Project Information

2005 Proposal Number: 0043

Proposal Title: **Fish Friendly Farming Environmental Certification Program**

Applicant Organization Name: **California Land Stewardship Institute**

Total Amount Requested: $**1,000,243**

ERP Region: Bay Region

Short Description

Proposed project would continue and expand the Fish Friendly Farming program in the Napa River watershed. The program assesses the site conditions on Napa Valley farms, develops plans for the application of BMPs (by private landonwers) to improve water quality and associated salmonid habitat.

Executive Summary

EXECUTIVE SUMMARY FISH FRIENDLY FARMING ENVIRONMENTAL CERTIFICATION PROGRAM California Land Stewardship Institute

This proposal would fund the Fish Friendly Farming (FFF) Environmental Certification program in the Napa River watershed for three years and implement significant numbers of creek restoration and erosion control projects. In addition this proposal would fund the data collection for an economic model of the costs and benefits to farmers of implementing environmental improvements. The FFF program is an incentive-based comprehensive program for farmers to inventory and assess their property and apply Beneficial Management Practices (BMPs) to reduce erosion, conserve water, increase native habitats and enhance aquatic habitats. The Napa River watershed supports threatened steelhead trout and Chinook salmon. The Napa River is listed as impaired for fine sediment under the Clean Water Act. Both of these environmental problems are caused by numerous land use activities throughout

the watershed and will only be remedied by comprehensive programs that alter land use practices and implement resource enhancement and restoration projects.

Landowners enroll a specific property in the FFF program and work with technical staff to complete a Farm Conservation Plan. The assessments include the owner/managers familiarity with the site and the current management practices and the technical expertise of an erosion control specialist and/or revegetation/restoration professional. The FFF program incorporates the concepts of adaptive management by revising agricultural practices to sustain and produce good quality water and salmonid habitats. In order to increase environmental improvements in specific tributaries landowner outreach will be focused in those areas.

The Farm Plan inventory documents all existing and potential sediment sources including natural features, all concentrated flow sources both in the vineyard and on all other areas of the site, viticultural methods including chemical applications, detailed road assessments for both currently used and inactive roads dating from prior land use activities, inventory and detailed assessment of all creeks and waterways with native plant revegetation and geomorphic–based restoration plans. The Farm Plan contains a list of required implementation actions and a timeline for each. In this manner the Fish Friendly Farming program addresses the numerous causes of water quality and riparian and aquatic habitat problems in one comprehensive effort. The Farm Conservation Plan is then "certified" by three regulatory agencies, the CA. Department of Fish and Game, NOAA–Fisheries and the SF Bay Regional Water Quality Control Board.

While the FFF program works in conjunction with a variety of agencies to fund and implement major projects, the landowner/manager implements the majority of the improvements listed in the farm plan. Only about 25% of the sites enrolled involve a major project. On most sites 100% of the improvements are funded and implemented by the private landowner. In addition the landowner completes operation and maintenance of program–funded projects. This is an enormous

benefit to the public and the resource as one of the biggest causes of failure in stream restoration projects is a lack of regular maintenance activities including removal of invasive plants, irrigation of native plants, weed removal around plantings and protection of plantings from trampling and grazing by livestock or wild animals. The landowner/manager completes these tasks on their property and photo monitors the results as part of the certification process.

FFF represents a new model for collaborative efforts between government and private landowners. Since 1999, over 37,000 acres have been enrolled in the FFF program in Sonoma, Mendocino and Napa Counties. Of the 37,000 total acres enrolled 14,500 are vineyards. We evaluate and certify the entire property not just the vineyards. A total of 16,200 acres have been through the certification process with the remaining approximately 20,000 acres in line for certification in 2006.

PROPOSAL: FISH FRIENDLY FARMING
ENVIRONMENTAL CERTIFICATION PROGRAM

1. PROBLEM STATEMENT

Environmental Problems

The State Water Resources Control Board has listed the Napa River as impaired by excess fine sediment under Section 303(d) of the Clean Water Act (State Water Resources Control Board 2002, 2005). This listing requires that a TMDL (total maximum daily load) program for fine sediment be prepared and adopted by the San Francisco Bay Regional Water Quality Control Board (RWQCB). In 2004, extensive field evaluations of sediment sources and siltation levels in stream channels were completed (RWQCB 2005). In 2005 the Technical Report for the Fine Sediment TMDL for the Napa River was released by the RWQCB. This report cited several anthropogenic sources of fine sediment: sheet erosion from vineyards and roads, gully erosion from grazing land, concentrated flow sources such as roads and vineyard drainage, and channel incision in the Napa River and tributary creeks. Excess fine sediment degrades aquatic habitats and beneficial uses of the Napa River as a cold water fishery, an agricultural and municipal water supply and a water recreation area. The Napa River also carries fine sediment into San Pablo Bay.

Two species of salmonids occur in the Napa River watershed, Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*). Steelhead trout are listed as threatened under the federal Endangered Species Act (ESA) (NOAA 2005). As part of the TMDL studies the limiting factors for salmonids were evaluated as the cold water fishery is a beneficial use of the Napa River impaired by fine sediment. The study (Stillwater Sciences 2002) identified low summer flows, high water temperatures, fine sediment and altered, simplified stream channels as the main limiting factors for salmonids.

There are numerous different causes of these environmental problems and each has developed over decades. Fine sediment is termed a non-point source pollutant, a name reflecting its generation throughout a watershed. Agricultural land management practices, maintenance of drainage facilities and roads, creek and river channel management practices and urban development practices all play a major role as non-point pollution sources in the Napa River watershed.

Creek and river channels and their aquatic habitats, while affected by direct management actions and land use on their floodplains, are largely formed and sustained through flood processes and are highly affected by watershed conditions. Any approach to addressing the environmental problems in the Napa River must address the many varied land-use activities in the watershed and the dispersed, non-point nature of pollution sources.

To restore the ability of the Napa River drainage to sustain salmonid habitat the entire drainage must be taken into account. Many of the stream “restoration”

projects which have been completed in the Napa drainage focus on manipulating scour channel features and stabilizing stream banks. This approach often fails to take into account watershed conditions and geomorphic processes and, as such, may not produce sustainable results over time (Roni et al 2002, Barbour et al 2001). This concern is particularly applicable in a system like the Napa River drainage where river and creek channel incision is a major process affecting tributary streams.

Regulatory Setting

The Napa River watershed is almost entirely private land, much of it in use as vineyard and ranchland. Napa County has relatively strict regulations of new hillside vineyard development and conversion of agricultural land to urban areas.

It would be difficult to create a program which would effectively regulate all land uses and actions which can generate fine sediment and degrade water quality and salmonid habitat. Most regulatory actions for fine sediment pollution consist of post release citations, or orders, issued to the most obvious problem site where neighbors have complained, or a safety, or major hazard has occurred. The citation does not necessarily undo the environmental damage. Although citations and regulatory actions are needed to reduce obvious violations and create a deterrent, this approach does not provide for a wide enough improvement in management practices to reduce overall pollutant loads. State and federal agencies lack adequate staffing to apply a regulatory approach to implement TMDLs. Additional efforts are needed. Finally the way in which fine sediment is generated through processes, such as sheet erosion, and during high rainfall events which often occur at night, make it nearly impossible to identify erosion sites by owner and enforce regulations.

For many landowners the regulatory system is confusing and frustrating. Regulatory programs do not translate readily into land management practices making it difficult for farmers to easily comply. If regulation becomes too severe and costly agricultural uses will give way to urban development. Due to the extent of impervious surfaces and their effects on hydrology and stream habitats, urban areas are far less likely to produce either clean water or sustain salmonid habitats so retaining agriculture is important to sustaining the fishery.

The focus needed in the Napa River watershed combines the most up-to-date scientific information with a focus on farmers and land management practices. Only by integrating practices which implement water quality and aquatic habitat improvements into the dominant land uses are environmental problems addressed and benefits sustained. Additionally environmental benefits need to be produced in a manner that is compatible with economic uses through one integrated operation if these benefits are to be sustained over time.

2. GOALS AND OBJECTIVES

Goal 1: Improve water quality in the Napa River and San Pablo Bay by reducing fine sediment loads generated from private agricultural lands and sustain these

improvements by integrating environmentally beneficial management practices into agricultural operations.

Objective: Use the Fish Friendly Farming (FFF) Environmental Certification program, an incentive-based program for farmers in the Napa River Watershed, to implement improved agricultural practices and implement components of the Napa River TMDL.

Objective: Enroll 7-10,000 acres in the Napa River watershed in the Fish Friendly Farming program over three years, complete and certify Farm Conservation Plans. Each Farm Plan includes a complete sediment source inventory, BMP prescriptions and project identification and implementation timeline.

Objective: Provide educational workshops to enrolled farmers on topics related to erosion control including cover crops, road repair and maintenance and winterization practices.

Objective: Implement actions and projects outlined in Farm Conservation Plans including BMPs and specific projects through both private landowner funding and public funding.

Goal 2: Improve creek and riparian habitats on private agricultural lands in the Napa River watershed to support and sustain threatened steelhead trout and Chinook salmon through comprehensive evaluations and implementation of management changes and restoration actions.

Objective: As part of the outreach process for the Fish Friendly Farming program focus on landowners in tributaries of known importance for steelhead trout including Sulphur, Dry, Ritchie, Redwood and Carneros Creeks.

Objective: As part of each Farm Plan for the 7-10,000 acre enrollment inspect all waterways, including ephemeral creeks and drainage ditches, for erosion problems and ongoing channel incision. Each Farm Plan will contain recommendations for structural and/or vegetative erosion control practices and, for incised channels, specific plans for restoring the connection between floodplain and channel and a diverse riparian habitat.

Objective: Implement erosion control and revegetation and restoration actions through both public and private funding. Private funding will also be used for long term management and maintenance including invasive plant control.

Goal 3: Reduce invasive non-native plant species along creeks and waterways.

Objective: As part of each Farm Plan, map the location and extent of invasive plants including giant reed, blue periwinkle, tamarisk, tree of heaven, Himalayan blackberry, English ivy, Cape ivy, pampas grass, broom and others.

Objective: Implement initial and follow-up invasives removal and control with the land owner/manager and any permit approvals required. Private funding will also be used for long-term management and maintenance including invasive plant control.

Objective: Document success of invasive plant control measures over time through site photo monitoring, site inspection and quantitative measurement at selected sites.

Goal 4: Formulate a long-term monitoring strategy to quantify the effects of widespread implementation of the FFF program on water quality and salmonid habitat.

Objective: Work with the RWQCB and the Napa RCD to review current RCD monitoring and coordinate additional types of monitoring or locations to coordinate with FFF enrollment areas.

Goal 5: Document costs and revenues to agricultural operations from implementing environmentally beneficial practices and projects for use in an economic model to evaluate cost effectiveness of the Fish Friendly Farming Program for farmers and government.

Objective: Identify a broad selection of properties and practices for use in the evaluation.

Objective: Collect detailed information to parameterize the model from a series of case studies in the FFF program.

Goal 6: Implement creek restoration projects already identified in 2004-2005 Fish Friendly Farming Farm Plans.

Objective: Complete detailed geomorphic and ecological surveys of five reaches of creek totaling 9.4 miles to use in restoration design and for comparison with post project measurements. Complete designs for these stream restoration/revegetation projects to re-create sustainable channel conditions for steelhead trout through changes in channel form, increases in sinuosity, re-creation of floodplain riparian habitat, set back of vineyard as needed, and long term management.

Objective: Implement revegetation and restoration actions through both public and private funding. Private funding will also be used for long term management and maintenance including invasive plant control.

3. CONCEPTUAL PLAN

Figure 1 depicts a conceptual plan outlining some of the major uses of agricultural lands. These uses, hillside and valley vineyards, dirt roads, historic land uses, floodplain vineyard and irrigated agriculture may not occur on every property, but are included to demonstrate the comprehensiveness of our approach. For each of these

agricultural land uses the primary watershed, or stream, process which is affected is described. The effects outlined for each land use represent a broad range of potential effects and assume few beneficial management practices are currently in use. This situation will not occur on all properties. The model depicts a range of BMPs which reduce, remove or mitigate the land use effects on watershed or stream processes, or features.

The BMPs are applied in a site specific manner following detailed site analysis and field evaluation as described in the Fish Friendly Farming BMP Workbook and Farm Conservation Plan template. An example of a portion of the workbook and template is attached. Based on this methodology, the expected outcomes and the effects on Napa River water quality and salmonid habitats are outlined. The effects on water quality and salmonid habitat are indicated as interactive as the effects from one land use, or one set of BMPs, is not discernable from those of another. Some of the expected outcomes may occur shortly after implementation. For example, sheet erosion volumes from vineyards are reduced by using 80-100% density cover crops over the next winter. Other expected outcomes will require longer time frames and a significant percentage of a tributary basin to be enrolled in the Fish Friendly Farming Program. The program currently has 14,000 acres in the Napa River Watershed enrolled after two years and is very popular with grapegrowers. We feel confident in reaching the level of enrollment needed to achieve the expected outcomes and the beneficial effects on water quality and salmonid habitat in the Napa River Watershed as depicted in the conceptual model.

Also included in this proposal are the initial steps in collecting the data for a detailed economic model of agricultural operations and the costs and benefits of implementing the FFF program. The red lines relate the expected outcomes of applying the BMPs back to the land use. The red boxes list the potential economic outcomes associated with the expected ecological outcomes which the model will evaluate.

The blue lines connect the effects on water quality and salmonid habitats back to the BMPs. These lines indicate the use of effectiveness monitoring information which will evaluate the degree of the improvements in water quality and salmonid habitat attained with application of the BMPs. The results of the effectiveness monitoring would be used to revise the BMPs at a future time as needed to attain the desired environmental outcomes.

4. APPROACH AND SCOPE OF WORK

Overview of Program

The Fish Friendly Farming (FFF) Environmental Certification Program was started in 1997 to combine the requirements of the Clean Water Act (especially TMDLs), the Federal and State Endangered Species Act, the California Fish and Game Code and water rights requirements into one set of Beneficial Management Practices (BMPs) along with a methodology for inventory and assessment of all aspects of an

agricultural property. The inventory documents all existing and potential sediment sources including natural features, all concentrated flow sources both in the vineyard and on all other areas of the site, viticultural methods including chemical applications, detailed road assessments for both currently used and inactive roads dating from prior land use activities, inventory and detailed assessment of all creeks and waterways with native plant revegetation and geomorphic-based restoration plans. A comprehensive Farm Conservation Plan is the result. In this manner the Fish Friendly Farming program addresses the numerous causes of water quality and riparian and aquatic habitat problems in one comprehensive effort.

The FFF program began in the Russian River watershed in Sonoma and Mendocino counties and, due to its popularity, expanded to the Navarro and Gualala River watersheds in 2000. In 2002 the FFF program was rewritten for use in the Napa River watershed at the request of the Napa County Farm Bureau, the Napa Valley Grapegrowers and the Napa Valley Vintners Association. In 2005 the FFF program also expanded into portions of Solano County in the Suisun Creek watershed.

Landowners enroll a specific property in the program and work with technical staff to complete the Farm Plan. In this manner the assessments are complete and include the owner/managers familiarity with the site and the current management practices and the technical expertise of an erosion control expert and/or revegetation/restoration professional. This approach focuses on applying beneficial management practices on a property by property basis reflective of the way farmers actually manage land. The FFF program incorporates the concepts of adaptive management by revising agricultural practices to sustain and produce good quality water and salmonid habitats. In order to increase environmental improvements in specific tributaries landowner outreach is focused in those areas.

The Farm Conservation Plan is then "certified" by three regulatory agencies, the CA. Department of Fish and Game, NOAA-Fisheries and the SF Bay Regional Water Quality Control Board. Each certifying agency issues a letter for the specific property and each agency may add actions to the Farm Plan implementation timeline, or issue a conditional certification requiring additional actions. The Farm Plan contains a list of required implementation actions and a timeline for each. For those actions which require a simple change in management practices, for example, improved seeding of cover crops or filter strips, the timeline will specify the next applicable season and year for the practice. For more complex actions such as a riparian revegetation project, erosion site, or road, repair, or a creek restoration project, the timeline will specify time periods for the design, permitting, implementation and maintenance phases of the project. A period of ten years is allowed for full implementation for the projects and re-certification is completed every five to seven years. Recertification serves as a status update on progress in implementing the plan. Every year the landowner must photo-document their practices and consult with the program to incorporate changes in the farm plan. The FFF program continues to work with the owner to cost-share implementation of major projects.

Program Success

FFF represents a new model for collaborative efforts between government and private landowners. Since 1999, over 37,000 acres have been enrolled in the FFF program in Sonoma, Mendocino and Napa Counties. Of the 37,000 total acres enrolled 14,500 are vineyards. We evaluate and certify the entire property not just the vineyards. A total of 16,200 acres have been through the certification process with the remaining approximately 20,000 acres in line for certification in 2006.

Farm plans include a complete road inventory and an ecological analysis of each creek and river corridor. As of October 2005 the FFF program has inventoried over 225 miles of dirt roads and prescribed repairs and improvements, evaluated and enhanced nearly 70 miles of blue line streams along with 21 miles of river riparian corridor. Many more miles of ephemeral creeks and drainage ditches were also inventoried and BMPs prescribed.

While the FFF program works in conjunction with a variety of agencies to fund and implement major projects, the landowner/manager implements the majority of the improvements listed in the farm plan. Only about 25% of the sites enrolled involve a major project. On most sites 100% of the improvements are funded and implemented by the private landowner. In addition the landowner dedicates the land area for the additional habitat and completes operation and maintenance of program-funded projects. This is an enormous benefit to the public and the resource as one of the biggest causes of failure in stream restoration projects is a lack of regular maintenance activities including removal of invasive plants, irrigation of native plants, weed removal around plantings and protection of plantings from trampling and grazing by livestock or wild animals. The landowner/manager completes these tasks on their property and photo monitors the results as part of the certification process.

In the past the FFF program has received funds from a variety of sources including: the State Coastal Conservancy, CalFed Watershed Program, State Water Resources Control Board, NOAA-Fisheries, Ca. Department of Fish and Game, EPA and the USDA-NRCS.

New Organization

Due to the popularity and rapid expansion of the FFF program, a regional organization was needed to operate the program. In 2005 a non-profit organization, the California Land Stewardship Institute (CLSI), was formed and received its tax exempt status from the IRS. The Board of Directors of the Institute consists of long term supporters and participants in the FFF program. The Institute's Executive Director is Laurel Marcus, the author and manager of the FFF program. The Institute will allow for continuity in the operation of the FFF program while also allowing for expansion and increased efficiency. The Institute is also developing public relations and marketing programs for certified farms to create a market-based reward system to recognize the high level of stewardship the program demands and to provide additional incentives to landowners.

Program Details

The FFF Program uses two workbooks – the Beneficial Management Practices (BMPs) workbook and the Farm Conservation Plan template. The BMP workbook contains the technical information supporting the FFF Program, as well as the inventory/assessment methods needed to complete a Farm Conservation Plan.

The Farm Conservation Plan template is separated into a series of elements: Element 1 – General Site Features, Element 2 – New Vineyard Design, Element 3 – Managing the Existing Vineyard, Element 4 – Major Replants, Element 5 – Roads, Element 6 – River and Creek Corridors, Element 7 – Watershed Stewardship, and Element 8 – Photo-Monitoring. The elements consist of the inventory/assessment of the natural features and agricultural areas of the property as well as the current management practices, application of BMPs from the workbook and an implementation timeline for application of the needed BMPs and for major road, erosion site and creek restoration projects. For new vineyards, a site inventory and a preliminary design are completed and then refined for permitting concerns and CEQA review to avoid negative impacts.

The BMPs for the FFF Program address all agricultural activities, facilities and a broad variety of natural resources. The 338-page BMP workbook for the Napa River watershed was completed based partly on the original version and a two-year process of literature review, research and discussion with growers, resource agencies, scientists, and agricultural and environmental groups. There are numerous sources of information used in the BMP workbook. For Element 3 Managing the Existing Vineyard soil erosion control measures were reviewed from the Natural Resources Conservation Service Technical Guides, numerous publications on cover crops and their broad variety of uses, texts and published papers on hydrology and hillslope processes and numerous publications on erosion control practices and products. CA. Department of Fish and Game, NOAA-Fisheries and State Water Board guidance on water rights and diversions was also included. The references list many of these source materials. For agricultural chemicals, each chemical approved for use with wine grapes was evaluated using a broad set of scientific databases for the LC_{50} for rainbow trout and LD_{50} for birds, potential pathway or movement into water and groundwater and soil half life. The BMPs consist of original writing compiled from many source documents and formulated for use by farmers with the Farm Plan Template.

Road BMPs were derived from the NRCS Technical Guides, various Forest Service publications and published books from a number of RCDs, Counties and other sources. As with the Vineyard Management BMPs, the road assessment methodology and BMPs are original writing compiled from many sources and designed for use with the Farm Plan Template.

The Creek and River corridor BMPs (see attachment) uses a broad variety of published sources on fluvial geomorphology, riparian ecology, fish ecology and

hydrology combined with original research and evaluation. A methodology specific to the Napa and Russian River watersheds was developed to relate watershed area to bankfull channel width. This method is based on all available cross-sectional survey data from the USGS, California Department of Fish and Game, the TMDL studies and other scientists in these two drainages as well as some from the Sonoma Creek watershed. This method is used to predict the needed bankfull channel width for restoration and then this width is multiplied by four for the riparian corridor width. This corridor width provides for a diverse selection of riparian plant species, a major buffer between the farmed area and the scour channel and the ability for the channel to meander a considerable distance before eroding the farmed area. These measurements define a required footprint for an unconfined alluvial channel which should provide for natural channel and ecological processes. The condition of the channel is also taken into account and whether the connection between the channel and floodplain is intact or needs to be re-established. Aggraded channel conditions are also evaluated. If a project is done the restoration/revegetation plan incorporates watershed area, channel form and processes, riparian ecology and invasive plant control.

The BMP workbook is updated every two years and is very comprehensive in scope. Here are some examples of the topics covered:

Element 3: Managing The Existing Vineyard

This element is filled out by the land manager following the workshops. The FFF program reviews the element and makes sure the BMPs are appropriate and that all concerns are included.

Inventory/Assessment of Site Features

- *Features of the property including: Topography and vineyard layout, Drainage system and vegetation, Stream drainage network and water sources*
- *Soil types and erosion potential*
- *Slopes*

BMPs

- *Vineyard management practices*
    - *Cover crops*
    - *Seasonal tilling/no till management*
    - *Winterization*
    - *Waterway buffer/filter strips*
    - *Emergency erosion control measures*
    - *Summer dust control*
    - *Vegetated waterways and ephemeral creek conditions and need for erosion control and revegetation.*
- *Erosion problems and repairs*
- *Fencing revisions to allow wildlife corridors*
- *Pest and disease control measures*
- *Vineyard drainage system*
    - *Maintenance*
    - *Winter inspection and management*
    - *Relationship to stream drainage network*

    - *Future upgrades needed*
- *Water supply and conservation*
    - *Irrigation system, frost control system and volumes*
    - *Water supply type, location and operation*
    - *Evaluation of barriers for fish migration, bypass flows, season of diversion*
    - *Water rights license status*

Element 5: Roads

This element addresses road systems on vineyard properties including roads not necessarily part of the vineyard, but part of the overall property. Roads are one of the largest sources of fine sediment in streams and can be repaired to create a stable road network and reduce erosion and sedimentation in streams.

Inventory/Assessment of Road System

- *General features of the road system - map*
- *Hillslope stability*
- *Condition of road surface - inventory of ditch condition, ponding, rilling, etc.*
- *Inventory and assessment of condition of all ditch relief culverts, energy dissipaters, frequency of culverts or rolling dips etc.*
- *Stream crossings-inventory and assessment of culverted crossings, bridges, fords, etc.*
- *Evaluation of barriers to fish migration*

BMPs

- *Summary of inventory and identification of repairs needed for entire road system*
- *Repair and improvement program for entire road system*
- *Road maintenance and winter inspection for entire road system*
- *Road closure and decommissioning*
- *New road design/construction methods*
- *Road reconstruction*

Element 6: Creek/River Corridors – This section of the workbook and template are included as an attachment.

The Fish Friendly Farming (FFF) Program was designed to implement water quality and fish habitat improvements on private agricultural lands. While there are other programs that educate farmers about improving practices (Wine Institute Sustainability Program) none includes the level of detail, technical analysis or environmental standards of the FFF program. These other programs are self-assessments and do not include third party certification, quantified results, or project implementation. The Beneficial Management Practices (BMPs) used in the FFF Program encompass a comprehensive set of actions to rapidly reduce sources of fine sediment and limit delivery to waterways. The FFF Program implements the TMDL for fine sediment and achieves quantifiable load reductions.

Scope of Work

The following scope of work reflects the tasks we have developed in contracts with the State and Regional Water Boards for the FFF program.

Task 1 – Program Management

- Coordinate all aspects of program, set schedules, oversee contracts, invoicing and status of program, interface with grant agency manager, coordinate with subcontractors, draft subcontracts, maintain schedule.
- Provide quality control and direction to all staff and subcontractor members of project team. Interface with landowners.

Task 2 – Program Outreach

- Write newsletter articles and announcements, prepare a new updated color, FFF Program brochure and print 1,000 copies, update the FFF program website with information on enrollment.

- Publicize FFF workshops through local newsletters of the Napa Farm Bureau, Napa Grapegrowers, Napa Vintners Association and local appellation and winery publications and newsletters. Attend meetings of agricultural organizations and provide handouts and brochures on the FFF Program.

- Provide focused outreach in tributaries with steelhead populations, including Dry, Ritchie, Carneros, Sulphur and Redwood Creeks by creating landowner lists from Assessor parcel maps and records and mailing information on the FFF program to properties of 10 acres and greater.

Task Deliverables: Brochures, articles, newsletters
List of locations and publications for outreach

Task 3 – Farm Conservation Plan Workshops and Field Trips

Workshops present the BMPs and how to apply them, as well as how to complete the Farm Conservation Plan. Each participant will receive a copy of the BMP workbook binder and the Farm Conservation Plan template in both digital (CD) and paper format. An aerial photograph at a 1" = 500' scale and a topographic map are provided for each enrolled site. The field trips demonstrate the inventory methods and management practices and allow certified farmers to discuss how they have implemented their Farm Conservation Plan.

- Conduct one series of workshops annually, with four classes in each workshop, for three years, for a total of three workshop series throughout the course of the contract. Up to 25 sites will be enrolled in each workshop.

- Describe BMPs at each workshop - soil and water conservation; water rights and conservation, road problems, repairs and maintenance; creek geomorphic and

biological features and restoration and invasive plant management practices; natural drainage features; and emergency erosion control measures.

- Coordinate a minimum of 3 field trips for further education of workshop participants. Topic specific field trips, such as cover crops and erosion control, roads, invasive species and stream corridor restoration, will be held depending on the needs of the participants.

Task Deliverables: Workshop descriptions and sign-in sheets
Field trip descriptions and sign-in sheets

Task 4 – One-on-One Site Visits, Farm Conservation Plan Completion and Initial Project Identification

- Conduct one-on-one site visits by a technical staffer with each FFF program participant and assist them in preparing and completing elements of their Farm Conservation Plan. Up to 75 Farm Conservation Plans will be completed covering up to 7-10,000 acres.

- Depending on the property, a road assessment and repair program, major erosion site identification and repair program and creek corridor evaluation and/or restoration/revegetation plan may be completed by the technical experts with the landowner/manager. These evaluations will then be incorporated into the Farm Conservation Plan. Through these site visits and based on coordinated input from technical experts and the owner/operator, the Farm Conservation Plan will contain a complete set of elements 1-8 including assessment of current practices, an inventory of site features, an identification of needed changes in management practices with application of BMPs, and identification of restoration/revegetation projects, road repairs and other projects for implementation. Photo-monitoring carried out under each Farm Conservation Plan and for all cost-shared projects will create an additional record of TMDL implementation.

- Develop a list of preliminary projects for review and further plan development by technical consultants under Task 6.

- Estimate sediment source reduction and acres of revegetation and habitat restoration for each completed Farm Conservation Plan. Record the total acreage of enrolled properties, miles of roads assessed and creek/river miles evaluated for all completed farm plans.

Task Deliverables: List of site visit dates; List of farmers eligible for Farm Conservation Plan certification; List of potential projects.

Summary of sediment load reduction and revegetation and habitat acreage, miles of road and creek/river.

