Monitoring Monday – Let's look at fish passage.

Join us each Monday as the Clean Water Team shares information and resources on water quality monitoring. This Monday we will look at fish passage and migration barriers.

Fish passage is the ability of fish or other aquatic species to move throughout an aquatic system among all habitats necessary to complete their life cycle. We can restore fish passage by removing in-stream barriers or replacing them with structures that allow fish to pass.

When fish and other aquatic species can't migrate or have access to important habitat, they can't reproduce and build sustainable populations. Some populations are so affected by barriers that they are listed as a threatened or endangered species or may even become extinct.

Anadromous fish habitats in California have been impacted by human-caused and natural disturbances. Passage impediments affect adult and juvenile fish by delaying or preventing upstream and downstream migration, preventing the use of available habitat, and possibly inflicting injury or death.

Addressing connectivity has been consistently identified as a high priority, cost-effective approach to protecting and restoring anadromous fish populations. Restoring unimpeded passage for aquatic organisms in anadromous systems is imperative for the success of all habitat restoration activities.

Types of Physical Barriers:

Culvert: Culverts are structures that allow water to flow under a road, railroad, trail, or similar waterway obstruction. An undersized or improperly placed culvert can impede or totally block fish and aquatic species from passing.

Dam: Dams are physical structures running the width of a river system to capture or impound water. Some fish species are very poor jumpers and cannot get past even low height dams.

Levee: Levees are typically constructed earthen low ridges or embankments along the edges of a stream or river that impede flooding of adjacent land. Levees often cut off access to wetland areas that are critical to aquatic species.

Sediment: Increased deposition of sediment in waterways changes the habitat and structure of the area and can result in the habitat becoming unpassable for an aquatic species. Increased suspended sediment in a waterway can also affect species' ability to pass through an area.

Water diversion: Water diversions are structures that redirect water from a stream for another purpose, such as agricultural use. These structures can be harmful to fish if the fish are redirected along with the water onto the agricultural lands or if the fish become caught on the water intake structure.

Water Flow: High velocities or lack of water flow can be a barrier to fish passage.

Many citizen and community water quality monitoring programs collect water quality data focused on ensuring salmonids are protected. Some of these organizations have also engaged in snorkel surveys (relative fish abundance, behavior…) and carcass counts (including the collection of scales, heads, tissue, length measurements, sex…). Fish passage barrier surveys, inventory, assessments, and improvement prioritization are a major components of many watershed management plans and some watershed groups engaged with collecting water quality data have also participated in these activities. Most of these field projects have occurred as partnerships with local, state or federal agencies, tribes and non-profit organizations. Field work usually consists of small crews conducting fish passage barrier surveys or road stream crossing surveys. Survey training is usually provided by the lead partner or through regional and conference workshops. Protocols for these surveys can be found online (also see references below).

California's Anadromous Fish Species
Chinook Salmon
Coho Salmon
Steelhead Trout
Coastal Cutthroat Trout
Southern Green Sturgeon
White Sturgeon
Pacific Lamprey
Longfin Smelt
Eulachon
Chum Salmon & Pink Salmon have been Incidental to California; with no established populations or consistent occurrence.)

Fish migration barriers are not just a California, eastern Pacific or North American issue but an international one. Local outreach and education efforts may choose to participate with World Fish Migration Day. This is a one-day global celebration to create awareness of open rivers and migratory fish. The next edition will be held on May 21, 2023. Everyone is welcome to join again on this celebration and organize events that promote migratory fish and free-flowing rivers!

More than a few people in California have never experienced a fish migration. If you or your co-sheltering in place family and friends fit into that category, try visiting a salmon run. A salmon run is the time when salmon, which have migrated from the ocean, swim to the upper reaches of rivers where they spawn on gravel beds. There are many accessible places where you can now watch a salmon run (see below) or view one remotely (search YouTube for salmon cam or salmon run).

RESOURCES:

AFS-BES/ASCE-EWRI Joint Committee on Fisheries Engineering and Science
https://units.fisheries.org/fishpassagejointcommittee/#:~:text=The%20AFS%2DBES%2FASCE%2D,of%20Civil%20Engineers'%20Environmental%20and

Anadromous Fish Restoration Program
www.watereducation.org/aquapedia/anadromous-fish-restoration -:~:text=In%20California%2C%20anadromous%20fish%20include,significant%20declines%20from%20historical%20populations.

Anadromous Fishes of California (Booklet)

https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3545

CalFish: CalFish is the leading source for California anadromous fish and stream habitat data, as well as the standards and tools needed to collect, understand, manage, analyze, and share those data.
https://www.calfish.org/Home.aspx

California Fish Passage Forum
www.cafishpassageforum.org/

- California Fish Passage Forum: Methods, Protocols & Guidelines
  www.cafishpassageforum.org/barrier-methods-protocols

California Salmonid Stream Habitat Restoration Manual: Part 9 - California Salmonid Stream Habitat Restoration Manual Volume Two Fourth Edition
https://23789655-514a-4d18-b49f-97d3d71f6b5f.filesusr.com/ugd/0e48c2_30ab221426304cdfa9844b9f356cbb97.pdf

Fish Passage Archives (California Trout)
https://caltrout.org/tag/fish-passage

FishXing - Fish Passage Learning Systems
This software is intended to assist engineers, hydrologists, and fish biologists in the evaluation and design of culverts for fish passage. It is free and available for download.
www.fs.usda.gov/ccrc/tool/fishxing-fish-passage-learning-systems

National Fish Passage Program
www.fws.gov/fisheries/fish-passage.html

State of Salmon in California
https://casalmon.org/statewide-status/#all-species

Snapshots of Our Salmon Rivers
https://casalmon.org/salmon-rivers/#albion-river

State Wildlife Action Plan 2015 | A Conservation Legacy For Californians – Anadromous Fishes
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=100049

Using the Fish Passage Assessment Tool to meet the National Environmental Standards for Freshwater (New Zealand) VIDEO
https://www.youtube.com/watch?v=mR-NJwQJ8c0

SALMON RUN VIEWING:

Battlecreek – Coleman National Fish Hatchery
www.fws.gov/coleman/

Bidwell Park – Chico
www.cawatchablewildlife.org/viewsite.php?site=28&display=q

Butte Creek Spring-Run Chinook Salmon
https://calsport.org/fisheriesblog/?p=1652

California Watchable Wildlife
www.cawatchablewildlife.org/index.php

Experience the Beautiful Fall Salmon Run on the Klamath River
https://activenorcal.com/experience-the-beautiful-fall-salmon-run-on-the-klamath-river/
Visit in the autumn (approximately mid-October through mid-December), during spawning season to observe returning salmon and spawning operation by the Iron Gate Hatchery crew.
https://wildlife.ca.gov/Fishing/Hatcheries/Iron-Gate

Lagunita Creek in West Marin
www.marinwater.org/315/Fish-Viewing
VIDEO https://seaturtles.org/video-salmon-return-to-marin-county-creeks/

Muir Woods
www.nps.gov/muwo/learn/nature/fish.htm

Nimbus Fish Hatchery
https://wildlife.ca.gov/fishing/hatcheries/nimbus
Visitors Guide to Nimbus Fish Hatchery
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=57711&inline

Trinity River
An underwater viewing window allows visitors to watch migrating fish.
https://wildlife.ca.gov/Fishing/Hatcheries/Trinity-River

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