

4.0 The Plan

4.1 Issues of Concern

4.1.1 River or Slough

One of the major issues for the landowners in the Petaluma Watershed is that the Petaluma River is not actually a river but is in fact a tidal slough or a tidewater estuary. This waterbody has been known as the Petaluma Creek, Petaluma Slough and Petaluma River. The lower reaches of the “slough” experience regular tidal exchange from San Pablo Bay. This tidal exchange, along with erosion problems throughout the watershed, cause sediment deposition that requires regular dredging to keep the creek navigable.

Landowners within the Petaluma Watershed are concerned about how water quality standards will be set for this waterbody. Standards for a river that have historically supported anadromous fish are likely to be more stringent than standards set for a tidewater slough. Southern Sonoma County RCD recommends that the landowners work with the Regional Water Quality Control Board (RWQCB) to set appropriate standards for different segments of the creek. For example, it is possible that the upper reaches, that may have higher quality habitat, could have higher standards applied. Conversely, those standards, which might apply to the lower reaches, may be lower, due to the lower reaches experiencing regular tidal influence. See section 2.2 of this Plan for more information regarding the RWQCB.

4.1.2 Fisheries

The Petaluma River has never been an outstanding salmonid stream such as its neighbor to the north, the Russian River. As part of the planning process, Prunuske Chatham, Inc., gathered and summarized existing information on the historical and current presence of salmonids in the Petaluma River watershed and identified opportunities to improve and expand anadromous fish habitat. This information is attached as Appendix I “Fisheries Enhancement”.

The “Fisheries Enhancement” contains background information on the fishery resources in the Petaluma River, focusing on anadromous fish; it lists habitat needs for steelhead and identifies areas and actions for enhancement. A map showing current and estimated historic steelhead runs is attached to Appendix I.

The Petaluma River system supports a variety of marine, estuarine, and freshwater fish species. These species use the Petaluma River and its tributaries as habitat for spawning, rearing, and migration.

Of particular concern in the watershed is the status of salmonid fish such as steelhead, which are found in the Petaluma watershed. Steelhead trout populations have drastically declined throughout their range in California over the last 30 years. Under the federal Endangered Species Act, steelhead south of and including the Russian River have been listed as “threatened” by the National Marine Fisheries Service.

Although there is a steelhead presence in the Petaluma watershed the area is thought to have never been outstanding for salmonid such as the Russian River. According to representatives of both the Department of Fish and Game and National Marine Fisheries Service the Petaluma watershed is not the type of habitat that would have historically supported Coho or Chinook salmon.

Limited information is available about the current and historic numbers of steelhead in the Petaluma River watershed. The Department of Fish and Game (DFG) does not have records on historic or current populations of steelhead. Bill Cox, a biologist with the Department of Fish and Game, believes that historically steelhead were found in Lichau, Adobe, and San Antonio Creeks, and possibly in Lynch, Willow Brook, and Thompson Creeks. Other tributaries in the Petaluma River watershed were, and still are, too small and dry for steelhead.

Watershed residents have observed fish in Lichau, Adobe, and San Antonio Creeks. Since 1985, United Anglers of Casa Grande High School have conducted surveys of salmonids and their spawning and rearing habitat. The students have observed steelhead in Adobe Creek, redds (the salmonid fish egg nests) in Willow Brook Creek just above the Highway 101 crossing, and fish at several other locations including Payran Street bridge to Lynch Creek confluence, Washington Street Creek, and the confluence of Lynch Creek.

According to the California Department of Fish and Game and the National Marine Fisheries Service, the Petaluma River is a low gradient stream that would not have historically supported Coho or Chinook salmon. Chinook salmon are found in much bigger river systems such as the Sacramento River. The Chinook salmon found today are believed to be hatchery strays entering San Pablo Bay that become “lost” on their way to the Sacramento River.

The watershed enhancement plan tries to balance recognition of the fact that the Petaluma watershed has never been an outstanding salmonid stream and a commitment to enhance resources for all native species in the watershed. One of the biggest concerns of many residents in the watershed is that the Plan is being written for a “river” when in fact the lower portion of the Petaluma River is a tidal dead end slough. Watershed residents in the lower portion of the watershed (tidal area) might have to meet standards set for a river system as found in the tributaries of the upper watershed. To tackle this problem one of the first tasks for the Watershed Council should be to work with the RWQCB to set different standards tailored to specific portions of the watershed. Instead of generalized requirements, individualized standards could be set for the lower tidal portion that reflect attainable conditions for a tidal dead end slough. Another set of standards could be set for the tributaries in the upper watershed that could possibly support steelhead.

To read further about the status of fisheries in the Petaluma watershed refer to Appendix I.

4.1.3 Unique Considerations for Ranchette Owners

Ranchettes or large lot, rural homesites are found throughout the watershed. These rural properties typically range from one to 20 acres in size and are not usually part of development tracts. Many rural residents keep livestock such as sheep and horses. On the eastern side of the watershed, rural areas surround Penngrove and extend into the Lichau Creek and Lynch Creek areas. On the western side of the watershed, the rural areas outside Petaluma (Liberty Road, Rainsville Road, Skillman Lane, Middle Two Rock, and Eastman Lane) continue to be subdivided and expand. This particular type of residential density/land use has unique considerations for planning and several issues have been identified.

- Subdivision of land. The division of large parcels of agricultural land can decrease the amount of land available for productive and profitable agricultural operations. For example, while 200 acres could support a dairy operation, it is unlikely that ten 20-acre parcels could each support such a use.
- Concentration of animals and related facilities in small areas. Livestock trampling and heavy grazing can lead to accelerated erosion, soil compaction, and increased runoff of pollutants such as nutrients. This is particularly a concern in Liberty Valley, a major groundwater recharge area with sandy soils. Cumulatively, intense use of rural lots can contribute to an increase in runoff from roads and roofs resulting in erosion and degraded water quality.
- Improper drainage. Many rural residential landowners have developed their properties in ways that change natural drainage patterns and cut into hillsides. This also leads to accelerated erosion and drainage problems.
- Development of roads. Unpaved or improperly constructed roads are often a major source of erosion and sediment.
- Loss of contiguous wildlife habitat. A patchwork of differing land uses reduces the size of oak woodlands and fragments riparian forests, seasonal wetlands, and other important wildlife areas. Fences, cats, dogs, and increased human activity restrict wildlife access to those areas that remain. Domestic animals may prey on wildlife in natural areas. Replacing native vegetation with ornamental plants can also have a profound collective impact on the quality and quantity of wildlife habitat.

4.1.4 Manure Management

The streams and waterways within the watershed and throughout the County provide many miles of diverse aquatic and riparian habitats for a wide array of fish and wildlife species, some of which are classified as threatened or endangered. Streams, which once supported steelhead, are no longer able to support these species because of diversion and contamination of remaining flows. The birds and mammals that are dependent upon streams for food, water, and shelter to rear their young also suffer when animal wastes pollute streams. The quality of this water is critical for the health and welfare of the people and food-producing animals as well. Agricultural enterprises that generate animal wastes are encouraged to manage manure in order to maximize economic benefits, while reducing potential for pollution.