Task 5 – Current Projects from 2004-2005 Farm Plans

The FFF program has a set of projects from enrolled properties which need detailed designs for implementation. Many of these projects encompass adjacent properties along several miles of creek. These reaches include: Rector Creek 1.5 miles; Dry Creek 1.6 miles; Ritchie Creek 0.8 miles; Carneros Creek 4.0 miles total; Bear Creek/ Bale Slough 1.5 miles. All of these sites are steelhead trout streams.

- Complete site topographic surveys and evaluation of stream channels for restoration actions such as creation of a floodplain along an incised channel, setting banks back, addressing entrenched alluvial fan channels, structures adjacent to channels. If needed a flood analysis will be completed. Site surveys will provide a before-project data set and include monumented measurements.

- Complete biological surveys to map existing vegetation, invasive plants and determine precise revegetation plans in conjunction with an engineer or geomorphologist. Revegetation plans will identify the number of each species of native overstory and understory plants needed and allow for seeds and propagules to be collected in the Napa River drainage. Only local genetic stock is used in our revegetation projects. Another nonprofit organization – Circuit Riders Productions, is our partner for revegetation design, custom-grown native plants and installation.

- Complete draft project designs and description for review and approval by grant agency Project Representative. The designs and project description will be used in CEQA compliance and permitting (Task 7).

- Summarize sediment load reductions and revegetation and habitat acreage from project implementation.

Task Deliverables: Draft project plans and budgets
Summary of improvements from projects
Project surveys for use as before project data set

Task 6 – Project Design

After projects are initially identified in the 2007-2009 Farm Plans, the sites will be visited and proposed projects reviewed by a technical expert appropriate to the project type. After the field assessment is completed, revisions are made and project plans finalized. Projects identified may include, but not be limited to, major road repair or closure, creek corridor restoration, erosion site repair, revegetation of ephemeral streams, and retrofit of water supply facilities.

- Conduct site visits of potential restoration projects identified in the Farm Conservation Plan preparation process under Task 4.

- Submit prioritized list of projects for review and approval by the grant agency's Project Representative.

- Develop draft project plans. For creek restoration projects site topographic surveys may be completed to use in the design and to serve as a before-project data set and will include monumented measurements. Review project plans with the technical consultants and the owner/manager. Determine amount of cost share to be provided by this grant, the landowner, or other grant sources. Cost share will be included in the final plans submitted.

- Develop final project designs including plans and specifications. Detail all earthwork, planting locations, species, planting specifications and maintenance requirements for stream restoration. Obtain civil engineering review for projects requiring structural erosion control, water facility retrofit, major road repair, or major creek restoration. Project designs developed in Task 5 will also be included in this and the following subtasks.

- Following completion of CEQA compliance and permitting, prepare and submit final project designs, budgets, and schedules for review and approval by the owner/manager and the grant agency's Project Representative.

- Complete landowner project agreements including maintenance actions and schedule from landowners prior to any project work.

- Summarize sediment load reductions and revegetation and habitat acreage from project implementation.

Task Deliverables: Priority list of projects
Draft project plans and budgets
Final project designs and budgets with cost share details
Landowner project agreements
Summary of improvements from projects
Project surveys for use as before project data set

7 – CEQA Compliance and Permitting

All projects undergo CEQA compliance and are implemented with full permits. To the extent practicable the CalFed CEQA documents will be used and tiered off of for project CEQA compliance. The Napa RCD will act as the CEQA lead agency and be a permit applicant for many of the projects. CLSI as a non-profit cannot act as a CEQA lead agency and has a partnership with the Napa RCD to implement projects in the FFF program.

- File appropriate CEQA documents after grant agency has approved prioritized list of projects. Complete archaeological, botanical or other specialized site surveys as needed.

- Apply for necessary permits including local permits, 1600 Fish and Game permits, 404/401 permits, and others.

- Provide completed CEQA and permits to grant agency three months prior to construction.

Task Deliverables: Final CEQA documents.
Final permits

Task 8 – Implementation of Projects

This task will involve implementing projects identified through the Tasks 5, 6 and 7. Projects implemented in this task may include riparian corridor revegetation and channel restoration, sediment reduction on roads, culverts, gully repair, and revision of water supply facilities. BMPs such as cover crops, filter strips, drip irrigation, pesticide use reduction, and invasive species removal are carried out entirely by the owner/manager. Projects will be issued for bid by qualified construction contractors

- Construct priority projects on private lands based on the approved design plans developed in Task 6.

- Conduct photo documentation, before, during, and after project implementation.

Task Deliverables: Before, during, and after photos of projects

Task 9 – Farm Conservation Plan Certification

The final step of the Fish Friendly Farming Program is certification of the Farm Conservation Plan by a team of representatives from the National Marine Fisheries Service, California Department of Fish and Game, and Regional Water Quality Control Board. The certification team reviews the Farm Conservation Plan with the owner and the FFF program representative then visits the farm and discusses the site and farm implementation timeline with the owner/manager. Each Farm Conservation Plan is certified based on its completeness and accuracy in describing the resources and current practices on the farm, the BMPs and projects included to mitigate identified problems, and the implementation timeline. We will also be asking program participants to evaluate the FFF program so that we can modify and adapt the program to better educate farmers and improve land management.

- Orient and train certification team members to assure agency staff is familiar with all of the details of the FFF Program and the certification process. Repeat orientation if new staff is assigned to the certification team.

- Conduct the certification process described above.

- Send copies of certification letters and FFF certificate to landowner

Task Deliverables: Two training workshops for agency staff
Copies of certification letters
Evaluation survey

Task 10 –Performance Measures

- Summarize miles of roads assessed, miles of creek/river corridor evaluated, acres of total property enrolled, acres of vineyard enrolled, the number of properties enrolled, the number of reservoirs and water supply systems evaluated and the number of BMPs implemented by landowners. Provide estimates of sediment load reductions, acres of revegetation and restoration of various types, and other improvements resulting from Farm Conservation Plan project implementation. Submit a report summarizing this information to demonstrate the level of water quality and habitat improvement and TMDL implementation.

Task Deliverables: Summary report

Task 11 – Effectiveness Monitoring Plan

An important aspect of the FFF program is evaluating the effectiveness of BMPs and project designs and adding to and updating the program. Currently the Napa County RCD is carrying out long term monitoring of turbidity and stream flow in several tributary drainages. The RWQCB aspect of the TMDL studies measured gravel permeability, channel cross-sections and other features at a number of sites. In the next three years (2006-2009) the FFF program will provide focused outreach in certain tributary basins in the Napa River watershed.

- In conjunction with the Napa RCD and RWQCB, formulate a monitoring plan to evaluate changes in fine sediment levels and salmonid habitat where FFF enrollment is high in the drainage.

- Review monitoring plan with various academic institutions to pursue future partnerships and funding.

Task Deliverables: Monitoring Plan

Task 12 – Economic Model

It is important to evaluate environmental improvements for their economic costs and benefits in order to further refine and integrate improvements into businesses and farming. The FFF program offers a chance to use real world data for a detailed economic analysis.

- In consultation with natural resource economists at the Napa RCD and Napa County, identify the model to be used and types of data needed for the model.

- Interview members of the academic community to ascertain the interest in the FFF program and economic analysis. Identify potential principal investigators and involve these individuals in reviewing the data collection methods.

- Discuss the model with participants in the FFF program and identify farmers willing to provide detailed information on time and cost of completing the program and implementing the BMPs.

- Collect detailed information needed to parameterize the model and set it up for detailed use.

Task Deliverables: Summary of collected data

This scope of work can be modified to address a reduction in budget by reducing the number of enrollees, or the number of projects in Tasks 1-9. Tasks 11 and 12 could be removed as they are not required as a part of operating the FFF program but do provide very useful information.

5. PERFORMANCE EVALUATION

A number of performance measures will be evaluated for the FFF program on a yearly basis. These include:

- Total acres of land enrolled in the program
- Acres of vineyard enrolled in the program
- Miles of roads assessed
- Miles of seasonal and year-round creeks evaluated
- Number of erosion sites evaluated and repaired
- Number of reservoirs and water sources evaluated
- Number of BMPs applied prior to FFF farm plans and after farm plan
- Acres of riparian habitat restored by owner/manager and cost-shared projects.
- Miles of creek restored by owner/manager and cost-shared projects
- Estimated volume of sediment load reduced from BMP implementation and cost-shared projects
- Cost information for BMP implementation by farmers on selected sites

This information will be summarized and evaluated, then provided to the Grant Agency.

6. FEASIBILITY

Fish Friendly Farming is already operating in the Napa River watershed and is avidly supported by agricultural organizations and landowners as well as local and regulatory agencies. We have proposed a scope of work for a three year period and will build on the current program with the proposed grant. For project implementation we will work with our partner Napa County RCD to complete CEQA documents and permits in a timely manner. This is our current working arrangement. We will be completing projects which are consistent with local zoning and other regulatory programs. The FFF program in Napa County coordinates with the NRCS to maximize use of Farm Bill program funding. The FFF program also has received federal funding through the 319 program. Finally, we consistently have a high level of implementation using private landowner resources. To address channel incision, fish habitat and ecological restoration on the main Napa River, CLSI is seeking funds from the State Coastal Conservancy in conjunction with our partners, the Napa RCD and RWQCB.

7. TASK DELIVERABLES

The task deliverables described in our scope of work will be shared with the Grant Agency and our partners. We will also provide a summary report on our website.

8. INFORMATION VALUE

The FFF program represents a different model for agricultural land management, regulatory compliance and incentive-based environmental programs. The FFF program is comprehensive in addressing environmental issues, but also is farmer friendly. The FFF program provides a system that improves private land management, but does not involve acquisitions of property and as such lives up to the concept of integrating agriculture with ecosystem restoration.

9. PUBLIC INVOLVEMENT AND OUTREACH

The FFF program provides articles on the program, on BMPs and on our latest projects and enrollment for newsletters published by the Napa Farm Bureau, Napa Valley Grapegrowers and Napa Valley Vintners Association. We present the program at events, forums and tours for these organizations as well as others. We frequently complete outreach through mailings to all the landowners on a creek and will be providing this outreach under this grant. As part of the program we hold 1-2 field trips annually so that enrolled farmers can discuss their efforts with elected officials, agencies, community members and others.

B. ERP PRIORITIES

Fish Friendly Farming addresses several ERP priorities. The FFF program implements changes to agricultural properties and management actions to directly benefit and enhance salmonid habitat for MSCS-covered species and water quality through reduction in fine sediment generation and delivery, revegetation of ephemeral creeks and repair of erosion sites and roads, restoration of creeks, and changes in water supply facilities to increase summer flow and reduce entrapment of juveniles and other actions.

This proposal will also collect detailed data needed to complete a real world analysis of the economic benefits and costs of implementing environmental improvements. The long-term monitoring of creeks and water quality in coordination with FFF high enrollment areas will address and quantify environmental benefits.

2. RELATIONSHIP TO OTHER ECOSYSTEM RESTORATION ACTIONS

From a review of the funded proposals listed on the ERP website there are two in the Napa River Watershed which are directly related to this proposal. These are: 1998 Napa River Watershed Creek Restoration and 1999 Napa River Watershed Stewardship. Both grants went to the Napa County RCD and were for actions that will be further enhanced by the FFF program. The ERP has also invested in restoration of the Napa marshes near the mouth of Napa River. The FFF programs comprehensive improvements in water quality should benefit these areas as well.

C. QUALIFICATIONS AND ORGANIZATIONS

The California Land Stewardship Institute (CLSI) is a 501(c)(3) nonprofit corporation organized under the California Nonprofit Public Benefit Corporation Law for public and charitable purposes. CLSI is dedicated to implementing environmental stewardship, restoration and enhancement activities and practices on private lands in California. CLSI operates the Fish Friendly Farming Environmental Certification Program in Sonoma, Mendocino, Napa and Solano Counties. Laurel Marcus is the Executive Director of CLSI and the principal author and program manager for the Fish Friendly Farming Program. Ms. Marcus will oversee the program, assist in the preparation of Farm Plans and project designs and hold workshops. Ms. Marcus is an ecologist and has over 20 years of experience in ecological restoration planning and projects for river, creek and wetland habitats as well as watershed assessment and monitoring. She has overseen the design, permitting and implementation of over 100 projects. Dennis Jackson is a hydrologist who will assist in project design and site evaluations. Dennis wrote portions of the Fish Friendly Farming program. Dennis has over 20 years of experience in hydrologic and geomorphic analysis. Lisa Lackey will provide GIS services and prepare portions of the Farm Plans. Lisa has worked in the Fish Friendly Farming program for the past two years and has 15 years of experience in GIS.

The Napa County RCD will be a subcontractor and provide project CEQA, permitting and implementation services, prepare detailed erosion control plans and project designs and collaborate on the economic model and long term monitoring tasks (11 and 12). Leigh Sharp, Stewardship Director and Natural Resource Economist, Dave Steiner, Senior Soil Scientist, Lara Hadhazy, Restoration Projects Manager, and Bob Zlomke, District Manager and Hydrologist will be involved in the FFF program. The Napa RCD staff and CLSI staff have worked together for 3 years on this program. The Napa NRCS office will also be involved in project designs, particularly for erosion control projects.

Circuit Rider Productions (CRP) will provide revegetation plans, Napa-based genetic stock of native plants and plant installation. CRP is a 501(c)(3) nonprofit organization specializing in native plant projects. Since its founding in 1976, CRP has implemented thousands of projects in California.

CLSI will also hire additional subcontractors for engineering, geomorphology and project construction.

D. COST

1. Budget – See separate budget pages

2. COST SHARE AND MATCHING FUNDS

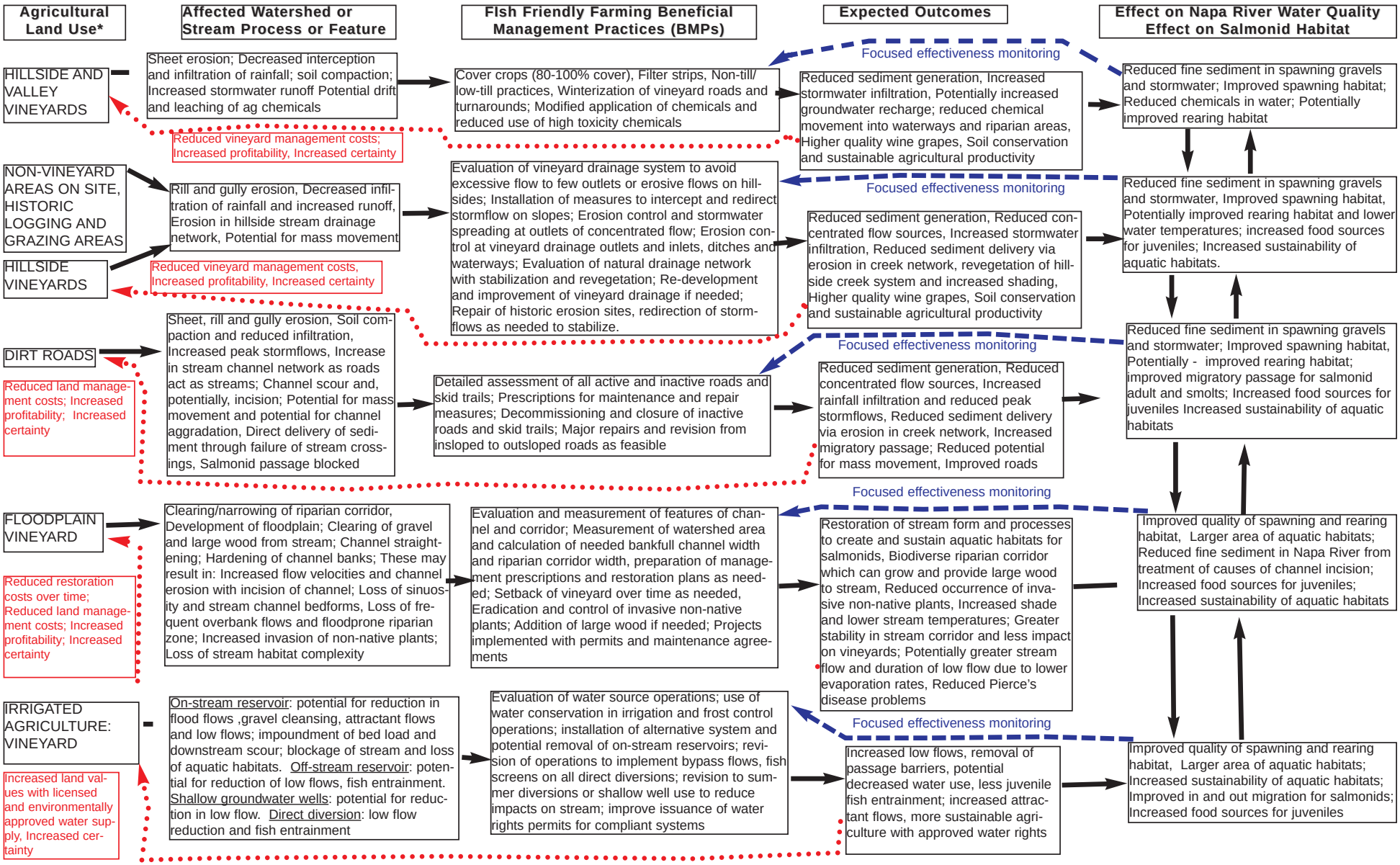
CLSI has received a 319 federal grant which will cover the 2006-2009 period and provide matching funds of $475,436.00. The FFF program also received $500,000 through the Napa RCD for the 2004-2006 period. CLSI will apply for grants from NOAA, CDFG and the State Coastal Conservancy. As enrolled farmers apply for Farm Bill funds, we will also keep track of these matching funds. We have not included these potential matching funds in our budget

Since landowners implement most of the BMPs in the FFF program, we consider their time and expenses as matching funds in our budget. We have included an estimated amount. CLSI will carefully track these matching funds along with additional project funds.

E. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

CLSI will comply with the Standard Terms and Conditions of the ERP grant agreement.

Figure 1. Conceptual Model of Napa River Watershed Agricultural Land Uses, Salmonid Habitat and Water Quality Improvements



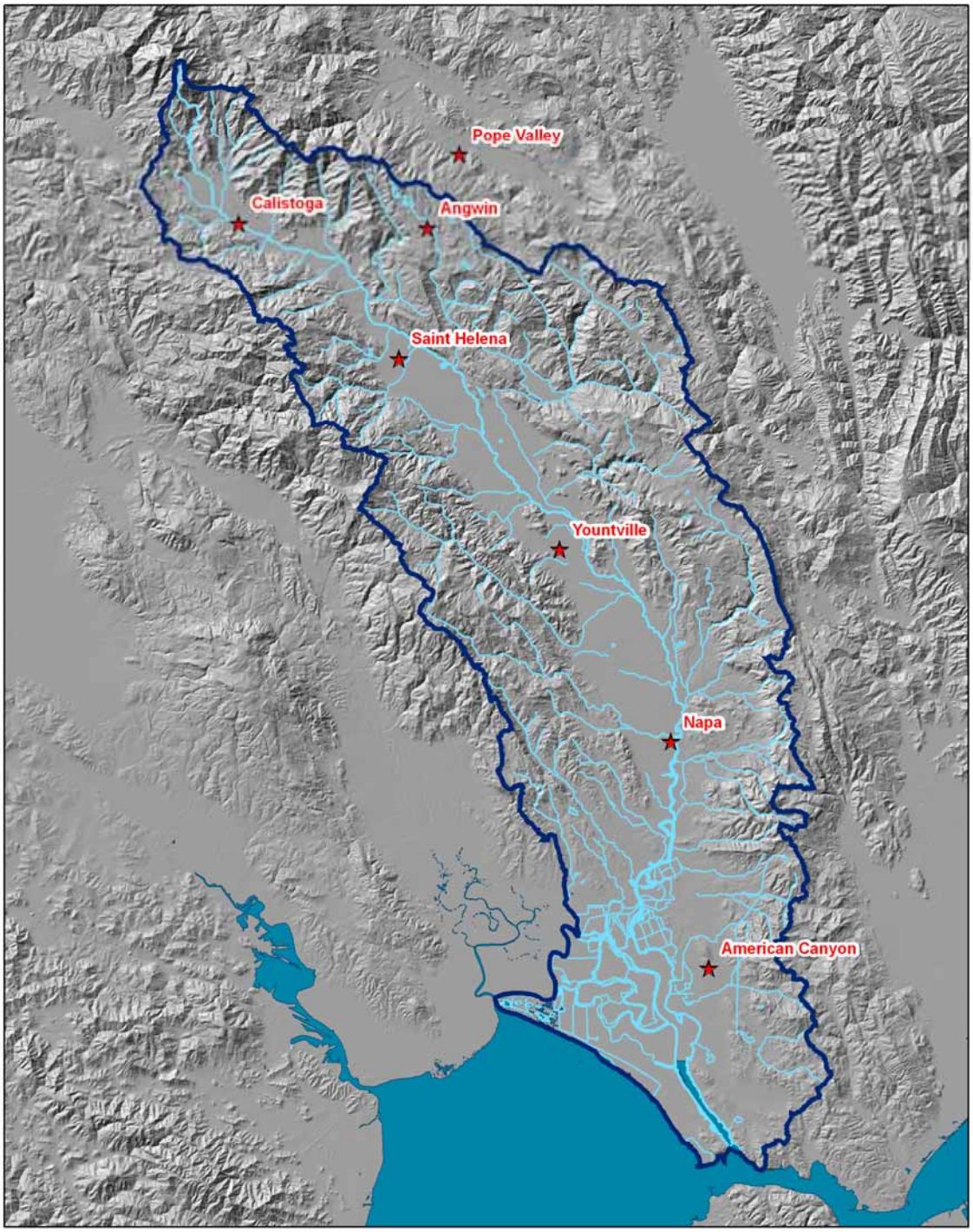


Figure 2. Napa River Watershed

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http://toxnet.nlm.nih.gov. Hazardous Substances Data Bank.

www.cdc.gov/niosh/rtecs. Registry of Toxic Effects of Chemical Substances.

www.ace.orst.edu/cgi-bin/mfs. "Pesticide Information Profiles"
http://ace.orst.edu/info/extoxnet

http://www.epa.gov/docs/envirofw/html/emci/chemref/index.html. US EPA Envirofacts Master Chemical Integrator

http://www.epa.gov/opppmsd1/PPISdata/ppisdata.htm

http://www.epa.gov/pesticides/. US EPA Office of Pesticide Programs

www.cdms.net. CDMS – Ag Chem Information Services

http://npic.orst.edu/tech.htm#ecpd. National Pesticide Information Center (NPIC)

http://www.pw.ucr.edu/WQ_Homep.asp. Pesticide Wise – University of California, Riverside Cooperative Extension Water Quality Program

ATTACHMENT 1
ELEMENT 6 CREEK AND RIVER CORRIDORS
BENEFICIAL MANAGEMENT PRACTICES AND FARM PLAN TEMPLATE
FROM THE "FISH FRIENDLY FARMING FOR THE NAPA VALLEY"
WORKBOOKS

ELEMENT VI - STREAM AND RIVER CORRIDORS: INSTRUCTIONS AND BENEFICIAL MANAGEMENT PRACTICES

This element is for new, existing and replanted vineyards and addresses creeks and rivers on the entire property. This element includes:

- ❑ Inventory/assessment of stream corridor condition.
- ❑ Evaluation of current management practices and other factors influencing the corridor condition.
- ❑ Application of Beneficial Management Practices (BMPs) for the corridor.
- ❑ Formulation of a timeline and identification of funding sources (if needed) for the implementation of BMPs and creek corridor restoration.

INTRODUCTION

The focus of this element is perennial and intermittent creeks and their riparian corridors. The BMPs focus on the long-term sustainability of both the stream corridor and its habitat values, and the vineyard operation. Vegetative methods for creek restoration are emphasized, as well as restoration of natural channel form, rather than in-stream structures. These measures involve the lowest environmental impact, have been shown to be the most effective over time and can be implemented with a minimum of regulation and permitting.

The program uses an adaptive management approach in which the condition of the corridor and current management measures are inventoried and evaluated, BMPs and restoration methods are applied, the condition is re-evaluated over time and additional management is applied or changed and revegetation continued. As greater understanding and new measures for restoration and management of stream corridors are developed, or as conditions on the creek or river channel change, the use of the BMPs and management methods are revised. In this way, the goals of supporting and sustaining both the farming operation and the stream corridor can be better achieved over the long term.

The time frame for implementing changes and restoring riparian corridors considers both environmental and economic factors. Riparian corridors under natural conditions change over long periods of time. A bank erodes and a large tree falls into the channel. New trees germinate next to the channel on the floodplain. The creek and riparian corridor naturally change over time. Restoration of riparian corridors needs to mimic this natural process and be done in stages, or in response to changes from large storms.

The inventory and assessment in the Farm Conservation Plan may also show that the meandering creek may need a wider corridor area or changes to the channel width and depth to create a functional floodplain for riparian trees. Incised or downcut channels may need banks set back, the re-creation of a new floodplain, and revegetation. But achieving these changes should not necessarily involve greater environmental impacts than benefits. Instead incremental improvements can be achieved as a bank erodes or changes occur and repair and restoration can widen the corridor over time. This restoration approach is less intensive and will require a longer timeline. For this reason a 10-year period is used in implementing the Farm Conservation Plan.

For an incentive-based program to function, implementation of riparian corridor restoration must also consider the farmers' needs. Widening and restoration of some riparian corridors may require taking land out of production. This change can result in a reduction of income to the farmer. Causes of change in some riparian corridors, such as incision in the main Napa River channel from the large municipal dams in the watershed and the mining, dredging and channelization of the river are not necessarily within the control of the landowner. However, the farmer often must absorb the cost of repairs and restoration. Phasing restoration activities into the farm operations make them easier to implement. Many farmers may also realize cost savings by reducing the amount of active management of the creek and using revegetation for bank repair rather than costly riprap.

However, widening and restoration of creek corridors will require financial assistance to farmers for the initial capital investment in project construction. In general, the restored corridor does not create income to the farmer, but does provide public benefits for water quality and habitat. Appropriate management of the corridor done by the farmer, such as on-going control of invasive plants or irrigation of new native plants, will add value to the project. Over the long term, restoring and sustaining riparian corridors and fish habitat will succeed only if both the environmental and economic factors are considered and integrated equally into implementation strategies.

In 2003, the Napa County Board of Supervisors revised the conservation regulations to require a setback of 150-100 feet for all new vineyard developments adjacent to Class 1 and 2 streams. The County is using the California Department of Forestry stream classification, which is utilized by very few scientists and professionals outside of timber harvest plans. This classification depends on the ability of a stream to support certain types of aquatic life, which is largely determined by stream flow. Class 1 and 2 streams are equivalent to perennial and seasonal or intermittent streams, as used in these BMPs.

The "Habitat Restoration Plan" developed under this element should be considered a voluntary, incentive-based mechanism for achieving the goals of the County ordinance.

Background: Stream and River Riparian Corridors

This assessment assists the farmer in evaluating the stream/river corridor, determines how to revise management practices, and identifies what short and long-term changes and restoration activities need to be performed.

Overall, the goal is to allow the creek or river channel to reach a more stable and natural form that can sustain riparian and fish habitat. Restoration activities focus on:

- Revising farm operations to remove conflicts with creek processes
- Restoration of a vegetated corridor of adequate width for alluvial creeks, including necessary changes to the channel form and floodplain
- Revegetation measures for banks and floodplain areas
- Restoration and management of confined creek channels in canyons

FARM PLAN SHOWING EVALUATION OF CREEK AND RIPARIAN CORRIDOR

Removal of invasive non-native plants and revegetation with native plants from local genetic stock

- ❑ Correction of upstream erosion and drainage problems to reduce their effect on the creek

- ❑ Protection of the creek habitat and the watershed lands through beneficial stewardship

The restoration approach for this program involves as little intervention in the active (scour) channel as possible. This is the highly dynamic portion of the creek and efforts to manage the active channel with in-stream structures have not been very successful (Roni et al, 2002). Instead, the goal is to create and manage a riparian corridor of sufficient width to be able to undergo natural flood and meandering processes and have an adequate riparian forest for natural habitat to form and regenerate. If there is excessive upstream erosion or increases in flood flows, the channel will be constantly adjusting to these factors. Creek corridor restoration approaches that include the watershed and focus on the overall corridor are most likely to be successful (USDA, 1998). It is not possible to restore fish habitat over the long-term just through manipulation of the creek channel itself.

