

Willis Evans Canyon Creek at San Geronimo Valley Dr. (2005)

Before: Prior to construction, the old box culvert created a velocity barrier to coho salmon due to slick concrete inside and a jump barrier due to the scour hole at the outlet.



After: Replacement of the crossing with an open-bottomed arch allows the road crossing to literally become “invisible to the creek”, providing passage for adult fish swimming upstream to spawn and juveniles migrating downstream during low flows in spring and summer.



East Fork Woodacre Creek at the Woodacre Improvement Club (2005)

Comprehensive restoration of this site included day-lighting approximately 200' of stream channel which ran beneath a tennis court and installation of an arched culvert with an open-bottom channel to eliminate a serious migration barrier. Extensive streambank restoration and revegetation provides cover and shade for salmon. The project opened up 1700' of habitat in upper Woodacre watershed and served as a model for multi-partnership collaboration between the community, the Woodacre Improvement Club, County of Marin and Federal, State, and local funding agencies.

Before: Day-Lighting 200' of creek from beneath a tennis court



After: Replacement of the under-sized, pipe with an open-bottomed arched culvert opened up 1700' of habitat.



Woodacre Creek at Park St. (2006)

Before: High flow velocities through this slick, concrete culvert, combined with rocky rubble dumped at the outlet, created a jump and velocity barrier to salmon.

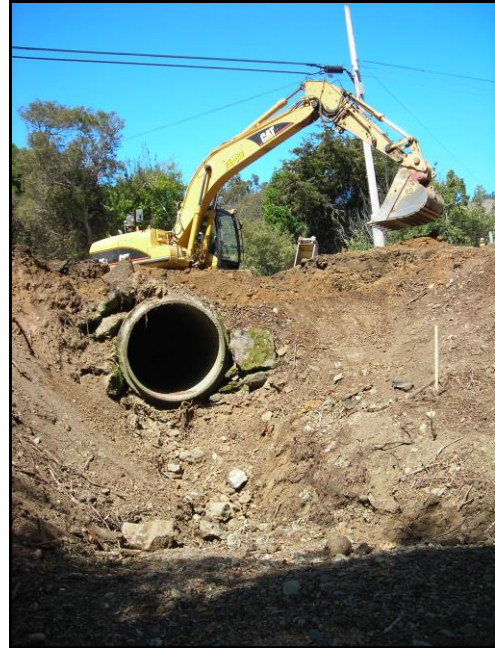


After: Restoration of this site included replacing the old culvert with an open bottomed arch, installing a roughened channel with embedded weirs to restore channel grade, and revegetating the adjacent stream banks with native plants from the watershed.



Kent Canyon Creek at Muir Woods Road (2007)

Before: This under-sized concrete pipe running under Muir Woods Rd. created a velocity and jump barrier for salmonids moving upstream from Redwood Creek to spawn in Kent Canyon. It was also a low flow barrier for juvenile fish moving downstream during summer low flows.



After: Replacement of the concrete pipe with an open-bottomed arched culvert allows the road crossing to become invisible to the creek; salmon can now pass under Muir Woods Road at all flows, with nothing to impede them.



Woodacre Creek at San Geronimo Valley Drive (2007)

Before: The large box culvert under SG Valley Dr. created a velocity barrier due to the slick concrete bottom and wide flat surface which caused water to come roaring out of the box during spawning in the fall and winter.



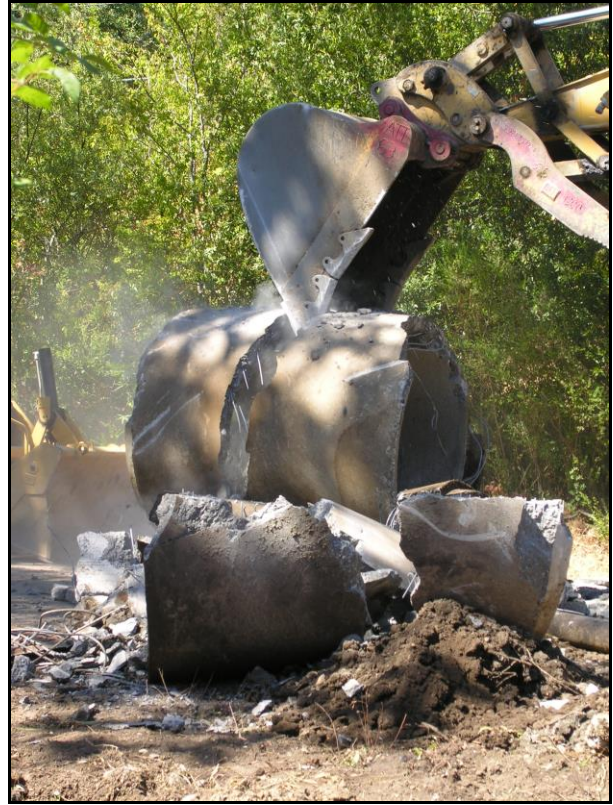
After: A roughened rock ramp was installed below the box culvert with a steel sill attached at the outlet to create a backwater, low flow channel for juvenile salmonids. Now during migration periods, fish just swim right through the box- the jump barrier is eliminated.



