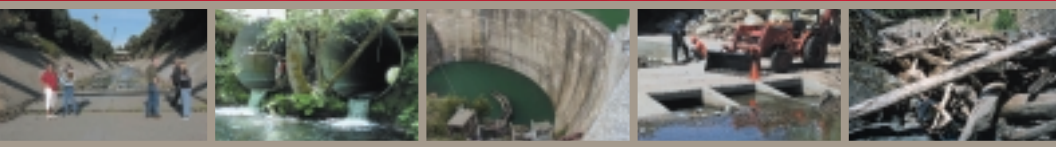
FISH PASSAGE IMPROVEMENT

in California's Watersheds

Assessments & Recommendations by the
Fish Passage Forum



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The mission of the Fish Passage Forum is to protect and restore listed anadromous salmonid species in California by promoting the collaboration among public and private sectors for fish passage improvement projects and programs.

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Barriers to Fish Passage and Their Significance

California's salmon, steelhead and other aquatic life depend on the health of our coastal rivers and streams. Healthy streams provide cool water, clean gravel, natural meandering channels, and access to upstream habitat.

But almost every stream along our 1,100-mile coast has been fragmented by roads, dams, culverts, concrete channels, low-water crossings or other structures that create difficult or impassable migration barriers for fish. For landowners these structures may also cause loss of land and property as a result of erosion in the surrounding area.

David Pritchett photo

Salmon and steelhead are anadromous fish: they are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Once numbering in the millions, their populations are a fraction of their historical abundance. Coho salmon, for example, are currently at 6 to15% of their abundance during the 1940's. One of the greatest factors in their decline has been migration barriers. Migration barriers prevent salmon and

David Pritchett photo

Michael Love photo

From large dams to steep culverts, migration barriers are one of the leading causes in the decline of salmon and steelhead populations. Barriers prevent fish from reaching spawning and rearing areas.

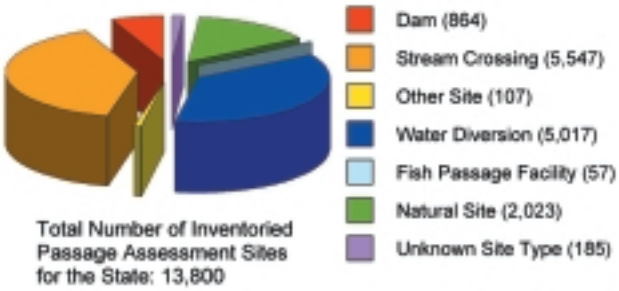
steelhead from reaching stream areas needed for spawning and rearing. Barriers not only create difficult or impassable heights for migration but can also alter the depth of jump pools and eliminate the riffles and resting areas fish need as they swim up or downstream. Barriers alter instream flows, water temperatures, and the habitat diversity and complexity salmon and steelhead need to survive. Barriers also disrupt the biological and natural sediment balance in the stream, causing severe bank erosion, loss of property, and diminishing the downstream transport of sediment needed to replenish our beaches.

Most migration barriers were built in an era when little thought was given to fish migration. Some migration barriers, such as undersized or steep culverts, were immediately impassable. They increased stream velocities, diminished water depth, and/or were too far above the streambed. Other culverts and crossings that were previously passable became impassable due to inadequate maintenance or alterations to the stream channel over time.

Small migration barriers may seem insignificant, but the cumulative effect of culverts, road crossings, and other structures up and down the coast has impaired fish passage greatly. Working together to remove barriers, large and small, is an essential part of recovering coastal salmon and steelhead.

How Bad Is the Problem?

A first step in recovering salmon and steelhead is determining how many migration barriers exist. A Coastal Conservancy study identifies more than 13,000 potential barriers to fish passage in California's coastal watersheds. At least 2,500 of these structures are severe or impassable, and detailed assessments will likely show that most of the others hinder or block salmon or steelhead from migrating up and downstream. These estimates do not include 3,700 stream crossings owned or managed by Caltrans in coastal watersheds, many of which also pose significant barriers to fish passage.



The number of migration barriers is similar in other parts of the State. In interior watersheds, there are at least 13,000 migration barriers, including more than 6,800 stream crossings owned or managed by Caltrans.

Across California, detailed and comprehensive studies are underway to evaluate the severity of each of these potential barriers, identify opportunities to remedy them, and prioritize their removal or modification.

What Is Being Done?

Recovering salmon and steelhead on the California coast requires landowners, agencies, and others to work together to identify and remove barriers to fish passage.

While new culverts and other stream crossings are designed to insure unimpeded fish passage for both adult and juvenile fish, old barriers are a big problem. But what can we do to remove or modify existing migration barriers?

Matt Stoecker photo

The **Fish Passage Forum**, an association of public, private and government organizations, is developing programs to assist private landowners, community groups, and public agencies in efforts to remove migration barriers and restore currently inaccessible habitat.