Fish habitat is formed and maintained in the active or scour channel of a river or creek by the interactions of many features. During a flood, the energy of water flowing downhill moves sediment, gravel, wood and other materials. With each flood the channel changes. The features, or variables in each creek channel that affect its form and habitats include:

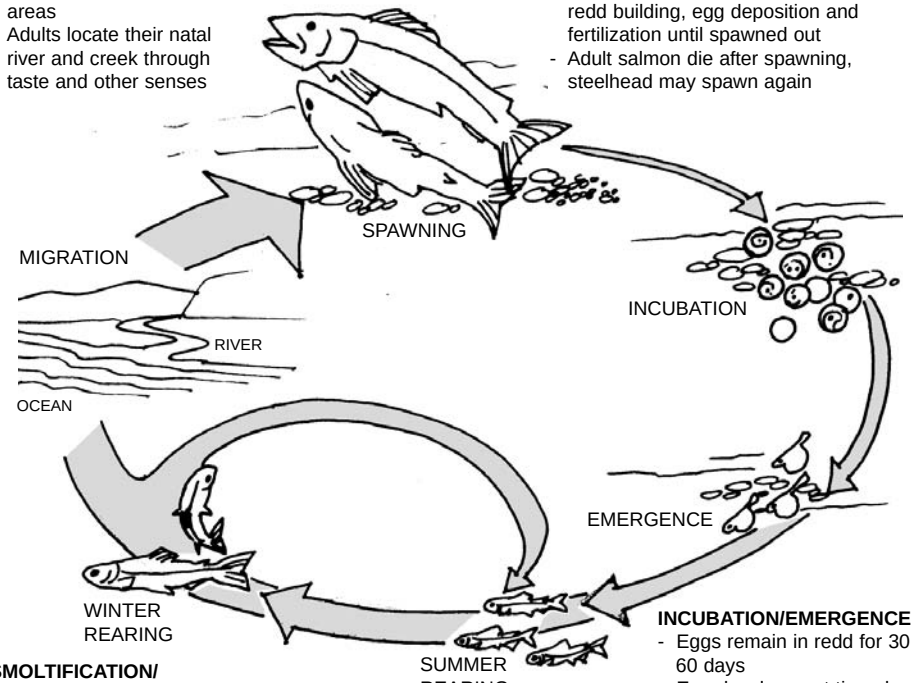
- Slope of the creek bed
- Sinuosity of the channel
- Volume of floodwater
- Sediment supply
- Supply of large wood for in-channel habitat
- Velocity of the floodwater
- Channel substrate type – gravel, sand, or bedrock
- Width and depth of water flow
- Roughness - vegetation, gravel, rocks, and wood in the channel

Change in one variable induces change in all the others in different proportions to each other. Looking at the active channel after the flood gives some clues as to how the overall stream channel is changing. But trying to second-guess how the creek will change in the next flood is not reliable. Each flood event is different and a different set of changes in the variables may occur in the next flood. With the creek being so complex, it is nearly impossible to permanently "fix" a creek for either habitat or flood control. A fix may solve one problem at one location over the short term, but create numerous long-term problems.

COHO SALMON AND STEELHEAD TROUT LIFE CYCLE

ADULT MIGRATION
- Adults enter river system from ocean
- Adults hold in main river and reach sexual maturity, change color
- Adults jump barriers and fight their way upstream to gravel bed spawning areas
- Adults locate their natal river and creek through taste and other senses

SPAWNING
- Female chooses redd or nest site in gravel near to pool/complex habitat
- Female builds redd by fanning gravel surface and creating depression
- Female lays eggs and male(s) release milt to fertilize eggs
- Female covers eggs with gravel
- Female and male repeat process of redd building, egg deposition and fertilization until spawned out
- Adult salmon die after spawning, steelhead may spawn again



SMOLTIFICATION/ OUTMIGRATION
- Parr undergo physiological change to smolts
- Lack of adequate habitat and overcrowding may induce early transformation and migration out to sea
- Water temperature and season also affect change to smolts
- Smolts may need to hold in estuary while they adapt to salt water

JUVENILE REARING
- Fry school in cover along bank when they emerge
- Fry become parr - larger individuals find and defend their territories
- Parr need cover and feeding areas
- Parr feed on drifting and aquatic insects, and other fish
- Parr remain in the rearing habitat 1 to 2 years

INCUBATION/EMERGENCE
- Eggs remain in redd for 30 to 60 days
- Egg development time depends on water temperature and dissolved oxygen
- Eggs hatch into alevins which remain in the spaces in the gravel while their yolk sac is absorbed
- Fish wriggle out through the gravel into creek and are called fry

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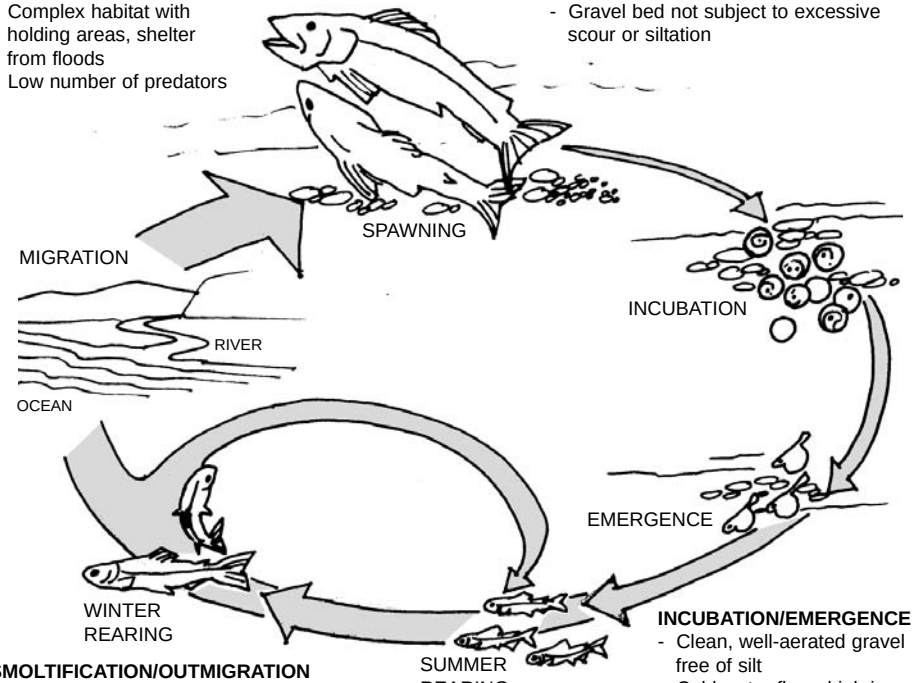
HABITAT REQUIREMENTS FOR COHO SALMON AND STEELHEAD TROUT

ADULT MIGRATION
- Adequate cold water river flows
- Medium flow velocity during migration
- Lack of impassable barriers
- Normal turbidity/high water quality
- Complex habitat with holding areas, shelter from floods
- Low number of predators

SPAWNING
- Clean, medium-sized gravel clean of silt
- Adequate streamflow
- Cold water temperatures
- High water quality/low turbidity
- Channel with complex habitat: pools, riffles, riparian trees, large logs
- Lack of siltation
- Gravel bed not subject to excessive scour or siltation



SMOLTIFICATION/OUTMIGRATION
- Low number of predators
- Cold water temperatures
- Cover and complex habitat along river channel
- Lack of barriers in channel
- Adequate flow

JUVENILE REARING
- Adequate summer cold water flows
- Food production areas
- Channel with complex habitat: pools, riffles, riparian trees, large logs
- Adequate territories for feeding and refuge
- Lack of siltation/high water quality
- Low predator numbers
- Channels without excessive scour or siltation
- Complex habitat for flood refuge areas

INCUBATION/EMERGENCE
- Clean, well-aerated gravel free of silt
- Cold water flows high in dissolved oxygen
- Lack of excessive channel scour and siltation
- Channel with complex habitat: pools, riffles, riparian trees, large logs
- Low predator populations

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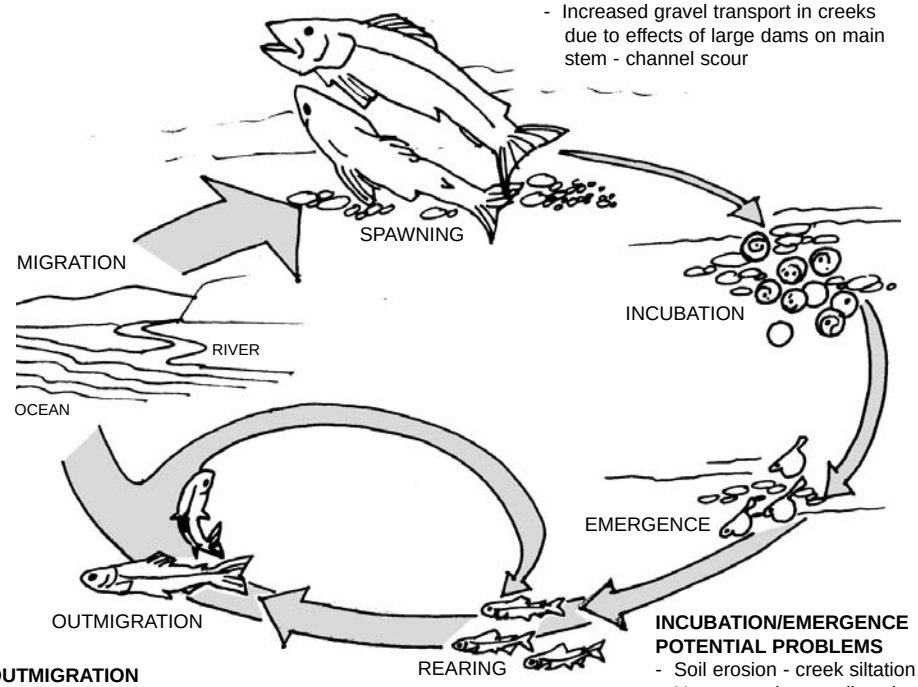
FACTORS AFFECTING COHO SALMON AND STEELHEAD TROUT HABITAT

ADULT MIGRATION - POTENTIAL PROBLEMS
- Reservoir releases - false flows
- High turbidity
- Barriers - road culverts and crossings, temporary dams, high velocity channels
- Channelization of creeks
- Water diversions
- Loss of complex habitat in creek and river

SPAWNING POTENTIAL PROBLEMS
- Soil erosion - siltation of creek
- Loss of channel form - channelization, removal of gravel, riparian forest and large wood
- Lack of gravel due to mining, channel incision, reservoirs and watershed changes
- Increased peak storm runoff due to roads, urbanization and land clearing causing channel scour
- Increased gravel transport in creeks due to effects of large dams on main stem - channel scour



OUTMIGRATION POTENTIAL PROBLEMS:
- Warm water reservoir releases cause increased numbers of predator fish
- Water diversions
- Loss of channel form and habitat
- Barriers - temporary dams
- Connection of gravel pits to river - increased predator fish, loss of guiding river current
- Excessive water temperatures

JUVENILE REARING POTENTIAL PROBLEMS
- Excessive surface water/groundwater pumping, no screens on diversions
- Loss of channel form - channelization, removal of riparian forest, large wood
- Soil erosion - siltation of creek
- Warm water releases from reservoirs
- Excessive channel scour or fill
- Urban runoff, leaking septic systems - poor water quality
- Excessive water temperatures

INCUBATION/EMERGENCE POTENTIAL PROBLEMS
- Soil erosion - creek siltation
- Unscreened water diversions
- Loss of channel form - removal of riparian forest, large wood, gravel
- Urban and agricultural runoff, leaking septic systems - poor water quality
- High velocity flows - urban areas and roads - channel scour
- Reservoir releases - channel scour
- Channelization of streams - loss of habitat
- Excessive water temperatures

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Insert – riparian corridors provide shade to streams and insects for fish was well as a filter for the vineyard from flood debris (155)
Most figures were removed to make file small

Insert – riparian corridors (155)
Most figures were removed to make file small

Allowing natural processes to occur is the easiest and cheapest way to manage the system over the long-term.

In alluvial streams, riparian forest grows adjacent to the active channel on the floodplain. The floodplain next to the channel is frequently inundated in the winter and not more than a few feet higher than the active channel edge. The spatial relationship between the channel and its floodplain is a very important part of restoration design. Incised or entrenched channels may require a change in form to re-create this relationship in order to support and sustain riparian plants and reduce erosion. Riparian plant species grow at particular distances from the active channel and the specific requirements of the plant species must be incorporated into restoration design.

The very important first step is to evaluate and gain an understanding of the creek you are working with. The entire corridor should be evaluated along with the watershed, not each individual bank blowout. Simplifying the creek in order to control just one feature is likely to fail. Misdiagnosing the problem will lead to mis-management. For these reasons, our program focuses on letting the creek corridor function with as little intrusion as possible and letting the farmer operate with as little impact from the creek or river as possible. Developing a workable strategy to accomplish this balance requires observing the system and measuring its features. The first step is to complete an assessment.

INVENTORY: STREAM/RIVER CORRIDOR

This inventory requires measurement of a number of features of your stream corridor to document its current condition and review of the watershed. Stream systems are dynamic - the shape of the channel, its width, depth and meanders, change with every flood. Erosion in the watershed, urbanization, gravel mining, dams and other conditions upstream and downstream can affect the stream corridor. Land use and corridor management on the farm as well as the management of adjacent lands also affect the condition of the corridor. Assessing many features of the corridor gives different clues as to what is affecting the corridor and how it is changing.

The Farm Conservation Plan workshop instructor will assist with these measurements and inventory. Take photographs of the sites you measure and number and mark each on your map or aerial. The measurements can be repeated at the same location to document how the creek is changing and establish a record about the creek's condition. These measurements and photographs can protect the owner should a regulatory situation ever arise. Use a plastic pipe, piece of rebar or stake to mark measurement sites and place field tape on the marker with the number of the site.

These features are then used by the workshop instructor and other restoration specialists, in conjunction with the farmer, to devise an appropriate and successful restoration project. There are numerous regulations that affect what actions can be taken in creeks and limit management and restoration options and must also be included.

Once completed, the inventory will include:

- A delineation of the entire stream network including the swales, ephemeral streams, intermittent streams, and year-round creeks (completed in Element III).

- A determination of the type of creek on the property – alluvial, partly alluvial/partly confined, or confined by hard rock

- An assessment of the condition of the active, or scour, channel - including bars, pools and riffles, large wood, summer water flows, flood levels, and bank erosion areas

- An analysis and measurements of the channel form - high steep banks, low banks, narrow or wide channel, a trend of deepening or widening in the channel.

- Measurements of the riparian corridor width and the proximity of the vineyard.

- An assessment of vegetation types and sizes in the corridor as well as the extent of non-native invasive species including Pierce's disease host plants.

- Observations of fish and wildlife

- Identification of upstream and downstream areas of erosion, locations of reservoirs, roads, and other features which may affect the creek

- An inventory of the current management regime including channel vegetation clearing, dredging or moving of gravel, riprapping and other measures

- Measurement of proximity to the main river channel

- Evaluation of main river channel conditions

1. STREAM SYSTEM

❑ Delineate the entire system of streams on the entire property. Check Element II – New Vineyard Design, and Element III – Managing the Vineyard, as you may have already done this. Use a copy of your topo map and aerial photo. The following features should be included:

- ❑ Year-round or perennial creeks - typically a solid blue line on the topo map
- ❑ River frontage – portions of the property which are adjacent to the main stem of the river
- ❑ Seasonal or intermittent creeks – typically a dashed line on the topo map
- ❑ Ephemeral creeks/swales – these have been identified for the vineyard Elements II and III, but there maybe others on the property that should also be outlined. Detailed directions on how to identify these are on page 20.
- ❑ Vineyard drainage system – use the map or aerial from Element II or III
- ❑ Reservoirs – on-site and nearby (within five miles) of the stream corridor

The focus of this section, Element VI, is on year-round and seasonal creeks. However since these creeks are highly affected by ephemeral creeks, reservoirs and drainage systems, the entire system needs to be included.

- ❑ For each stream, use the name from the topo map, or if the creek has no name give it one or give it a number. Use the same names or numbers for all the streams that you used in Elements II and III.

- ❑ Measure from the map or estimate the length of each creek and fill in the summary table in Section 15.

- ❑ Photograph the corridor along its edge with the vineyard and from all crossings and bridges, from roads above canyons and other views both in the summer and the winter. This section should include year round and seasonal creeks and, to a lesser degree, ephemeral creeks as these may be documented in other elements.

2. CREEK TYPES

There are different types of channels depending on their location in a watershed and their features. The physical processes of water and sediment movement and channel adjustments occur in all stream channels. However, the expression and effect of these processes has a different outcome in different types of channels. Therefore different types of channel require specific restoration and management strategies.

Generally, the defining features of a channel used in this program are the slope, the seasonality of water flow, the material the channel is composed of, and whether the channel is naturally confined by bedrock. In the very upper portion of a watershed channels are steeply sloped and can undergo very rapid movements of sediment, termed debris flows or landslides. These channels, often ephemeral streams, are important to restore and manage and are dealt with under the BMPs for natural drainage channels and soil conservation in Elements II and III. Ephemeral channels are more likely to occur near hillside vineyards and grazing lands and, although they carry water and sediment in storms, they generally do not have fish habitat. However the condition of these ephemeral streams can have a large effect on downstream areas with fish habitat.

The types of channels likely to be found in the farm setting are:
Alluvial, unconfined channels with seasonal or year-round flow: Alluvial channels are made up of unconsolidated material such as gravel which the stream or river can easily move. Alluvial channels have creeks with banks made up primarily of gravel, silt and clay, rather than very large rocks or a solid rock formation. Alluvial channels typically occur in flat or low slope valleys and are not directly confined by the walls of the valley.

Alluvial streams typically meander and have a gravel bed with bars, pools, and riffles. These are the type of streams that have an adjacent floodplain and large riparian forests. During floods water will flow out of the scour channel onto the floodplain. On the floodplain, the floodwater slows in velocity and may deposit fine sediment. There is usually a groundwater basin below and to the sides of the channel and, while the flow may be very low in the summer, there can be isolated groundwater-fed pools where the fish may rear over the summer. The riffles and bars may provide spawning habitat.

Partially confined, alluvial channels with seasonal or year-round flow: Creeks may also flow through a wide area or flat valley where bedrock or rocky slopes or banks may be prominent. These channels have a floodplain in many areas with riparian forest. The channel may meander and have gravel bars and pools in sections with an alluvial bank on one side of the channel and a rocky bank on the other. These types of streams often occur in valleys and flat areas in mountains and along the mountainous edge of floodplain valleys. There may be a groundwater basin under and to the side of the channel that provides summer water for fish rearing. Bars, riffles and gravel deposits can provide rearing habitat.

Confined bedrock channels with seasonal or year-round flow: Confined or bedrock-controlled channels are another type of channel found in most watersheds. The creek channel is dominated by bedrock, cliffs and canyons, and confined with a gorge or canyon with little or no floodplain. The bedrock keeps the channel from meandering. Confined channels can be much higher in slope than unconfined channels. Floodwaters tend to move at a high velocity and be very deep in the confined channel. Confined channels change due to watershed conditions often with different results than alluvial channels.

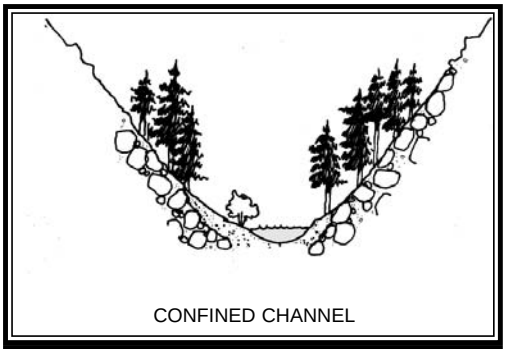
You may have a creek that comes out of a canyon or gorge and into a valley. Typically the valley section is the unconfined alluvial part of the creek and the canyon section is the confined section of the creek.

Further evaluating channel confinement
If after reading the above descriptions you are still not sure about your creeks try this approach:

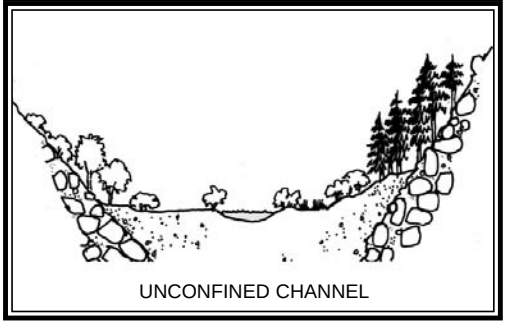
The depth of the water in a stream determines the weight of the water on the streambed. For a given slope, deeper water can move a greater amount of heavy material such as rocks and cobbles than shallow water. The volume of flowing water (discharge), the slope of the channel and the width and roughness of the channel control the depth of the water. Generally, a narrow channel can transport more sediment than a wide channel. Most of the sediment is transported during flood events. Thus, for a given channel segment, the width of the channel during flood events determines the water depth. During a flood a river that flows through a wide flat area will overflow its banks and spread out over its floodplain. During this flood the water depth in the main channel of the river will be limited to slightly greater than the scour channel or bankfull (the 2-year flood) depth. In contrast, during a large flood a river that flows through a steep walled canyon has no area for the water to spread out and the water becomes very deep. Thus, rivers in wide valleys differ from rivers in narrow valleys in the depth and power of flood flows.

Another term for this difference is channel confinement. The river is confined by the narrow valley and unconfined by the wide valley. Confinement measures the ability of floodwaters to spill over the banks of the stream.

CONFINED CHANNEL



CONFINED CHANNEL



UNCONFINED CHANNEL

UNCONFINED CHANNEL

FISH FRIENDLY FARMING FOR THE NAPA VALLEY	ALLUVIAL UNCONFINED CHANNEL AND CONFINED BEDROCK CHANNEL

Channel confinement is defined as the ratio of valley width (VW) to channel width (CW).

Table VIA
Definition of Channel Confinement

Confinement Class	Definition
Confined	VW < 2CW
Moderately Confined	2CW < VW < 4CW
Unconfined	VW > 4CW

VW = valley width; CW = channel width

Using the three classes of confinement, a stream is confined if the valley width, including the channel, is less than 2 bankfull channel widths. It is moderately confined if the valley width is 2 to 4 bankfull channel widths. And it is unconfined if the valley width is greater than 4 bankfull channel widths.

Here is a simplified method to determine confinement from a topographic map:

- On each side of the stream there is a contour line that is roughly parallel to the stream. These contour lines are actually the same line and so have the same elevation.

- Follow one of the lines upstream, it will eventually cross the stream.

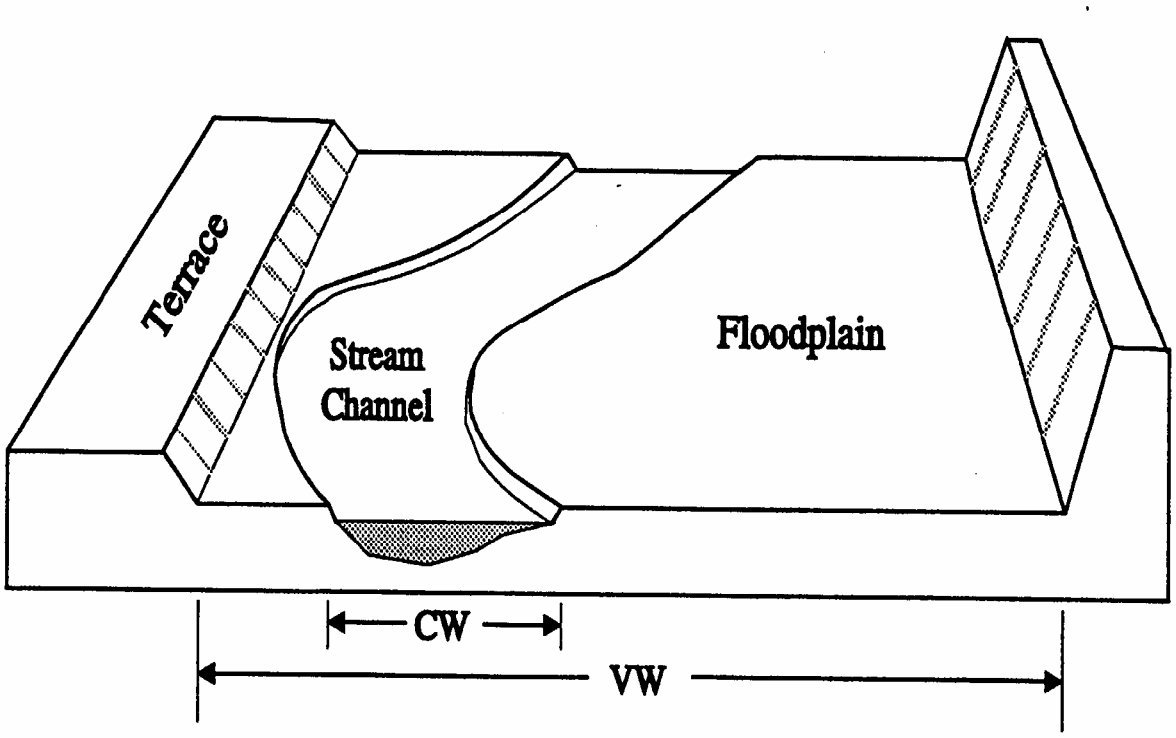
- On a standard 7.5-minute topographic map with a 40 foot contour interval, measure the distance between the contour lines on each side of the creek. Note that the scale of a 7.5-minute quad map is 1:24,000, or one inch equals 2,000 feet. If the distance, is 1/8 inch or less we will consider the stream to be confined. If the distance is between 1/8 inch and 1/4 inch we will consider the stream partially confined. If the distance is greater than 1/4 inch we will say the stream is unconfined.

Table VIB
Definition of Confinement as measured on a 7.5-minute topographic map

Distance between contour lines Map Scale 1"=2,000'	Confinement Class
1/8" or less	Confined
1/8" to 1/4"	Moderately Confined
Greater than 1/4"	Unconfined

In mountainous regions, most stream segments will be confined. Occasionally there may be short segments of unconfined or moderately confined channel. Unconfined stream segments may be expected along larger streams and in valley areas.

- ❑ Using your review of the creek channel features, determine what type of creek you have and complete sections A or B of the Farm Conservation Plan, or both for each year-round and seasonal creek. The Farm Conservation Plan workshop instructor will assist you with all of the evaluations.



ALLUVIAL AND PARTIALLY CONFINED CHANNELS: ASSESSMENT OF STREAM CORRIDOR CONDITION

For each alluvial and partially alluvial stream you will need to do a series of measurements. If you only have confined channels on your property, leave Section A blank and complete Section B.

The workshop instructor, in conjunction with the farmer, does the creek assessment. Additional specialists may also assist with the restoration designs, if needed. Measurements are done at 500-1000 foot intervals along the stream channel (or closer if you have a shorter corridor with great variability). A piece of rebar, a stake, or plastic pipe is placed to mark the location of the measurement. Make sure the field marker won't interfere with machinery turnarounds.

A3. WIDTH OF THE ACTIVE OR SCOUR CHANNEL

The active or scour channel is the area of the creek that is usually unvegetated. There may be gravel bars, pools and riffles in this area. This measurement involves several measurements of the scour area from one edge to the other edge of the vegetation, or where there is an obvious break in the elevation and a clear difference in the channel edge.

On the Farm Conservation Plan template, record these measurements:

- ❑ Using a tape measure, measure the width of the active or scour channel at the locations you've marked. This is the area that typically has a gravel bed and usually has gravel bars, pools and riffles. There may be some vegetation as well but it is usually sparse. The scour channel will be larger than the low flow or summer flow channel. Record all the measurements on the table and then take the average.

- ❑ The width of the main river channel can be too wide to measure with a tape measure. The aerial photo can be used to estimate the width of the active channel. At a number of locations, measure the area of the scour channel on a recent aerial photo with a ruler and multiply by the scale on the photograph to determine the measurement. Go out to the site to make sure your estimate is correct.

A4. WIDTH OF THE RIPARIAN CORRIDOR

The area of land next to the scour or active channel of the creek or river is termed the floodplain and under natural conditions supports riparian forest. The floodplain is usually at a slightly higher elevation than the scour channel and a variety of plants extend from the outer edge of the active channel, along the upper bank and onto the floodplain. The floodplain area nearest the channel may be flooded several times a year whereas the area farther away may be flooded only once in a decade. This measurement is of the corridor of vegetation that currently exists along the creek and may be made up of all sorts of plants. In some areas there may not be a corridor and this condition should also be noted.

