CHAPTER 10. ECONOMIC ANALYSIS

Key Points

- The Scott River TMDL Action Plan builds on ongoing voluntary efforts in the watershed, and implementation of existing regulatory requirements where voluntary efforts are insufficient or too slow. No new water quality objectives or prohibitions are established, and no new burdens are imposed on dischargers. The Plan is geared toward using ongoing efforts and existing regulatory standards and enforcement tools more effectively than in the past, using available watershed-specific information and applicable science to inform those efforts.

- The proposed Scott River TMDL Action Plan will therefore have no direct economic costs or benefits above and beyond those required by existing regulatory requirements except to the degree that existing authorities and obligations will be more effectively implemented and complied with under the Plan. Landowners and dischargers are already bound by various existing regulatory requirements that involve water quality and natural resource protection, and the economic impacts associated with existing obligations are not directly attributable to this Action Plan.

- There are no costs or benefits associated with encouragement of ongoing efforts.

- Compliance with existing regulatory requirements can have both positive and negative economic impacts. Costs and benefits associated with meeting existing requirements are included in this document for informational purposes.

- Positive impacts include benefits related to:
    - fishing, including commercial, subsistence, and cultural fishing;
    - flooding;
    - properly functioning ecosystems;
    - recreation;
    - remediation activities, including habitat restoration and road maintenance;
    - land values; and
    - water conveyance and storage facilities.

- Negative impacts include costs related to:
    - road maintenance and sediment waste discharges avoidance;
    - dredge mining implementation actions;
    - temperature and vegetation implementation actions;
    - water use implementation actions;
    - flood control and bank stabilization actions;
    - implementation actions for the USFS and BLM; and
    - grazing implementation actions.

- The costs and benefits will not be uniformly distributed throughout the watershed, or even across properties with similar land uses.
- Potential sources of financing include private financing as well as public monies available through grants and other public funding programs.

This chapter includes an analysis of the potential economic impacts, both positive and negative, from compliance with existing regulatory requirements as implemented through the the proposed Scott River TMDL Action Plan. Because the Action Plan does not include any new regulatory requirements, and relies in part on encouraging existing self-directed efforts in the watershed, there are no incremental positive or negative economic impacts directly attributable to this action. Nevertheless, to provide information on negative economic impacts, or costs, that could be incurred and positive economic impacts, or benefits, that may accrue as a result of compliance with existing regulatory requirements, this chapter provides information on both costs and benefits of compliance. The negative impacts relate to the costs of compliance and the costs of remediation. The positive economic impacts relate to both economic and non-economic values that will be improved by recovery of the watershed, high water quality, and supported beneficial uses.

Regional Water Board staff conclude that the estimated costs are existing obligations and therefore are not directly attributable to the proposed Scott River TMDL Action Plan, but that even if they were treated as new costs associated with the Plan, they are justified, not only because of the economic benefits that would be achieved, but also because of the legal obligations under which the Regional Water Board must act to protect water quality, beneficial uses, and the general public interest in fulfilling these obligations.

10.1 LEGAL FRAMEWORK

In amending the Basin Plan, the Regional Water Board must analyze the reasonably foreseeable methods of compliance with proposed performance standards and treatment requirements (Pub. Resources Code §21000 et seq.). This analysis must include economic factors, but does not require a cost-benefit analysis.

Additionally, in accordance with the Porter-Cologne Water Quality Control Act, it is the policy of the state to protect the quality of all waters of the state. Waters of the state include “any surface water or groundwater, including saline waters, within the boundaries of the state” (CWC §13050). When adopting the Porter-Cologne Act, the Legislature declared that all values of the water should be considered, but then went on to provide only broad, non-specific direction for considering economics in the regulation of water quality.

> “The Legislature further finds and declares that activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be

> made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible" (CWC §13000).

The Porter-Cologne Act directed regulatory agencies to pursue the highest water quality that is reasonable, and *one* of the factors used to determine what is reasonable is economics. It is clear, though, that economic factors cannot be used to justify a result that would be inconsistent with the federal Clean Water Act or the Porter-Cologne Act. The Regional Water Board is obligated to restore and protect water quality and beneficial uses.

