hillslopes above wetlands.
- ❑ Site-specific conditions should be integrated into designs for road improvements. In some cases it would be beneficial to replace minimal culverts with open span bridges and allow for free-flowing conditions, whereas in other cases, removal of culverts and fill could reduce wetland hydroperiod and cause an impact. It may be desirable to install gates or weirs that can be adjusted to develop optimum flow.
- ❑ Siting of structures should not exacerbate erosion of unstable slopes or increase erosion and should avoid fragmentation of habitats.

COORDINATE EFFORTS OF CONSERVATION ORGANIZATIONS TO WORK ON PRIORITIES FOR LAND ACQUISITION AND TO PARTICIPATE IN PROJECTS AS OUTLINED IN THE WSCEP

A Stewardship Committee has been formed to encourage coordination among conservation efforts within the watershed. The Committee will meet on a regular basis. An important role of the Stewardship Committee and the coordination meetings is to ensure communication among stewardship organizations and agencies. A list of partnering agencies and organizations is included below. Periodic meetings between resource managers and resource organizations will help coordinate future activities and help update the WSCEP. The following is a list of agencies.

- ❑ County of Santa Cruz
- ❑ City of Watsonville
- ❑ California Department of Fish and Game
- ❑ California State Coastal Conservancy
- ❑ U.S. Department of Interior Fish and Wildlife Service
- ❑ U.S. Department of Agriculture Natural Resources Conservation Service
- ❑ U.S. Environmental Protection Agency
- ❑ Santa Cruz County Resource Conservation District

The following agencies and non-profit organizations are among those who have expressed interested in taking an active role in plan implementation:

- Land Trust of Santa Cruz County
- Coastal Watershed Council
- Community Action Board of Santa Cruz County
- Open Space Alliance
- Santa Cruz County Farm Bureau
- Watsonville Wetlands Watch
- American Farmland Trust
- Association of Monterey Bay Area Governments (AMBAG)
- Friends of Pajaro Dunes
- Trust for Public Land
- Community Alliance with Family Farmers

The following is provided as general information on what is entailed in implementing an enhancement project.

Scientific justification for project

The project must have demonstrable biological and/or water quality benefits that meet the overall program goals and strategies. These benefits must be demonstrable using current accepted scientific and engineering practices. The project must be feasible from a construction, implementation, management, operations, and maintenance standpoint.

Landowner cooperation and land availability

Each project must have the cooperation of landowners whose lands are involved or affected. The land proposed for enhancement must be available for dedication to natural resource management by fee-title or conservation easement. In some cases, specific grant funding sources require protection of restored habitat in perpetuity. There may be operations, monitoring and maintenance requirements for projects that require access through private lands and maintenance resource requirements that highlight the need for cooperation.

CEQA and regulatory compliance and permitting

All projects undertaken must meet conditions of the California Environmental Quality Act

(CEQA) and in some cases the National Environmental Protection Act (NEPA). Some project may require permits from resource agencies such as California Department of Fish and Game, the U.S. Army Corps of Engineers, National Marine Fisheries Service, Regional Water Quality Control Board, County of Santa Cruz, Coastal Commission or U.S. Fish and Wildlife Service. The projects must have sufficient planning, engineering and scientific detail so that permitting applications and packages can be compiled and reviewed. Each project needs a project proponent and a lead agency responsible and accountable for seeing that the project is carried out as permitted and maintained, and to conduct any required monitoring and complete any remedial measures.

Funding

Most projects require funding and many will require multiple funding sources and implementation partners. The watershed plan will provide a vehicle for attracting funding to acquire land and conservation easements and to construct enhancement projects. As with regulatory compliance, many funding programs have specific requirements with regard to administration of the grant money and contracts to carry out the project.

Cooperation and coordination between funders, regulators and implementing organizations

It is anticipated that a number of organizations and landowners will be involved in implementing a watershed plan. There is a need to follow a planning process that allows project proponents to design a project and then develop and transmit information to funding and regulatory agencies.