Bankfull Channel **Most figures were removed to make file small**

On the Farm Conservation plan template fill in the measurements:

- ❑ On a copy of the aerial mark the outer edges of the riparian corridor for each alluvial creek. Mark both edges even if there are different owners on the other bank. If you are on the main stem of the river also mark the outer corridor edges on both banks of the river.

- ❑ Measure the entire width of the corridor from the outer edge to the other outer edge including the scour channel. Use the same measurement locations as for the scour channel. Use a tape measure or measure from the aerial photo. For the main river channel, you can measure this distance from a recent aerial photo.

- ❑ Record all the measurements on the table in the Farm Conservation Plan template.

A5. CHANNEL/CORRIDOR/VINEYARD

Typically the vineyard will be located on the floodplain or a terrace near to the creek. The vineyard may be located very close to the scour channel or there may be a riparian corridor separating the scour channel from the edge of the vineyard. If the vineyard is next to the scour channel, any change in the channel is likely to cause erosion or failure of a portion of the vineyard.

On the Farm Conservation Plan template fill in the measurements:

- ❑ Measure the distance from the edge of the scour channel to the first row of vines in the vineyard at the same locations used for the other measurements. Use a tape measure or an aerial photo and verify your measurement.

- ❑ Measure the distance from the edge of the riparian corridor to the first row of vines. Depending on the site, this may be the same as measuring from the scour channel edge or it may be very different.

- ❑ Record all the measurements on the table.

A6. BANK HEIGHTS/CONDITION

Besides the width of the active channel, the depth of the channel is also very important. The bank height is an indicator of whether the stream channel is entrenched or incised. This condition means that the bottom, or bed, of the channel has dropped in elevation and the channel has incised into the floodplain and has steep and usually unstable banks. Restoration of creeks with this condition is different than for channels that are not entrenched. The entrenched channel may have no area for flood flows to spread out. The floodwater is contained entirely in the channel with all the velocity and power of the floodwater being directed into the bed and banks often resulting in frequent and large bank failures.

On the Farm Conservation Plan template, fill in the measurements:

- ❑ It can be difficult and sometimes dangerous to measure channel depths until the dry season. During the dry season measure with a tape, yardstick or graduated rod from the top of the bank to the lowest point in the channel (usually a pool). You should make

many measurements of tall banks, moderate, and shorter banks. Always measure the deepest point to the top of bank above that deep point, not anywhere else.

- ❑ Mark all the measurements on the table in the template. While you are measuring the banks, note if the banks are generally real steep (1:1), moderate (2:1), or gentle (3:1 or flatter) and if it is vegetated, or unvegetated. Also note what the bank is made up of: loose gravel and sand, silt/loam, compacted clay, or large boulders with silt, gravel, and sands.

A7. VEGETATION

The type and extent of vegetation along the outer and inner edges of the corridor is an indicator of the health and sustainability of the stream corridor. It is also an indicator of the need to eradicate invasive non-native plants. Each plant species grows a different distance from the scour channel due to different tolerances for inundation and mechanical damage from floods. Each plant species has a particular strategy to set seed, spread vegetatively or compete with other species. Generally for this measurement, the primary features to evaluate are the type and size of the trees, amount of undergrowth and presence and extent of invasive non-native plants.

On the Farm Conservation Plan template, fill in the measurements:

- ❑ Walk the outer corridor edge and look at the vegetation. Walk the scour channel and look at the vegetation. Take photos at several sites and of the different types of plants. Fill out the template regarding:
  - ❑ The type and size of the trees and density of vegetation on the outer edge of the corridor
  - ❑ The type and size of the trees and vegetation along the edge of the scour channel
  - ❑ The occurrence and extent of invasive non-native plants.
- ❑ There are several good field guides for riparian plants: A Guide to Restoring Native Riparian Habitat in the Russian River Watershed is available from Circuit Rider Productions (707-838-6641) and Common Riparian Plants of California by Phyllis Faber is available from the California Native Plant Society at www.cnps.org.

A8. CREEK CHANNEL FEATURES

The features of the creek channel will vary over time and for every different stream. This basic evaluation sets a baseline of information about your stream channel to use as indicators of the condition of the stream and to use to compare with later evaluations. Generally the scour channel is the dynamic changing part of the creek or river. The movement of flood water and sediment through the channel creates and modifies such features as pools, riffles, gravel bars, banks, and the overall width and depth of the channel, as well as the size of its meanders.

Insert – stages of riparian forest large trees become wood in the channel and habitat for fish (164)

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On the farm plan template fill in the features you observe for the creek channel:

- ❑ If the creek is highly variable, then make notes next to the different conditions listed and how often or where each applies.

- ❑ An important aspect of fish habitat is the presence of large logs and wood in the stream channel. As you walk the stream, record the presence of large wood.

- ❑ If possible take a graduated rod or other measuring device and measure the depth of several of the pools. Record the dates of the measurement and whether it was a wet or dry year.

- ❑ For the water flows in the summer, ask your neighbors if you have only recently purchased the site. Otherwise record your observations and be as accurate as possible.

- ❑ For the evaluation of the stream bottom the focus is on bar and riffle areas rather than the pool bottom. It is sometimes useful to pick up a few handfuls of material on each bar and really look at the amounts of gravel, sand, and silt. The gravel on the bars or riffles must have large rocks with large air spaces dominating the surface of the bar. If there are some large rocks, but there is a lot of silt and sand around each rock, then indicate this condition on the template. Write down any details you observe.

A9. FISH AND WILDLIFE

Landowners often observe wildlife and this is your chance to record the animals you see. There is also a section on the template to record your observations of small fish in the stream.

Fill in the template about the fish and wildlife you observe:

- ❑ It is difficult to determine if you are seeing trout or salmon fry or other small fish unless you use behavior as an indicator. The trout and salmon will dart very quickly into a protected area, such as next to the bank or under a submerged log, at the first sound of a person approaching the creek. There are other small fish, but these are not as quick to hide as the trout. This behavioral difference can be used to confirm the type of fish you are seeing.

- ❑ Record the other animals you see on the template.

A10. FLOOD AREAS

The overflow of floodwater onto the floodplain is a natural event that slows down flood flows. Some portion of the vineyard, near a stream or river may be flooded either on a regular basis or only occasionally when a large flood comes. If a channel is highly incised, floodwater may be carried entirely in the channel with no overbank flow and act to erode banks.

On the Farm Conservation Plan template, fill in the information:

- ❑ On the aerial mark the areas where flooding occurs most often along each creek. Also mark the areas that flood only in real big storms. Indicate any road area that regularly floods.

- ❑ If you are along an area of a creek corridor below a large municipal reservoir, record your observations regarding the effects of the reservoir on the stream or river corridor.

A11. STREAM CROSSINGS

Roads are addressed in Element V. However, a road crossing a stream can have an impact on the stream corridor that needs to be considered in the restoration and management of the corridor or may block fish migration on the creek. The road crossing may need to be modified or rebuilt.

On the Farm Conservation Plan template, fill in the information:

- ❑ Mark all permanent and temporary road-crossing locations on the aerial.

- ❑ List the type of crossing and its season of use. This same information should be completed for Element V and the improvements to the crossing that may be needed are addressed in that element.

- ❑ List any public roads that cross the stream within one-half mile of your site.

A12. CHANGES OVER TIME

If you have owned or managed the property for a period of time - what large changes have you noticed in the stream/river corridor? There are often not adequate records of how a stream has changed from large floods, fires, reservoir construction, upstream developments and downstream changes.

On the Farm Conservation Plan template:

- ❑ Indicate those changes you have observed and fill in the name/number of the creek.

A13. CHECK YOUR PRACTICES

Often a management practice gets started after a large fire and flood cycle and is only really appropriate for a few years, but is continued long past that time. Continued use of a management strategy can change features of the creek, not produce the intended result and be detrimental to the farming operation, as well as fish habitat.

Some examples of management practices and their potential effects:
Annual clearing involves removal of the vegetation in the channel. This practice increases the speed of the floodwater in the channel, moving water faster to downstream areas. However, faster moving water erodes more sediment from the channel and the creek often eats away at its bed and banks and the channel incises, or downcuts.
Channel incision, also called entrenchment, can produce:

- ❑ Steep unstable banks which eventually collapse as the channel widens.

- ❑ Increased delivery of fine sediment and water quality degradation

- ❑ Back cutting into the streams and drainageways that feed from the vineyard into the incised channel. This back-cutting can erode the vineyard and its installed drainage system.

- A loss of riparian habitat from bank erosion and loss of in-stream habitat from channel scour. As these changes occur and the channel entrenches further, riparian vegetation cannot re-establish on the steep banks or in the channel with high velocity flows.

- Entrenched channels undergo a process of adjustment involving further bed erosion, followed by bank slumping and formation of a new floodplain.

If the vegetation along the channel edges is allowed to grow larger and shade the stream, there will be less brushy vegetation in the floodway. Active replanting of native vegetation can protect banks and reduce erosion.

Channelization involves ditching and straightening to allow for greater amounts of land to be farmed. Along many alluvial streams this practice will produce additional farmland for a limited time. As the straightened creek carries faster moving water, it undergoes the incision process. As its banks become steeper they are prone to collapse and the channel will widen out again reclaiming the farmland. This process may take several decades. Channelizing the creek, combined with vegetation removal, can create greater rates of incision.

Removal of gravel is done to reduce meandering and bank erosion, and in some instances, for confining floods to the channel. Again, the management activity may achieve these purposes for a period of time, but if the quantities of gravel removed are greater than gravel replenishment, which is very common, the channel is likely to incise. Despite the gravel removal, deposition can still occur in the next flood, making any flood control improvement temporary. Careful measuring, surveying and monitoring every year must be done to avoid over-extraction. Removal of gravel also disturbs the gravel bar surface and removes the protective "armor" of larger rocks and can leave the under layer more vulnerable to erosion in floods with an increased lowering of the bed. Annual removal of gravel can destabilize the stream and result in more long-term negative effects. Although it may be necessary from time to time to remove gravel if it builds up, this practice should be carefully considered and limited. Creating an adequate riparian corridor and reducing upstream erosion can reduce the need for gravel removal.

Levees are built on the floodplain adjacent to the channel to restrict floodwater from inundating the floodplain. The levees are usually several to many feet higher than the floodplain. For a period of years, this practice will reduce many floods from inundating the floodplain; however, once the floodflows are confined in the channel, they have greater velocity and will erode the bed and banks, causing incision. Over time, as the channel deepens, the banks grow tall and collapse and the levees may eventually be undercut.

Bank stabilization with various materials involves using rock, old cement and other hard materials to cover the bank to reduce erosion at one point along the channel. Generally, the bank needs to be laid back to a stable slope the project should be designed by a civil engineer. Often rock and vegetative methods are combined. In many sites, this practice is done because the river or creek is meandering in response to previous management actions or other watershed changes. Riprap armoring of banks often results in erosion of the opposite bank or downstream areas of the channel as the riprap increases water velocity. Riprap used in an incised channel is undercut and becomes ineffective over time. If many areas of the channel consistently undergo bank erosion, the stream corridor needs a different management approach.

On the Farm Conservation Plan template, check all of the practices you use currently or have used in the past, and list the creek name or number.

- ❑ Indicate if the practice is used over small areas of the creek as a problem site application or if it is applied to the entire stream corridor. Indicate if you have recently made changes to your management practices.

- ❑ If you have recently purchased or begun management of a site list the previous owner's practices to gain a better understanding of the causes of the corridor condition.

- ❑ For the bank erosion section, determine where and how often bank erosion occurs for each stream and fill in the template. If there are one or two problem areas indicate these on your map or aerial and list this on the template. If there is a persistent problem over one or more creeks also indicate this condition.

A14. UPSTREAM/DOWNSTREAM CONDITIONS

Watershed Conditions

Creeks function within the context of their watersheds. Most property boundaries have little to do with watershed boundaries and few landowners control an entire drainage. Although the focus of the farm conservation plan is to manage and restore creeks on the individual farmer's property, this can be difficult if watershed conditions are having a great effect on the channel. Use the inventory of ephemeral creeks done for Elements II and III to identify upstream erosion sites on the property.

The reasons for looking at watershed features is that land uses can change the sediment supply or the amount of floodwater in the creek. The creek on your property will adjust to the changes in these factors. Knowing some of the reasons for the sudden changes in the creek will help in determining an effective repair and restoration strategy. A change in the watershed may take many years to reach your part of the creek and it is sometimes difficult to connect the cause with the effect. For example, the failure of a road or a landslide may send a slug of sediment into the system. Several years later this slug reaches your section of the creek causing the banks to erode as the channel widens to accommodate the increased load. However, in other cases, a new reservoir may retain sediment immediately in one big storm and your creek may incise, or a new urban area will drastically increase the volume of stormwater and again the creek may incise rapidly.

Napa River

In the Napa River watershed, another major cause of change in the creek system comes from change in the river channel. There have been several studies of the condition of the Napa River and its tributaries. The most recent study, Napa River Watershed Limiting Factors Analysis (Stillwater Sciences, 2002), found the main Napa River had incised up to 6 feet downstream of Calistoga and is currently incising upstream of Calistoga. There are other recent studies that show 12-15 feet of incision since 1940. USGS streamflow records from the St. Helena gage (Zinfandel Lane Bridge Station # 11456000) indicate incision of 6-10 feet. An analysis of the measurements of the river channel from the USGS gaging station at St. Helena reveals significant channel incision with periodic relocation of the gage to a new lowered datum as the river bottom drops (WET, Inc., 1990). In some locations, the 50-100 year frequency flood is contained in the entrenched channel, further increasing incision. There are many causes for this major change.

Insert – processes of bank erosion (168)
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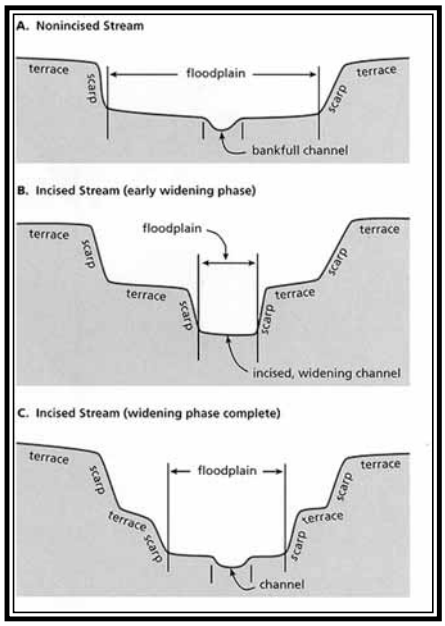
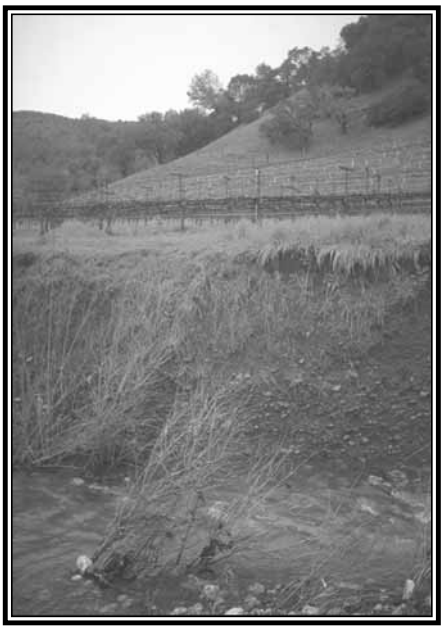




FISH FRIENDLY FARMING FOR THE NAPA VALLEY	CHANNEL INCISION CAN CAUSE INCREASES IN BANK EROSION WITH LOSSES OF VINEYARD AND RIPARIAN FOREST

Reservoirs are one cause of channel incision in the Napa River. Reservoirs interrupt sediment supply to the stream below the dam and cause incision, as well as other changes. There are 28 reservoirs with storage capacity greater than 28 acre-feet in the Napa River (Stillwater Sciences, 2002). The largest of these reservoirs are municipal and include Conn Creek dam on Lake Hennessey, built in 1948 and the Rector, Bell Canyon, and Milliken reservoirs. These four reservoirs together represent over 91 percent of the total reservoir storage in the Napa River watershed. With the exception of Soda Creek, all the tributaries on the east side of the watershed are blocked by major reservoirs. Approximately 30% of the average annual runoff in the watershed is collected in these major reservoirs. Additionally, the dams on Conn, Bell Canyon, and Rector Creeks removed about 17% of the historic steelhead habitat in the Napa River watershed. Prior to the dam, Conn Creek is believed to have been one of the best tributaries for steelhead trout in the basin (Stillwater Sciences, 2002).

Channel and floodplain alterations have also contributed to incision in the main Napa River channel. In the 1960s, the river channel was cleared of large wood and vegetation, dredged in its downstream reaches, mined for gravel in many locations, and leveed in some locations (Stillwater Sciences, 2002). As part of agricultural and urban development, floodplain wetlands were filled and side channels eliminated. The banks of the river channel in various locations were lined with riprap, gabions, concrete, and other hard materials for stabilization.

The Limiting Factors Analysis also compared conditions in three areas of the main river between 1940 and 1998. In 1940, prior to the widespread use of bulldozers and heavy equipment for flood control and floodplain reclamation, the river channel had a gravel bed, channels with bars, pools, mid-channel islands, multiple channels in some locations, a wide corridor of riparian forest, and a floodplain which was inundated frequently and was in connection with the stream channel. By comparison, in 1998, the channel was narrow, straightened, incised to a depth such that its former floodplain is only inundated in large floods and long shallow pools had replaced the bars, pools, riffles, and mid-channel islands. Riparian forest has been reduced to a narrow band (Stillwater Sciences, 2002).

The activities of straightening, clearing, dredging, and lining the river channel with hard materials all serve to alter natural processes, increase water velocity and scour in the river channel while “stabilizing” banks to prevent meandering and channel adjustment to reduce velocities and scour. This cycle of changes combined with the reduction of sediment supply due to the reservoirs, increases the incision process over time, producing a river channel that has lowered into its floodplain by 10 feet, and maybe as much as 15 feet, and has steep unstable banks. The banks continue to slump as the incision process progresses and the river adjusts by widening and re-creating a new floodplain to slow and spread floodwater.

The drop in base elevation of the main river channel, affects the lower sections of the tributaries. The incision backcuts up the tributary often affecting road bridges and property. For example, upstream of the Silverado Trail bridge over Soda Creek, the stream channel shows incision and a structure has been installed in the channel to reduce incision. Incision in lower Dry Creek and Conn Creek, as well as many west side tributaries, has also been documented (Stillwater Sciences, 2002). Incision in the tributaries produces the same cycle of change as in the main river channel. Additionally, removal of wood, clearing and straightening of tributary creeks has been widespread in the Napa basin (Stillwater Sciences, 2002). Because the river conditions can have such an effect in the tributary

channel, this feature is evaluated in detail in the Farm Conservation Plan and stream restoration plan.

Channel incision may also create barriers to fish migration by lowering the elevation of the channel below hard rock areas, culverted crossings and other types of features fixed in the channel. Barriers may also occur due to the type of culverts used and Element V– Roads inventories these features.

On the Farm Conservation Plan template, indicate:

- ❑ Use the topo map/aerial photo to locate both small and large farm ponds and reservoirs upstream of the creek(s) on your site. For each creek list the number and size of the reservoirs. The reservoirs do not need to be on the main stem of the creek to affect your stream. Indicate all the reservoirs and estimate the distance to your site.

- ❑ Indicate any areas where land uses have recently changed including hillside vineyards, timber harvesting, or major roads and list the name or number of the creek.

- ❑ For each creek, indicate any urban areas upstream.

- ❑ Indicate any large landslides upstream of each creek.

- ❑ Indicate any known barriers to salmonid migration within your creek segment, upstream or downstream of it.

- ❑ Indicate erosion sites or erosion in ephemeral creeks as identified in Elements II and III.

- ❑ If the stream corridor is within one mile of the confluence with the main Napa River channel, the conditions of the river channel are likely to affect your creek. List the creek name or number.

A15. SUMMARY

The measurements and features evaluated in Sections 1 –14 should be summarized on the two tables in the farm plan template for each year round or seasonal creek.

- ❑ For each creek, list all the measurements and then list the average of the number. Only list the features you checked and observations you've made.

A16. DETERMINING CORRIDOR CONDITION

The assessment and review of current conditions and management practices allows the farmer to determine which of several types of conditions occur. Use these descriptions for all year-round and seasonal creeks. The conditions of the main stem Napa River are listed separately.

On the Farm Conservation Plan template:

- ❑ For each creek, review the summary table of measurements.

- ❑ Review the following detailed descriptions of corridor conditions.

- ❑ Determine which corridor condition best describes your creek/river corridors. Pay particular attention to:
    - ❑ Bank height measurements (A-6)
    - ❑ Proximity of vineyard to the active or scour channel (A-3- A-5
    - ❑ Current management practices(A13)
- ❑ Fill in the condition on the summary table in Section 15.

Highly Altered

The following are descriptions of some typical conditions for highly altered corridors. There maybe other situations that also create highly altered creeks.

- Vineyard area is within 10 to 20 feet of the bank of the scour channel, creek banks are 12 feet high or more and require repair often. Management activities occur every year and involves vegetation removal, channelization, gravel removal or other direct manipulation of the channel. If the creek should erode the bank, the vineyard would be directly affected.
- Vineyard area is within 20 feet of the bank of the scour channel; there is little to no riparian vegetation and the creek is actively cleared, straightened and managed. If the creek should erode the bank, the vineyard would be directly affected.
- The scour channel requires constant active management such as clearing of vegetation, gravel extraction and straightening. Maintenance costs are high. The scour channel is very narrow and has little to no riparian corridor. The banks are over 12 feet in height and vertical. The vineyard is within 20 feet of the creek bank and any erosion along the creek would affect the vineyard.
- Creek channel is braided and wide, gravel is extracted on a regular basis, there is little riparian vegetation and the vineyard is within 20 feet of the bank.

Moderately Altered

The following are descriptions of some typical conditions for moderately altered corridors. There maybe other situations that also create moderately altered corridors.

- Vineyard area is 30 feet or so from bank of scour channel, there is one row of riparian trees; channel is cleared and managed every few years.
- Creek has little vegetation, vineyard is 50 feet from bank of scour channel, creek banks are over 12 feet in height, and channel bed is actively managed with heavy equipment or mined at least every 5 years.
- Creek bed is broad, channel braids, some areas have riparian vegetation. There has been a rapid widening of the channel. Creek bed is actively managed with heavy equipment at least every 5 years.

- Specific areas of the creek channel require constant management. The corridor has some vegetation, but the channel is narrow and has been stabilized with rock, cement or other materials in many spots.

Occasionally Problematic

The following are descriptions of some typical conditions for occasionally problematic corridors. There maybe other situations that may create occasionally problematic corridors.

- Only large storm events cause bank blowouts. Creek banks are greater than 12 feet in height and vegetated. Recently after a major storm banks began eroding and the channel seemed to fill in with gravel material.

- Large storm events consistently cause problems in one area of the channel. This area is next to the foothills where the creek flattens out onto the valley floor from a steeper hilly section. After big storms, the scour channel braids and widens affecting the vineyard area that is about 30 feet from the scour channel edge.

- Vineyard area is 50 feet from creek channel; banks are over 12 feet in height and there is very little floodplain along the channel. Banks have failed, causing the area between vineyard and creek to get smaller.

Rarely A Problem

The following are descriptions of some typical conditions for corridors that are rarely a problem. There maybe other situations that also create corridors that are rarely a problem.

- Vineyard area is on a terrace away from the creek and creek is not managed.

- Vineyard area is 25 feet or more from the edge of the riparian corridor and there is a densely vegetated riparian corridor. Corridor is rarely managed and problems are few. Vineyard is not affected by bank erosion.

- The creek may benefit from removal of exotic invasive plants and some enhancement. Generally there is little the farmer does and the corridor and creek do fine.

Suddenly A Problem

The following are descriptions of some typical conditions for corridors that are suddenly a problem. There maybe other situations that also create corridors that are suddenly a problem.

- The creek corridor changed from rarely a problem to have some major bank erosion during a wet winter. There are some changes in the watershed that might have started this change.

- A large increase or decrease in the width or depth of the scour channel after floods.

Main Stem River

Indicate the area your site is located in:

- Upper Napa River, upstream of Zinfandel Lane
- Middle Napa River, downstream of Zinfandel Lane, but north of Trancas Avenue in Napa
- Lower Napa River, downstream of Trancas Avenue in Napa

Insert – examples of highly altered and moderately altered corridor conditions (172)

Insert – examples of occasionally problematic, rarely a problem, suddenly a problem corridor conditions (172)

A17. DETERMINING NECESSARY CORRIDOR WIDTH

Many stream channels have been altered, narrowed, channelized or cleared and no longer reflect the conditions needed for fish habitat. The first step in recovering and restoring the streams is to determine the width they need to undergo natural processes. This section includes a summary of a method originally developed for the Russian River watershed using extensive analysis of flow gage data and cross sectional measurements and refined by using available data for use in the Napa River watershed. The method provides a guideline for determining the needed corridor width for a specific creek based on the size of the watershed and the streamflow from a 1.5 - 2.0 year flood event. By using this method rather than some arbitrary number such as 100, 200, 300 feet as the needed width, the actual physical features of the stream are taken into account. Appendix 6 has the detailed data analysis for the method.

A Method to Determine the Minimum Width of the Riparian Corridor

Stream channels are part of a dynamic system. Over a period of time, stream channels adjust their shape so that they can carry the water, sediment and debris flow supplied by the watershed. Bank collapse is a normal part of the dynamics of a stream. Therefore, it is prudent to keep land uses away from the top of the stream bank. How far away is adequate to avoid problems? Since streams are dynamic, we must frame our answer in terms of a specific time period, say 20 years. Next we must recognize that streams have a tendency to meander. The meandering process is the result of repeated bank collapse, at a specific location, on one side of the channel and deposition on the other side of the channel. Meandering can result in the rapid retreat of the streambank. So the riparian corridor must provide enough set back distance to allow bank collapse and meandering to occur during the planning horizon of 20 years.

Bankfull Discharge

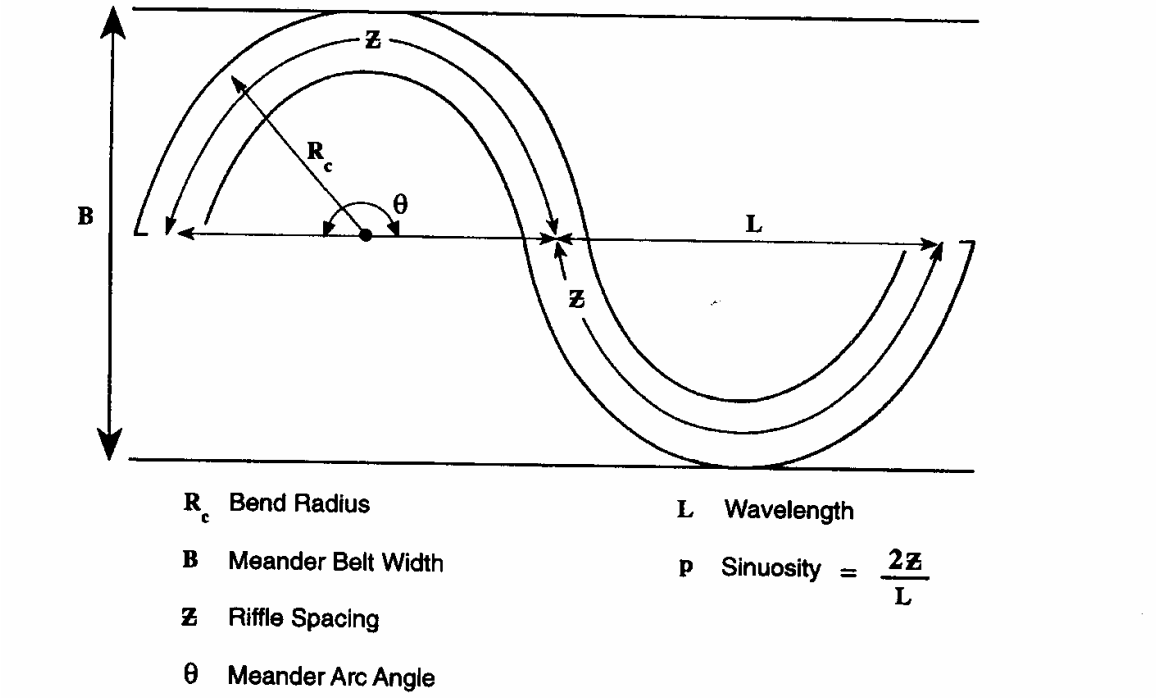
Contemporary fluvial geomorphology has demonstrated that the shape of a stream channel is dictated by flood flows. Analysis of extensive sediment transport data shows that the flows that do the most work, that is carry the greatest total amount of sediment over a period of many years, correspond to the floods that occur roughly every other year. The frequent floods shape the channel and are called the bankfull discharge or channel forming flow.