10.2 SCOPE OF THE ECONOMIC ANALYSIS

10.2.1 Existing Requirements

Landowners and dischargers are bound by various existing regulatory requirements that involve water quality and natural resource protection. The economic impact of existing obligations should not be attributed to the proposed Scott River TMDL Action Plan.
Applicable existing requirements include:

- Existing Basin Plan requirements (such as the sediment prohibition, the federal and state antidegradation policies, the controllable factors requirement, the general Waste Discharge Requirements and general waiver for timber harvest activities, and the existing water quality objectives for temperature, sediment, settleable material, suspended material, and turbidity).
- State nonpoint source program requirements.
- Porter-Cologne Act requirements (such as the requirement of Section 13260 for every person who discharges a waste that impacts water quality to file a report of waste discharge with the Regional Water Board, and the cleanup and abatement requirements of Section 13304).
- The California Department of Forestry and Fire Protection requirements for timber harvest activities.
- The federal and state endangered and threatened species requirements.
- Obligations imposed by other local, state and federal natural resource agencies.

There are no costs associated with encouragement of existing and ongoing activities in the watershed.

10.2.2 Geographic Scope

The costs and benefits of complying with existing regulatory requirements will not be uniformly distributed throughout the Scott River watershed. The implementation actions proposed by the Scott River TMDL Action Plan (see Chapter 5 of this Staff Report) are not uniformly required across the Scott River watershed or even across properties with similar land uses. Instead, many of the implementation actions will be required of landowners on an as-needed, site-specific basis or are simply activities that are encouraged by the Regional Water Board. While this flexibility adds greatly to the effectiveness of the Scott River TMDL Action Plan, it is one factor preventing this economic analysis from totaling benefits and cost on a watershed scale.

Additionally, more intensive land use activities will face greater costs than less intensive land use activities. Activities on steep, erosive slopes in proximity to water bodies will require greater care and higher costs than activities on lands that do not deliver to a water body or on lands that are not highly erosive.

10.3 BENEFITS

This section presents the estimated benefits of the complying with existing water quality requirements. These benefits relate to both economic and non-economic values that will be improved by recovery of the watershed, high water quality, and supported beneficial uses. Benefits also include avoiding costs associated with the impacts of current and expected sediment waste discharges and elevated temperatures if they are not prevented and controlled. Existing temperature and sediment impairment of beneficial uses negatively impact the cold water salmonid fishery (including the essential habitat of these fish), the fishing industry, water supplies, parks and the recreation industry, and others. The loss of soil from stream bank erosion and topsoil runoff for farming, grazing, and horticulture is another economic impact to agricultural industries.

Ribaudo (1989), an economist with the U.S. Department of Agriculture, studied water quality benefits related to prevention of soil erosion under the U.S.D.A. Conservation Reserve Program. He concluded that if sediment could be prevented from entering streams, the benefits to downstream landowners and water users would include actual benefits and avoided costs, such as lowered water treatment costs, reduced sediment removal costs, reduced flood damage, less damage to equipment that uses water, and increased recreational fishing. For the Pacific Region (including California), the amount calculated for sediment that could be prevented from entering streams was $2.48 per ton (in 1989 dollars). Not only was this amount calculated 16 years ago, but it does not even begin to address the impacts to commercial fishing, reduced road maintenance costs, the benefits of keeping soil in place and on-site to protect agricultural and silvicultural productivity, and protection of threatened and endangered species – all important in the Scott River watershed.

Although many of the economic benefits of complying with existing water quality requirements are foreseeable and describable, there is inadequate information to fully quantify some of these benefits. What information is available on benefits related to fishing, flooding, properly functioning ecosystems, recreation, remediation activities, residential land prices, and water conveyance and storage facilities are described in the following sections. These sections are organized alphabetically, and are not listed in order of importance or size of economic benefit.

10.3.1 Fishing – Commercial, Subsistence, & Cultural

Commercial commodity fishing has been adversely affected by the decline in fisheries stocks in recent years. Salmon, especially, have economic value to commercial, recreational, and cultural fishing activities. The financial losses of commercial fisheries are due to many factors beyond the impact of sediment and water temperature impaired habitat (including ocean harvest, water diversions, and other habitat impairments such as low dissolved oxygen), so the amount of the loss attributed to excess sediment and high water temperatures in the Scott River watershed has

not been determined. However, the Coho Recovery Strategy extrapolates coho recovery benefits and concludes that the economic benefits of recovery would be greater than the costs:

> "Benefits associated with non-use values include intrinsic, or existence values which are derived from the knowledge that coho salmon populations exist, and bequest values which confer value to the resource for the benefit of future generations. Based on studies that examined streams in Colorado and salmon restoration in the Columbia River Basin, the San Joaquin River, and the Elwha River, the extrapolated value of California coho salmon recovery could be significantly larger than the fiscal or socioeconomic costs of recovery" (CDFG 2004).