The health of the watershed depends on the diligence and continual improvement of waste management practices. Proper management will help the agricultural producer reduce the risk of penalties for substandard performance and maximize economic

benefits from fertilizer application. California regulations require adequate pond size to contain manured area runoff expected from the wettest winter expected in 10 years as well as the one-day runoff from a 25-year storm. Locally, this amounts to a total of between three to four feet of water from all manured areas.

The California Regional Water Quality Control Board requires landowners and operators to have a Farm Plan and Annual Report for those dairy operations with over 700 cows or over 1,000 animal units. The RWQCB also requires adequate manure disposal and established nutrient budget levels to be maintained. The RCD, RWQCB, UCCE and AWC will work with producers to reach compliance with water quality standards set by regulating agencies. In cases of continual violations, abatement requirements or fines may be issued by the proper authorities.

Facilities with horses also must be aware of manure management. Horses contribute a small portion of total pollutants entering local waterways, but the impact is real. Voluntary compliance is the key issue and message of this plan. If all agricultural producers effectively manage their own operations and encourage others to do the same, the industry will benefit in the long term and the health of the watershed will be improved.

Best Management Practices (BMPs) have been developed through landowner and multi-agency cooperation. It is important to recognize that runoff water from clean and manured areas should be separated to the extent possible, maximizing benefits to the landowner and the environment. The 1997 Sonoma Marin Animal Waste Committee's ten recommendations and design guidelines for manure management are identified below:

- Facilities need to safely convey clean rainwater away from manured areas and ponds without creating erosion.
- Control all wastes and storm water runoff from confined animal facilities and manured areas.
- All liquid and solid manure should be managed in a manner that prevents the migration of manure and manure constituents into local waterways.
- Corrals or densely used portion of pastures need manure management.
- Manage pastures and fields for safe, effective manure utilization.
- Locate the animal feeding sites to protect waterways within high-use areas.
- Develop a short-term and long-term waste management plan.
- Develop an emergency plan.
- Manure and water testing will provide for better decision-making.
- Apply manure fertilizer appropriately.

4.1.5 Impacts from Urbanization in the Watershed

Urban land uses and the continued expansion of urbanization in the watershed have a pronounced influence on the health of the watershed. The AC felt strongly that the issue of existing and continued urbanization is a significant contributor to water quality impacts and degradation or loss of valuable riparian habitat. In summer months, it is quite common to view trash and unwanted household items filling the waterways and storm drains throughout the downtown river's segment.

Construction related impacts, such as topography changes (even subtle site grading) and increasing the amount of impervious cover associated with buildings and roads, alters and many times accelerates, natural processes or the rate of erosion and sedimentation in the waterway and refocuses the natural ecological change within a watershed. Urban development impacts ultimately effect all the stakeholders in a watershed and commit our non-renewable resources, such as water, forever. This is considered an irretrievable and irreversible commitment of resources.

The AC recommends that for the Plan “to be adopted”, the Watershed Council may be interested in coordinating with the City of Petaluma.

4.1.6 Waste Tire Use

In the mid 1950’s through the 1980’s used tires were placed in gullies on ranches in the Petaluma Watershed and throughout Sonoma County for erosion control. Use of waste tires was a recommended practice by a number of agencies until the 1980s. Now these tires are considered a hazardous waste and the California Integrated Waste Management Board (CIWMB) is responsible for determining how these “legacy waste tire” piles will be remediated and at whose cost.

Landowners in the Petaluma Watershed have expressed concern about this issue and the burden that would be placed on the landowners if they were required to remove the tires. Not only is the actual removal of the tires extremely costly; there could be considerable erosion causing increased sedimentation of creeks. Other costly erosion control methods would need to be put into place where tires are removed.

The tire issue is a critical one that could eventually effect many landowners in and around Sonoma County. Removal by landowners could mean a severe financial burden for many dairies and ranchers and possibly the loss of their ranches. A significant financial burden attributable to landowner tire removal would cause or contribute to agriculture’s inability to continue operation in this County.

Southern Sonoma County Resource Conservation District and landowners in the Petaluma Watershed have agreed to seek funding for a demonstration project to determine an economical and environmentally safe way to deal with the waste tire issue. The RCD, local landowners, the CIWMB and numerous regulatory agencies are working together to solve this problem in a new and innovative way.

4.1.7 Setting Standards for Water Quality

One of the major concerns for landowners in the Petaluma Watershed is the requirement to meet certain water quality standards that still need to be identified. Landowners are concerned that they will be required to meet standards that would be appropriate for a river. Since the lower portion of the watershed is actually a slough with tidal fluctuation, specific standards should be set for this portion of the watershed. Different standards could be set for the upper watershed tributaries that do not have tidal influence.

The AC has acknowledged that it is vital for them to work with the RWQCB to produce a “TMDL”. TMDL stands for Total Maximum Daily Load, which simply put is an estimate of the maximum amount of a specific pollutant a body of water can receive and still meet water quality standards for its designated use. The Federal Clean Water Act of 1972 requires EPA to create a TMDL for every water body listed as an “impaired water body.”

According to a Fact Sheet produced in 1997 by the RWQCB, TMDLs are developed to provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. States are required to include approved TMDLs and associated implementation measures in State water quality management plans or basin plans.

TMDLs are usually based on readily available information and studies. In some cases, complex studies or models are needed to understand how stressors are causing waterbody impairment. In many cases, simple analytical efforts provide an adequate basis for stressor assessment and implementation planning.

Where inadequate information is available to draw precise links between these factors, TMDLs may be developed through a *phased approach*. The *phased approach* enables states to use available information to establish interim targets, begin to implement needed controls and restoration actions, monitor waterbody response to these actions, and plan for TMDL review and revision in the future. Phased approach TMDLs are particularly appropriate to address nonpoint source issues.

TMDLs should address all significant stressors which cause or threaten to cause waterbody use impairment, including:

- *point sources* (e.g., sewage treatment plant discharges),
- *nonpoint sources* (e.g., runoff from fields, streets, range, or forest land) and
- *naturally occurring sources* (e.g., runoff from undisturbed lands).

A TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources and natural background pollutants, and an appropriate margin of safety. TMDL Plans may address individual pollutants or groups of pollutants, as long as they clearly identify the links between:

- *the waterbody use impairment or threat of concern,*
- *the causes of the impairment or threat, and*
- *the load reductions or actions needed to remedy or prevent the impairment.*

4.1.8 Permits for Levee Landowners

Presently, the two sets of permit regulations that govern work in and around the levees in the Lakeville area (Section 404- Clean Water Act and Section 10- Rivers and Harbors Act) are issued from the U.S. Army Corps of Engineers (ACOE) as one combined,

“blanket” permit. This particular permit covers the regulatory authority of eight local, state, and federal agencies. This permit allows landowners to: 1) clean existing drain ditches (on their land only), and 2) take bayside earthen material to cap the existing levee on the bayside only.