Most natural alluvial streams have a well-defined floodplain. In these streams the bankfull discharge fills the active or scour channel and begins to flow onto the floodplain. That is, the water level reaches the top of the bank of the scour or active channel and begins to spill onto the floodplain.

Meander Amplitude

The terms used to describe stream and river meanders typical of alluvial channels are shown in the figure below. A well-developed meander has a radius of curvature of 2 to 3 bankfull channel widths. On a natural stream the bankfull channel is the same as the active or scour channel but typically larger than the low flow or summer channel. The meander belt width is twice the radius of curvature. Therefore, the meander belt width is 4 to 6 times the bankfull channel width.

If we are dealing with streams that have not been significantly straightened or altered, we can assume that a certain amount of meandering is already present in the stream. That is we do not need to provide a set back that is large enough to provide for the development of a completely new meander. Therefore, the width of the riparian corridor may already be 4 to 6 bankfull channel widths.



Definition diagram for meander plan form. From *Applied Fluvial Geomorphology for River Engineering and Management*, Edited by Thorne, Hey and Newson, 1997.

Channel Entrenchment

Luna Leopold (*A View of the River*, 1994) defines a floodplain as:

> "A floodplain is a level area near a river channel, constructed by the river in the present climate and subject to overflow during moderate storm events."

The idea that the river constructs its own floodplain is an important one. The material that forms the floodplain was transported to its present location by the river or stream and the material is termed alluvial.

An entrenched channel is one that lacks a floodplain. Entrenched channels have often incised due to channelization, straightening, and the effects of reservoirs, urbanization or the clearing of vegetation. If a corridor has a floodplain, then stormflows can spill out of the channel and onto the floodplain. This limits the depth of floods and allows the water to

spread out and slow down, which in turn limits the amount of force on the bed of the stream. On the other hand for stream corridors that lack a floodplain the amount of force on the streambed can be substantially greater for the same size of flow. Greater force erodes the streambed and undermines the banks. So, if the banks of the stream are higher than the level of the bankfull discharge then the banks will tend to collapse. This process of bank collapse will continue until a bench is created that is wide enough to act as a new floodplain. After the bench is formed the top of the banks of the bench will be at the level of the bankfull discharge.

Channel entrenchment is one of the processes that can cause this cycle of bank collapse. However by creating a wide enough corridor the channel can develop a floodplain. As the channel develops its floodplain, the bank collapse caused by channel entrenchment will stop.

One scientist, Dave Rosgen, approaches channel entrenchment by defining the entrenchment ratio as the flood prone width of the channel divided by the bankfull channel width. The flood-prone width is defined as the valley width at the elevation of twice the maximum bankfull depth above the streambed. Rosgen's flood-prone width is a specific portion of the floodplain and could also be called the stream corridor width. The floodplain can extend beyond Rosgen's flood-prone area.

Rosgen judges a channel to have a floodplain when the entrenchment ratio is greater than 2.2. Since the entrenchment ratio is defined in terms of bankfull width, we see that the riparian corridor must be at least 2.2 bankfull channel widths to accommodate the development of the flood-prone area.

We also reviewed the Natural Resource Conservation Service (NRCS) Conservation Practice standard for Riparian Forest Buffer. This standard uses a similar approach to Rosgen.

Minimum Riparian Corridor Width

The above considerations suggest that the minimum width of the riparian corridor should be a total of 3 to 4 bankfull channel widths. This will allow for the development of a flood-prone area and provide some room for meander development. The most practical way of laying out a riparian corridor that is a minimum of 3 to 4 bankfull channel widths wide is to measure one to one and one-half bankfull widths away from the top of the bank on each side of the stream.

Determining Bankfull Channel Width

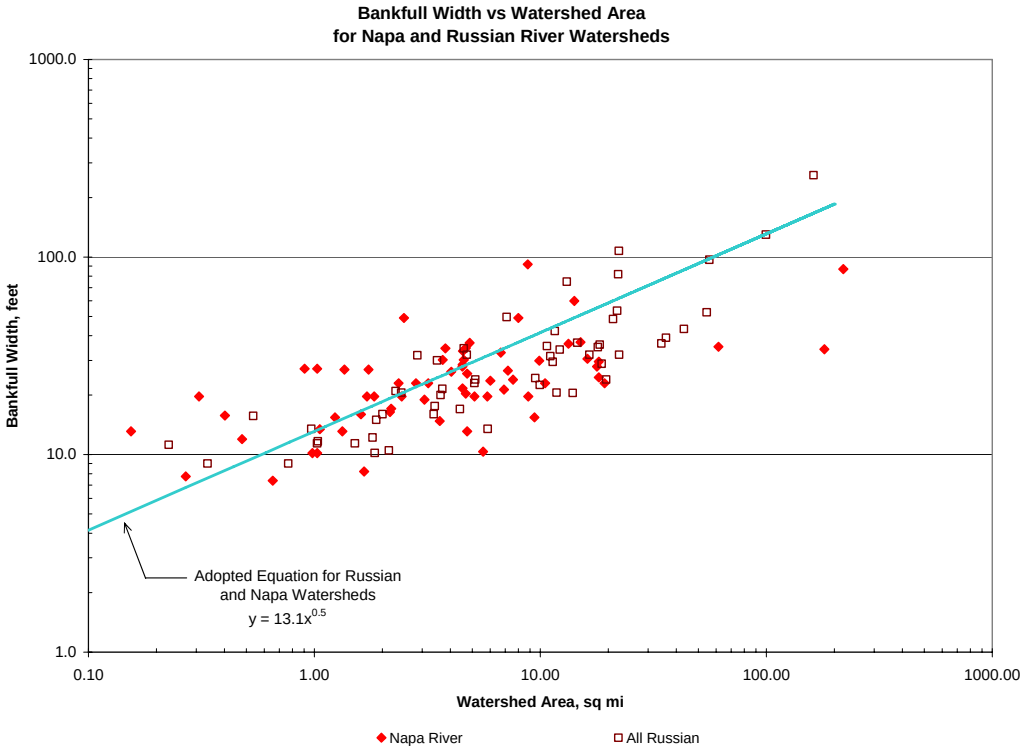
Measurements of stream channels in the Napa River watershed are limited. Data was collected from three scientific consultants working in the Napa River basin. The Limiting Factors Analysis, the Napa River Watershed Task Force report, and watershed assessments under way for the Napa RCD stewardship program provide some data on tributary channels. These data are surveyed cross sections of the bankfull channel width completed by professionals. We plotted these channel measurements against an analysis of the watershed area draining to that location on the channel. The data were also reviewed for variations in the watershed area to channel width for various geologic conditions and geographic differences within the Napa River basin. No significant variations were found.

In addition to the data from the Napa basin, the larger data sets from the Russian River already used in the Fish Friendly Farming program were evaluated with the Napa data. The

Russian River data included 50 bankfull cross sections collected from six USGS gauging stations and from Department of Fish and Game stream surveys. The analysis of this data is summarized in Appendix 6

These data were used to create a formula to predict bankfull channel width based on watershed area:

$$\textit{Bankfull Width} = 13.1(\textit{Watershed Area})^{0.5} \qquad R^2 = 0.760$$



Graph 1. Bankfull width versus watershed area data is shown from 56 sites in the Russian River watershed and 66 sites in the Napa River watershed. The line shows the adopted relationship between bankfull width and watershed area from the Russian River watershed. The Napa River watershed bankfull width data appears similar to the Russian, so the same equation was used for both watersheds. Y is bankfull width, X is the watershed area and R^2 is the regression coefficient

Bankfull data from 66 sites in the Napa River watershed was combined with the 56 Russian River sites. Graph 1 shows both sets of bankfull width data plotted against watershed area. The line shows the adopted relationship between bankfull width and watershed area from the Russian River watershed. The Napa River watershed bankfull width data is similar to the Russian River, so the same equation was used for both watersheds.

This methodology is applied to tributary creeks that are alluvial and unconfined or alluvial and partly confined channels (see Table VIC). The methodology is not applied to the mainstem of the Napa River, any confined channels, or creeks immediately below the large municipal water supply reservoirs. Table VID summarizes the total watershed area at the confluence of each tributary creek with the Napa River. The corridor measurement for a restoration plan would be completed based on the actual watershed area upstream of the site.

As part of developing this methodology, a number of natural creeks in the Napa River watershed were measured. Unconfined alluvial channels with the most natural, unaltered conditions were chosen. The field evaluation found that the four times bankfull width corridor had a diversity of plant species and natural regeneration of seedlings at all but one site (see Appendix 6). This site was overrun by English ivy and blue periwinkle and incised with 15-foot vertical banks. These conditions severely limit natural regeneration of native species.

Determining your necessary corridor width:

- ❑ On a topo map(s) of your tributary basin mark the upstream boundary of the creek corridor. You will need to measure the acreage or square miles of the land area or the watershed that drains to this point on the creek. The Napa Green workshop instructor will complete this analysis with the farmer.

- ❑ Once you have the watershed area, make sure it is in square miles. Use Table VIC to determine the necessary width of scour channel and the width for the riparian corridor.

- ❑ Record these numbers on the farm plan template for each year-round and seasonal creek in Section 17.

- ❑ If you have over one-half mile of creek corridor, do the estimate for the upstream and downstream ends of the corridor and record both numbers.

- ❑ If you have frontage on the main river channel, fill out the river corridor table. The above methodology is for alluvial tributary creeks, not the main river channel.

- ❑ If your existing riparian corridor is greater in width than described in Table VIC, do not remove vegetation to make it smaller.

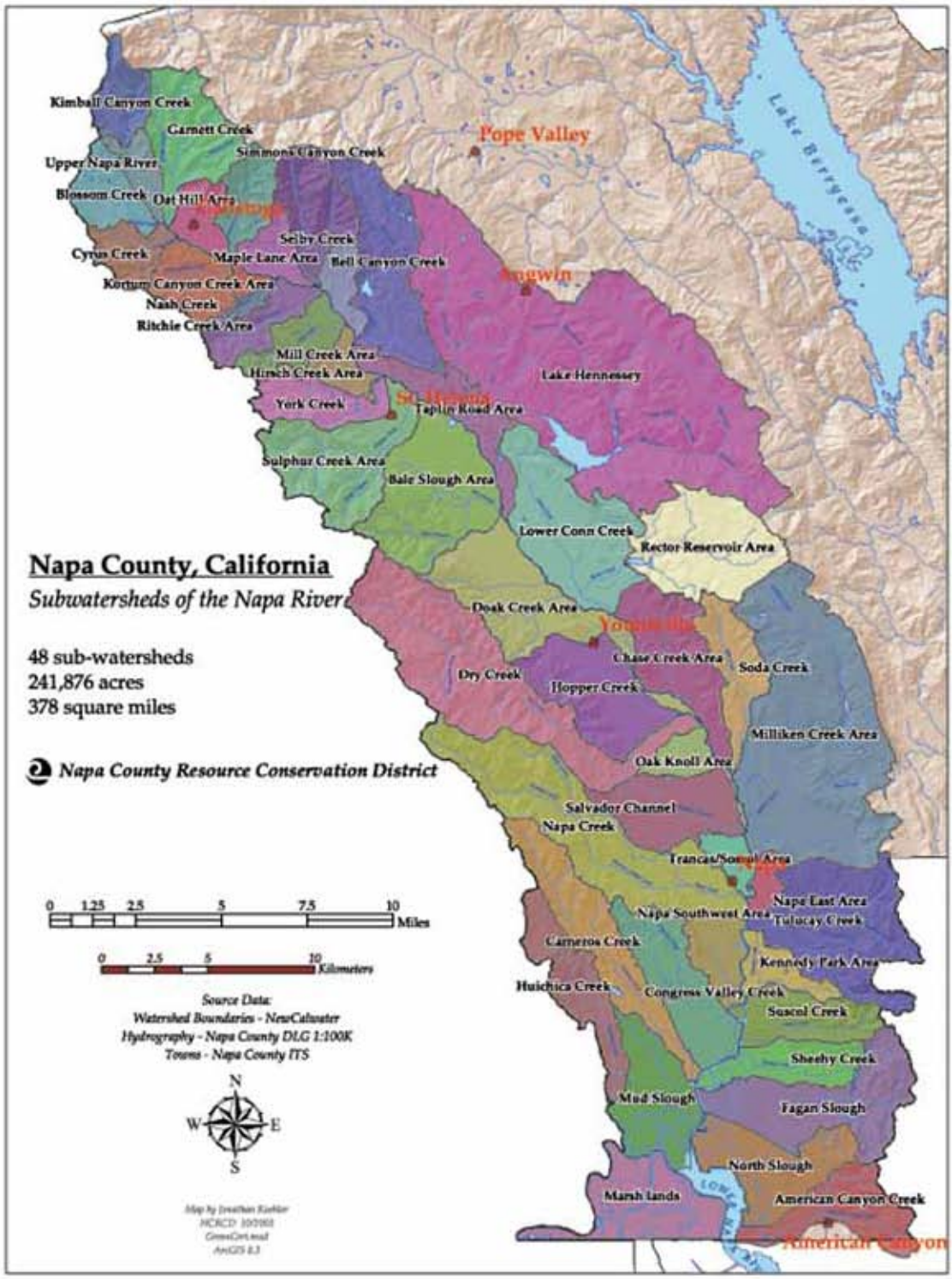
Table VIC
Estimates of tributary creeks bankfull width for various watershed areas based on combined data from the Napa River and Russian River watersheds.

Watershed Area (square miles)	Estimated 1.5-Year Discharge (cfs)	Estimated Bankfull Channel Width (feet)	Estimated Necessary Corridor Width* (feet)
less than 1		11.3	50
1	110	13.1	50
2	200	18.5	75
3	290	22.7	90
4	380	26.2	105
5	460	29.3	115
6	540	32.1	130
7	630	34.7	140
8	710	37.1	150
9	790	39.3	155
10	870	41.4	165
12	1,030	45.4	180
14	1,180	49.0	195
16	1,340	52.4	210
18	1,490	55.6	220
20	1,640	58.6	235
22	1,790	61.4	245
24	1,940	64.2	255
26	2,090	66.8	265
28	2,240	69.3	275
30	2,380	71.8	285
32	2,530	74.1	295
34	2,670	76.4	305
36	2,810	78.6	315
38	2,960	80.8	325
40	3,100	82.9	330
42	3,240	84.9	340
44	3,380	86.9	350
46	3,520	88.8	355
48	3,660	90.8	365
50	3,800	92.6	370
60	4,500	101.5	405
70	5,180	109.6	440
80	5,850	117.2	470
90	6,520	124.3	495
100	7,180	131.0	525
110	7,840	137.4	550
120	8,490	143.5	575

*Four times bankfull width rounded off to the nearest 5 feet

Table VID – Napa River Watershed Tributary Watersheds

Tributary	Acres	Square Miles
American Canyon Creek	4123.53	6.44
Bale Slough Area	7920.56	12.38
Bell Canyon Creek	6471.93	10.11
Blossom Creek	2488.31	3.89
Carneros Creek	5894.34	9.21
Chase Creek Area	5260.95	8.22
Congress Valley Creek	5142.16	8.03
Crystal Springs Area	1514.85	2.37
Cyrus Creek	2026.88	3.17
Doak Creek Area	7355.19	11.49
Dry Creek	12636.38	19.74
Fagan Slough	7064.44	11.04
Garnett Creek	4826.83	7.54
Hirsch Creek Area	1498.00	2.34
Hopper Creek	5690.73	8.89
Huichica Creek	4072.75	6.36
Kennedy Park Area	1766.20	2.76
Kimball Canyon Creek	2170.21	3.39
Kortum Canyon Creek Area	2784.37	4.35
Lake Hennessey	32095.70	50.15
Lower Conn Creek	8043.71	12.57
Maple Lane Area	1739.73	2.72
Marsh lands	5457.00	8.53
Mill Creek Area	2389.46	3.73
Milliken Creek Area	18784.39	29.35
Mud Slough	4804.65	7.51
Napa Creek	11522.18	18.00
Napa East Area	826.21	1.29
Napa Southwest Area	2253.54	3.52
Nash Creek	488.96	0.76
North Slough	5119.85	8.00
Oak Knoll Area	1526.08	2.38
Oat Hill Area	1731.61	2.71
Rector Reservoir Area	6950.33	10.86
Ritchie Creek Area	2253.51	3.52
Salvador Channel	4612.02	7.21
Schramsberg Area	438.37	0.68
Selby Creek	3714.46	5.80
Sheehy Creek	3189.61	4.98
Simmons Canyon Creek	2318.74	3.62
Soda Creek	3293.32	5.15
Sulphur Creek Area	6411.40	10.02
Soscol Creek	3582.40	5.60
Taplin Road Area	3600.39	5.63
Trancas/Soscol Area	1205.35	1.88
Tulucay Creek	8600.29	13.44
Upper Napa River	1396.12	2.18
York Creek	2818.82	4.40
TOTAL	**241876.81**	**377.91**


Napa County, California
Subwatersheds of the Napa River
48 sub-watersheds
241,876 acres
378 square miles
Napa County Resource Conservation District
Kimball Canyon Creek
Garnett Creek
Simmons Canyon Creek
Upper Napa River
Blossom Creek
Oat Hill Area
Selby Creek
Cyrus Creek
Maple Lane Area
Bell Canyon Creek
Kortum Canyon Creek Area
Nash Creek
Ritchie Creek Area
Mill Creek Area
Hirsch Creek Area
York Creek
Taplin Road Area
Sulphur Creek Area
Bale Slough Area
Lower Conn Creek
Rector Reservoir Area
Doak Creek Area
Chase Creek Area
Soda Creek
Dry Creek
Hopper Creek
Milliken Creek Area
Oak Knoll Area
Salvador Channel
Napa Creek
Napa East Area
Napa Southwest Area
Tulucay Creek
Carneros Creek
Kennedy Park Area
Huichica Creek
Congress Valley Creek
Suscol Creek
Sheehy Creek
Mud Slough
Fagan Slough
North Slough
Marsh lands
American Canyon Creek
Lake Hennessey
Pope Valley
Angwin
0 1.25 2.5 5 7.5 10 Miles
0 2.5 5 10 Kilometers
Source Data:
Watershed Boundaries - NewCalwater
Hydrography - Napa County DLG 1:100K
Towns - Napa County ITS
N
W
E
S

RESERVOIRS **Most figures were removed to make file small**

ALLUVIAL AND PARTIALLY CONFINED CHANNELS: APPLYING BMPs:

A18. DETERMINING CORRIDOR RESTORATION STRATEGY

Repair, Restoration and Management Practices

Here are some general guidelines for restoring and repairing creek/river corridors:

- ❑ Use the inventory to carefully and thoroughly evaluate your creek to make well-informed decisions.

- ❑ Address watershed problems on the property such as slope erosion, effects of reservoirs and roads.

- ❑ Have caution and respect for the power of floods. Even the best-vegetated corridors can change greatly in large flood events. Highly altered corridors are often the most damaged in floods.

- ❑ The most important features of the corridor to restore are: corridor width, channel form to offset incision, re-establishment of native vegetation and repair of upslope problems.

- ❑ Continue to observe and monitor the creek and revise management over time as the corridor changes. Sometimes creeks are misunderstood due to a lack of information and management is misdirected. Careful observation is best. Watch the creek and how the repair/revegetation project progresses. Take photos in the winter. Keep a logbook of your observations as part of the monitoring element.

- ❑ Focus restoration work on creating a stream corridor for natural stream processes and riparian vegetation. Work with the natural system rather than against it. Low cost methods using vegetation, not structural measures, are best. Avoid projects designed to modify the active or scour channel. Instream enhancement such as adding large wood to the channel can be beneficial, but activities should only be used after the corridor is wide and well vegetated enough to allow for in-stream changes.

- ❑ Allow the stream to function with little management and it will interfere less with the farm.

- ❑ In some cases the transition from a highly altered stream to a well-vegetated corridor may take several years and require financial assistance. However this approach will create a more stable and functional creek and farm over the long term.

- ❑ These BMPs provide guidance for restoration of corridors with native riparian plants and the use of native plants to repair eroded banks. The Farm Conservation Plan workshops will provide professional assistance in the design and implementation of creek restoration projects.

Background: Riparian Vegetation

Riparian vegetation can be used as a low cost and effective method to reduce bank erosion and revegetate entire creek corridors. However to use native plants most effectively, it is helpful to know how they grow and where to plant what species.

Riparian vegetation consists of a range of plants that grow in the areas next to streams where water is available in the summer.

For alluvial creeks, there is a progression of different species of riparian plants from the edge of the scour channel up to the outer edge of the corridor on the floodplain. It is very important when restoring riparian areas to mimic the natural system. If the plants are put in the wrong location in relation to the scour channel, they may not live long and the project will need to be redone. It is also essential that native plants grown from plants from the watershed of the restoration site be used. Riparian plants from other areas (Lombardi poplars, for example) are not native to California and do not belong in restoration projects as they are not part of California's ecosystem. Native plants from other areas of California, such as Los Angeles or Sacramento, are also not acceptable; only local genetic stock should be used. Only reputable native plant nurseries and experienced restoration ecologists should develop and implement restoration projects.

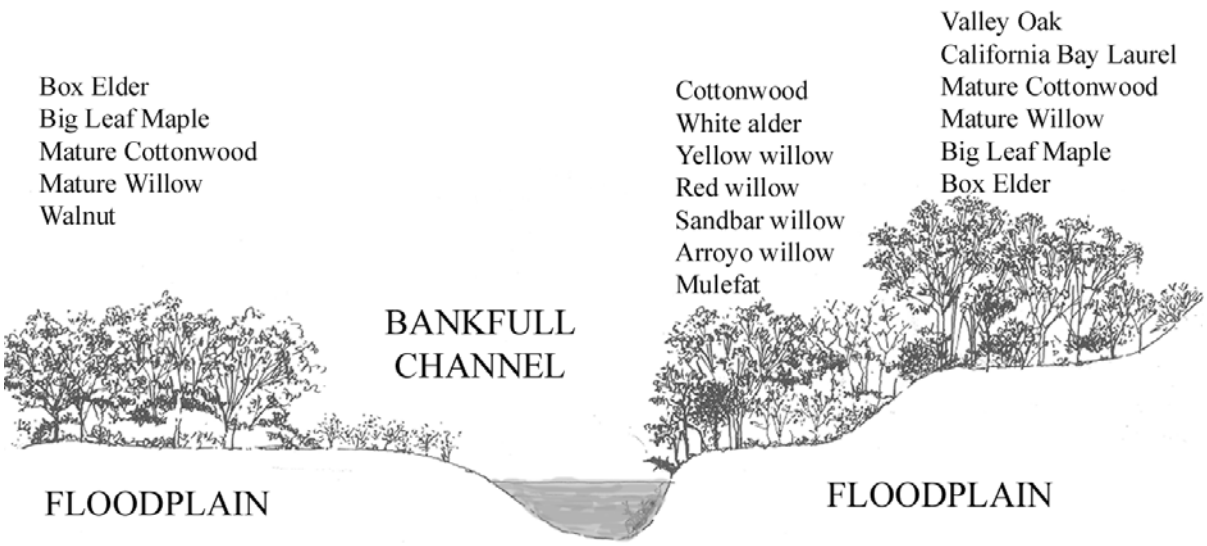
Generally riparian plant species vary in:

- Tolerance of mechanical effects of floods – scour and high velocity flows
- Tolerance of inundation
- Need for sunlight/tolerance of shade
- Ability to compete with other species
- Need for organic material in the soil for seed germination
- Methods for reproducing /spreading
  - Vegetative means through roots and runners
  - Seed
  - Size and dispersal method of seed
- Location in relationship to the active/scour channel

Zone 1: Species growing closest to the active or scour channel

These are the pioneer plants, mainly willow, cottonwood, alder and mulefat. The wind blown seed of these species, termed cotton, lands along river or creek bars and thousands of little seedlings germinate. Very few will survive. The willow, for example, is adapted to survive several weeks of inundation and can withstand relatively high velocity flows of up to 6 feet/ second. However the willow cannot withstand drought for very long. The seedlings must establish a deep root system that can "chase" summer groundwater levels downward to remain well watered over the dry season. Willow and cottonwood also need bright sunlight and do not tolerate shade as seedlings. They can however grow on the nearly mineral soil of gravel bars. White alder also grow along the edge of the bankfull channel.

Due to their natural ability to grow quickly and withstand high velocity flows, cottonwood, alder and willow are the best species to use for vegetative bank protection. However, willow will not survive in the scour channel over the long term. They may invade this area during



RIPARIAN PLANT SPECIES GROW IN PARTICULAR AREAS OF THE CORRIDOR IN RELATIONSHIP TO THE ACTIVE OR SCOUR CHANNEL

Insert – willows are one of the pioneer plants in the riparian zone growing closest to the active channel. Willow is often used to revegetate banks and stream corridors. (182)
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RIPARIAN SPECIES Most figures were removed to make file small

years of drought, but will likely be washed out in the first large flood. Revegetation of this active, moving section of the streambed is not necessary.

Zone 2: Species Growing Midway in the Riparian Corridor

Away from the scour channel on the floodplain are larger willows and cottonwoods as well as other trees and a dense understory of vines and herbaceous plants. Willows trap sediment during floods and the elevation of the area around them will build up as the active scour channel migrates to a different location. As the willows are covered over with sediment, they sprout adventitious roots from nodes on their branches and grow up through the new alluvium. In this manner, they are able to thrive in the ever-changing conditions along the creek channel.

The larger the willows and cottonwoods get, the more shade they create and the fewer of their species will germinate. The shady conditions as well as the absence of frequent high-powered floods allow for other plants to grow. There may be box elder, walnut, big-leaf maple, Oregon ash, California buckeye and other species. These trees are tolerant of inundation and have larger seeds which float to new locations, or are eaten or carried by animals. These tree seedlings can grow in shadier conditions and need more organic matter in the soil. Understory species may include native blackberry, snowberry, spicebush, sedges and rushes, wild rose and others.

Zone 3: Species Growing Along the Outer Edge of the Riparian Corridor - Mature Forest

This is the floodplain forest with the biggest trees and the greatest diversity of species. There are willows and cottonwoods intermixed with box elder, walnut, big-leaf maple, Oregon ash, alder, bay laurel and valley oak. Redwoods also grow in this zone along coastal streams. These two species – bay laurel and oaks, are good to have along the outer corridor edge to reduce the spread of Pierce's disease into the vineyard.

The mature forest supports many animals and most of the tree species in this zone can be planted. Understory species may include native blackberry, snowberry, spicebush, sedges and rushes, wild rose and others. Non-native invasive plants must be removed to avoid competition.

The locations and sizes of these zones will be different for every stream but can be generally estimated from the necessary corridor width and bankfull channel width. As a rule of thumb, zone 1 should only be planted on the edge of the scour channel, and zones 2 & 3 on the adjacent floodplain.

Channel Form and Function

Besides evaluating the distance from the active or scour channel another important feature of successful revegetation projects is consideration of channel form and its function in supporting the plants. Generally **stream banks should be re-sloped** to create a 2:1 or 3:1 slope for planting or a low floodplain bench created. It is difficult to have a successful riparian restoration project on a 1:1 bank.

In an **incised or entrenched channel** the active channel may be 10-12 feet or more below the top of the bank. There may not be a floodplain or any area for floodwater to spread out. Instead the incised channel is more like a canyon or gorge with steep walls and no place for

riparian plants to create a corridor. Trying to revegetate these steep high banks is not likely to succeed.

In these situations, a new floodplain is created. The new floodplain bench is constructed out of the existing high bank through excavation and should be located no more than about 5 feet above the channel edge. It should start at the edge of the existing scour channel (or predicted scour channel width for highly altered channels) and extend away towards the terrace. In some cases, a combination of a new floodplain bench and setting back the existing bank at an angle of 3:1 or in some cases 2:1 is needed. The new bench and re-sloped bank are densely revegetated. A willow wall or other vegetative structure can be placed at the scour channel edge of the new bench to add stability to the project. Rock may also be placed at the toe of the new bench to protect the new slope in the first year, but should be limited in use in order to create a natural channel.