In addition to the impact on the commercial fishery, fishing plays an important role in Native American cultures in the Klamath River to which the Scott River is tributary. Improved habitat resulting from reduced sedimentation and lowered temperatures will result in improved opportunities for cultural and subsistence fishing. Although these benefits are not quantified, the economic and cultural impact on the tribes of the Klamath Basin due to loss of salmonids fisheries is significant. The economic costs due to changes in traditional diets were explored in a recent study:

> "Whereas historic fish consumption for the Karuk Tribe is estimated at 450 pounds per person per year, fish consumption for the Tribe based on the tribal fish catch in 2003 is estimated at less than 5 pounds per person per year. . . .The central thesis of this report is that Karuk people face significant and costly health consequences as a result of denied access to many of their traditional foods. Not only does a traditional diet prevent the onset of conditions such as obesity, diabetes, heart disease, kidney trouble and hypertension, a traditional diet of salmon and other foods is one of the best treatments for such conditions" (Norgaard 2004)

The Coho Recovery Strategy also discussed this issue, but could not quantify it:

> "Coho salmon recovery will have significant costs, but will also provide economic benefits. Benefits associated with Yurok and Hoopa Valley tribes' Federally reserved fishing rights, increased commercial land and water use activities, multiple species benefits, and improved water quality and watershed health will be realized, but they are not quantified. Coho salmon recovery will also result in benefits to recreational and commercial fishing and related industries, which are also not quantified in this document" (CDFG 2004).

10.3.2 Flooding

Increased sedimentation in stream channels reduces the capacity of the channel to pass peak flows, which can result in flooding. Property damage includes fences being knocked down during floods, loss of agricultural productivity through deposition of silt on crops, threats to

septic systems, loss of water supplies by filling of pools with sediment, and wear and failure of pumps and other mechanical devices. When floodwaters enter homes, they cause damage to floorings, furniture, walls, etc., and residents are forced to raise furniture and property for its protection. Cleanup after a flood event is costly and time-consuming. Residents attempt to protect their homes from floodwaters by using sandbags or by constructing walls and levees. Due to increased risk of flooding, property values are reduced and flood insurance is not only difficult to obtain, but very expensive. A decrease in the sediment loading of water bodies will decrease flooding and will result in monetized and non-monetized economic benefits.

10.3.3 Properly Functioning Ecosystems

Another large, but intangible, benefit can be ascribed to properly functioning ecosystems at various scales – local planning watershed, watershed, regional, etc. The National Academy of Sciences states, "We now think of the natural environment, and the ecosystems of which it consists, as natural capital – a form of capital asset that, along with physical, human, social, and intellectual capital, is one of society's important assets" (National Academy of Sciences 2004). Some functions are most beneficial if they remain part of an integrated ecosystem rather than as individual components. Some of the valuable functions of intact ecosystems are nutrient recycling, regulation of climate and atmospheric gases, maintenance of biodiversity, water supply, flood risk reduction, etc. Not all of these services, of course, are impacted by excess sedimentation or high water temperature. The National Academy of Sciences has recently reviewed the studies associated with valuation of ecosystem services. They discuss several non-market valuation methods for both use and nonuse benefits. These analyses are beyond the scope of what is required for this economic analysis, but the concept of ecosystem services, apart from direct measurable goods and services, is among the intangible benefits of controlling sediment waste discharges and high water temperatures.

10.3.4 Recreation

Recreation does more than just supply leisure activity – recreation can have a significant economic impact. "Recreation and tourism are California's largest industries. California's rivers draw more of these users than any other location, except for its beaches" (California State Lands Commission 1993). "The demand for water-based recreation has been increasing as our population expands and the desire for outdoor recreation grows, particularly near urban areas and in national parks and other unique sites" (Koteen et al. 2002). Recreation and leisure activities provide economic value to those offering travel services,. Services and amenities proximate to the recreation locations, such as equipment rental, hotels, camp grounds, restaurants, sale of supplies, park fees, etc.