Another permit is issued by the San Francisco Bay Conservation & Development Commission (BCDC). See section 5.0 Guide to Federal, State and Local Agencies & Permitting Requirements for BCDC permit information. The permits are typically renewable and the existing permit was issued for five years and is due to expire in March 2000. The SSCRCD is currently working to assist the Lakeville area levee landowners in the renewal of these permits.

4.2 Other Planning Efforts in the Watershed

The Petaluma Watershed Enhancement Plan has been written as a planning tool to be used and referenced for the enhancement of the Petaluma watershed. The Plan is a working document, which can be amended as the issues within the watershed change over time. Below is a summary of current planning efforts in the Petaluma watershed. Work conducted by the City of Petaluma within the city limits is referenced in the context of how it fits into other watershed enhancement work.

City of Petaluma

The City of Petaluma has several watershed enhancement projects including:

Petaluma River Access and Enhancement Plan. Adopted in May 1996, the Petaluma River Access and Enhancement Plan establishes policies for preservation, enhancement, and restoration along a 7.8 mile stretch of river from the urban limit line near Old Redwood Highway, through downtown, and to the marina. The plan calls for creating a continuous riparian corridor or “greenway” along the river, identifies restoration and enhancement opportunities, and designates appropriate access points.

Petaluma River Marsh Enhancement Plan. In 1992, the City of Petaluma completed a plan for 300-acres of undeveloped disturbed wetland south of the City marina. The plan includes recommendations for water quality protection, habitat enhancement and restoration, endangered species protection, public access, and public recreational opportunities. Most of the land is in the City limits and owned by the City of Petaluma.

Petaluma Demonstration Marsh and Effluent Management Plan. In 1992, as part of the City’s Long-Range Effluent Management Plan, the City approved acquisition of approximately 170 acres adjacent to the Petaluma Marsh to create a demonstration marsh. The plan includes restoration of approximately 100 acres of tidal marsh and creation of a mosaic of seasonal wetlands, riparian areas, and freshwater ponds.

The Ellis Creek Watershed Enhancement and Wetland Mitigation Plan. In 1996 this Plan was developed by the City as a mitigation project for a proposed reservoir on Higgins Creek. The Ellis Creek Plan includes fencing, installation of cattle crossings, bank stabilization, and enhancement planting of approximately 8,100 lineal feet along Ellis Creek. Additional freshwater wetlands and enhancement are also proposed on Higgins Creek (a tributary to Ellis Creek) as mitigation for the reservoir impacts. The

City is continuing to evaluate discharge options, which may eliminate the need for a reservoir.

County of Sonoma

Sonoma County has policies and programs to protect agriculture and natural resources. Most of these are contained in the County's General Plan, which was last updated in 1989.

Agriculture. The Sonoma County General Plan reflects the desire of residents to manage growth and protect agriculture. Agricultural land use policies include stabilizing agricultural land use at the urban fringe, limiting the intrusion of new residential areas into agricultural areas by maintaining parcels large enough for farmers to lease or buy for their operations, and minimizing conflicts between agricultural and non-agricultural uses.

Open Space. The Sonoma County General Plan identifies open space as a limited and valuable resource. Policies to protect open space include: maintaining community separators between Petaluma and both Novato and Rohnert Park and protecting scenic resources such as the Sonoma Mountains between Petaluma and Sonoma, the grassy hills and ridgelines south of Petaluma near the Marin County border, and views of San Pablo Bay along Highway 37.

Natural Resources. Policies were developed to protect critical wetland, marsh, and oak savanna habitat that are highly sensitive to change. For example, the riparian corridor policy states that agricultural cultivation and grazing should occur 100 feet from the top of the streambank in flatland areas and 50 feet in upland areas. Policies are identified to control soil erosion, protect agricultural and domestic water supplies, maintain Sonoma County's diverse plant and animal communities, and protect fishery resources while balancing needs for agriculture, development, and mining.

Other Policies. In addition to the General Plan, Sonoma County has several other natural resource-related policies. The County's Valley Oak Ordinance specifies that when oak trees on particular soil types are removed, landowners must notify the County and indicate that they will either plant new oaks or implement measures to protect existing trees. Sonoma County, several cities, public agencies, and various organizations (both environmental and agricultural) have also worked on a Vernal Pool Preservation Plan. A general permit has been requested from the ACOE to manage or restrict development-related activities on lands with vernal pools.

The County of Sonoma has recently adopted a Vineyard Planting and Replanting Ordinance restricting vineyard development on steep slopes in order to minimize soil erosion and water quality impacts. The new ordinance goes into effect on October 1, 1999 and will require farmers to first register with the County Agricultural Commissioner before planting grapes. The ordinance prohibits vineyards on steep hillsides (50-percent grade or more) and requires erosion control plans on lesser slopes. It also requires that vineyards near streams, creeks, and rivers provide a 50-foot setback to preserve riparian corridors.

4.3 Enhancement Plan Goals, Objectives, and Recommended Actions

The AC, in its first round, developed ten goals for the Petaluma Watershed Enhancement Plan. These goals were then further discussed and reshaped to form four comprehensive goals.

The intent of the goals is to provide direction for future enhancement efforts in the Petaluma watershed. The four goals listed below encompass and share common themes: support local control of future enhancement in the watershed, improve water quality in the Petaluma watershed, support the viability of agriculture and enhance existing wildlife habitat. Each goal is broken down into a number of objectives. The objectives are tangible extensions of the goals. Each objective is then assigned recommended actions. The recommended actions are given a probable timeline to complete of 2 years, 5 years, and ongoing.

GOAL A

Establish a local Watershed Council for residents and organizations to fund and coordinate watershed enhancement activities and keep one another informed.

Paramount to the goals of this plan, is the desire by the landowners to form a council or conservancy group to facilitate achievement of the other goals and objectives in this plan. The Advisory Committee members are committed to establishing a landowner Watershed Council for the purposes of addressing watershed-wide concerns and in increasing communication between all watershed stakeholders. The contributing authors of this plan feel that by establishing a strong and active council, a sense of oversight and coordination will occur and a collective voice will be able to effectively communicate the issues and objectives of this group. The formation of a Watershed Council is the first and most important step in achieving all the other goals developed by the Advisory Committee and future goals of the Council as described hereafter.

Objective: Form a local, citizen-based, Watershed Council to keep watershed residents informed of watershed planning and implementation efforts.

Recommended Actions

Two Year Actions

- Elect or appoint a Council chairperson, develop subcommittees. Establish a mission statement. Establish short and long term goals for the Watershed Council.
- Conduct regular one-on-one and “kitchen table” outreach meetings to let watershed residents know about how to participate in watershed enhancement efforts and to identify potential watershed enhancement projects.

- Keep landowners informed of watershed efforts, function as a clearinghouse for watershed and urban residents, sponsor enhancement efforts, and assist agencies and citizens in coordinating meetings.

