Replacement of Fish Ladders
San Anselmo Creek at Saunders Avenue and Pastori Avenue, Corte Madera Creek Watershed

Friends has been awarded a contract by National Fish and Wildlife Foundation, in collaboration with the National Marine Fisheries Service (NOAA Fisheries), the California Department of Fish and Game, and the California Department of Transportation (Caltrans) to design and permit the replacements for two fish ladders on San Anselmo Creek that do not meet current fish passage criteria. The funds were provided to the San Francisco Bay Salmonid Habitat Restoration Fund by Caltrans as required mitigation for possible impacts on steelhead and salmon from pile driving and other activities undertaken as part of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project. The funds are being used to benefit salmonids in central and south San Francisco Bay watersheds.

The two fish ladders were assessed by Ross Taylor and Associates during a partial survey of the watershed conducted in 2003 with funding provided to the Marin County Department of Public Works by the Coastal Conservancy. They determined that the fish ladders are too steep and water velocities are too high during spawning periods. In addition, the narrow concrete channel downstream of the Saunders Avenue fish ladder is an impediment to fish migration.

The work is divided into three phases: (1) design, (2) preparation of design drawings, and (3) permitting. This work will begin in July 2005 and is expected to be complete by October 2006. There will public meetings periodically to present results and receive input from stakeholders. When the designs and permits are secured, Friends will seek funding for the construction.

Design Treatments

Ross Taylor, Michael Love, and Stetson Engineers will develop alternative designs for the sites, each of which is associated with a box culvert supporting a bridge. There will be agency and property owner input in the process.

Detailed land surveys, accurate to ± 2 ft, will be prepared for each site, and then Ross Taylor and Michael Love will prepare conceptual designs for fishways that would meet current passage criteria established by NOAA Fisheries and CDFG, and that could be used to replace the existing denil fish ladders.

Two treatment alternatives will be evaluated for each site. These are: (1) modifying the existing ladders or removing them and replacing them with fishways that meet current standards for fish passage for salmonids at varying life stages and stream flows (the fishway modification or replacement alternative); and (2) removing the existing ladders and restoring the reach to a soft-bottom, natural grade (the natural grade alternative).

The natural grade alternative would consist of completely removing the existing concrete fish ladder and slab structure, excavating below the determined maximum scour depth, and constructing a replacement slab structure for structural support and scour protection. The intent of the natural grade alternative is to minimize the physical and hydraulic obstruction effect of the bridges and thereby allow the natural stream slope and channel form to be restored by future high flows. Sediment deposited over the years behind the existing concrete structures would be excavated to its determined natural equilibrium grade.

At Saunders, the depth of stream sediment required to be excavated would range from about 6 ft at the bridge to zero feet at a distance upstream of about 1,000 ft. At Pastori, the depth of sediment to be excavated would range from 9 ft at the bridge to zero feet at a distance upstream of about 800 ft. The toes of the banks of the deepened channel upstream would be stabilized and protected using an appropriate biotechnical method, such as vegetated ½-ton rip-rap. Projects could incorporate cabled large woody debris in the vegetated rock rip-rap toe protection. If feasible, the gravel-sized component of the removed sediment would be cleaned and washed and then used to fill over the replacement slab foundation structure to create a soft bottom. The existing plunge pool immediately downstream from the Pastori ladder site would be filled to natural grade, using clean, washed river gravel.

Further analysis may support variants of the above-described natural grade alternative to reduce the length of affected channel upstream from the bridges, either to reduce cost, or to allay concerns about

destabilizing specific properties. Another possible cost-saving variant of the natural grade alternative would be limiting excavation and scour protection slab replacement to the area directly beneath the bridges and extending only a short distance upstream (e.g., about 100 ft upstream), leaving a relatively steep slope upstream (between 5 and 10 percent) composed of in-situ stream sediment that would be redistributed by future high flows. The feasibility of this variant would depend on the results of further site analysis, environmental analysis and permits, and the cooperation of upstream landowners.

Evaluation criteria will include fish passage performance, environmental impacts and regulatory compliance, constructability, structural integrity, Town and property owner acceptance, cost, and others. The evaluation will be documented in an alternatives analysis report, which will be incorporated in subsequent regulatory compliance documents.

Prepare Engineering Design Drawings

Two levels of engineering design drawings will be prepared for the preferred alternative. These are: (1) preliminary drawings and (2) detailed drawings. The preliminary drawings will describe the treatment work in sufficient detail to convey the nature and scope of the work and allow for assessment of environmental impacts. The preliminary drawings will be suitable for inclusion in regulatory compliance documents. The detailed drawings will contain a high level of detail and will be suitable for engineering cost estimates, but not suitable for construction. They will be peer reviewed by a licensed engineer to ensure that the modifications do not jeopardize the integrity of the bridges or nearby structures. Preparation of the detailed drawings and specifications will include any needed structural, geotechnical, and hydraulic engineering studies, laboratory testing, evaluations, location of utilities, and right-of-way acquisition.

Submit Applications for Permits and Approvals

Friends of Corte Madera Creek will prepare submittals with assistance from Stetson, AAR, and GANDA. Taylor will review appropriate portions of the applications. Table 1 lists the necessary approvals.

Table 1: Agencies and Approvals

Agency	Approval Needed	Submission
San Francisco Bay Regional Water Quality Control Board (RWQCB)	Section 401 Water Quality Certification	JARPA form
US Army Corps of Engineers (USACE)	404 Nationwide Permit	JARPA form
California Department of Fish and Game (DFG)	Streambed Alteration Agreement	JARPA form
National Marine Fisheries Service (NOAA Fisheries)	Biological Opinion through a Section 7 Consultation	JARPA form, Biological Assessment
Town of San Anselmo (Saunders Avenue)	Building Permit	JARPA form
Town of Fairfax (Pastori Avenue)	Building Permit	JARPA form
Federal Emergency Management Agency (FEMA)	"No-rise" finding	Hydraulic Analysis
State Historic Preservation Officer (SHPO)	SHPO review and concurrence of inventory/evaluation report	JARPA form; cultural resources assessment