The impact of water quality on recreation varies depending on the type of recreational activity. Some activities are more sensitive to sediment and temperature related water quality impairments than others. A study by Koteen et al. (2002) showed that rafters, for example, are more interested in water quantity than sediment loads and are less willing to pay for improved water quality than are other recreational users such as swimmers, shoreline camping, fishing, and viewing. Koteen et al. (2002) summarized the value of water for particular recreational activities. They compared the mean increase in benefit to households in 1998 dollars for a

specific change in water uses – such as from non-boatable to boatable; boatable to fishable; fishable to swimmable, etc. – in various geographic areas and nationwide. For example, a nationwide study showed a mean increase in benefit to households in 1998 dollars for a water quality change that allowed a change in recreation activity from boatable to fishable to be $79.60 or for a change from fishable to swimmable to be $88.68. The report also summarized a 1982 study in 119 counties in Idaho, Oregon, and Washington that calculated the mean annual recreation benefits of swimming ($54,630), camping ($49,957), fishing ($98,303), and boating ($66,515). They also summarized the marginal values of increasing water flow by type of activity, with fishing offering the highest marginal values per acre-foot for higher flows.

Recreational salmonid fishing, especially for steelhead, will increase if fish stocks recover. Recreational fishing also creates jobs. As more fish are available, recreational fishing will be more attractive. Stedman and Hanson (2005) reported: "During 1991 it was estimated that 2.7 million people spent more than $1.5 billion fishing in California. The state's recreational fishery generated more than $900 million in earnings by supporting 40,000 jobs and contributed more than $90 million in state sales tax." Some studies suggest that recreational fishing for steelhead rivals or exceeds commercial fishing for steelhead in its economic impact. Recreational fishing also supports direct and indirect economic value. "Dollars pumped into California's economy from river recreation include not only the direct value of licenses for fishing, registration of boats, equipment purchased and hiring of guides or rafts, but also the value of lodging or campsites, money generated by travel to and from the rivers, and the maintenance and repair of river-related equipment" (California State Lands Commission 1993).

The impact of reducing sediment loads and improving water temperatures on recreational uses (and the associated economic benefit) will vary, depending on the activity and location. Recreational fishing appears to be highly sensitive to water quality improvements – not only because of the nature of the recreational water contact (i.e., it is more desirable to fish in clear water), but also because of the impact of poor water quality on fish stocks.

10.3.5 Remediation - Habitat Restoration and Road Maintenance

Remediation costs can be expected to decrease if sediment discharges and adverse impacts to temperature are prevented. Remediation of fish habitat after impairment occurs can be expensive. The need for expensive restoration and remediation will be reduced, if not eliminated, if waste sediment can be prevented from discharging to water bodies and adverse impacts to temperature can be lessened.

The failure to prevent discharges can result in much larger costs for landowners for remediation and restitution after degradation occurs. Prevention is far less expensive than remediation after degradation occurs. Recent enforcement cases in the North Coast Region illustrate how expensive remediation and enforcement costs can be. In one recent case, a vineyard expansion with substantial grading and road development resulted in serious erosion to three nearby water bodies. The landowner was required to install erosion control measures, repair erosion damage, re-vegetate, grade, drain, remove fill, restore channels, and hire consultants including biologists, engineers, and geologists. The restitution costs were $225,000 and the remedial work to restore the property was about $750,000. Additionally, there were legal fees associated with the

criminal charges that were filed. In another case, roadwork for a home site development resulted in a large sediment discharge to a creek. The restitution and remediation was about $1.5 million (with $277,500 for cleanup and land stabilization).

Typical costs associated with stream-bank remediation and restoration can be avoided if the adverse impacts can be prevented or minimized. Some of the typical costs are provided by the 2004 Coho Recovery Strategy and are excerpted in Table 10.1. Actual costs will vary depending on many site-specific factors, such as site accessibility, on the specific work that is required, and the prevailing prices and wage rate in the area. The need for these activities and the associated costs will be reduced, if not eliminated, if compliance with existing water quality requirements prevents the discharge of excess waste sediment to waters of the state and reduces water temperatures.

Road maintenance costs for both the private and public sectors can be expected to decrease if roads are properly designed for sediment control. Some costs associated with this activity may be transferred to an earlier time, leading to a short-term increase but an overall decrease in costs. For example, replacing an inadequate stream crossing before it fails and releases sediment to a water body would be a short-term cost increase, but would save the larger cost of fixing a failed crossing. Similarly, storm-proofing roads so that they can shed water without causing gullies will lead to a short-term cost increase, but the annual maintenance costs will be lower than if gullies, etc. have to be repaired on an on-going basis. The 2004 Coho Recovery Strategy (CDFG 2004) talks about the need to control sediment associated with roads – using techniques such as, removing unstable sidecast and fill materials from steep slopes, improving surface drainage, and upgrading stream crossings. These cost are excerpted in Table 10.1.