Aggraded channels are also problematic. The active or scour channel and parts of the adjacent floodplain are receiving more sediment than the flood flows can carry downstream. Trying to plant riparian trees too close to the scour channel will not be successful. If the channel is highly or moderately altered, start at the outer edge of the necessary corridor width and move inward with the plantings. Set any banks back at a stable angle of 3:1 and plant willow or cottonwood along the edges. Using dormant willow poles may be good if large poles are available and can be deep augured. Don't try to get too close to the scour channel, it is changing and your project may be jeopardized. Be careful not to disturb the active channel and do not remove or rearrange the gravel in the channel as this may further destabilize the situation and affect your plantings.

Some channels dry up of surface flows in the summer due to changes in the main river channel, a general lowering of groundwater levels, extensive water storage upstream or a lack of vegetation and shade resulting in high evaporation levels. There are also some channels that naturally have subterranean flow. For channels in this type, deep auger willows poles or use large size container stock. Don't plant very high (5 feet) above the lowest channel elevation. Plant along the edges of the bankfull channel width as calculated outward to wherever the banks exceed 5-feet above the lowest channel point. This is the area most likely to support plants and revegetation potentially can be expanded from this narrow area to a broader area. You might also dig some test wells to watch fluctuations in the groundwater levels and use this information to fine-tune your project. Always plant in the winter and provide irrigation over the summer.

Pierce's Disease Concerns

Element III contains information on the relationship of riparian plants species to blue-green sharpshooters and Pierce's disease bacteria. Non-native plants as well as some native understory plants are the primary hosts of both the insect and the bacteria. In restoring your corridor or completing a bank repair, remember that many of the Zone 3 trees which are best suited to the outer corridor next to the vineyard are the least likely to host the blue-green sharpshooter or the bacteria. It will likely be necessary for you to manage the corridor to remove the non-natives and those native understory plants that can spread the disease.

Invasive Plant Removal and Management

Exotic plant species are capable of invading riparian zones and replacing native habitats. Highly invasive species may negatively affect the stream corridor in the following ways:

- ❑ Replacement of native species due to competition with invasives and loss of native riparian forest

- ❑ Increased water temperature as most invasives do not provide adequate shade canopy

- ❑ No contribution of large wood into the stream for fish habitat

- ❑ Ineffective for bank protection

- ❑ Reduction in wildlife habitat values

The following lists the most common invasive species and the recommended methods for eradication. It is important to note that any use of herbicides should be done in full accordance with label directions and restrictions. In general, if the area to be treated is next to water, the herbicide suggested is a formulation of glyphosate safe for use near to water. Consult with the County Agricultural Commissioner for details on herbicide use. In many instances cut and paint methods where full strength herbicide is painted directly onto the cut stem of the invasive plant is the most effective control and avoids drift into creek areas. It is also important to note that if a large area of invasive plants is removed, a plan for revegetation of the area should be completed. Native plant sprigs or container stock should be on order when the eradication is done, as these species are not readily available from nurseries.

Invasive plants typically move from upstream to downstream and should be removed starting from the upper watershed or channel. The Napa County Flood Control District is completing a comprehensive mapping of the extent of Arundo donax or giant reed along the alluvial creeks and river channel in the Napa basin. This Arundo mapping will be used to address eradication of this invasive species in individual Farm Conservation Plans.

In almost all trials and studies of invasive plant removal, herbicide has proven more effective than mechanical removal methods. However, hand removal performed several times a year consistently for a decade or more can completely eradicate invasive plants if no re-infestations occur from upstream.

Giant reed (*Arundo donax*) - Cut the reeds to the ground in September and paint with glyphosate within 30 seconds of cutting. This is a very difficult plant to remove once established. Try to cut and paint as soon as any of these are found on your property. Cut and paint all survivors and continue removal on a regular basis. In areas where flooding is not common, the Arundo can be cut and covered with thick black tarps secured to the ground with 12” staples for 12 months. This method should not be used adjacent to the channel where tarps can be scoured away by floodwater.

Blue periwinkle (*Vinca major*) **-** Spray with glyphosate when plant is green and growing vigorously, being careful to avoid other plants and any drift. Don’t spray when plant is wilted. Re-spray all survivors. This understory plant provides little to no erosion control and soil can be washed out from underneath with out notice. This plant is a host species for Pierce's disease. This plant will dominate the understory of established riparian areas and reduce or eliminate the germination of native tree seedlings and shrubs. Over time, as the riparian trees age and die, the corridor will have no replacement trees and a monoculture of Vinca is created. Hand removal can be done, but must be repeated several times a year and done thoroughly.

Insert – invasive non-native plant species (185)
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Himalayan blackberry (*Rubus discolor*) - This is the blackberry that has bigger leaves, bigger thorns and bigger berries and is found both on streams and roadsides. It is a host species for Pierce's disease and an invasive plant that will take over native areas and provide no erosion protection for banks. Spray with glyphosate only in areas where other native riparian plants will not be affected. Cutting and painting stems with glyphosate is also effective. If it is interspersed with natives or if mechanical methods are preferred, cut and pull by hand using really thick gloves and follow up with removal several times a year.

Tamarisk (*Tamarix ssp*.) - This is a desert species of tree that is becoming established in California and is tough to get rid of. Cut the tree before it has a chance to flower and paint with triclopyr. Remove duff with seeds to the greatest extent possible. Pull out all seedlings and retreat any re-sprouting stumps.

Tree of heaven (*Ailanthus altissima*) and Acacia **-** These invasive trees are just getting a hold and should be cut and then painted with glyphosate to kill the root system. They can also be cut continuously several times a year and all seedlings removed.

Scotch (*Cytisus scoparius*) or French (*Genista monspessulana*) broom - There are a number of invasive brooms that can be cut and painted with glyphosate and seedlings hand pulled. Hand removal requires all parts including roots and the seed bank be removed. There are areas in the riparian corridor that may have broom, although it is more common on hillsides. Do not let this one get established, it is very fire prone. A weed wrench works well for removal of this species because broom generally does not re-sprout from roots.

Cape (*Delairea odorata*) and English (*Hedera helix*) ivy - These very invasive species spread by runners. Spray with glyphosate and remove and re-spray all survivors until it is gone. Cape ivy will climb trees and smother them resulting in the dead tree falling and often taking the stream bank or slope with it. If it is interspersed with natives, cut and pull by hand.

A good reference book on invasive plants is Invasive Plants of California's Wildlands by Bossard, Randall, and Hoshovsky available from www.caleppc.org.

ALLUVIAL AND PARTIALLY CONFINED CHANNELS: APPLYING BMPs: RIPARIAN REVEGETATION

Revegetation of the corridor may involve large areas or small areas. In either case follow these practices:

PLANNING AND INSTALLATION

The Farm Conservation Plan workshop instructor and other professionals will complete revegetation/restoration designs and permits and assist in proper implementation of revegetation projects. Each site should follow these guidelines:

- ❑ Determine the scour channel or bankfull width as well as the overall corridor width for the site using the BMPs and plan how to achieve this width on your site.

- ❑ Replanting should focus on the upper or outer edges of the scour channel up the banks to the floodplain and to the outer edge of the stream corridor. If you are restoring a highly or moderately altered corridor, you can determine this area by the estimate of the

needed corridor width and bankfull channel width. Only the edges of the bankfull channel should be planted, not the main channel where scour is common. Use those native species grown from plants that naturally grow in your area for best results.

- ❑ The Farm Conservation Plan workshops will have a professional ecologist prepare planting plan using the appropriate plant species at the appropriate distances from the bankfull channel. The plan should include removal of all invasive non-native species including Pierce's disease host plants and revegetation with native non-host plants. An engineer, hydrologist or other professional may also be involved in the design process.

- ❑ The plan should evaluate the channel form from your assessment and determine if some changes are needed prior to planting such as: re-sloping of banks; making alterations to incised channels to create a new floodplain bench or set banks back at a 3:1 angle or flatter prior to planting; incorporate changes to replanting plans for aggraded channels and summer dry channels.

  If your corridor needs some bank protection, the plan may use vegetative methods – willow walls, brush mattress, or bank re-sloping and planting. Depending on the site, a civil engineer may need to be involved. If your assessment shows the corridor needs to be widened, the plan should create this wider corridor as part of each bank repair over time. The bank should be set back or a combination of new floodplain bench and bank re-sloping done to add the needed width to the corridor.

- ❑ The implementation of the plan should begin planning early, line up sources of native plants for the site, line up contractors if needed and permits if needed and expect to complete earthwork construction by October 15 with erosion control. The program will assist or complete these steps. Revegetation should begin when soil moisture will support the plantings typically in fall and early winter. If earthwork is extensive, temporary revegetation may be needed prior to winter rains with irrigation until the rainy season begins.

- ❑ In certain circumstances some structural component may be called for such as rock along the toe of the bank repair. This is particularly true along the main river channel. Other structural elements such as complete bank armor or other types of revetments are very expensive and do not serve to increase habitat.

- ❑ For these reasons, hard solutions are only recommended as a component of a creek project or where a house, road or other building or facility needs structural protection. A civil engineer should design all structural projects.

- ❑ For **suddenly a problem, occasionally a problem, and rarely a problem** corridor conditions, the emphasis is on low cost vegetated solutions and increasing the width of the corridor over time if your assessment shows this is necessary. It can cause greater harm than benefit to widen a vegetated corridor by removing the existing vegetation unless the vegetation is very sparse or made up of non-native species. Instead the corridor can be increased in width by planting along the outer corridor edges. For incised channels, a secondary channel or bench can be created next to the existing vegetation to widen the corridor. If there are sections of the creek where there is little vegetation or a great deal of non-native cover this section needs a large restoration plan and project.

Insert – examples of use of the willow wall revetment (187)
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Insert – details for brush mattress bank repair (187)
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BARRIERS **Most figures were removed to make file small**

- ❑ For the highly altered and moderately altered corridor conditions major restoration plans and phased projects may be required. In these areas a section of creek corridor is planned out using the necessary corridor width and vegetation restoration BMPs. Revegetation and channel form alterations are done in phases - one section per season. Remaining areas are protected from erosion and invasive plants are controlled.

- ❑ Changes to streams and riparian corridors require approval and permits from the California Department of Fish and Game.

Revegetation Methods

- ❑ Seeds or propagules should be collected as close as possible to the project site. This method ensures that only the genetically appropriate plants (those that are adapted to the local conditions) will be used on the site. Introduction of plant material from other areas should be avoided.

- ❑ Propagation of plants in containers needs to begin up to 18 months prior to planned revegetation work. For example, a particular species may have seed that ripens in June. After treatment of the seed and germination and culturing in a nursery, the plant will be ready for planting the following fall.

- ❑ Planting should be done during the winter when moist soil conditions persist and plants are most likely to establish and grow. While not recommended, if planting is done earlier in the season then irrigation will be needed to provide adequate soil moisture until the rainy season. Irrigate immediately after planting and on a regular basis to avoid soil drying out or the plants will die.

- ❑ Broadcast seeding of native grasses and forbs should take place prior to September 30 of each year to ensure adequate time for seed germination prior to the onset of cold weather.

- ❑ Relocation of plants found growing near the restoration site is sometimes appropriate. Some species are best acquired by thinning in nearby thickets and stands.

Willow sprigging

Willow sprigging can be an effective and inexpensive way to revegetate stream banks. Willow must be planted in sunny areas where plants can establish roots and reach summer groundwater. Sprigs should be collected and planted when willows are dormant in January. However, some willows, such as the sandbar willow, do not sprig well and should not be used. Cottonwoods also work well for sprigging.

Sprigs should be at least one-half inch in diameter and 18 inches long. Sprigs two to three inches in diameter and three to four feet long work the best. Cuttings should be planted on the same day they are cut. If this is not possible then the entire cutting should be placed in water in a cold area until used.

Plant the willow with the buds up after sharpening the bottom end of the sprig with an axe or pruners. Springs should be driven into the soil 75 to 80 percent of their total length at a slight angle downstream to decrease the resistance to water flows. In hard soil, an iron bar or auger can be used to bore planting holes. After placing the cutting in the hole, tamp

firmly around the cutting to remove any air pockets in the soil. In soft soils, sprigs can be driven in with a wooden mallet or sledgehammer. Cut off the tops of the sprigs if they should split while hammering. Leave only one or two buds exposed.

Along stream banks spacing of the sprigs may be as close as one foot. Cattle tend to browse on young willow; the revegetated areas may need protection with exclusionary fencing.

Summer irrigation

For the first three summers following planting of native riparian plants, each plant will require irrigation. Dormant willow sprigs may not require irrigation. Unlike many ornamental plants, natives need deep infrequent watering.

In April, install a drip irrigation system for the native plants and irrigate for an eight-hour period every three weeks. Irrigation should extend from late April if rains have ended to the beginning of the next rainy season. If a drip system cannot be installed, hand water.

Weeding and protection from deer and rodent browse

When native plants are put in, weeds around the site should be removed and a square of weed mat installed around the plant. As part of spring or summer maintenance, weeds should be removed next to the new plant. Dormant willow sprigs should have weeds removed if appropriate as well, but not have weed mat installed. There are a variety of protective tubes used for native plants to reduce browsing by rodents and deer for the first several years of growth. These are placed around or over the plant and should not be used near the actively flooding portion of the channel. All tubes and protective hardware should be removed after 2-3 years.

Pruning native vegetation

Only prune your native plants when they become so successful that they are extending into the vineyard or seedlings are germinating in the vineyard. Only prune in the winter and spring months when plants are dormant. Within the corridor area no pruning or trimming is needed and in fact is detrimental to the wildlife values in the corridor.

A19. IMPLEMENTATION TIMELINE

CORRIDOR CONDITIONS: SUDDENLY A PROBLEM
RARELY A PROBLEM
OCCASIONALLY A PROBLEM

The Farm Conservation Plan workshop instructor will work with the farmer to determine the restoration strategy.

For these corridor conditions the Farm Conservation Plan should indicate one of the following restoration strategies:

- **Increase the width of the corridor over time (10 years).** As bank erosion occurs, revegetation will be completed. There are areas without vegetation but the corridor needs to be widened. Vineyard and roads are moved back over time to increase corridor width. BMPs used are:
  - Revegetation of the corridor
  - Revegetation of banks, revegetation of floodplain area

Insert – farms with riparian corridors and active restoration management (190)
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- ❑ Removal and management of invasive species

- ❑ Incised channels, aggraded channels and summer dry channels conditions are addressed.

❑ **Increase the width through several seasons (3-5 years of active revegetation)** Vineyards and roads are moved back to increase the corridor width. BMPs used are:

- ❑ Revegetation of the corridor

- ❑ Revegetation of banks, revegetation of floodplain area

- ❑ Removal and management of invasive species

- ❑ Incised channels, aggraded channels and summer dry channels conditions are addressed.

- ❑ Corridor restoration under this option should be scaled to allow for phases of vineyard setback and revegetation to occur in seasonal periods between April 15 and October 15. Indicate the phases on a site map or aerial photo. This is not a good option for the corridor if it is currently well vegetated with native species.

❑ **Corridor width is adequate** on your site as defined in the necessary corridor width calculation. A management only option is needed consisting of the following BMPs:

- ❑ Revegetation along the outer edge of the corridor

- ❑ Removal and management of invasive species

❑ **Main Napa River sites** – Revegetation and management will involve setback of vineyard over time and bank revegetation as feasible using the following BMPs:

- ❑ Revegetation of banks and floodplain areas as appropriate

- ❑ Removal and management of invasive species

- ❑ It is highly likely that any revegetation effort on the banks of the river will require a set back to a 3:1 slope or in some cases 2:1, or re-creation of a new low floodplain area. However, the owner has little control over such factors as reservoirs, historic channel management and historic gravel mining effects and cannot repair the problems these factors may produce. Bank blowouts may require major financial assistance.

- ❑ Some projects maybe eligible for cost sharing from the Napa County Flood Control District. Sites downstream of Trancas Avenue and in or near the incorporated areas should coordinate with the Flood Control District.

❑ **The lower mile of tributary streams may be highly affected by river conditions**

- ❑ Owner will revegetate and manage using the BMPs indicated for the corridor condition on the site. Factors outside the owner's control may cause the stream to be less stable and the owner may not be able to revegetate the site.

CORRIDOR CONDITIONS: HIGHLY ALTERED
MODERATELY ALTERED

For these corridors a phased restoration program is needed. The Farm Conservation Plan workshop instructor will work with the farmer to determine the restoration strategy.

For highly altered corridors, complete phased revegetation/restoration plan over a 10-year time frame. Plan to set back vineyard with each phase. If you own one side of the channel, accommodate half the required width on your side. The plan should use the following BMPs:

- ❑ Changes to channel form appropriate to the site
- ❑ Revegetation with native species at appropriate distance and elevation to active channel
- ❑ Revegetation of banks and floodplain area
- ❑ Removal and management of invasive species
- ❑ Incised channels, aggraded channels and summer dry channels conditions are addressed. Since many highly altered corridors are also incised channels, address this issue by incorporating a floodplain bench into the revegetation plan.
- ❑ Invasive plant removal should be addressed both prior to revegetation efforts and over the course of the restoration program as a maintenance activity. Make sure your workers are trained in the differences between the newly planted native species and the invasive ones.

For moderately altered corridors there are areas with some vegetation or just several problem areas where the corridor needs additional width, increase the width through several seasons (3-5 years of active revegetation). Vineyards and roads are moved back to increase the corridor width. BMPs used are:

- ❑ Revegetation of the corridor
- ❑ Revegetation of banks and floodplain area
- ❑ Removal and management of invasive species
- ❑ Incised channels, aggraded channels and summer dry channels conditions are addressed.
- ❑ Corridor restoration under this option should be scaled to allow for phases of vineyard setback and revegetation to occur in seasonal periods between April 15 and October 15.

Indicate the phases on a site map or aerial photo. This is not a good option for the corridor if it is currently well vegetated with native species.

Main Napa River sites – Highly and moderately altered corridors of the main river are likely to be unstable and capable of eroding banks and vineyards easily. Setting the vineyard back from the scour channel is likely to save money over time, particularly if implementation

funds are available. The river can erode 20-30 feet of bank and floodplain vineyard in one large storm, making these vineyards very vulnerable. Revegetation and management will involve setback of the vineyard over time and bank revegetation as feasible using the following BMPs:

- ❑ Vegetated bank protection
- ❑ Removal and management for invasive species
- ❑ It is highly likely that any revegetation effort on the banks of the river will require a set back to a 3:1 slope or in some cases 2:1, or the re-creation of a new floodplain area. However, the owner has little control over such factors as reservoirs, historic channel management and historic gravel mining effects and cannot repair the problems these factors may produce. Bank blowouts may require major financial assistance.
- ❑ Some projects maybe eligible for cost sharing from the Napa County Flood Control District. Sites downstream of Trancas Avenue and in or near the incorporated areas should coordinate with the Flood Control District.

The lower mile of tributary streams may be highly affected by river conditions.

- ❑ Owner will revegetate and manage using the BMPs indicated for the corridor condition on the site. Factors outside the owner's control may cause the stream to be less stable and the owner may not be able to revegetate the site.

ALLUVIAL AND PARTIALLY CONFINED CHANNELS: IMPLEMENTATION TIMELINE

The implementation timeline sets out how the Farm Conservation Plan will get done. The timeline covers a ten-year period and allows for the costs of repair and restoration work to be spread out over this period. The timeline section of the Farm Conservation Plan should also identify the projects that the farmer intends to apply for cost share or grant funds. Generally, the implementation timeline for each element should outline a sequence of events such as:

- ❑ Changes in riparian corridor management that will be implemented in the first several years.
- ❑ Creek corridor revegetation and restoration projects should be identified and their sequence of implementation set out over the ten-year period.
- ❑ The projects proposed for cost sharing or other assistance should be delineated and a meeting set up with the program to review restoration project funding.

CONFINED/BEDROCK CHANNELS: ASSESSMENT OF STREAM CONDITIONS

Confined stream channels differ significantly from alluvial channels in the way they change and are affected by floodflows and sediment transport. Since the channel size and shape is dictated by bedrock, the shape does not alter the way an alluvial channel adjusts its width,

depth and meander characteristics during a flood. Confined channels do undergo changes and do need to be assessed, restored and their watershed lands managed well.

During a flood event in a bedrock channel, the confined nature of the channel keeps water from spreading out and creates a deeper flow of water with a high velocity. The flow will scour loose material, deposit material, move large logs and wood, and erode banks or the toe of canyon slopes. Bridges, road crossings, banks and unstable areas are often damaged in floods along these types of channels.

The supply of sediment to the stream and changes to the volume of floodwater (from urbanization or vegetation clearing, for example) can have an effect on confined channels. Construction of roads, crossings and buildings are also typical problems in these canyon streams.

For these reasons, the focus of the inventory for confined channels is not on the width of the corridor, as the canyon largely determines this. It focuses more on the condition of the watershed, the supply of fine sediment to the stream, the number and type of road crossings and other channel obstructions, and the adequacy of large wood and tree canopy along the stream.

B3. PHOTOGRAPH

- ❑ Take photos (you will need a flash) of all year-round and seasonal confined stream channels. Try to photograph each creek from above and from every bridge and crossing. Photograph during both the winter (if safe) and the summer. Label each photograph when developed with the location and the date.

B4. VEGETATION

- ❑ On the Farm Conservation Plan template, check the vegetation types on the slopes and/or the stream banks.

- ❑ Stand in the channel if you can and determine if it is well shaded. If you can only view the channel from a road, look at how thick the canopy is over the low flow channel. Fill in the template.

- ❑ On the template, describe the condition of the canyon or banks of the stream.

- ❑ On the template, describe the size of the trees and condition of the creek banks for each creek. Describe the amount and size of large wood in the channel

B5. CHANNEL FEATURES

Bedrock or confined channels can vary greatly in regards to where pool, gravel areas and other features are located. If you can easily see the features of the channel from a road or by walking along the channel mark the features you observe for each creek on the Farm Conservation Plan template. If only a part of the channel is visible, indicate the features and

Insert – Figure Confined channel restoration requires more focus on the watershed and reducing sediment than changing the corridor or channel (194)
Most figures were removed to make file small

the area you reviewed on your map or aerial. If none of the channel features can be seen indicate this and skip this section.

B6. SEDIMENT

- ❑ Assessing the amount of sediment in the creek is an important but difficult thing to do. This evaluation is to give you a sense of just how much fine sediment can be in the channel and affect the fish habitat. It is a qualitative evaluation and should only be done at low water in late summer. If access to the channel is difficult, skip this section.

- ❑ Go to 5-10 gravel areas and visually inspect the amount of silt clogging the gravel. Kick the gravel surface or use your hands to dig down several inches and inspect the subsurface layer as well. On the Farm Conservation Plan template indicate if there is a high (greater than 50% silt), medium (25-50% silt), or low (less than 25% silt) level of fines surrounding the gravel or cobble. When doing this evaluation, you are looking at the amount of silt filling the air spaces around the gravel or cobble, not the percentage of the streambed made up of silt.

B7. WATER FLOW

- ❑ On the Farm Conservation Plan template indicate the features of water flow in the channel.

B8. ROADS AND CROSSINGS

- ❑ Does a road run along the creek or above the creek along the canyon slope? Be sure this road and all the crossings are evaluated in Element V.

B9. HILLSLOPE STABILITY

- ❑ Indicate on the template if there are landslides along the channel or on the hillslopes above the channel.

- ❑ Mark the locations on a map.

CONFINED/BEDROCK CHANNELS: APPLYING BMPs

The management priority for confined channels is to reduce sources of excessive fine sediment from roads, cleared areas and other uses of watershed lands. Revise road crossings, retain canopy over the stream and make sure that water flows are not reduced through excessive diversions and storage. Additionally, enhancement of the channel through placement of large logs and stumps as well as some streamside revegetation may increase fish habitat. For many of the larger watershed issues, it may not be possible for one landowner to address all the problems. Formation of a stewardship group in conjunction with the RCD may be the best method for addressing the larger watershed issues of sediment and water use (see Element VII).

The following BMPs address these issues:

- ❑ Elements II, III and V address many methods to control erosion. Be sure these elements are completed and all erosion control BMPs are used.

- ❑ Roads and road crossings of confined channels may need reconstruction and drainage and erosion improvements. Review Element V to make sure all roads along confined channels are addressed. If possible avoid using streamside roads and restore these to avoid affecting the creek.

- ❑ Review the water conservation section of Element II and III to make sure adequate flows remain in the stream.

Additional BMPs that may address particular features on your creek include:

- ❑ Stabilize landslides along the channel and on canyon slopes. Consult with NRCS, or an engineering geologist for assistance.

- ❑ Do not remove trees that fall into the stream unless a bridge or structure is threatened. Work with Fish and Game to relocate large wood rather than removing it.

- ❑ Revegetate channel banks identified on the inventory as bare or without canopy if revegetation with riparian species is appropriate.

- ❑ Revegetate slopes and hillsides with native species and forest to increase future supplies of large wood and increase canopy over the stream, as well as reduce soil erosion and stabilize slopes.

- ❑ Install large wood and stumps to increase habitat for fish – consult with Fish and Game on locations and project design.

- ❑ All new activities on slopes near to the streams should avoid disturbing the channel or removing trees within 300 feet of the channel. Forestland studies have shown that this 300 feet streamside buffer area provides large wood and canopy.

- ❑ Work with neighbors to reduce erosion and fine sediment from getting into the creek. Avoid increasing flood volumes though avoidance of new road construction, vegetation clearing and urbanization.

- ❑ Review your inventory of the confined channel to determine which features it has and which BMPs are needed. On the Farm Conservation Plan template indicate the BMPs to be applied to the confined channel.

CONFINED/BEDROCK CHANNELS: IMPLEMENTATION TIMELINE

The implementation timeline sets out how the Farm Conservation Plan will get done. The timeline covers a ten-year period and allows for the costs of repair and restoration work to be spread out over this period. The timeline section of the Farm Conservation Plan should also identify the projects that the farmer intends to apply for cost share or grant funds. Generally, the implementation timeline for each element should outline a sequence of events such as:

- ❑ Changes to management practices such as channel and road management that will be implemented in the first several years.

- ❑ Road repair and creek corridor revegetation and restoration projects should be identified and their sequence of implementation set out over the ten-year period.

- ❑ The projects proposed for cost sharing or other assistance should be delineated and a meeting set up with the program to review restoration or other project funding.

ELEMENT VI - CREEK/RIVER CORRIDORS: FARM CONSERVATION PLAN

Instructions begin on page 235 in the BMP workbook.

This section focuses on year-round and seasonal creeks on the property. The maps and aerials from Elements II and III or with the ephemeral creeks and vineyard drainage system will also be used in this section.

INVENTORY OF CREEK/RIVER CORRIDOR SYSTEM

Photograph creek corridors along the edge with vineyards, from all crossings and bridges, from roads above canyons and other views, both in the summer and the winter.

1. INDICATE ALL STREAMS ON SITE

- Aerial or map with the stream system outlined.
- Measure each creek on the topo map or aerial photo and list the length in feet or miles of all the year-round and seasonal streams on site on the summary table in Section 15.

2. DEFINE THE CREEK TYPE

For each year-round and seasonal creek determine the general type of creek and fill in the appropriate inventory for each creek.

☐ **UNCONFINED, ALLUVIAL CHANNEL – Fill out Section A**

☐ **PARTLY CONFINED, ALLUVIAL CHANNEL – Fill out Section A**

☐ **CONFINED, BEDROCK CHANNEL – Fill out Section B**

If you have unconfined and confined channels fill out both sections A and B.

SECTION A. ALLUVIAL, UNCONFINED AND ALLUVIAL, PARTIALLY CONFINED CHANNEL

ASSESS CONDITION OF CREEK/RIVER CORRIDOR

For Sections 3-6 make one measurement every 500-1000 ft along the creek. The Farm Conservation Plan workshop instructor will assist with all measurements. Place a piece of rebar, a stake, or plastic pipe in the ground at each location where measurements are taken and mark a number on the map for each location. Use the same locations for all measurements.

A3. MEASUREMENT OF THE WIDTH OF THE SCOUR CHANNEL

- List all measurements in feet. Complete for all creeks. Measure the width of the scour channel. List creek name or number next to measurement.

Creek Name or Number	Measurement	Measurement	Measurement	Measurement	Average of Measurements

Additional comments:

Have you noticed a rapid widening of the creek scour channel indicating it may be aggrading?

☐ yes
☐ no

If yes, estimate how many feet it has widened and in what area of the corridor?