Five Year Actions

- Develop and maintain an Internet website. Post information about upcoming meetings, available funding, enhancement efforts and monitoring results. Link to other websites with enhancement information and Petaluma Watershed data.
- Publish and distribute a watershed newsletter at least twice a year.

Ongoing Actions

- Inform landowners of monitoring methods and training through the Watershed Council.
- Keep landowners informed of upcoming agency plans and actions related to the Petaluma Watershed.
- Attend meetings of agencies and organizations (such as City of Petaluma, County Board of Supervisors, Farm Bureau, etc.) to keep them informed about landowner concerns and efforts.
- Support sub-watershed community efforts, (different areas have distinct issues and concerns).

Objective: Encourage local residents to take the lead in developing and implementing enhancement projects.

Recommended Actions

Two Year Actions

- Work with the Department of Fish and Game to determine the presence and occurrence of steelhead in the watershed.
- Encourage voluntary watershed activities including a student service learning component such as the Adopt-A-Watershed curriculum.
- Assist in developing a TMDL for Petaluma watershed (develop reasonable water quality standards for a tidal slough).

Ongoing Actions

- Encourage coordination of efforts for steelhead recovery where practical.
- Assist agencies and citizens in coordinating meetings.
- Set new short and long term goals for the Watershed Council.
- Work collaboratively with City of Petaluma and Sonoma County in rural watershed projects.
- Provide input to RCD planning and implementation efforts.

Objective: Encourage community involvement in developing flood hazard reduction measures that protect the local economy while conserving natural resources.

Recommended Actions

Two Year Actions

- Keep informed of the cumulative impact of proposed flood hazard reduction projects on overall watershed resources and comment on proposed plans.

Five Year Actions

- Coordinate with urban residents regarding common flooding issues.
- Develop restoration projects to reduce factors contributing to flooding.
- Inform community about impacts of upstream activity on flooding and habitat degradation.

Ongoing Actions

- Request a PL 566 Small Watershed Project from NRCS.
- Develop flood hazard reduction measures.
- Assess conditions of levees in the lower watershed.
- Recommend incorporating habitat enhancement measures into flood hazard reduction projects.

Objective: Seek funding and technical advice to attain Goals B, C and D in collaboration with all watershed stakeholders.

Recommended Actions

Two Year Actions

- Designate a member of the Watershed Council as grant writer.
- Identify where limited funding can most effectively be spent.
- Provide low-cost or free technical assistance to develop and implement conservation practices.
- Watershed Council creates a list of grantors and permit guidelines to assist agricultural landowners with conservation practices, planning, permitting, and funding to implement conservation projects.

Ongoing

- Seek funding for Watershed Council and enhancement implementation.
- Seek and provide technical assistance for all willing landowners.

GOAL B

Improve water quality and ground water recharge in the Petaluma Watershed with the ultimate purpose of removing the Petaluma River from the RWQCB Impaired Waterbody List 303d.

The Petaluma River is listed as an “Impaired Waterbody” under the California Regional Water Quality Control Board’s 303d provisions. Decades of urbanization along the river corridor and continued erosion control and flooding problems significantly contribute to the river’s impaired status. Ultimate reversal of the listing of the river is one of the primary goals of this enhancement plan. To this end, the Watershed Council’s focus would be to work towards lowering the water temperature, reducing sedimentation and erosion, and increasing watershed education and landowner information on a variety of water quality topics. The health of groundwater and watercourse bodies in the watershed are fast becoming one of the most important national environmental concerns because of its direct correlation as an indicator of our environment as a whole.

Objective: Inform landowners of ways to prevent erosion, improve water quality and inform them of new and existing regulations.

Recommended Actions

Two Year Actions

- Produce and distribute a *Creek Care Guide*. Topics could include erosion control, riparian management, wildlife habitat, nutrient and waste management, road maintenance, and proper drainage.
- Make the *Handbook for Forest and Ranch Roads* published by the Mendocino County Resource Conservation District available to watershed residents, free of charge or for a nominal cost.
- Provide information about the sources and impacts of water pollutants including animal waste, fertilizers, household and ranch maintenance products and practices, etc.

Ongoing Actions

- Conduct research on the long-term water supply concerns for rural residents and agricultural operations especially in San Antonio Creek. Consider how increases in water supply or water use will affect natural resources and development.
- Keep landowners up-to-date with new water quality information.
- Assist residents in working with the Counties on well and septic installation and management to maintain or improve ground and surface water quality.

Objective: Continue and expand current voluntary surface and groundwater monitoring programs.

Recommended Actions

Two Year Actions

- Support local coordinator for monitoring outreach and coordination.
- Conduct outreach to landowners about water quality.
- Provide water quality monitoring kits to landowners.
- Encourage U.C. Cooperative Extension and/or the RCD to hold monitoring workshops in the watershed.

Five Year Actions

- Establish a watershed science team to evaluate, interpret, and make recommendations for further monitoring programs in the watershed.

Ongoing actions

- Assist landowners and organizations with volunteer water quality monitoring efforts.
- Keep watershed residents informed about water quality testing results and improvements.

Objective: Reduce accelerated soil erosion and manage sediment loads.

Recommended Actions

Two Year Actions

- Concentrate erosion control activities in the high priority sub-watersheds of Willow Brook, Lynch, Adobe, Ellis, and San Antonio Creeks.
- Seek funding and technical advice for landowners in the upper watershed for installation and maintenance of erosion control measures.

Five Year Actions

- Complete stream channel stability, upslope erosion, and geomorphological studies. The *Erosion and Sedimentation in the Petaluma Watershed* (see Appendix E) recommends that these studies be conducted in sub-watersheds with complicated system-wide erosion problems such as Lichau Creek, portions of Willow Brook Creek, upper Lynch Creek, upper Washington Creek, upper Adobe Creek, and San Antonio Creek.
- Manage livestock access to creeks and gullies, especially in the wet season.
- Provide workshops and conduct other outreach. Topics could include “do-it-yourself” erosion control, small farm and pasture management, and reducing rill and sheet erosion for pastures and corrals.

Ongoing Actions

- Maintain drainage ditches, spillways, culverts, etc. to avoid overtopping and delivery of sediment to the streams.
- Improve upstream waterways for flood and sediment control by planting native species.

- Maintain erosion control measures in the upper watershed.

Objective: Encourage natural stream morphology as a means of flood control and ground water recharge.

Recommended Actions

Ongoing Actions

- Collect information on ground water recharge and encourage recharge.
- Promote water conservation throughout the watershed.
- Reduce unnecessary diversions from creeks.
- Encourage maintenance of summer stream flow- for example, canopy cover.
- Maintain existing summer stream flow and avoid depleting instream pools of water in the summer.

GOAL C

Support the viability of agriculture in the community.

Past and present, the Petaluma community is founded on agriculture. Currently, the increasing land prices and stricter environmental regulations threaten the viability of the agricultural community. One of the most important factors contributing to the quality of life in the community is its history of and continued linkage, to agriculture. This goal seeks to support sustainability of agriculture in the watershed and work on improving its viability as an industry. Stewardship of the land is a significant hallmark of this plan and the sentiments of its contributors. With the formation of a Watershed Council, the agriculturists would have an opportunity to voice collective concerns and to work cooperatively with other stakeholders to promote broad public support for agricultural viability.