Table 10.1
Costs of Typical Habitat Restoration Activities
(Adapted from Appendix I of CDFG 2004 Coho Recovery Strategy)

Activity	Units	Cost ($)
Compacted fill	CY	2.50
Cut and fill	CY	130.00
Geotextile fabric	SF	1.25
Grading and shaping	AC	200.00
Mobilization	Each	1,250.00
Rock, in place	CY	100.00
Rock/fill	CY	50.00
Seedbed preparation	AC	50.00
Stream tree revetment	Each	22.00
Wildlife repellent (chemical)	LF	125.00
Stream bank protection, general	LF	125.00
General control fencing	LF	3-12.00
Labor requirements for stream-bank improvements in California		
Brush layering	LF/hr	6-7.00
Fascine placement	LF/hr	5.00
Seedling planting	plants/hr	30-120.00
Seeding	AC/hr	0.05-0.50
Hydroseeding	AC/hr	0.12-0.37

"USDA cost estimates report that stream-bank protection projects in general cost about $125 per square foot in California. However, these cost estimates do not include the cost of maintenance or permitting." The coho strategy provides estimates of permitting and short-term maintenance to be $30 to $1000 per foot.
AC = acre CY = cubic yard LF = linear foot SF = square foot

10.3.6 Residential Land Prices

Water quality has a positive economic impact on property values, even if property owners do not consume the water. Koteen et al. (2002) summarized studies concerning the change in residential property prices near waterbodies as related to changes in water clarity. "The studies examined the change in property price for each foot of lake frontage given a 1-foot improvement in water clarity." The studies found price increases ranging from $2.34 per foot of lakefront in Minnesota to $16-28 in Maine. Conversely, the authors include a study showing a decrease in property value related to a decrease in water clarity in Florida. The precise property value changes discussed in the report cannot, of course, be applied directly or quantitatively to the Scott River watershed; the authors caution, "The value is unique for each situation, such as location and current clarity." The tendency, though, for property values to increase when water quality is increased is borne out by other studies.

10.3.7 Water Conveyance and Storage Facilities

Excess water-borne sediment is deposited in slow moving areas, such as reservoirs and irrigation canals. This will reduce the life of these facilities. Higher sediment loads increase maintenance costs of irrigation canals and reservoirs. The capacity of reservoirs is reduced. The costs avoided

by reducing sediment loads are difficult to quantify, but dams are expensive and this economic benefit is likely large overall.

10.4 COSTS

Compliance with existing water quality regulatory requirements will have positive and negative economic impacts. This section presents these estimated costs. These costs relate to the economic impacts of compliance and remediation. See Section 10.2 for a discussion of the costs that can be ascribed to the Scott River Action Plan compared to the costs that are imposed by existing regulatory requirements.

The costs of complying with existing water quality regulatory requirements will not be uniformly distributed throughout the Scott River watershed. The types of actions anticipated (see Chapter 5 of this Staff Report) are not uniformly required across the Scott River watershed or even across properties with similar land uses. Instead, the extent of the implementation action necessary is not known and may change based on the success of implementation. Additionally, there are various ways to address a given impairment and not all the management measures listed may be needed. Also, some of the actions called for in the Scott River TMDL Action Plan (such as control fencing and road inventories) are already in place or completed. Finally, many of the implementation actions will be required of landowners on an as-needed, site-specific basis or are simply activities that are encouraged by the Regional Water Board. While this flexibility should greatly improve the effectiveness of the complying with existing water quality regulatory requirements, it is a factor that prevents this economic analysis from totaling benefits and cost on a watershed scale. Therefore, estimated costs are expressed on a unit scale (e.g., per acre, per linear foot of fence).