A4. CORRIDOR WIDTH

- Mark the outer edges of the riparian forest on a copy of the aerial.
- Measure the width of the riparian corridor from edge to edge. Complete for all creeks. Measure at the same locations for Sections 3-6.
- List name or number next to the measurement on the table.

Creek Name or Number	Measurement	Measurement	Measurement	Measurement	Average of Measurements

Additional comments:

A5. CORRIDOR AND VINEYARD

- Measure from the top of the bank of the scour channel to the first row of vines on each side of the corridor. Complete for all creeks next to vineyards. Measure at the same locations for Sections 3-6.

Creek Name or Number	Measurement	Measurement	Measurement	Measurement	Average of Measurements

Additional comments:

- Measure from the outside edge of the riparian corridor to the first row of vines on each side of the corridor. Complete for all creeks next to vineyards. Measure at the same locations for Sections 3-6. List creek name or number next to the measurement

Creek Name or Number	Measurement	Measurement	Measurement	Measurement	Average of Measurements

Additional comments:

A6. BANK HEIGHTS

In the summer stand in the creek bottom and measure from the lowest point in the creek to the top of the bank. Complete for all creeks. Measure as close to the locations used for Sections 3-5 as possible where you can still measure the deepest point in the channel to top of bank. If there are large differences in various areas of your creek, measure areas with tall banks and shorter banks. Complete for all creeks.

Creek Name or Number	Measurement	Measurement	Measurement	Measurement	Average of Measurements

Additional comments:

How steep are the banks? Indicate name or number of creek.

- ☐ Real steep (1:1)
- ☐ Moderate (2:1)
- ☐ Gentle (3:1 or less)

What are the banks made up of?

- ☐ Loose gravel and sand
- ☐ Silt/loam
- ☐ Compacted clay
- ☐ Large boulders with gravel, sand, and silt
- ☐ Riprap

Have you noticed a large change in the depth of the creek or height of the banks indicating that the bed may be dropping or incising?

☐ yes
☐ no

Estimate how many feet the bed has dropped in how many years. If there is one area where this is occurring, indicate its location on the aerial photo.

Is there is a bridge to measure change in the creek bed? If yes, indicate it on the aerial photo.

☐ yes
☐ no

Is there a large amount of bank erosion in any area of the stream or river corridor?

☐ yes
☐ no

Mark the eroding area on the aerial and indicate if this occurred in a wet winter or occurs regularly nearly every winter.

A7. VEGETATION

The trees along the outer edge of the corridor are: (check those that apply; if the corridor is large and several apply, indicate what areas on the aerial or list next to each choice). List name or number of creek next to vegetation type.

☐ Large and over 20 feet tall
☐ Medium and less than 15 feet tall
☐ Dense undergrowth of vines and other plants under the trees
☐ Small and bushy trees
☐ Little or no vegetation
☐ There is riprap or other material along the creek edge
☐ Large areas of non-native vegetation (see BMP workbook).
☐ Other – describe

The trees along the edge of the scour channel are: (check those that apply; if the corridor is large and several apply, indicate what areas on the aerial or list next to each choice) List name or number of creek next to vegetation type.

☐ Large and over 20 feet tall
☐ Medium and less than 15 feet tall
☐ Small and bushy
☐ Little or no vegetation
☐ There is riprap or other material along the creek edge
☐ Large areas of non-native vegetation (see BMP workbook).
☐ Other – describe

A8. CREEK CHANNEL FEATURES

Complete for all creeks. List creek name or number next to measurement.

The creek has:
☐ Deep pools > 10 feet deep
☐ Small pools < 5 feet deep
☐ Gravel bars in a meandering channel
☐ Riffles (a ridge of small gravel which extends across the channel)
☐ Bends and a meandering course
☐ Occasional bank erosion along the outside of bends
☐ Bank erosion almost every year
☐ Logs and stumps along the channel edges and in the scour channel
☐ No large wood in the scour channel
☐ Other – describe

Describe summer water flows in the creek. Complete for all creeks. List creek name or number next to measurement. The creek:
☐ Always dies up
☐ Always runs year-round
☐ Has deep pools but no surface flow
☐ Only dries up in dry years
☐ Started to dry up a few years ago, but used to run year-round
☐ Started to dry up a few years ago, but used to have deep pools
☐ Other – describe

Describe the material on the stream bottom. Complete for all creeks. List creek name or number next to measurement.

Stream bottom (bars and riffles, not pools) is made up primarily of:
☐ Silt
☐ Silt with some sand and gravel
☐ Gravel with a lot of silt
☐ Gravel with little silt

☐ Cobbles with sand and gravel
☐ Big rocks with little areas of sand, silt or gravel
☐ Other – describe

Notes:

A9. FISH AND WILDLIFE

Do you see large adult (>12 inches) salmon/trout in the creek between October and April? Complete for all creeks. List creek names.

☐ yes
☐ no

Do you see small fish (<1 inches) in the stream?

☐ yes
☐ no

Do the small fish:

☐ dart quickly away?
☐ continue to swim slowly in the pool or riffle?

List other wildlife you see near or in the creek and the riparian corridor:

A10. FLOODING

- Where does the creek regularly flow over its banks and flood? Mark these areas on the aerial.

- Where does the creek occasionally flow over its banks and flood? Mark these areas on the aerial.

A11. ROAD AND VEHICLE CROSSINGS

- Mark all your creek crossings on the map/aerial.

- List the type of crossing and season of use:

- List any public road crossings within one-half mile of the creek:

A12. CHANGES OVER TIME

Indicate the changes you have noticed in the stream/river corridor over the past ten years or more. List the creek name or number next to the condition. If your have not owned or managed the site for very long, this section is optional.

☐ Large amounts of bank erosion
☐ Large amounts of filling in of the channel
☐ Channel bed has dropped over five feet
☐ Summer water flows have decreased substantially
☐ Flood levels have increased for about the same size of rainstorm
☐ Large invasion of invasive plants
☐ There is almost no gravel in the channel anymore, it is down to hardpan.
☐ Large amounts of fine silt cover gravel or fill pools
☐ Pools are shallow that used to be deep
☐ Other changes – be specific

A13. CHECK YOUR PRACTICES

Indicate which of the following practices you perform on the creek/river and its corridor. List the name or number of the creek next to the practice.

☐ Tree/brush removal over entire creek channel every year
☐ Herbicide channel to keep plants from growing
☐ Riprap creek channel
☐ Straighten creek channel, remove gravel bars and remove trees
☐ Gravel extraction over part or all of channel
☐ Rearrange gravel bars with heavy equipment
☐ Remove large trees when across current
☐ Rearrange large trees from across the current to bank edge
☐ No direct management of creek corridor
☐ Clear non-native plants in corridor
☐ Clear native plants in corridor for Pierce's Disease

If yes, list how you determine what plants to remove:

☐ Other – be specific

Notes – Indicate if practice is used over entire creek or just portions of it. Indicate any recent changes in management and year of change.

Bank stabilization done when necessary includes:
☐ Replant with willows or other native plants
☐ Stabilize bank with woody materials and rock at toe of slope but not predominantly rock
☐ Stabilize banks with structures – riprap, gabions, cribwalls, or other structures

A14. EVALUATE UPSTREAM AND DOWNSTREAM CONDITIONS

On the aerial or map indicate all stream crossings and bridges upstream or downstream of site.

Are there reservoirs upstream of the creek corridor?

- ☐ yes
- ☐ no

If yes, for each creek count the number of reservoirs, how far upstream the reservoirs are and how large each is.

Are there urban areas upstream of the corridor?

- ☐ yes
- ☐ no

If yes, indicate which creek

Are there any large slides upstream of the corridors?

- ☐ yes
- ☐ no

If yes, indicate which creek

Does the inventory in Elements II, III or IV of ephemeral creeks indicate large areas of erosion?

- ☐ yes
- ☐ no

If yes, indicate which creek and if repair of these areas included in the element?

Is the main river channel within one mile of the site?

- ☐ yes
- ☐ no

If yes, indicate which creek

A15. INVENTORY SUMMARY

Use the tables to summarize the measurements and condition for each of the year-round and seasonal creek/river corridors.

FARM CONSERVATION PLAN ELEMENT IV. CREEK/RIVER CORRIDOR SUMMARY TABLE FOR CORRIDOR INVENTORY

- List the measurements and features for each year-round and seasonal creek on the property.

Creek Name or Number	Length on property (feet)	Creek flow regime (year-round or seasonal)	Creek type (unconfined /alluvial or partly confined/alluvial)

Additional comments:

A15. SUMMARY OF MEASUREMENTS FROM INVENTORY
LIST AVERAGES OF MEASUREMENTS UNLESS OTHERWISE SPECIFIED

Creek Name or Number								
Scour Channel Width								
Corridor Width								
Distance to Vineyard From Scour Channel Edge								
Distance to Vineyard From Corridor Edge								
Bank Heights								
Vegetation Type for Outside Edge of Corridor								
Vegetation Type for Edge of Scour Channel								
Summer Water Features								
Stream Bottom Features								
Flooding Areas and Frequency								
Changes Over Time								
Upstream/Downstream Conditions								
Primary Management Practices								
Corridor Condition (From #16)								

Additional comments:

A16. DETERMINING CORRIDOR CONDITION

Based on the summary table and the detailed descriptions in the BMP workbook, determine the corridor condition for each creek. Pay attention to the measurements in your summary table of:

- Bank heights
- Proximity of vineyard to scour channel
- Current management practices

Conditions include:
☐ Highly altered
☐ Moderately altered
☐ Occasionally problematic
☐ Rarely a problem
☐ Suddenly a problem
☐ Main Stem Napa River

Fill in the condition on the summary table (Section 15) for each creek. Corridor conditions for the main stem Napa River are listed separately.

A17. NECESSARY CORRIDOR WIDTH

- For each year-round/seasonal creek calculate the necessary corridor width and record it below along with information from the inventory (see method and instructions in BMPs workbook). The Farm Conservation Plan workshop instructor will complete many of these measurements with the farmer. Fill out table for the Napa River, if you have main channel frontage.
- If the corridor is over one mile long or has many tributaries, calculate corridor width at the upstream and the downstream ends separately and list both measurements.

Creek Name								
Watershed Area in Square Miles								
Estimated Scour Channel Width in Feet								
Current Average Scour Channel Width in Feet								
Estimated Corridor Width in Feet								
Current Average Corridor Width in Feet								
Indicate if Bank Heights Are in Excess of 12 Feet								

Do you own both sides of the creek?

☐ yes
☐ no

If not, divide the necessary corridor width in half and measure from the center of the scour channel out to your property to figure out your necessary corridor width.

MAIN STEM NAPA RIVER REACH

Location	
Proximity of Vineyard to Edge of Scour Channel	
Proximity of Vineyard to Edge of Riparian Corridor	
Overall Width of Riparian Corridor	
Bank Heights	
Major Bank Erosion Problems Occurring – List How Often	
Do You Own Both Sides Of The Channel?	

A18. DETERMINING CORRIDOR RESTORATION STRATEGY

- Work with the Farm Conservation Plan instructor to determine the revegetation project for the site and attach a map or site plan indicating the areas to expand the corridor width as needed.

A19. DETERMINING IMPLEMENTATION TIMELINE

CORRIDOR CONDITIONS: SUDDENLY A PROBLEM
RARELY A PROBLEM
OCCASIONALLY PROBLEMATIC

For the above listed corridor conditions, indicate one of the following restoration strategies:

☐ **Increase the width of the corridor over time (10 years) as bank erosion occurs** and revegetation is done. There are areas without vegetation but the corridor needs to be widened. Vineyard and roads are moved back over time to increase corridor width. BMPs used are:
- ☐ Revegetation of the corridor
- ☐ Revegetation of banks and floodplain
- ☐ Removal and management of invasive species
- ☐ Incised channels, aggraded channels and summer dry channels conditions are addressed

☐ **Increase the width through several seasons (3-5 years of active revegetation)** Vineyards and roads are moved back to increase the corridor width. BMPs used are:
- ☐ Revegetation of the corridor
- ☐ Revegetation of banks and floodplain
- ☐ Removal of and management of invasive species

☐ Incised channels, aggraded channels and summer dry channel conditions are addressed

☐ Corridor restoration under this option should be scaled to allow for phases of vineyard setback and revegetation to occur in seasonal periods between April 15 and October 15.

☐ Indicate the phases on a site map or aerial photo. This is not a good option for the corridor if it is currently well vegetated with native species.

☐ **Corridor width is adequate** on your site as defined in the necessary corridor width calculation. A management only option is needed consisting of the following BMPs:

- ☐ Revegetation as needed
- ☐ Removal and management of invasive species

☐ **Main Napa River sites** – Revegetation and management will involve setback of vineyard over time and bank revegetation as feasible using the following BMPs:

- ☐ Revegetation of banks and floodplain
- ☐ Removal of and management of invasive species
- ☐ Removal and management of invasive species
- ☐ It is highly likely that any revegetation effort on the banks of the river will require rock at the toe of the bank and set back to a 3:1 slope or creation of a new low floodplain. However, the owner has little control over such factors as reservoirs, historic channel management and historic gravel mining effects and cannot repair the problems these factors may produce. Bank blowouts may require major financial assistance.

☐ **The lower mile of tributary streams may be highly affected by river conditions**.

- ☐ Owner will revegetate and manage using the BMPs indicated for the corridor condition on the site. Factors outside the owner's control may cause the stream to be less stable and the owner may not be able to revegetate the site.

CORRIDOR CONDITIONS: HIGHLY ALTERED
MODERATELY ALTERED

For these corridors a phased restoration program is needed.

☐ **For highly altered corridors, complete phased revegetation/restoration plan over a 10-year time frame**. Plan to set back vineyard roads with each phase. If you own one side of the channel, accommodate half the required width on your side. The plan should use the following BMPs:

- ☐ Changes to channel form appropriate to the site
- ☐ Revegetation with native species at appropriate distance and elevation to active channel
- ☐ Revegetation of banks and floodplain
- ☐ Removal of and management of invasive species
- ☐ Incised channels, aggraded channels and summer dry channel conditions are addressed. Since many highly altered corridors are also incised channels, address this issue by incorporating a floodplain bench into the revegetation plan
- ☐ Invasive plant removal should be addressed both prior to revegetation efforts and over the course of the restoration program as a maintenance activity. Make sure your

workers are trained in the differences between the newly planted native species and the invasive ones.

☐ **For moderately altered corridors there are areas with some vegetation or just several problem areas where the corridor needs additional width. Increase the width through several seasons (3-5 years of active revegetation).** Vineyards and roads are moved back to increase the corridor width. BMPs used are:

- ☐ Revegetation of the corridor
- ☐ Revegetation of banks and floodplain
- ☐ Removal of and management of invasive species
- ☐ Removal and management of invasive species
- ☐ Incised channels, aggraded channels and summer dry channel conditions are addressed.
- ☐ Corridor restoration under this option should be scaled to allow for phases of vineyard setback and revegetation to occur in seasonal periods between April 15 and October 15. Indicate the phases on a site map or aerial photo. This is not a good option for the corridor if it is currently well vegetated with native species.

☐ **Napa River sites** – Highly and moderately altered corridors of the main Napa River are likely to be unstable and capable of eroding banks and vineyards easily. Setting the vineyard back from the scour channel is likely to save money over the long-term particularly if implementation funds are available. The river can erode 20-30 feet of bank and floodplain vineyard in one large storm making these vineyards very vulnerable. Revegetation and management will involve setback of the vineyard and bank revegetation as feasible using the following BMPs:

- ☐ Revegetation of banks and floodplain
- ☐ Removal of and management of invasive species
- ☐ Removal and management of invasive species
- ☐ It is highly likely that any revegetation effort on the banks of the river will require rock at the toe of the bank and set back to a 3:1 slope or in some cases of 2:1 or creation of a new low floodplain. However, the owner has little control over such factors as reservoirs, historic channel management and historic gravel mining effects, and cannot repair the problems these factors may produce. Bank blowouts may require major financial assistance.

☐ **The lower mile of tributary streams may be highly affected by river conditions**.

☐ Owner will revegetate and manage using the BMPs indicated for the corridor condition on the site. Factors outside the owner's control may cause the stream to be less stable and the owner may not be able to revegetate the site.

SUMMARY: UNCONFINED, ALLUVIAL AND PARTLY CONFINED, ALLUVIAL CHANNELS

BMPS ALREADY APPLIED:

☐ Completed inventory of corridor condition and other factors with maps, aerial photos, site photos and required information included.

☐ Current management practices are reviewed and revisions recognized.

☐ Assessment of necessary width for sustainable corridor is completed.

☐ If upslope problems such as on-channel reservoirs and roads are on the property, they are addressed in the other required elements of the Farm Conservation Plan.

☐ If upslope or river channel problems are affecting the stream corridor, problem is identified and owner will work with the Farm Conservation Plan workshop instructor to address problem.

☐ For highly altered corridors and moderately altered corridors, restoration and management strategy and timeline are attached.

☐ For all other types of corridors - revegetation and management strategy with timeline is completed.

☐ Revegetation strategy and timeline incorporates seasonal restrictions and winter inspection of projects and removal of invasive non-native species with maintenance follow-up.

☐ Implementation funds are applied for if needed.

BMPs TO BE APPLIED

☐ Completed inventory of corridor condition and other factors with maps, aerial photos, site photos and required information included.

☐ Current management practices are reviewed and revisions recognized.

☐ Assessment of necessary width for sustainable corridor is completed.

☐ If upslope problems such as on-channel reservoirs and roads are on the property, they are addressed in the other required elements of the Farm Conservation Plan.

☐ If upslope or river channel problems are affecting the stream corridor, problem is identified and owner will work with the Farm Conservation Plan workshop instructor to address problem.

☐ For highly altered corridors and moderately altered corridors, restoration and management strategy and timeline are attached.

☐ For all other types of corridors - revegetation and management strategy with timeline is completed.

☐ Revegetation strategy and timeline incorporates seasonal restrictions and winter inspection of projects and removal of invasive non-native species with maintenance follow-up.

☐ Implementation funds are applied for if needed.

IMPLEMENTATION TIMELINE: ALLUVIAL UNCONFINED AND PARTIALLY CONFINED CHANNELS

Timeline should demonstrate how BMPs will be implemented over the next 10 years.

ACTION/BMP	TIME FRAME

SECTION B: CONFINED/BEDROCK CHANNELS

INVENTORY OF STREAM FEATURES

B3. PHOTOGRAPH

Take photos (you will need a flash) of the channel from numerous locations as listed in the instructions. Label each photograph with the location and the date.

B4. VEGETATION

Check the vegetation types on the slopes and/or the stream banks and indicate the creek name or number:

☐ Chaparral scrub
☐ Coniferous forest (pine, Douglas fir, redwood)
☐ Oak woodland
☐ Oak grassland
☐ Mixed hardwoods (madrone, oak, scrub, conifers)
☐ Grassland with few trees
☐ Grazed grassland
☐ Riparian trees on stream banks
☐ Rocky with few trees or vegetative cover
☐ Recently harvested of timber or cleared of vegetation
☐ Other - describe

Is the channel well shaded by trees along the banks?

☐ yes
☐ no

Describe other aspects of the canyon or banks of the stream:

☐ Large landslides along canyon or banks
☐ Small slips along the hillsides
☐ Hillside look very stable
☐ Lumpy looking, melted ice cream look to hillside
☐ Too much forest or vegetative cover to see condition of soil or slopes
☐ Other - describe

If there are trees along the creek, which of the following describes the size of the trees:

☐ Large and over 20 feet tall
☐ Medium and less than 15 feet tall
☐ Small and bushy
☐ Little or no vegetation
☐ There is riprap or other material along the creek edge

B5. CHANNEL FEATURES

Bedrock or confined channels can vary greatly in regards to where pool, gravel areas and other features form. If you can easily see the features of the channel from a road or by walking along the channel, note the features you observe. If only a part of the channel is visible, indicate the area your reviewed on the aerial or map. Indicate the creek name or number next to each feature. If none of the channel features can be seen, skip this section.

☐ Deep pools (> 7 ft. deep) the bottom will be hard to see
☐ Shallow pools (< 5 ft deep) the bottom is easy to see
☐ Shallow pools with a layer of fine sediment on bottom
☐ Riffle/gravel area with mostly rocks and large air spaces dominating the gravel surface
☐ Riffle/gravel area with silt covering over the gravel surface
☐ Large trees, wood stumps along channel edges or across channel
☐ Log jam (numerous trees, logs and debris) across channel
☐ Bank blow out or failures along channel edge, may have trees and stumps in the sediment
☐ Large landslides greater than 100 ft. in height
☐ Other features – be specific

B6. SEDIMENT

Assessing the amount of sediment in the creek is important but difficult to do. This evaluation is to give you a sense of just how much fine sediment can be in the channel. It is a qualitative evaluation and should only be done at low water in late summer.

- Go to 5-10 gravel areas along the length of the creek and visually inspect the amount of silt clogging the gravel. Review the BMP workbook for the method to complete this section for each creek.

- Indicate the level of fine silt around the gravel and cobble in the creek bottom.

	HIGH (>50% gravel surrounded by fines)	**MEDIUM (25-50% of gravel surrounded by fines)**	**LOW (<25% of gravel surrounded by fines)**
Creek Name or Number:			
Gravel Area 1			
Gravel Area 2			
Gravel Area 3			
Gravel Area 4			
Gravel Area 5			
Gravel Area 6			
Gravel Area 7			
Gravel Area 8			
Gravel Area 9			

	HIGH (>50% gravel surrounded by fines)	MEDIUM (25-50% of gravel surrounded by fines)	LOW (<25% of gravel surrounded by fines)
Creek Name or Number:			
Gravel Area 10			
Gravel Area 1			
Gravel Area 2			
Gravel Area 3			
Gravel Area 4			
Gravel Area 5			
Gravel Area 6			
Gravel Area 7			
Gravel Area 8			
Gravel Area 9			
Gravel Area 10			

B7. WATER FLOW

Evaluate the amount of water in the channel by checking the most applicable of the following. Complete for all creeks. List creek name next to each measurement.

☐ Always dries up
☐ Always runs year-round
☐ Has deep pools but no surface flow
☐ Only dries up in dry years
☐ Started to dry up a few years ago but used to run year-round
☐ Started to dry up a few years ago but used to have deep pools

Have you noticed a change in the summer water level over the past ten years or more?
☐ yes
☐ no

If yes, is there a new land use in the watershed which may be affecting water flows such as residential or agricultural development, timber harvesting or road construction?

B8. ROADS AND CROSSINGS

Does a road run along the creek or above the creek across the canyon slope? Be sure this road and all the crossings are evaluated in Element V.
☐ yes
☐ no

B9. HILLSLOPE STABILITY

Are there large (greater than 100 ft. in vertical distance) landslides along the channel or on the hillslopes above the channel?

☐ yes
☐ no

If yes, mark the location on a map.

B10. APPLYING BMPs: CONFINED/BEDROCK CHANNELS

The most important aspect of confined channels is to reduce sources of excessive fine sediment from roads, cleared areas and other uses of watershed lands. Revise road crossings, retain canopy over the stream, and make sure that water flows are not reduced through diversion and storage. Additional enhancement of the channel through placement of large logs and stumps, as well as some streamside vegetation, can increase fish habitat. For many of the larger watershed issues, it may not be possible for one landowner to address all of the problems. Formation of stewardship groups may be the best method for addressing the larger watershed issues of sediment and water use (see Element VII).

The following BMPs address these critical issues:

☐ Elements II, III, and V address many methods to control erosion. Be sure these elements are competed and all erosion control BMPs are used.

☐ Roads and road crossings of confined channels may need reconstruction and drainage and erosion improvements. Review Element V to make sure all roads along confined channels are addressed. If possible, avoid using streamside roads and restore these to avoid affecting the creek.

☐ Review the water conservation section of Element II and III to make sure adequate summer flow remains in the stream.

Additional BMPs that may address particular features on your creek include:

☐ Stabilization of landslides along channel and on canyon slopes. Consult with NRCS or an engineering geologist for assistance.

☐ Do not remove or relocate trees that fall into the stream unless a bridge or structure is threatened. Work with Fish and Game to relocate large wood rather than removing it.

☐ Revegetation of channel banks identified on assessment as bare or without canopy if revegetation with riparian species is appropriate.

- ☐ Revegetation of slopes and hillsides with native species and forest to increase future supplies of large wood and increase canopy over stream as well as reduce soil erosion and stabilize slopes.

- ☐ Installation of large wood and stumps to increase habitat for fish – consult with Fish and Game on locations and project design.

- ☐ All activities on slopes near streams should avoid disturbing the channel or removing trees within 300 ft. of the channel. Forestland studies have shown that large wood and canopy are provided by this 300 ft. of streamside buffer area.

- ☐ Work with neighbors to reduce erosion and fine sediment from getting in to the creek. Avoid increasing flood volume though avoidance of new road construction, vegetation clearing and urbanization.

SUMMARY: CONFINED/BEDROCK CHANNELS

BMPs ALREADY APPLIED:

☐ Completed inventory of corridor condition and other factors with maps, aerial photos, site photos and required information included.

☐ Completed Elements II, III, IV, and VII to address road crossings, erosion, water diversions and stewardship groups.

Indicate BMPs that address particular features on your creek.

☐ Stabilize landslides along channel and on canyon slopes. Consult with NRCS or an engineering geologist for assistance.

☐ Do not remove trees that fall into the stream unless a bridge or structure is threatened. Work with Fish and Game to relocate large wood rather than removing it.

☐ Revegetation of channel banks identified on inventory as bare or without canopy if revegetation with riparian species is appropriate.

☐ Revegetation of slopes and hillsides with native species and forest to increase future supplies of large wood and increase canopy over stream, as well as reduce soil erosion and stabilize slopes.

☐ Installation of large wood and stumps to increase fish habitat - consult with Fish and Game on locations and project design.

☐ All activities on slopes near to the streams should avoid disturbing the channel or removing trees within 300 feet of the channel. Forestland studies have shown that this 300-foot streamside buffer area provides large wood and canopy.

☐ Work with neighbors to reduce erosion and fine sediment from getting into the creek. Avoid increasing flood volume through avoidance of new road construction, vegetation clearing and urbanization.

☐ Implementation funds are applied for if needed.

BMPs TO BE APPLIED:

☐ Completed inventory of corridor condition and other factors with maps, aerial photos, site photos and required information included.

☐ Completed Elements II, III, IV, and VII to address road crossings, erosion, water diversions and stewardship groups.

Indicate needed BMPs that address particular features on your creek.

☐ Stabilize landslides along channel and on canyon slopes. Consult with NRCS or an engineering geologist for assistance.

☐ Do not remove trees that fall into the stream unless a bridge or structure is threatened. Work with Fish and Game to relocate large wood rather than removing it.

☐ Revegetation of channel banks identified on inventory as bare or without canopy if revegetation with riparian species is appropriate.

☐ Revegetation of slopes and hillsides with native species and forest to increase future supplies of large wood and increase canopy over stream, as well as reduce soil erosion and stabilize slopes.

☐ Installation of large wood and stumps to increase fish habitat - consult with Fish and Game on locations and project design.

☐ All activities on slopes near to the streams should avoid disturbing the channel or removing trees within 300 feet of the channel. Forestland studies have shown that this 300-foot streamside buffer area provides large wood and canopy.

☐ Work with neighbors to reduce erosion and fine sediment from getting into the creek. Avoid increasing flood volume through avoidance of new road construction, vegetation clearing and urbanization.

☐ Implementation funds are applied for if needed.

IMPLEMENTATION TIMELINE: CONFINED CHANNELS

For each BMP to be applied, outline a timeline for implementation over the next 10 years.