Objective: Support and seek funding for demonstration project to retain on-site and properly manage waste tires used historically for erosion control.

Recommended Actions

Two Year Actions

- Seek funding for abandoned tire demonstration project on rural lands.
- Begin demonstration project for abandoned tires on rural lands.

Five Year Actions

- Remove threat of violation from existing waste tires used for erosion by working with CIWMB to develop acceptable standards for legacy waste tire pile remediation.

Objective: Continue to provide information about technical and financial assistance for agriculture.

Recommended Actions

Two Year Actions

- Investigate financial incentives for landowners who plant trees along the riparian corridor or voluntarily take land out of production.
- Seek financial incentives to encourage landowners to leave buffer space along creeks on a voluntary basis.

Five Year Actions

- Provide assistance to property owners for self-diagnosing erosion problems, for developing possible solutions (especially those that are practical and stay away from regulatory concerns), and for identifying projects that residents can do themselves.
- Compile and distribute information on best management practices to ranchette owners.
- Compile and distribute information on best management practices to agriculture operations.

Ongoing Actions

- Provide information about upland grazing management.
- Encourage the use of best management practices for hillside vineyards.
- Support programs such as agriculture easements to protect farmlands on a voluntary basis.

Objective: Provide technical information to interested agriculture operators about the potential benefits and detriments of using reclaimed wastewater.

Recommended Actions

Five Year Actions

- Identify best management practices for using reclaimed water and biosolids.
- Provide information about obtaining reclaimed water and biosolids and uses for them.

Ongoing Actions

- Support users of reclaimed wastewater to develop irrigation management plans.
- Work with the City and County to provide more reclaimed water for agricultural use.
- Support the availability and responsible use of bio-solids and reclaimed water for interested agricultural users.

Objective: Support economic sustainability and stewardship activities of agricultural and rural residents.

Recommended Actions

Two Year Actions

- Hold ranch and vineyard planning workshops for both small and large landowners and managers.
- Assist rural residents with conservation practices, planning, permitting, and funding to implement conservation projects.
- Inform residents about the importance of agriculture to the local economy and about farming operations. Provide weekend tours and newsletters, and/or newspaper articles.

Five Year Actions

- Work cooperatively with regulatory agencies in streamlining permits for levee and ditch maintenance and agricultural operations.
- Develop a recognition program that acknowledges historical and current stewardship of the land by agriculture.
- Provide outreach to urban community about benefits of agriculture in the watershed.
- Develop a horse ranch management manual similar to the vineyard management manual.
- Hold conservation planning workshops for ranchette owners.

Ongoing Actions

- Support willing levee owners with stewardship practices that conserve or enhance wildlife habitat.
- Maintain long term landowner control of enhancement and implementation actions in the watershed.
- Support best management practices for manure disposal.

GOAL D

Conserve and enhance existing wildlife habitat.

This goal focuses on the protection, conservation, and restoration of riparian habitat along all waterways within the Petaluma watershed. Healthy vegetation within riparian corridors provides shade to help lower water temperatures and can also serve as a successful means of erosion control. These corridors provide excellent habitat and cover protection for a wide variety of terrestrial species including migratory songbirds.

Objective: Protect, preserve and restore riparian corridors in the watershed.

Recommended Actions

Two Year Actions

- Compile and distribute list of plants best suited for revegetation efforts.
- Begin to revegetate gullied areas with appropriate materials.

Five Year Actions

- Select enhancement projects that conserve or improve the habitat of endangered species. Follow any specific terms and conditions set by U.S. Fish and Wildlife Service and National Marine Fisheries Service.
- Devise a plan to try to control invasive exotic plant species.

Ongoing Actions

- Encourage the use of native plant species for riparian restoration.
- Protect intact sections of the riparian corridor.
- Revegetate high and medium priority sites identified in *Riparian Plant Community* (Appendix H). Work with willing landowners. High and medium priority sites include the opportunity to provide contiguous riparian forest habitat between an upper and lower reach of a stream, expand existing habitat, fill out areas of sparse cover, and provide cover in areas with a potential for high erosion. Inform community about local endangered species.
- Avoid depleting instream pools of water during the summer.

Objective: Encourage community pride in watershed's natural resources.

Recommended Actions

Two Year Actions

- Inform community about local wildlife enhancement potential with brochures and workshops.
- Conduct outreach regarding the importance and uniqueness of the Petaluma Marsh.

Five Year Actions

- Prepare and distribute information to the public about wildlife habitat needs, including steelhead and marsh species, and how residents can help enhance habitat. Include information on reducing summertime water diversions.
- Create manual on how residents can help enhance wildlife habitat.
- Provide workshops or written materials for residents about the importance of healthy riparian corridors to wildlife, erosion control, and water quality; do-it-yourself revegetation with native plants; how to maintain creek habitats; and available resources and technical assistance.

Ongoing Actions

- Get community involved with observing and preserving anadromous fish habitat.
- Support efforts to improve habitat for steelhead, songbirds, waterfowl, pond turtles, and other native wildlife species in the watershed. Concentrate on improving riparian habitat.
- Provide technical assistance to school and community groups working on revegetation projects.

Objective: Work with agencies to establish criteria for steelhead habitat.

Recommended Actions

Two Year Actions

- Incorporate steelhead habitat-related parameters into watershed monitoring (i.e., turbidity sampling, using aerial photographs to identify changes in riparian cover, etc.).

Five Year Actions

- Use the Department of Fish and Game protocol to evaluate the quality of steelhead spawning and rearing habitat. Focus on reaches being restored by watershed residents.
- Focus steelhead restoration efforts on tributaries that do, or potentially can, support steelhead, which include: Lichau Creek, Adobe Creek, San Antonio Creek, and possibly Lynch Creek and Willow Brook Creek.

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal A - Watershed Council				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Establish a local Watershed Council for residents and organizations to fund and coordinate watershed enhancement activities and keep one another informed.	Form a citizen-based Watershed Council to keep watershed residents informed of watershed planning and implementation efforts.	2 years	Elect or appoint chairperson, develop subcommittees. Establish a mission statement. Establish short and long term goals for the Watershed Council.	WC
			Conduct regular one-on-one and "kitchen table" outreach meetings to let watershed residents know about how to participate in watershed enhancement efforts and to identify potential watershed enhancement projects.	WC, RCD
			Keep landowners informed of watershed efforts, function as a clearinghouse for watershed and urban residents, sponsor enhancement efforts, and assist agencies and citizens in coordinating meetings.	WC, RCD
		5 years	Develop and maintain an Internet website. Post information about upcoming meetings, available funding, enhancement efforts and monitoring results. Link to other websites with enhancement information or Petaluma Watershed data.	WC
			Publish and distribute a watershed newsletter at least twice a year.	WC
		Ongoing	Inform landowners of monitoring methods and training through the Watershed Council.	WC, RCD UC Extension Farm Bureau
			Keep landowners informed of upcoming agency plans and actions related to the Petaluma Watershed.	WC, RCD