10.4.1 Methodology

The cost analysis was conducted to provide approximate estimates of the cost of complying with existing water quality regulatory requirements. An economist on staff with the State Water Resources Control Board assisted in developing this analysis (see Horner 2005 for more information). Costs of management measures that are likely to be required to achieve the types of actions specified in the TMDL were estimated using the Natural Resource Conservation Service (NRCS) Program Costs derived from the ProTracts cost dataset. ProTracts is a national dataset maintained by NRCS to assist local NRCS Districts in setting cost shares for implementing conservation practices. Cost estimates are provided at the county level and the data used for this analysis are specific to Siskiyou County. These cost estimates may not represent the total cost of implementing a management practice, but they do provide a reasonable approximation of costs that can be adjusted if necessary. NRCS Program Costs are updated on a monthly basis.

Management measures that are likely to achieve proposed implementation actions are varied and numerous. An early step in this analysis was to select the management measures from the NRCS Program Costs database that are the most appropriate and the most likely to be used to reduce

sediment waste discharges and elevated water temperatures. Table 10.2 lists the NRCS Program Costs management measure categories. The management measures that were selected are highlighted in bold text.

Table 10.2
NRCS Program Costs Management Measures

Code	Name		Code	Name
322	Channel Vegetation		548	Grazing Land Mechanical Treatment
327	Conservation Cover		550	Range Planting
328	Conservation Crop Rotation		**554**	**Drainage Water Management**
329	Residue Management, No-Till/Strip Till		555	Rock Barrier
330	Contour Farming		**560**	**Access Roads**
332	Contour Buffer Strips		561	Heavy Use Area Protection
340	Cover Crop		562	Recreation Area Improvement
342	Critical Area Planting		566	Recreation Land Grading and Shaping
344	Residue Management, Seasonal		568	Recreation Trail and Walkway
350	Sediment Basin		**570**	**Runoff Management System**
382	**Fence**		572	Spoil Spreading
386	**Field Border**		**574**	**Spring Development**
390	Riparian Herbaceous Cover		575	Animal Trails and Walkways
391	**Riparian Forest Buffer**		**580**	**Streambank and Shoreline Protection**
393	**Filter Strip**		582	Open Channel
410	Grade Stabilization Structure		584	Channel Stabilization
412	Grassed Waterway		585	Stripcropping
422	Hedgerow Planting		600	Terrace
423	Hillside Ditch		601	Vegetative Barriers
450	Anionic Polyacrylamide Erosion Control		**607**	**Surface Drainage, Field Ditch**
468	**Lined Waterway or Outlet**		**612**	**Tree/Shrub Establishment**
484	Mulching		**614**	**Watering Facility**
490	Forest Site Preparation		638	Water and Sediment Control Basin
511	Forage Harvest Management		655	Forest Trails and Landings
512	Pasture and Hay Planting		666	Forest Stand Improvement

10.4.2 Estimated Costs for Scott River TMDL Action Plan

Because the Scott River TMDL Action Plan does not include any additional regulatory requirements, the estimated costs of the Scott River TMDL Action Plan are theoretically zero, since should the Plan be adopted and implemented as proposed, the only costs are those associated with compliance with existing water quality regulatory requirements. These costs , and are listed in Table 10.3. The table is organized in the same order as the proposed implementation actions in Chapter 5. This information is based on the economic analysis conducted by an economist on staff with the State Water Resources Control Board (Horner 2005).

As discussed above, a single management measure will likely not be implemented over the entire extent of a given land use or across the entire Scott River watershed. It is up to the landowner/discharger to decide which implementation actions and management measures are most appropriate to control sediment and water temperature on his or her property. Also, some of the management measures have already been implemented or are required by other regulatory programs.

Table 10.3 Estimated Costs for Compliance with Existing Sediment and Temperature Water Quality Regulations		
Estimated Costs for Roads & Sediment Waste Discharges		
Development of an Erosion Control Plan	Timberland: $23.70 to $77.40 per acre Non-Timberland: $35.28 to $77.40 per acre	Based on estimates on the cost of developing an Erosion Control Plan from Pacific Watershed Associates (Weaver & Hagans, 2004; Fitzgerald, 2005a)
Grading and Shaping of Roads, Trails, and Landings	$200 per acre	Per NRCS Program Costs database. Assumes roads, trails, and landings are gravel and dirt.
Estimated Costs for Dredge Mining Implementation Actions		
Investigation & Study of Impacts	$60,000 total over three years.	Based on the cost for a state employee to conduct the proposed study. Assuming 0.20 personnel years at an annual cost of $100,000 per personnel year for three years.
Estimated Costs for Temperature and Vegetation Implementation Actions		
Planting Trees	$180 per acre.	Per NRCS Program Cost database.
Maintaining Trees	$800 per acre.	Per NRCS Program Cost database.
Fencing	$3.25 per running foot of fence	Per NRCS Program Cost database.
Installation of Remote Water Supply (Tanks)	$1.75 per gallon of tank capacity	Per NRCS Program Cost database.