Salmon also faced a jump barrier getting into the box due to downstream scour caused by the increased velocities and were impeded by low flows in the summer when water sheeted across the concrete creating a low flow barrier to migration.

Woodacre Creek at Carson Road (2008)

Before: Downstream view of the double barreled culvert prior to construction; the under-sized pipes created both velocity and low flow barriers to adult and juvenile coho salmon and steelhead.



After: Replacement of the old pipes with an open-bottomed arched culvert allows salmonids to move freely up and down through the crossing, regardless of time of year and level of stream flows. Completion of the construction of this project removed the last major barrier to coho salmon in the Woodacre Creek watershed.

Vineyard Creek in the Novato Creek Watershed (2008)



Before: This double box culvert on Vineyard Creek had a perched outlet with more than a five foot drop over riprap. It failed to meet fish passage criteria for all species of adult salmonids and all classes of juveniles.



After: Since the boxes were properly sized and in good shape, a retrofit fish passage project included installation of baffles within a large double box culvert to aide steelhead passing upstream during high flow conditions. The downstream channel was stabilized to prevent channel scour and to aid salmon when swimming upstream

through the culvert to spawn. The project completed in October 2008.



Arroyo Creek at Castro St. (2010)

Before: The circular corrugated metal pipe presented both a velocity and jump barrier for coho salmon attempting to navigate into the structure in spite of the slick concrete apron and fast flows through the pipe.



After: The culvert was replaced with an open bottomed arched structure with a natural substrate channel. Removal of the culvert opened up the channel so woody debris now passes unimpeded downstream into the mainstem of San Geronimo Creek.



Once the arched culvert was installed the banks of Arroyo Creek were restored by removing non-native invasive plants and replanting with native riparian plants protected with wire cages from deer.

San Geronimo #2 at Railroad Ave.

Before: A large box culvert on the mainstem of San Geronimo Creek, just upstream of the confluence with Woodacre Creek, was both a jump and velocity barrier for coho and steelhead. In 2011, a conceptual design was completed by Marin County Engineering, and after several years of construction grant applications was funded in 2015 by Department of Fish and Wildlife through the Drought resiliency program.



After: The existing box culvert was large enough to pass the 100 year flood, therefore the culvert was retrofitted with three concrete baffles inside and a concrete cut-off wall at the downstream end to slow water over the slick concrete interior of the box, concentrate low flows to one side, and allow resting areas within the culvert.



The project modified approximately 365 linear feet of San Geronimo Creek downstream of the culvert with rock and anchored log structures to eliminate the 5 ft. jump barrier into the culvert and restore fish passage for salmon and steelhead into the upper reach of San Geronimo Creek while creating pools and habitat features.



This project fulfilled some of the key goals of the San Geronimo Valley Salmon Enhancement Plan by increasing channel complexity, improving habitat quantity, value and resiliency for all life stages and removed barriers to fish migration.

Larsen Creek at Sir Francis Drake Blvd.

Existing Conditions: A series of baffles installed by Trout Unlimited in the 1980's attempted to address the jump and velocity barrier created by the slick, steep, perched box culvert running under Sir Francis Drake Blvd. Since then the baffles have degraded and leak, and have the potential to entrain and strand juvenile salmonids migrating downstream during low flows.



Barrier Removal Design- The new design installs a horseshoe shaped, partial flow fishway below the culvert and replaces the interior baffles to improve juvenile salmon migration during all times of year. The design also incorporates the naturally occurring peninsula in the downstream channel which provides high flow refugia in a watershed that is limited by lack of slow water for migrating and over-wintering juvenile coho.

Montezuma Creek in Forest Knolls Park

Existing Conditions: This circular concrete culvert near the confluence of Montezuma Creek with the mainstem of San Geronimo Creek was identified in the passage assessment report (Taylor 2003) as a partial barrier to coho and steelhead. Elimination of the barrier and restoration of the riparian zone in this reach of Montezuma Creek was later identified as a high priority in the San Geronimo Valley Landowner Assistance Program (SGVLAP); as part of the SGV LAP, a conceptual design was developed for the project. The full design for the project and implementation funds to construct it, are being sought through various grant programs for restoration.



Barrier Removal Design: The proposed restoration project includes removal of non-native invasive plants in the riparian zone of Montezuma Creek in an area where it flows through a County Park in downtown Forest Knolls. Marin County Parks will be a partner in the restoration of this site.



San Geronimo Valley Dr. at Roy's Pools (on-going)

Existing Conditions: The County of Marin is poised to partner with the San Geronimo Valley Golf Course on a solution to restore migratory passage through a barrier on San Geronimo Creek at Roy's Pools. The bulk of the project lies upstream in a structure known as Roy's Pools, owned by the San Geronimo Valley Golf Course. The County's owns a very small portion of the project which is a concrete sill located beneath the bridge crossing under San Geronimo Valley Dr.

View from the top of road down to the County section of the project; a bridge sill which lies beneath the San Geronimo Valley Drive impedes passage during summer low flows.



Barrier Removal Design: A fish ladder constructed in 1999 provides fish passage over a historic instream dam and includes a series of weirs large weir pools and a partial flow ladder for juvenile fish. Over time the Roy's Pools project has deteriorated and DFW has given the Golf Course a grant (2014) to redesign the structure including the County's bridge sill downstream.