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal A - Watershed Council					
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources	
Establish a local Watershed Council for residents and organizations to fund and coordinate watershed enhancement activities and keep one another informed.	Form a citizen-based watershed council to keep watershed residents informed of watershed planning and implementation efforts.	ongoing	Attend meetings of agencies and organizations (such as City of Petaluma, County Board of Supervisors, Farm Bureau, etc.) to keep them informed about landowner efforts.	WC City of Petaluma County of Sonoma	
			Support sub-watershed community efforts (different areas have distinct issues and concerns).	WC	
	Encourage local residents to take the lead in developing and implementing enhancement projects.	2 years	Work with the Department of Fish and Game to determine the presence and occurrence of steelhead in the watershed.	WC	
			Encourage voluntary watershed activities including a student service learning component such as the Adopt-A-Watershed curriculum.	WC	
			Assist in developing a TMDL for Petaluma watershed (develop reasonable water quality standards for a tidal slough).	WC, RCD RWQCB	
			Ongoing	Encourage coordination of efforts for steelhead recovery, where practical.	WC, RCD, USF&WS, DFG, City of Petaluma
				Assist agencies and citizens in coordinating meetings.	WC
	Set new short and long term goals for the watershed council.	WC			
	Ongoing	Work collaboratively with City of Petaluma and Sonoma County in rural watershed projects.	WC, RCD, City of Petaluma, County of Sonoma		
		Provide input to RCD planning and implementation efforts.	WC		

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal A - Watershed Council				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Establish a local Watershed Council for residents and organizations to fund and coordinate watershed enhancement activities and keep one another informed.	Encourage community involvement in developing flood hazard reduction measures that protect the local economy while conserving natural resources.	2 years	Keep informed of the cumulative impact of proposed flood hazard reduction projects on overall watershed resources and comment on proposed plans.	WC
		5 years	Coordinate with urban residents regarding common flooding issues.	City of Petaluma, RCD ACOE, FEMA
			Develop restoration projects to reduce factors contributing to flooding.	WC, City of Petaluma, RCD
			Inform community about impacts of upstream activity on flooding and habitat degradation.	WC, RCD
		Ongoing	Request a PL 566 Small Watershed Project from NRCS.	RCD
			Develop flood hazard reduction measures.	WC, City of Petaluma, RCD, County of Sonoma
			Assess conditions of levees in the lower watershed.	RCD Env. Consultant
			Recommend incorporating habitat enhancement measures into flood hazard reduction projects.	WC, RCD
	Seek funding and technical advice to attain goals B,C and D in collaboration with all watershed stakeholders.	2 years	Designate a member of the Watershed Council as grant writer.	WC
			Identify where limited funding can most effectively be spent	WC
			Provide low-cost or free technical assistance to develop and implement conservation practices.	RCD, NRCS

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal A - Watershed Council				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resource
Establish a local Watershed Council for residents and organizations to fund and coordinate watershed enhancement activities and keep one another informed.	Seek funding and technical advice to attain goals B,C and D in collaboration with all watershed stakeholders.	2 years	Watershed Council creates a list of grantors and permit guidelines to assist agricultural landowners with conservation practices, planning, permitting, and funding to implement conservation projects.	WC
		Ongoing	Seek funding for Watershed Council and enhancement implementation.	WC, RCD
			Seek and provide technical assistance for all willing landowners.	WC, RCD

Goal B - Improve Water Quality				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Improve water quality and ground water recharge in the Petaluma River and its tributaries with the ultimate purpose of removing the Petaluma River from the RWQCB Impaired Waterbody List 303d.	Inform landowners of ways to prevent erosion and improve water quality and inform them of new and existing regulations.	2 years	Produce and distribute a <i>Creek Care Guide</i> . Topics could include erosion control, riparian management, wildlife habitat, nutrient and waste management, road maintenance, and proper drainage.	RCD
			Make the <i>Handbook for Forest and Ranch Roads</i> published by the Mendocino County Resource Conservation District available to watershed residents, free of charge or for a nominal cost.	WC, RCD
			Provide information about the sources and impacts of water pollutants including animal waste, fertilizers, household and ranch maintenance products and practices, etc.	AWC, RCD

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal B - Improve Water Quality					
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources	
Improve water quality and ground water recharge in the Petaluma River and its tributaries with the ultimate purpose of removing the Petaluma River from the RWQCB Impaired Waterbody List 303d.	Inform landowners of ways to prevent erosion and improve water quality and inform them of s new and existing regulations.	Ongoing	Conduct research on the long-term water supply concerns for rural residents and agricultural operations, especially in San Antonio Creek. Consider how increases in water supply or water use will affect natural resources and development.	WC, SCWA	
			Keep landowners up to date with new water quality information.	WC, RCD, NRCS, RWQCB, UCCE	
			Assist residents in working with the Counties on well and septic installation and management to maintain or improve ground and surface water quality.	WC County of Sonoma	
	Continue and expand current voluntary surface and groundwater monitoring programs.		2 years	Support local coordinator for monitoring outreach and coordination.	WC, RCD
				Conduct outreach to landowners about water quality.	RCD, WC
				Provide water quality monitoring kits to landowners.	WC, RCD
				Encourage U.C. Cooperative Extension and/or the RCD to hold monitoring workshops in the watershed.	WC, RCD
			5 years	Establish a watershed science team to evaluate, interpret, and make recommendations for further monitoring programs in the watershed.	WC, SFEI

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal B - Improve Water Quality				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Improve water quality and ground water recharge in the Petaluma River and its tributaries with the ultimate purpose of removing the Petaluma River from the RWQCB Impaired Waterbody List 303d.	Continue and expand current voluntary surface and groundwater monitoring programs.	Ongoing	Assist landowners and organizations with volunteer water quality monitoring efforts.	WC, RCD, UCCE, RWQCB
			Keep watershed residents informed about water quality testing results and improvements.	DFG
	Reduce accelerated soil erosion and manage sediment loads.	2 years	Concentrate erosion control activities in high priority sub-watersheds of Willow Brook, Lynch, Adobe, Ellis, and San Antonio Creeks.	RCD, WC NRCS
			Seek funding and technical advice for landowners in the upper watershed for installation and maintenance of erosion control measures.	WC, RCD NRCS
			Complete stream channel stability, upslope erosion, and geomorphological studies. The <i>Erosion and Sedimentation in the Petaluma River Watershed</i> (see Appendix E) recommends that these studies be conducted in sub-watersheds with complicated system- wide erosion problems—Lichau Creek, portions of Willow Brook Creek, upper Lynch Creek, upper Washington Creek, upper Adobe Creek, and San Antonio Creek.	WC, RCD Env. Consultant
			Manage livestock access to creeks and gullies, especially in the wet season.	LANDOWNERS
			Provide workshops and conduct other outreach. Topics could include "do-it-yourself" erosion control, small farm and pasture management, and reducing rill and sheet erosion for pastures and corrals.	UCCE, RCD NRCS