Table 10.3 (cont.) Estimated Costs for the Scott River TMDL Action Plan		
Estimated Costs for Water Use Implementation Actions		
Develop a Study Plan	$120,000 total over three years.	Based on the cost for staff of the State and the County of Siskiyou to develop the Study Plan. For the state, this estimate assumes 0.20 personnel years at an annual cost of $100,000 per personnel year for three years ($60K). For the county, it assumes 0.20 personnel years at an annual cost of $100,000 per personnel year for three years ($60K).
Estimated Costs for Flood Control and Bank Stabilization Implementation Actions		
Planting Trees	$180 per acre.	Per NRCS Program Cost database.

Maintaining Trees	$800 per acre.	Per NRCS Program Cost database.
Estimated Costs for Implementation Actions for the USFS & BLM		
Development of an Erosion Control Plan	$23.70 to $77.40 per acre	Based on estimates on the cost of developing an Erosion Control Plan from Pacific Watershed Associates (Weaver & Hagans, 2004; Fitzgerald, 2005a)
Grading and Shaping of Roads, Trails, and Landings	$200 per acre	Per NRCS Program Costs database. Assumes roads, trails, and landings are gravel and dirt.
Analyze Current Grazing Management Practices and Monitoring Activities	$70,000 total over one year	Based on the cost for staff of the State, the USFS, and BLM to conduct the analysis. For the state, this estimate assumes 0.10 personnel years at an annual cost of $100,000 per personnel year for one year ($10K). For the USFS and BLM, it assumes 0.30 personnel years each at an annual cost of $100,000 per personnel year for one year ($30K x 2 = $60K).
Estimated Costs for Grazing Implementation Actions		
Fencing	$3.25 per running foot of fence	Per NRCS Program Cost database.
Installation of Remote Water Supply (Tanks)	$1.75 per gallon of tank capacity	Per NRCS Program Cost database.
Development of a Grazing and Riparian Management Plan	Level Ground: $8.50 to $12.50 per acre Steep Ground: $12.50 to $18.50 per acre	Based on the estimated cost for a consultant to prepare the plan at a rate of $200 to $300 per day. A plan for 100 acres of flat ground would take about 4 days to prepare and a plan for 100 acres of steep ground would take about 6 days to prepare. Miscellaneous expenses (e.g., gas) are also included (Fitzgerald, 2005b).

10.5 SOURCES OF FUNDING

Potential sources of funding include monies from private and public sources. Public financing includes, but is not limited to, grant funds, as described below, single-purpose appropriations from federal, state, and/or local legislative bodies, and bond indebtedness and loans from government institutions.

There are several potential sources of public financing through grant and funding programs administered, at least in part, by the Regional Water Board and the State Water Board. These programs vary over time depending upon federal and state budgets and ballot propositions approved by voters. Regional and State Water Board grant and funding programs that are pertinent to the proposed Action Plan for the Scott River Sediment and Temperature TMDLs and are currently available at the time of this writing or will be available in the near future are summarized and described below.

Consolidated Watershed Nonpoint Source Grant Program (Proposition 40)

The Consolidated Watershed Nonpoint Source (NPS) grant program is funded by Proposition 40, the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002. This program has not yet solicited grant proposals, but will fund nonpoint source, coast non-point source, urban storm water, and watershed management projects.

Nonpoint Source Pollution Control Program (Proposition 40)

The Non-point Source Pollution Control Program provides funding for projects that protect the beneficial uses of water throughout the state through the control of nonpoint source pollution. Up to $19 million is available to local public agencies and non-profit organizations.

Integrated Regional Watershed Management Grant Program (Proposition 40)

The Integrated Regional Watershed Management grant program funds projects for development of local watershed management plans and for implementation of watershed protection and water management projects. This grant program will provide $47.5 million statewide for competitive grants to non-profit organizations and public agencies.

Integrated Regional Water Management (IRWM) Grant Program (Proposition 50)

The IRWM Grant Program is a joint program between the Department of Water Resources (DWR) and the State Water Board which provides funding for projects to protect communities from drought, protect and improve water quality, and reduce dependence on imported water. Funding is available for both IRWM Planning and Implementation Grants.