

Assurances will also be sought from government agencies or utility companies for protection of projects undertaken on lands or easements owned by these organizations. Additionally, prior to implementing any riparian corridor revegetation projects, the Trustee Council will consult with local technical experts regarding revegetation priorities and selection of plant species. A listing of the proposed projects approved for implementation is given in Appendix C.

1. Riparian Corridor Revegetation

Riparian habitat is important to aquatic and terrestrial resources. A healthy complex of vegetation, including large canopy trees and understory vegetation, along with instream structure creates shade to keep water temperatures cool for fish and provides habitat where fish can rest, feed, and reproduce. These riparian habitats are also critical for numerous species of birds, mammals, and amphibians. Loss of these important habitats impacts all aquatic life, as well as other species who depend on these areas for food and cover. Additionally, there is the potential that revegetated and stabilized banks will filter run-off that may contain pollutants such as fertilizers, pesticides and herbicides. Such chemicals, if present, may impact fish and macroinvertebrates.

Throughout the San Luis Obispo Creek watershed, riparian habitat has been severely degraded by urban encroachment and poor land management practices. Within urbanized areas, buildings are erected adjacent to the creek banks leaving no space for an adequate vegetation buffer. The creek is also channelized in some locations, leaving the area devoid of useful habitat. In agricultural areas, cattle grazing and channel clearing have caused habitat degradation. Exotic species proliferation is a problem throughout the San Luis Obispo Creek watershed. These plants, primarily giant reed (*Arundo*), castor bean, and cape ivy, are out-competing native species. The result is diminishing riparian habitat.

Degraded riparian habitat often leads to bank erosion and downstream sedimentation. Sedimentation, which refers to the accumulation of fine particulate matter on creek bottoms. This has several negative affects on fisheries resources and is one of the most critical problems facing fish in the San Luis Obispo Creek watershed. Anadromous fish species in this watershed, such as the Southern Steelhead Trout, rely on clean gravels for spawning. Eggs are laid in clean gravel nests called redds. Water flowing through the clean gravel assures an adequate oxygen supply to the maturing eggs. However, when eggs are covered with sediment they receive less oxygen and suffer high mortality rates. Sedimentation also contributes to a decrease in aquatic macroinvertebrate habitat. Aquatic insects live among clean gravels and rocks. When these substrates become embedded with sediment they no longer function as macroinvertebrate habitat. The decrease in habitat translates to a decrease in numbers of these organisms. This has a direct effect on fisheries because these insects are a major food source for fish.