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal B - Improve Water Quality				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Improve water quality and ground water recharge in the Petaluma River and its tributaries with the ultimate purpose of removing the Petaluma River from the Waterbody List 303d.	Reduce accelerated soil erosion and manage sediment loads.	Ongoing	Maintain drainage ditches, spillways, culverts, etc. to avoid overtopping and delivery of sediment to the streams.	Landowners
			Improve upstream waterways for flood and sediment control by planting native species.	Landowners Petaluma A-A-W WC, RCD
			Maintain erosion control measures in the upper watershed.	Landowners WC
	Encourage natural stream morphology as a means of flood control and ground water recharge.	Ongoing	Collect information on ground water recharge and encourage recharge.	WC, County of Sonoma SCWA
			Promote water conservation throughout the watershed.	City of Petaluma County of Sonoma
			Reduce unnecessary diversions from creeks.	Landowners County of Sonoma
			Encourage maintenance of summer stream flow - for example, canopy cover.	City of Petaluma SCWA
			Maintain existing summer stream flow and avoid depleting instream pools of water in the summer.	Landowners City of Petaluma SCWA

Goal C - Support Agricultural				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Support the viability of agriculture in the community.	Support and seek funding for demonstration project to retain on-site and properly manage waste tires used historically for erosion control.	2 years	Seek funding for tire demonstration project on rural lands.	RCD, County Health, CIWMB
			Begin demonstration project for tires on rural lands.	Landowners WC, RCD

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal C - Support Agricultural				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Support the viability of agriculture in the community.	Support and seek funding for demonstration project to retain on-site and properly manage waste tires used historically for erosion control.	5 years	Remove threat of violation from existing waste tires used for erosion control by working with CIWMB to develop acceptable standards for legacy waste tire remediation.	RWQCB, EPA, CIWMB, RCD, WC
		2 years	Investigate financial incentives for landowners who plant trees along the riparian corridor or voluntarily take land out of production.	WC, RCD
	Seek financial incentives to encourage stakeholders to leave buffer space along creeks on a voluntary basis.		WC, RCD	
	5 years	Continue to provide information about technical and financial assistance for agriculture.	Provide assistance to property owners for self-diagnosing erosion problems, for developing possible solutions (especially those that are practical and stay away from regulatory concerns), and identifying projects that residents. can do themselves.	RCD, NRCS
			Compile and distribute information on best management practices to ranchette owners.	WC, RCD, NRCS
			Compile and distribute information on best management practices to agriculture operations.	WC, RCD, NRCS
	Ongoing	Provide information about upland grazing management.	RCD, NRCS	
		Encourage the use of best management practices for hillside vineyards.	Ag. Commissioner RCD, SCGGA	
		Support programs such as agriculture easements to protect farmlands on a voluntary basis.	Open Space District RCD	

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal C - Support Agricultural				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Support the viability of agriculture in the community.	Provide technical information to interested agriculture operators about the potential benefits and detriments of using reclaimed waste water.	5 years	Identify best management practices for using reclaimed water and biosolids.	SCWA, City of Petaluma
			Provide information about obtaining reclaimed water and biosolids and uses for them.	SCWA, City of Petaluma
		Ongoing	Support users of reclaimed wastewater to develop irrigation management plans.	SCWA, City of Petaluma
			Work with the City and County provide more reclaimed water for agricultural use.	SCWA, City of Petaluma
			Support the availability and responsible use of bio-solids and reclaimed water for interested agricultural users.	SCWA, City of Petaluma
	Support economic sustainability and stewardship activities of agricultural and rural residents.	2 years	Hold ranch and vineyard planning workshops for both small and large landowners and managers.	RCD, SCGGA
			Assist rural residents with conservation practices, planning, permitting, and funding to implement conservation projects.	WC, RCD
			Inform residents about importance of agriculture to the local economy and about farming operations. Provide weekend tours and newsletters, and/or newspaper articles.	WC, RCD
		5 years	Work cooperatively with regulatory agencies in streamlining permits for levee and ditch maintenance and agricultural operations.	WC, RCD
			Develop a recognition program that acknowledges historical and current stewardship of the land by agriculture.	WC, RCD, County of Sonoma

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal C - Support Agricultural				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Support the viability of agriculture in the community.	Support economic sustainability and stewardship activities of agricultural and rural residents.	5 years	Provide outreach to urban community about benefits of agriculture in the watershed.	WC, City of Petaluma, RCD, County of Sonoma
			Develop a horse ranch management manual similar to the vineyard management manual.	RCD, NRCS, UCCE
			Hold conservation planning workshops for ranchette owners.	RCD, UCCE
		Ongoing	Support willing levee owners with stewardship practices that conserve or enhance wildlife habitat.	WC, RCD
			Maintain long term landowner control of enhancement and implementation actions in the watershed.	WC
			Support best management practices for manure disposal.	WC, RCD

Goal D - Wildlife Habitat				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Conserve and enhance existing wildlife habitat.	Protect, preserve and restore riparian corridors in the watershed.	2 years	Compile and distribute list of plants best for revegetation efforts.	RCD, UCCE Circuit Rider Productions
			Begin to revegetate gullied areas with appropriate materials.	Landowners RCD, AmeriCorps
		5 years	Select enhancement projects that conserve or improve the habitat of endangered species. Follow any specific terms and conditions set by US Fish and Wildlife Service and National Marine Fisheries Service	Landowners RCD

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal D - Wildlife Habitat				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Conserve and enhance existing wildlife habitat.	Protect, preserve and restore riparian corridors in the watershed.	5 years	Devise a plan to try to control invasive exotic plant species.	Ca. Exotic Pest Control
		Ongoing	Encourage the use of native species for riparian restoration.	WC, RCD
			Protect intact sections of the riparian corridor.	Landowners RCD
			Revegetate high and medium priority sites identified in <i>Riparian Plant Community</i> (Appendix H). Work with willing landowners. High and medium priority sites include the opportunity to provide contiguous riparian forest habitat between an upper and lower reach of a stream, expand existing habitat, fill out areas of sparse cover, and provide cover in areas with a potential for high erosion. Inform community about local endangered species.	NRCS, RCD AmeriCorps
		Avoid depleting instream pools of water during the summer.	Landowners SCWA	
	Encourage community pride in watershed's natural resources.	2 years	Inform community about local wildlife enhancement potential with brochures and workshops.	WC, RCD, NRCS
			Conduct outreach about the importance and uniqueness of the Petaluma Marsh.	WC, RCD City of Petaluma
		5 years	Prepare and distribute information to the public about wildlife habitat needs, including steelhead and marsh species, and how residents can help enhance habitat. Include information on reducing summertime water diversions.	WC, RCD, NRCS USFWS
			Create manual on how residents can help enhance wildlife habitat.	RCD, NRCS, DFG, USFWS