The Forum's work extends beyond inventorying and compiling databases on barriers. Studies of fish behavior and migration needs, for example, have improved our ability to assess the

impacts of migration barriers and develop solutions that work with natural stream conditions. For example, we've learned that modifying road culverts requires taking into account factors such as stream hydrology, channel stability, floodplain function, and the swimming abilities of adult and juvenile fish.

Humboldt County photo

Margaret Tauzer, NOAA Fisheries photo

To make fish passage improvement projects easier to complete, the Fish Passage Forum is working to coordinate and streamline permits required for restoration. We are seeking long-term funding for fish passage projects, and conducting workshops that provide design and project implementation assistance to private landowners and local agencies. We are also developing education programs to increase public support for fish passage work.

This culvert on Lindsay Creek in Humboldt County was formerly a complete barrier to fish passage (top). It was replaced with a natural-bottom culvert (bottom) and now provides complete passage for wild salmon, such as this healthy chinook making its way upstream to spawn.

What Can You Do and What Resources Are Available?

Landowners are the most important managers of California's coastal streams. Their role as good stream stewards means taking responsibility for our watersheds and ensuring that our activities support and sustain streams that salmon, steelhead, and other aquatic life depend on.

Private landowners, local officials, and members of watershed groups all have a role to play in restoring salmon and steelhead runs to California's rivers and streams. The first step in improving stream habitat is planning the project carefully. Examine your stream, analyze its problems and understand what caused them. Get advice and assistance from professionals to determine what should be done, and understand the amount of effort, money, and permits needed to complete and maintain the project. Members of the Fish Passage Forum are here to help.

Funding

Funding for fish passage improvement is available from a variety of sources, including the Coastal Conservancy, the Department of Fish and Game, NOAA Fisheries Services, and others. For more information, contact any of these agencies directly at the websites listed on the following page.

Coastal Conservancy:

http://www.scc.ca.gov

Department of Fish and Game: Fisheries Restoration Grant Program:

http://www.dfg.ca.gov/nafwb/fishgrant.html

NOAA Restoration Center:

http://www.nmfs.noaa.gov/habitat/restoration

David Pritchett photo

Art Reeve, Del Norte County photo

Around the State, agencies and private citizens are improving fish passage in local watersheds. Restoration of fish passage achieves long-term savings for local governments in the form of lower maintenance costs at stream crossings and culverts. One such case was this installation (bottom) of a fish-friendly, natural-bottom culvert at Jordan Creek in Del Norte County.

Technical Assistance

Specialists with the California Department of Fish and Game are available to discuss restoration options as well as provide advice regarding potential funding sources, such as the DFG's Fishery Restoration Grant Program. You can contact them by phone at the numbers below:

North Coast Region:
Gary Flosi, 707-725-1060

San Francisco Bay Region:
Bob Coey, 707-944-5500

Central Coast Region:
John Kleinfelter, 805-549-3700

South Coast Region:
Mary Larson, 562-342-7150

Five Counties Program:
530-623-1351 extension 5

Websites and Online Technical Documents

"FishXing" is a website maintained by State and federal agencies to provide a central source for information on fish migration barrier removal. The website was developed by the Forest Service and is located at http://www.stream.fs.fed.us/fishxing. It features sample projects, videos and other media, as well as software for evaluating and designing fish passage projects, an annotated bibliography, extensive links to design manuals, regulatory and management guidelines, literature on fish migration characteristics, and links to websites for related agencies and organizations.

The Coastal Conservancy report *Inventory of Barriers to Fish Passage in California's Coastal Watersheds* identifies the 175 highest-priority total migration barriers, more than 1,000 moderate-priority fish migration barriers, and more than 20,000 additional sites that may affect the free passage of salmon and steelhead. The report, other associated data, and a version of ARC Explorer (free GIS software) is available from the Coastal Conservancy or online at http://www.CalFish.org. These tools allow the viewer to navigate any given watershed, and extract fish passage data from locations clearly demarcated on a GIS layer. At the CalFish website the viewer may analyze barrier data in the context of species presence/absence, habitat condition, restoration projects, and a variety of other factors.

Chapter 9 of the *California Salmonid Stream Habitat Restoration Manual* addresses fish passage evaluations at stream crossings (roads, bridges, etc.). The manual includes the Department of Fish and Game and NOAA Fisheries Services design criteria for fish passage improvement projects and data collection criteria for evaluations using the FishXing software. It also details many aspects of stream restoration and watershed monitoring associated with fisheries habitat improvement projects. The manual is the California standard for fisheries habitat improvement. The new section, Part IX "Fish Passage Evaluation at Stream Crossings," can be downloaded at http://www.dfg.ca.gov/nafwb/pubs/2003/FishPassage.pdf.

Ross Taylor photo

This hefty chinook salmon was found and photographed above a former barrier on Lindsay Creek, tributary to the Mad River. Thanks to the joint efforts of nearby landowners, DFG, the Coastal Conservancy, the County Department of Public Works, Simpson Timber, and others, four migration barriers — one county and three private — were removed between 2002 and 2004. Coho salmon, chinook salmon, steelhead, and coastal cutthroat trout are now found spawning upstream of these former barriers, following a 50-year absence.

Coastal Conservancy