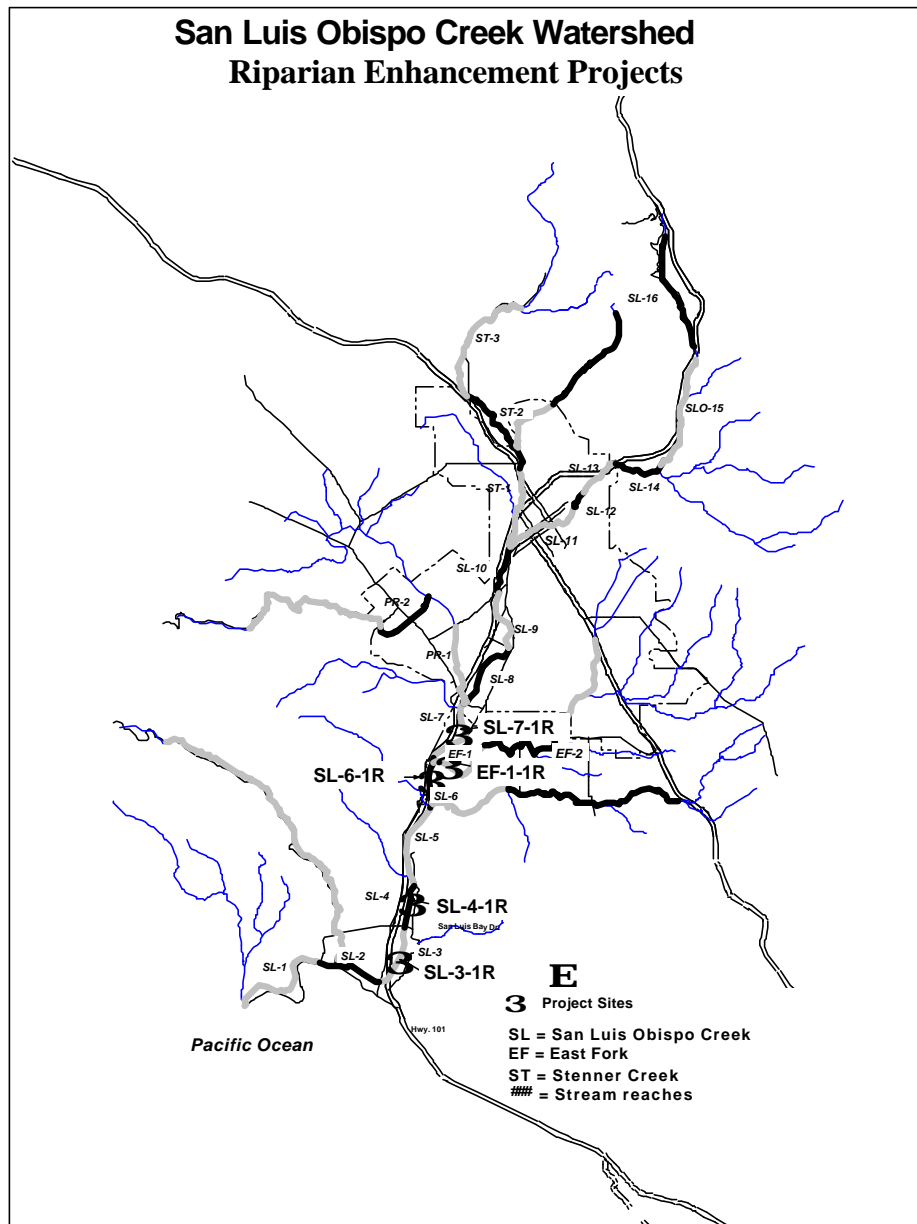
Another result of sedimentation is filling of deep pool habitat. This habitat type is becoming increasingly scarce in the San Luis Obispo Creek watershed. Fish rely on deep pools for cool water, safe havens, and feeding.

Restoration Actions
within the San Luis Obispo Creek Watershed

The solutions to bank erosion include a variety of techniques from “hard” solutions that require rock or other structures to be placed on the bank, to “soft” solutions based on replanting with native vegetation to stabilize the bank. There are also techniques that make use of both hard and soft solutions. The appropriateness of each solution is based on a site specific evaluation of the local hydrology and channel morphology.

Figure 2 illustrates the locations of the approved Riparian Corridor Revegetation projects.

Figure 2. Map of approved Riparian Corridor Revegetation Project Sites Showing Stream Reaches and Project Number.



Site SL-3-1R



Figure 3. Photograph of Project Site SL-3-1R.

Problems: Bank failure at this site is the result of past vegetation removal that has left an insufficient vegetation buffer. While some willow is colonizing the site, the single layer of vegetation is insufficient to withstand high winter flows. Much of the erosion is caused by return flow of water during frequent

floods. Secondary deficiencies on this site include the absence of overhead canopy and lack of a vegetative filter strip to catch sediment from overland run-off. This site would benefit from additional vegetation to help cool water temperatures and act as an enhanced vegetative filter strip.

Project Description: The focus of this project is to stabilize the banks with vegetation including willow material. A riparian buffer strip of at least 25 feet on each bank would protect the site from the frequent flooding and filter run-off from the agriculture operation.

The project will consist of reshaping and revegetation of approximately 100 feet of the north bank and vegetation enhancement over an additional 300 feet of bank. A vegetated corridor of 25 feet on each bank will be established. The total restoration area will measure approximately ¼ acre. Willow material will be used to stabilize the reshaped bank by post planting or through a bio-engineered approach. Exotic species of vegetation will be removed as part of the project and will be monitored during the monitoring period.

Expected Project Benefits: The project will enhance fisheries habitat by providing shade to cool water temperatures, a source of woody debris for in-stream cover, and reducing sediment contribution from actively eroding stream banks and returning floodwaters.

Estimated Project Cost: \$13,000

Site SL-4-1R



Figure 4. Photograph of Project Site SL-4-1R.