Table 4 - Enhancement Goals - Potential Sources of Funding and Technical Support

Goal D - Wildlife Habitat				
Goal	Objective	Time Line Target	Recommended Actions	Potential Resources
Conserve and enhance existing wildlife habitat.	Encourage community pride in watershed's natural resources.	5 years	Provide workshops or other written materials for residents about the importance of healthy riparian corridors to, wildlife, erosion control, and water quality; do-it-yourself revegetation with native plants; how to maintain creek habitats; and available resources and technical assistance.	RCD, NRCS
		Ongoing	Get community involved with observing and preserving anadromous fish habitat.	RCD, USFWS DFG
			Support efforts to improve habitat for steelhead, songbirds, waterfowl, pond turtles, and other native wildlife species in the watershed. Concentrate on improving riparian habitat.	WC, RCD
			Provide technical assistance to school and community groups working on revegetation projects.	RCD Petaluma A-A-W
	Work with agencies to establish criteria for steelhead habitat.	2 years	Incorporate steelhead habitat-related parameters into watershed monitoring (i.e., turbidity sampling, using aerial photographs to identify changes in riparian cover, etc.)	DFG, USFWS
		5 years	Use the Department of Fish and Game protocol to evaluate the quality of steelhead spawning and rearing habitat. Focus on reaches being restored by watershed residents.	DFG, USFWS
			Focus steelhead restoration efforts on tributaries that do, or potentially can, support steelhead. These are Lichau Creek, Adobe Creek, San Antonio Creek, and possibly Lynch Creek and Willow Brook Creek.	WC, RCD DFG, USFWS

4.4 Summary of Appendices

Several technical studies were conducted in conjunction with the Petaluma Watershed Enhancement Plan. A summary of the technical appendices follows.

Appendix A Land Use in the Petaluma Watershed – Prunuske Chatham, Inc., 1997.

This report summarizes available land use and watershed enhancement information from the City of Petaluma, Sonoma County, and other sources. It includes an overview of the historic relationship between the city and county regarding land use planning, as well as an identification of land use concerns related to agricultural sustainability, natural resources, and rural community quality of life.

Appendix B Ground Water Quality in the Petaluma Watershed – Southern Sonoma County Resource Conservation District, 1998.

This report evaluates ground water quality and contamination in the Petaluma watershed. Cumulative data has shown that up until 1984, when the last study was completed, Petaluma's ground water quality had continually degraded. Historical problems have been identified with excessive nitrates, electrical conductivity (salts), coliform bacteria, and mineral constituents associated with seawater intrusion and connate water sources.

Appendix C Water Quality Monitoring Guidelines for the Petaluma Watershed – Southern Sonoma County Resource Conservation District, 1998.

This report is designed to provide landowners and residents with an introduction to existing monitoring data, data gaps, monitoring guidelines and recommendations for the Petaluma River watershed. These guidelines are designed to steer future monitoring projects. Further evaluation and assessment by the monitoring group is recommended before enacting a monitoring program.

Appendix D Flood Control Impacts in the Petaluma Watershed – Prunuske Chatham, Inc., 1998.

This summary is a compilation of existing information on flood control. It outlines proposed flood control projects within the watershed and describes potential habitat impacts from these projects. The summary also has an attached map of flood areas within the watershed. The ACOE and the City of Petaluma are beginning a channel widening project in the troubled Payran reach of Petaluma that will accommodate a 40-year flood event. Downstream of the City, large areas of agricultural land are dependent on a system of levees. In the winter of 1997/98 levees in the Lakeville area were overtopped by the high flows in the river.

Appendix E Erosion and Sedimentation in the Petaluma Watershed – Prunuske Chatham, Inc., 1998.

This report identifies priority sub-watersheds for erosion control work. It gives an overview of why erosion is of concern in the watershed, describes the methods used to

prepare this summary, presents an overview of slope stability and landslides, and lists enhancement recommendations and opportunities. Beginning on page 14, each sub-watershed is characterized in terms of location, land use, soils, and erosion. Recommendations are listed for each sub-watershed. A base map delineating the sub-watersheds of the Petaluma River and showing their erosion repair priority is attached.

Appendix F PSIAC Model: Sediment Yields in Sub-watersheds of the Petaluma River – Southern Sonoma County Resource Conservation District, 1998.

The Pacific Southwest Inter-Agency Committee (PSIAC) study estimates average annual rates of sediment yield from five major tributaries into the Petaluma River. Sediment yield may be defined as the volume of sediment that reaches some arbitrary point in the watershed, for the Petaluma watershed that arbitrary point is the valley floor. The five sub-watersheds chosen were Lichau, Willow Brook, Lynch, Adobe and San Antonio. Each sub-watershed was chosen based on a number of factors including historical data available, accessibility and existing riparian habitat. Criteria should be developed to prioritize the sub-watersheds in terms of sediment reduction potential and/or technical feasibility. Elements of the criteria may include results of this sediment yield report, land ownership, potential cooperators, road network, feasibility of restoration, erosion control, and other pertinent factors.

Appendix G Marsh/Bay Habitat in the Petaluma Watershed – Prunuske Chatham, Inc., 1998.

The Marsh/Bay Habitat report illustrates overall marsh related habitat concerns. The three federally listed species that depend on the marsh habitat are the California Black Rail, the California Clapper Rail and the Salt Marsh Harvest Mouse. This summary describes the habitat of these species, their predators, historic and current range, the role of the U.S. Fish and Wildlife Service (USFWS) consultations and recommendations.

Appendix H Riparian Plant Community Enhancement in the Petaluma Watershed – Prunuske Chatham, Inc., 1998.

This study is an overview of riparian conditions outside the Petaluma urban boundary and is designed to identify recommendations for SSCRCD and the watershed advisory group to consider. The report describes the methods used in conducting the overview survey, the historic and current riparian communities and conditions in the watershed, and a list of recommendations to enhance the riparian corridor. A characterization of each of the creeks and sub-watersheds is included and contains enhancement opportunities. Watershed maps and references are also included.

Appendix I Fisheries Enhancement in the Petaluma Watershed – Prunuske Chatham, Inc., 1998.

This report contains background information on the fishery resources in the Petaluma River, focusing on anadromous fish; it lists habitat needs for steelhead and identifies areas and actions for enhancement. A map showing current and estimated historic steelhead runs is attached. This summary tries to balance recognition of the fact that the

Petaluma River has never been an outstanding salmonid stream and a commitment to enhance resources for all native species in the watershed.

Appendix J Monitoring California's Annual Rangeland Vegetation - University of California Cooperative Extension, 1990.

This report contains information about various methods of monitoring rangeland vegetation. Some of the many purposes of monitoring rangeland vegetation are to determine range grazing capacities, provide for better herd management, identify actual impacted resource areas, or to determine the effects of various levels of livestock use on plant succession.

Appendix K Record of Public Comment - Southern Sonoma County Resource Conservation District, 1999.

The public comment contained within this appendix includes comments that did not directly relate to specifics of the Plan, were not a consensus of opinion, or were submitted too late in the process to be incorporated into the document.