



Restoring Salmon and Trout Habitat at East Schooner Creek, Point Reyes National Seashore

Background and Importance: *Historically, coho salmon and steelhead trout returned from the ocean to spawn in small streams at Point Reyes National Seashore; Seashore managers are now removing old infrastructure to allow fish access to their historic range.*

Federally threatened steelhead trout and endangered coho salmon are born in freshwater streams and spend more than a year in them before heading to the ocean. After maturing in the ocean, the fish return to their home streams to spawn. Steelhead trout still live in East Schooner Creek, a freshwater stream in the Seashore that runs along a portion of Sir Francis Drake Boulevard and drains into Drakes Estero. The creek also contains potential habitat for coho salmon. Historically road crossings were designed without regard to fish passage, preventing anadromous fish from moving freely and interfering with their life cycles.



Streams throughout Point Reyes National Seashore support federally threatened steelhead trout.

In an effort to restore natural systems and their associated processes, the Seashore removed two road crossing culverts (large-diameter pipes directing water under roads) that prevented fish passage on East Schooner Creek. These projects were part of the Drakes Estero Coastal Watershed Restoration Project, which was completed in 2008. The projects were designed to meet current fish passage standards requiring all life stages to be able to move and migrate without being blocked.

Project Overview: *As part of the Coastal Watershed Restoration Project, the Seashore replaced existing road-crossing facilities at Mt. Vision Road and Estero Road on East Schooner Creek, a freshwater stream supporting federally threatened steelhead trout.*

Culverts within the project sites not only prevented fish passage, but also frequently overflowed during flood events and needed to be replaced because of their very poor condition. These culverts were replaced with new structures bridging natural stream bottoms. The structures are designed to allow for natural hydrologic processes and to improve aquatic habitat, fish passage, and flow capacity. They also decrease the risk of structural failure, reduce long-term operation and maintenance needs, and therefore

increase sustainability. The culvert replacements enhance habitat for steelhead trout and allow for the reintroduction of coho salmon.

Restoration makes ecosystems more adaptable to global climate change, as the system is able to evolve without infrastructure or barriers



(Left: Before; Right: After) The culvert at Estero Road crossing, before and after replacement. Fish can now pass freely through the bottomless arch culvert, and vegetation is re-establishing.

affecting natural processes. The culvert replacements can pass flood flows beyond the known historic range and may accommodate any larger storm events that may result from a shift in natural variability as a result of climate change.

Project Details: *Replacement of the road crossings involved removing fish and other species from the work site, clearing brush, removing existing culverts, installing new bottomless culverts, reconstructing the stream corridor, and revegetating the site.*

The existing metal culverts at Mt. Vision and Estero Roads were in very poor condition, and the sites, one mile apart, were densely vegetated and deeply incised downstream. A five foot vertical downstream drop at Mt. Vision and a three foot drop at Estero prevented fish passage. The culverts were also too small to adequately convey existing flood flows and frequently overflowed. Water was piping outside of both culverts on a routine basis.

Work took place in fall 2007, with pumps moving streamflow around the sites. Contractors replaced the old, failing culverts with larger concrete bottomless arch culverts that more than doubled the conveyance capacity of Estero and more than quadrupled that of Mt. Vision. These structures span the channel and maintain a natural streambed bottom that can adjust with changes in the adjacent streambed. The culverts provide fish passage, will easily convey a 100-year flood, and will reduce long-term maintenance. At each site, the project required regrading and reconstruction of the stream corridor upstream and downstream of the project area, providing stable transitions between the altered channel and the existing channel. Contractors created a roughened rock ramp with step-pool structures for this purpose.



Workers place a piece of the bottomless culvert at the Estero Road crossing.

As part of the planning process for this and all restoration projects, park biologists undertake a number of actions to reduce impacts to resources and visitors. During initial biological clearance surveys, project biologists encountered and properly relocated a number of species, including California red-legged frog, steelhead trout, California giant salamander, Pacific tree frog, garter snake, rough-skinned newt, sculpin, and stickleback. Staff, contractors, and volunteers stockpiled topsoil and vegetation and used it to support natural revegetation at each site; they also installed erosion control measures on the slopes to prevent excessive sediment runoff. In addition, work included measures to protect cultural resources, minimize disruption to recreational activities, and protect plant and animal life in the project area.

Current Condition: *East Schooner Creek flows freely through the new bottomless culverts at Mt. Vision and Estero Roads with no fish passage barriers. The work has provided a functional riparian corridor with stable, dependable road crossings for visitor trail access. Steelhead trout are now able to migrate freely from freshwater to ocean and back, through the bottomless arch culverts, throughout their life cycles.*

The Drakes Estero Coastal Watershed Restoration Project was completed in 2008 using \$2.44 million in federal funding received in 2006. The project restored estuarine and stream habitat, fish passage, and tidal connectivity by removing or replacing infrastructure associated with previous development. These facilities were located in five different coastal watersheds, both agricultural and wilderness, all draining into Drakes Estero. Each of the watersheds support federally threatened steelhead trout and contain potential habitat for endangered coho salmon. More information about these projects, including environmental compliance documents, can be found at: http://www.nps.gov/pore/parkmgmt/planning_cwr.htm.

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