Problems: Sections of this reach have been artificially straightened and protected with concrete riprap that has led to channel incision, bank erosion, and degradation of riparian vegetation. These factors contribute to sedimentation of fish habitats. Frequent flooding also contributes sediment as the water returns to the creek. Much of

this site is in stable condition however and enhancing the vegetation diversity while repairing the damaged areas would be a positive step toward establishing a long reach of high quality fish and wildlife habitat.

Project Description: Restoration activities center on establishment of a continuous vegetated corridor planted with large canopy tree species. This would provide shade to cool the water and add stability to the creek banks. Trees will also be a source of woody debris that would enhance instream fish habitat.

Several sections through this project site are lacking native riparian vegetation and contribute to bank erosion and collapse. The gaps in vegetation are overgrown with exotic weeds that prevent re-establishment of a healthy riparian corridor. The goal of this project is to enhance current gaps in the riparian corridor by removing exotic species and planting native plants in a riparian buffer strip. The enhanced vegetation buffer will also help filter sediment from returning flood waters. Approximately 1,100 feet of stream bank will be enhanced on the project site.

Expected Project Benefits: This area floods regularly during high flows, delivering topsoil to the creek. Dense understory vegetation and ground cover would serve to trap sediment as floodwaters recede back into the channel reducing sedimentation. Establishment of canopy cover would keep water temperatures cool and provide a source of woody debris for instream cover. Bank stabilization in eroded areas would decrease downstream sedimentation.

Estimated Project Cost: \$37,500

Site SL-6-1R



Figure 5. Photograph of Project Site SL-6-1R.

Problems: This site exhibits several problems that are common in the San Luis Obispo Creek watershed. Riparian vegetation on this site is highly degraded, leaving banks vulnerable to erosion. Fine sediment from eroding banks settles downstream and contributes to degradation of fish spawning gravels. Degraded riparian vegetation also decreases the in-stream cover that provides fish with safe havens and velocity breaks. In addition, exposed oil pipelines divert water into banks and pose a potential for oil spills. The “San Luis Obispo Creek Steelhead Trout Inventory and

Investigation: 1995”(Land Conservancy, 1995) identified this reach of the Creek as having the poorest in-stream shelter rating on the main stem of San Luis Obispo Creek.

Secondary problems include the lack of overhead canopy. These factors contribute to elevated water temperatures and poor fisheries habitat. Summertime temperatures at this site have been measured in the 70°F range (Coastal Resources Institute, 1994). High water temperatures affect local trout fisheries because steelhead have difficulty extracting oxygen from water at temperatures above 70°F.

Project Description: This reach of San Luis Obispo Creek will be revegetated with native riparian species. Banks will be stabilized with willow material and may include a vegetation based structural element. Work will focus on the south bank and consist of a continuous corridor approximately 40 feet wide. Total restoration area is approximately 1.6 acres. Some bank re-sloping may be necessary that will require permits from applicable agencies. Prior to implementation, this site will require closer hydrologic inspection to determine the preferred methods for stabilizing eroded banks.

Habitat such as deep pools and instream cover are lacking at this site. Due to the flow velocity along this reach, even during low flow periods, there is an opportunity to establish pools and instream cover through the installation of fish habitat devices such as boulders.

Exposed oil pipelines at this site represent a significant threat to the riparian corridor as they are occasionally active and are subject to washout during high water flows. Exposed pipelines should be re-buried or otherwise removed from the active channel as part of this project. The current pipeline owner (Tosco) has expressed interest in a cooperative project on this site. The LCSLOC is working with Tosco to solve the problem. Tosco would be responsible for costs related to the pipe re-burial or removal and repair of the immediate construction area. Trustee Council funds would be expended for areas immediately upstream and downstream of the pipeline location. The Trustee Council will not spend restoration funds to reposition oil pipelines as part of the proposed project.

Expected Project Benefits: The shade created by the new trees would, in concert with projects upstream, assist in lowering local water temperatures and provide a source of woody debris to enhance instream fish habitat. The riparian buffer would protect adjacent lands from flood scour and trap sediment from floodwaters returning to the Creek. Bank vegetation would increase the extent of instream cover and terrestrial riparian habitat. The introduction of fish habitat structures will improve fish habitat. In addition, removal of the oil pipelines from the active channel would reduce erosion and protect the Creek from a potential spill.

Estimated Project Cost: \$119,000