ACTION/BMP	TIME FRAME

Tasks And Deliverables

Task ID	Task Name	Start Month	End Month	Personnel Involved	Deliverables
1	Program Management	1	36	Marcus, Laurel	Managed project Status reports and invoices Draft and final project reports
2	Program Outreach	1	36	Marcus, Laurel Lackey, Lisa Sharp, Leigh	Brochures, articles, newsletters List of locations and publications for outreach Enrolled agricultural properties
3	Farm Conservation Plan Workshops and Field Trips	4	30	Marcus, Laurel Lackey, Lisa	Workshop descriptions and sign-in sheets Field trip descriptions and sign-in sheets
4	One-on-One Site Visits, Farm Conservation Plan Completion and Initial Project Identification	5	36	Marcus, Laurel Lackey, Lisa	List of site visit dates; List of farmers eligible for Farm Conservation Plan certification; List of potential projects. Summary of sediment load reduction and revegetation and habitat acreage, miles of road and creek/river.
5					

	Current Projects from 2004–2005 Farm Plans	1	24	Marcus, Laurel Lackey, Lisa Sharp, Leigh Steiner, Dave Gaffney, Karen Jackson, Dennis TBD, TBD	Draft project plans and budgets Summary of improvements from projects Project surveys for use as before project data set
6	Project Design	12	36	Marcus, Laurel Lackey, Lisa Sharp, Leigh Steiner, Dave Gaffney, Karen Jackson, Dennis	Priority list of projects Draft project plans and budgets Final project designs and budgets with cost share detailsLandowner project agreements Summary of improvements from projects Project surveys for use as before project data set
7	CEQA Compliance and Permitting	1	36	Lackey, Lisa Sharp, Leigh Steiner, Dave	Final CEQA documents tiered from CalFed documents as much as possible Final permits
8	Implementation of Projects	13	36	Marcus, Laurel Lackey,	Constructed projects Before, during, and after photos of

				Lisa Sharp, Leigh Steiner, Dave Gaffney, Karen Jackson, Dennis TBD, TBD TBD, TBD TBD, TBD	projects Summary report
9	Farm Conservation Plan Certification	6	36	Marcus, Laurel Lackey, Lisa	Two training workshops for agency staff Copies of certification letters Evaluation survey
10	Performance Measures	1	36	Marcus, Laurel Lackey, Lisa	Summary report
11	Effectiveness Monitoring Plan	14	36	Marcus, Laurel Lackey, Lisa Sharp, Leigh Steiner, Dave Gaffney, Karen Jackson, Dennis TBD, TBD TBD, TBD TBD, TBD Hadhazy,	Monitoring Plan

				Lara Zlomke, Bob	
12	**Economic Model**	**14**	**36**	**Marcus, Laurel Lackey, Lisa Sharp, Leigh**	**Summary of collected data**

Total Project Budget Summary by Task and by Fiscal Year

Note: This budget summary **automatically links** to the costs and totals on the **"Budget Detail"** worksheet.
DO NOT CHANGE FORMULAS OR ENTER NUMBERS INTO ANY CELLS EXCEPT THE SHADED CELLS for "Cost Share" and "Other Matching Funds"

BUDGET SUMMARY	Total Amount for Year 1	Total Amount for Year 2	Total Amount for Year 3	Total Amount for All Years
Total Costs for Task One	$ 8,856.00	$ 8,856.00	$ 8,856.00	$ 26,568.00
Total Costs for Task Two	$ 12,052.80	$ 5,356.80	$ 5,356.80	$ 22,766.40
Total Costs for Task Three	$ 5,616.00	$ 5,616.00	$ 5,616.00	$ 16,848.00
Total Costs for Task Four	$ 34,754.40	$ 34,754.40	$ 34,754.40	$ 104,263.20
Total Costs for Task Five	$ 80,892.00	$ 45,921.60	$ -	$ 126,813.60
Total Costs for Task Six	$ -	$ 79,488.00	$ 36,180.00	$ 115,668.00
Total Costs for Task Seven	$ 14,947.20	$ 14,947.20	$ 14,947.20	$ 44,841.60
Total Costs for Task Eight	$ -	$ 243,600.00	$ 243,600.00	$ 487,200.00
Total Costs for Task Nine	$ 5,810.40	$ 5,810.40	$ 5,810.40	$ 17,431.20
Total Costs for Task Ten	$ 2,332.80	$ 2,073.60	$ 2,332.80	$ 6,739.20
Total Costs for Task Eleven	$ -	$ 7,992.00	$ 8,640.00	$ 16,632.00
Total Costs for Task Twelve	$ -	$ 7,236.00	$ 7,236.00	$ 14,472.00
Total Costs for Task Thirteen	$ -	$ -	$ -	$ -
Total Costs for Task Fourteen	$ -	$ -	$ -	$ -
Total Costs for Task Fifteen	$ -	$ -	$ -	$ -
Total Costs for Project Tasks	$ 165,261.60	$ 461,652.00	$ 373,329.60	$ 1,000,243.20
1/Cost Share	$ 158,000.00	$ 158,000.00	$ 158,000.00	$ 474,000.00
2/ Other Matching Funds	$ 100,000.00	$ 100,000.00	$ 100,000.00	$ 300,000.00

1/ *Cost share funds* are specifically dedicated to your project and can include private and other State and Federal grants. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

2/ *Other matching funds* include other funds invested consistent with your project in your project area for which the ERP grant applicant is not eligible. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

BUDGET FOR TASK ONE (Administrative)	**TOTAL AMOUNT TASK 1 All Years**	**Year 1**			**Year 2**			**Year 3**		
		Amount per hour	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 18,000.00	$ 50.00	120	$ 6,000.00	$ 50.00	120	$ 6,000.00	$ 50.00	120	$ 6,000.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 18,000.00**			**$ 6,000.00**			**$ 6,000.00**			**$ 6,000.00**
										-
[1/] Benefits as percent of salary	20%			$1,200.00			$1,200.00			$1,200.00
Personnel Total (salary + benefits)	**$21,600.00**			**$7,200.00**			**$7,200.00**			**$7,200.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ 3,000.00			$ 1,000.00			$ 1,000.00			$ 1,000.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 3,000.00**			**$ 1,000.00**			**$ 1,000.00**			**$ 1,000.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 656.00			$ 656.00			$ 656.00
Total Costs for Task One	**$ 26,568.00**			**$ 8,856.00**			**$ 8,856.00**			**$ 8,856.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK TWO	TOTAL AMOUNT TASK 2 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										
Laurel Marcus	$ 2,500.00	$ 50.00	30	$ 1,500.00	$ 50.00	10	$ 500.00	$ 50.00	10	$ 500.00
Lisa Lackey	$ 4,800.00	$ 40.00	40	$ 1,600.00	$ 40.00	40	$ 1,600.00	$ 40.00	40	$ 1,600.00
New employee	$ 3,600.00	$ 30.00	40	$ 1,200.00	$ 30.00	40	$ 1,200.00	$ 30.00	40	$ 1,200.00
	$ -			$ -			$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 10,900.00**			**$ 4,300.00**			**$ 3,300.00**			**$ 3,300.00**
										-
[1/] Benefits as percent of salary	20%			$860.00			$660.00			$660.00
Personnel Total (salary + benefits)	**$13,080.00**			**$5,160.00**			**$3,960.00**			**$3,960.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)-printing and postage	$ 5,000.00			$ 5,000.00			$ -			$ -
2/ Travel and Per Diem	$ 3,000.00			$ 1,000.00			$ 1,000.00			$ 1,000.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 8,000.00**			**$ 6,000.00**			**$ 1,000.00**			**$ 1,000.00**
[5/] Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 892.80			$ 396.80			$ 396.80
Total Costs for Task Two	**$ 22,766.40**			**$ 12,052.80**			**$ 5,356.80**			**$ 5,356.80**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK THREE	TOTAL AMOUNT TASK 3 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										
Laurel Marcus	$ 7,500.00	$ 50.00	50	$ 2,500.00	$ 50.00	50	$ 2,500.00	$ 50.00	50	$ 2,500.00
Lisa Lackey	$ 1,200.00	$ 40.00	10	$ 400.00	$ 40.00	10	$ 400.00	$ 40.00	10	$ 400.00
New Employee	$ 1,800.00	$ 30.00	20	$ 600.00	$ 30.00	20	$ 600.00	$ 30.00	20	$ 600.00

	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
	$ -			$ -			$ -			$ -		
Personnel Subtotal	**$ 10,500.00**			**$ 3,500.00**			**$ 3,500.00**			**$ 3,500.00**		
[1/] Benefits as percent of salary	20%			$700.00			$700.00			$700.00		
Personnel Total (salary + benefits)	**$12,600.00**			**$4,200.00**			**$4,200.00**			**$4,200.00**		
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**		
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -		
2/ Travel and Per Diem	$ 3,000.00			$ 1,000.00			$ 1,000.00			$ 1,000.00		
3/ Equipment	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
Other Costs Subtotal	**$ 3,000.00**			**$ 1,000.00**			**$ 1,000.00**			**$ 1,000.00**		
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 416.00			$ 416.00			$ 416.00		
Total Costs for Task Three	**$ 16,848.00**			**$ 5,616.00**			**$ 5,616.00**			**$ 5,616.00**		

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK FOUR	**TOTAL AMOUNT TASK 4 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 25,500.00	$ 50.00	170	$ 8,500.00	$ 50.00	170	$ 8,500.00	$ 50.00	170	$ 8,500.00
Lisa Lackey	$ 20,400.00	$ 40.00	170	$ 6,800.00	$ 40.00	170	$ 6,800.00	$ 40.00	170	$ 6,800.00
New Employee	$ 10,800.00	$ 30.00	120	$ 3,600.00	$ 30.00	120	$ 3,600.00	$ 30.00	120	$ 3,600.00
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
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Personnel Subtotal	**$ 56,700.00**				**$ 18,900.00**			**$ 18,900.00**			**$ 18,900.00**	
											-	
[1/] Benefits as percent of salary	20%				$3,780.00			$3,780.00			$3,780.00	
Personnel Total (salary + benefits)	**$68,040.00**				**$22,680.00**			**$22,680.00**			**$22,680.00**	
Other Costs	**Total All Years**				**Total Year 1**			**Total Year 2**			**Total Year 3**	
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)-postage and color printing	$ 1,500.00				$ 500.00			$ 500.00			$ 500.00	
2/ Travel and Per Diem	$ 6,000.00				$ 2,000.00			$ 2,000.00			$ 2,000.00	
3/ Equipment	$ -				$ -			$ -			$ -	
4/ Sub-Contractor - RCD	$ 21,000.00				$ 7,000.00			$ 7,000.00			$ 7,000.00	
4/ Sub-Contractor	$ -				$ -			$ -			$ -	
4/ Sub-Contractor	$ -				$ -			$ -			$ -	
4/ Sub-Contractor	$ -				$ -			$ -			$ -	
4/ Sub-Contractor	$ -				$ -			$ -			$ -	
Other Costs Subtotal	**$ 28,500.00**				**$ 9,500.00**			**$ 9,500.00**			**$ 9,500.00**	
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%				$ 2,574.40			$ 2,574.40			$ 2,574.40	
Total Costs for Task Four	**$ 104,263.20**				**$ 34,754.40**			**$ 34,754.40**			**$ 34,754.40**	

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK FIVE	**TOTAL AMOUNT TASK 5 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 3,500.00	$ 50.00	40	$ 2,000.00	$ 50.00	30	$ 1,500.00			$ -
Lisa Lackey	$ 2,200.00	$ 40.00	25	$ 1,000.00	$ 40.00	30	$ 1,200.00			$ -
New Employee	$ 1,650.00	$ 30.00	25	$ 750.00	$ 30.00	30	$ 900.00			$ -
Dennis Jackson	$ 10,500.00	$ 50.00	140	$ 7,000.00	$ 50.00	70	$ 3,500.00			$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
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	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 17,850.00**			**$ 10,750.00**			**$ 7,100.00**			**$ - -**
										-
[1/] Benefits as percent of salary	20%			$2,150.00			$1,420.00			$0.00
Personnel Total (salary + benefits)	**$21,420.00**			**$12,900.00**			**$8,520.00**			**$0.00**

Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ 2,000.00			$ 1,000.00			$ 1,000.00			
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor - RCD	$ 14,000.00			$ 7,000.00			$ 7,000.00			$ -
4/ Sub-Contractor - Engineers/geomorphologist	$ 60,000.00			$ 40,000.00			$ 20,000.00			$ -
4/ Sub-Contractor -CRP	$ 20,000.00			$ 14,000.00			$ 6,000.00			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 96,000.00**			**$ 62,000.00**			**$ 34,000.00**			**$ -**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 5,992.00			$ 3,401.60			$ -
Total Costs for Task Five	**$ 126,813.60**			**$ 80,892.00**			**$ 45,921.60**			**$ -**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			**Year 2**			**Year 3**		
BUDGET FOR TASK SIX	**TOTAL AMOUNT TASK 6 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 2,500.00			$ -	$ 50.00	25	$ 1,250.00	$ 50.00	25	$ 1,250.00
Lisa Lackey	$ 1,000.00			$ -	$ 40.00	25	$ 1,000.00	$ 40.00		$ -
New employee	$ 750.00			$ -	$ 30.00		$ -	$ 30.00	25	$ 750.00
Dennis Jackson	$ 10,000.00			$ -	$ 50.00	140	$ 7,000.00	$ 50.00	60	$ 3,000.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
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Personnel Subtotal	**$ 14,250.00**			**$ -**			**$ 9,250.00**			**$ 5,000.00**
										-
[1/] Benefits as percent of salary	20%			$0.00			$1,850.00			$1,000.00
Personnel Total (salary + benefits)	**$17,100.00**			**$0.00**			**$11,100.00**			**$6,000.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 1,000.00			$ -			$ 500.00			$ 500.00
2/ Travel and Per Diem	$ 2,000.00			$ -			$ 1,000.00			$ 1,000.00
3/ Equipment	$ -			$ -			$ -			
4/ Sub-Contractor - RCD	$ 7,000.00			$ -			$ 7,000.00			

4/ Sub-Contractor -Engineers/geomorphologist	$ 60,000.00			$ -			$ 40,000.00			$ 20,000.00
4/ Sub-Contractor - CRP	$ 20,000.00			$ -			$ 14,000.00			$ 6,000.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 90,000.00**			**$ -**			**$ 62,500.00**			**$ 27,500.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ -			$ 5,888.00			$ 2,680.00
Total Costs for Task Six	**$ 115,668.00**			**$ -**			**$ 79,488.00**			**$ 36,180.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK SEVEN	**TOTAL AMOUNT TASK 7 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
Lisa Lackey	$ 1,200.00	$ 40.00	10	$ 400.00	$ 40.00	10	$ 400.00	$ 40.00	10	$ 400.00
New Employee	$ 900.00	$ 30.00	10	$ 300.00	$ 30.00	10	$ 300.00	$ 30.00	10	$ 300.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
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Personnel Subtotal	**$ 2,100.00**			**$ 700.00**			**$ 700.00**			**$ 700.00**
										-
[1/] Benefits as percent of salary	20%			$140.00			$140.00			$140.00
Personnel Total (salary + benefits)	**$2,520.00**			**$840.00**			**$840.00**			**$840.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc) permit fees	$ 15,000.00			$ 5,000.00			$ 5,000.00			$ 5,000.00
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			
4/ Sub-Contractor -RCD	$ 24,000.00			$ 8,000.00			$ 8,000.00			$ 8,000.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 39,000.00**			**$ 13,000.00**			**$ 13,000.00**			**$ 13,000.00**

[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 1,107.20			$ 1,107.20			$ 1,107.20
Total Costs for Task Seven	**$ 44,841.60**			**$ 14,947.20**			**$ 14,947.20**			**$ 14,947.20**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK EIGHT	**TOTAL AMOUNT TASK 8 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 2,000.00	$ -		$ -	$ 50.00	20	$ 1,000.00	$ 50.00	20	$ 1,000.00
Lisa Lackey	$ -	$ -		$ -	$ 20.00		$ -	$ 40.00		$
New Employee	$ 3,000.00	$ -		$ -	$ 30.00	50	$ 1,500.00	$ 30.00	50	$ 1,500.00
Dennis Jackson	$ 5,000.00	$ -		$ -	$ 50.00	50	$ 2,500.00	$ 50.00	50	$ 2,500.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
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Personnel Subtotal	**$ 10,000.00**			**$ -**			**$ 5,000.00**			**$ 5,000.00**
										-
[1/] Benefits as percent of salary	20%			$0.00			$1,000.00			$1,000.00
Personnel Total (salary + benefits)	**$12,000.00**			**$0.00**			**$6,000.00**			**$6,000.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ 2,000.00			$ -			$ 1,000.00			$ 1,000.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor - Various Construction Contractors	$ 400,000.00			$ -			$ 200,000.00			$ 200,000.00
4/ Sub-Contractor-RCD	$ 50,000.00			$ -			$ 25,000.00			$ 25,000.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 452,000.00**			**$ -**			**$ 226,000.00**			**$ 226,000.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	5%			$ -			$ 11,600.00			$ 11,600.00
Total Costs for Task Eight	**$ 487,200.00**			**$ -**			**$ 243,600.00**			**$ 243,600.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK NINE	TOTAL AMOUNT TASK 9 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										
Laurel Marcus	$ 7,500.00	$ 50.00	50	$ 2,500.00	$ 50.00	50	$ 2,500.00	$ 50.00	50	$ 2,500.00
Lisa Lackey	$ 2,400.00	$ 40.00	20	$ 800.00	$ 40.00	20	$ 800.00	$ 40.00	20	$ 800.00
New Employee	$ 1,800.00	$ 30.00	20	$ 600.00	$ 30.00	20	$ 600.00	$ 30.00	20	$ 600.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
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Personnel Subtotal	**$ 11,700.00**			**$ 3,900.00**			**$ 3,900.00**			**$ 3,900.00**
										-
[1/] Benefits as percent of salary	20%			$780.00			$780.00			$780.00
Personnel Total (salary + benefits)	**$14,040.00**			**$4,680.00**			**$4,680.00**			**$4,680.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 600.00			$ 200.00			$ 200.00			$ 200.00
2/ Travel and Per Diem	$ 1,500.00			$ 500.00			$ 500.00			$ 500.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 2,100.00**			**$ 700.00**			**$ 700.00**			**$ 700.00**
[5/] Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 430.40			$ 430.40			$ 430.40
Total Costs for Task Nine	**$ 17,431.20**			**$ 5,810.40**			**$ 5,810.40**			**$ 5,810.40**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK TEN	TOTAL AMOUNT TASK 10 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										

Laurel Marcus	$ 3,000.00	$ 50.00	20	$ 1,000.00	$ 50.00	20	$ 1,000.00	$ 50.00	20	$ 1,000.00		
Lisa Lackey	$ 1,600.00	$ 40.00	20	$ 800.00	$ 40.00		$ -	$ 40.00	20	$ 800.00		
New employee	$ 600.00	$ 30.00		$ -	$ 30.00	20	$ 600.00	$ 30.00		$ -		
	$ -	$ -		$ -	$ -		$ -	$ -		$		
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Personnel Subtotal	**$ 5,200.00**			**$ 1,800.00**			**$ 1,600.00**			**$ 1,800.00**		
										-		
[1/] Benefits as percent of salary	20%			$360.00			$320.00			$360.00		
Personnel Total (salary + benefits)	**$6,240.00**			**$2,160.00**			**$1,920.00**			**$2,160.00**		
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**		
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -		
2/ Travel and Per Diem	$ -			$ -			$ -			$ -		
3/ Equipment	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
4/ Sub-Contractor	$ -			$ -			$ -			$ -		
Other Costs Subtotal	**$ -**			**$ -**			**$ -**			**$ -**		
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ 172.80			$ 153.60			$ 172.80		
Total Costs for Task Ten	**$ 6,739.20**			**$ 2,332.80**			**$ 2,073.60**			**$ 2,332.80**		

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK ELEVEN	**TOTAL AMOUNT TASK 11 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 2,250.00			$ -	$ 50.00	20	$ 1,000.00	$ 50.00	25	$ 1,250.00
Dennis Jackson	$ 2,250.00			$ -	$ 50.00	20	$ 1,000.00	$ 50.00	25	$ 1,250.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
										-
										-

	$ -	$ -	$ -	$ -	$ -	$ -	$		
	$ -	$ -	$ -	$ -	$ -	$ -	$		
	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Personnel Subtotal	**$ 4,500.00**		**$ -**			**$ 2,000.00**			**$ 2,500.00**
									-
[1/] Benefits as percent of salary	20%		$0.00			$400.00			$500.00
Personnel Total (salary + benefits)	**$5,400.00**		**$0.00**			**$2,400.00**			**$3,000.00**
Other Costs	**Total All Years**		**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -		$ -			$ -			$ -
2/ Travel and Per Diem	$ -		$ -			$ -			$ -
3/ Equipment	$ -		$ -			$ -			$ -
4/ Sub-Contractor -RCD	$ 10,000.00		$ -			$ 5,000.00			$ 5,000.00
4/ Sub-Contractor	$ -		$ -			$ -			$ -
4/ Sub-Contractor	$ -		$ -			$ -			$ -
4/ Sub-Contractor	$ -		$ -			$ -			$ -
4/ Sub-Contractor	$ -		$ -			$ -			$ -
Other Costs Subtotal	**$ 10,000.00**		**$ -**			**$ 5,000.00**			**$ 5,000.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	8%		$ -			$ 592.00			$ 640.00
Total Costs for Task Eleven	**$ 16,632.00**		**$ -**			**$ 7,992.00**			**$ 8,640.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK TWELVE	**TOTAL AMOUNT TASK 12 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Laurel Marcus	$ 2,500.00	$ -		$ -	$ 50.00	25	$ 1,250.00	$ 50.00	25	$ 1,250.00
Lisa Lackey	$ 2,000.00	$ -		$ -	$ 40.00	25	$ 1,000.00	$ 40.00	25	$ 1,000.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 4,500.00**			**$ -**			**$ 2,250.00**			**$ 2,250.00**
										-
[1/] Benefits as percent of salary	20%			$0.00			$450.00			$450.00

Personnel Total (salary + benefits)	**$5,400.00**			**$0.00**			**$2,700.00**			**$2,700.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor -RCD	$ 8,000.00			$ -			$ 4,000.00			$ 4,000.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 8,000.00**			**$ -**			**$ 4,000.00**			**$ 4,000.00**
5/ Overhead Percentage (Applied to Personnel & Other Costs)	8%			$ -			$ 536.00			$ 536.00
Total Costs for Task Twelve	**$ 14,472.00**			**$ -**			**$ 7,236.00**			**$ 7,236.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK THIRTEEN	**TOTAL AMOUNT TASK 13 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$** - **-**
										-
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -

2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ -**			**$ -**			**$ -**			**$ -**
5/ Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Thirteen	**$ -**			**$ -**			**$ -**			**$ -**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK FOURTEEN	**TOTAL AMOUNT TASK 14 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ - -**
										-
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -

Other Costs Subtotal	**$ -**			**$ -**			**$ -**			**$ -**
5/Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Fourteen	**$ -**			**$ -**			**$ -**			**$ -**
1/ Indicate your rate, and change formula in column immediately to the right of this cell										
2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.										
3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet										
4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")										
5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification										
		Year 1			**Year 2**			**Year 3**		
BUDGET FOR TASK FIFTEEN	**TOTAL AMOUNT TASK 15 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ - -**
										-
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ -**			**$ -**			**$ -**			**$ -**
5/Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Fifteen	**$ -**			**$ -**			**$ -**			**$ -**

1/ Indicate your rate, and change formula in column immediately to the right of this cell
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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")
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Proposal Number
Proposal Name

Detailed Breakdown of Equipment Purchase

Applicant Name

NO equipment will be purchased over $5,000 for this project

Environmental Compliance

CEQA Compliance

Which type of CEQA documentation do you anticipate?
− none *Skip the remaining questions in this section.*
− negative declaration or mitigated negative declaration
− EIR
X categorical exemption *A categorical exemption may not be used for a project which may which may cause a substantial adverse change in the significance of a historical resource or result in damage to scenic resources within an officially designated state scenic highway.*

If you are using a categorical exemption, choose all of the applicable classes below.

X Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.

− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.

− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

X Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

X Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded.

– Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.
Napa County Resource Conservation District
Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).

Is the CEQA environmental impact assessment complete?
No.

If the CEQA environmental impact assessment process is complete, provide the following information about the resulting document.

Document Name

State Clearinghouse Number

If the CEQA environmental impact assessment process is not complete, describe the plan for completing draft and/or final CEQA documents.

We will work with the Napa RCD to complete individual CEQA documents in conjunction with permits for those projects which require CEQA documents. Final CEQA documents will be done 3 months prior to project implementation. Most of the actions complete under the FFF program do not require CEQA review.

NEPA Compliance

Which type of NEPA documentation do you anticipate?
X none *Skip the remaining questions in this section.*
– environmental assessment/FONSI
– EIS
– categorical exclusion

Identify the lead agency or agencies.

Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).

If the NEPA environmental impact assessment process is complete, provide the name of the resulting document.

If the NEPA environmental impact assessment process is not complete, describe the plan for completing draft and/or final NEPA documents.

Successful applicants must tier their project's permitting from the CALFED Record of Decision and attachments providing programmatic guidance on complying with the state and federal endangered species acts, the Coastal Zone Management Act, and sections 404 and 401 of the Clean Water Act.

Please indicate what permits or other approvals may be required for the activities contained in your proposal and also which have already been obtained. Please check all that apply. If a permit is *not* required, leave both Required? and Obtained? check boxes blank.

Local Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
conditional Use Permit	–	–	
variance	–	–	
Subdivision Map Act	–	–	
grading Permit	–	–	
general Plan Amendment	–	–	
specific Plan Approval	–	–	

rezone	**–**	**–**	
Williamson Act Contract Cancellation	**–**	**–**	
other	**–**	**–**	

State Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
scientific Collecting Permit	**–**	**–**	
CESA Compliance: 2081	**–**	**–**	
CESA Complance: NCCP	**–**	**–**	
Lake Or Streambed Alteration Agreement	**–**	**–**	
CWA 401 Certification	**–**	**–**	
Bay Conservation And Development Commission Permit	**–**	**–**	
reclamation Board Approval	**–**	**–**	
Delta Protection Commission Notification	**–**	**–**	
state Lands Commission Lease Or Permit	**–**	**–**	
action Specific Implementation Plan	**–**	**–**	
SWRCB Water Transfer Approval	**–**	**–**	
other	**–**	**–**	

Federal Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
ESA Compliance Section 7 Consultation	**–**	**–**	
ESA Compliance Section 10 Permit	**–**	**–**	
Rivers And Harbors Act	**–**	**–**	
CWA 404	**–**	**–**	
other	**–**	**–**	

Permission To Access Property	Required?	Obtained?	Permit Number (If Applicable)
	–	**–**	

permission To Access City, County Or Other Local Agency Land Agency Name			
permission To Access State Land Agency Name	–	–	
permission To Access Federal Land Agency Name	–	–	
permission To Access Private Land Landowner Name **All Landowners Who Enroll In The FFF Program And Provide Access To Their Site At That Time.**	–	–	

If you have comments about any of these questions, enter them here.

Permit requirements will be determined at the time that project designs are complete

Land Use

Does the project involve land acquisition, either in fee or through easements?
X No. *Skip to the next set of questions.*
– Yes. *Answer the following questions.*

How many acres will be acquired by fee?

How many acres will be acquired by easement?

Describe the entity or organization that will manage the property and project activities, including operation and maintenance.

Is there an existing plan describing how the land and water will be managed?
– No.
– Yes. *Cite the title and author or describe briefly.*

Will the applicant require access across to or through public or private property that the applicant does not own to accomplish the activities in the proposal?
– No. *Skip to the next set of questions.*
X Yes. *Answer the following question.*

Describe briefly the provisions made to secure this access.

As landowners enroll thier property in the Fish Friendly Farming program they provide access to their property for the site evalutions and all follow-up work. This is a cooperative program and landowners volunteer for it so we do not have problems gaining access to private land.

Do the actions in the proposal involve physical changes in the current land use?
X No. *Skip to the next set of questions.*
– Yes. *Answer the following questions.*

Describe the current zoning, including the zoning designation and the principal permitted uses permitted in the zone.

Describe the general plan land use element designation, including the purpose and uses allowed in the designation.

Describe relevant provisions in other general plan elements affecting the site, if any.

Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?
– No. *Skip to the next set of questions.*
X Yes. *Answer the following questions.*

Land Designation	Acres	Currently In Production?
Prime Farmland	**unknown until enroll**	**X**
Farmland Of Statewide Importance	**unknown until enroll**	**X**
Unique Farmland	**unknown until enroll**	**X**
Farmland Of Local Importance	**unknown until enroll**	**X**

Is the land affected by the project currently in an agricultural preserve established under the Williamson Act?
– No. *Skip to the next set of questions.*
X Yes. *Answer the following question.*

Is the land affected by the project currently under a Williamson Act contract?
– No. *Skip to the next set of questions.*
X Yes. *Answer the following question.*

Why is the land use proposed consistent with the contract's terms?

The FFF program does not reduce the agricultural land acreage by large amounts except when an owner volunteers to change some of their land to habitat areas. These change would not change either the overall land use or the Williamson Act Contract.

Describe any additional comments you have about the projects land use.

The FFF program works to make agricultural operations more sustainable and does not focus on taking land out of

agricultural production.