CALIFORNIA FISH PASSAGE ADVISORY COMMITTEE

The FishPAC newsletter is intended to connect members and others interested in fish passage remediation with a focus on sharing information and working together as a fish passage community to enhance California's resilience. Stay safe.

FALL/WINTER 2021 NEWSLETTER

What's Inside?

Caltrans and 3Cs Continue Progress Assessing Barriers on the State Highway System

During the past 22 months, Caltrans has partnered with the California Conservation Corps to assess fish passage barriers on the State Highway System. To date, five Corpsmember teams, including the LA/Pomona, Camarillo, San Luis Obispo, Monterey, and Stockton Centers, have completed 1,652 1st Pass Assessments from Chico, CA to the Mexico border. The San Luis Obispo, Stockton, and Monterey teams are currently active, and two new teams from Fortuna and Redding are expected to be deployed by the end of 2021.

New Protections Under the State Endangered Species Act

In June, the California Fish and Game Commission unanimously voted to list Northern California Summer Steelhead (*O. mykiss*) as endangered and Upper Klamath-Trinity River Spring Chinook Salmon (*Oncorhynchus tshawytscha*) as threatened under the California Endangered Species Act (CESA). The Commission is also considering a petition to list Southern California Steelhead. It is expected to determine whether such listing may be warranted at its February 2022 meeting.

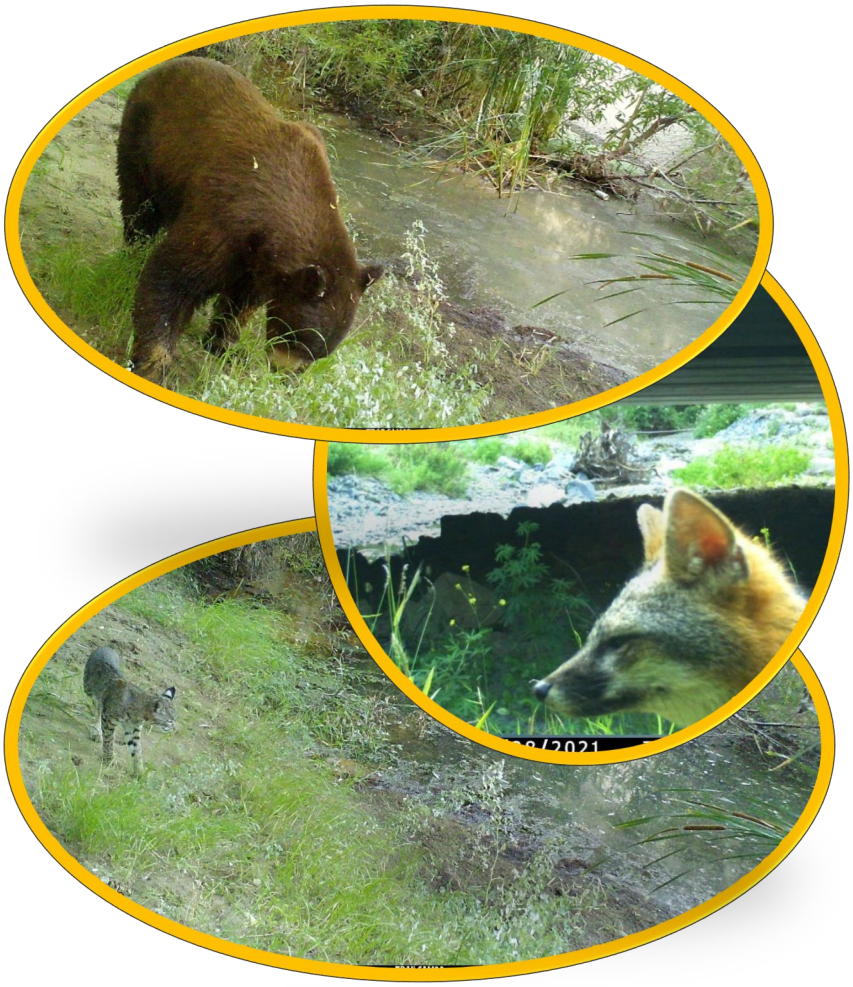
Southern California Steelhead. Photo credit: NOAA Fisheries.

Wildfires Impact Salmon and Steelhead Habitats

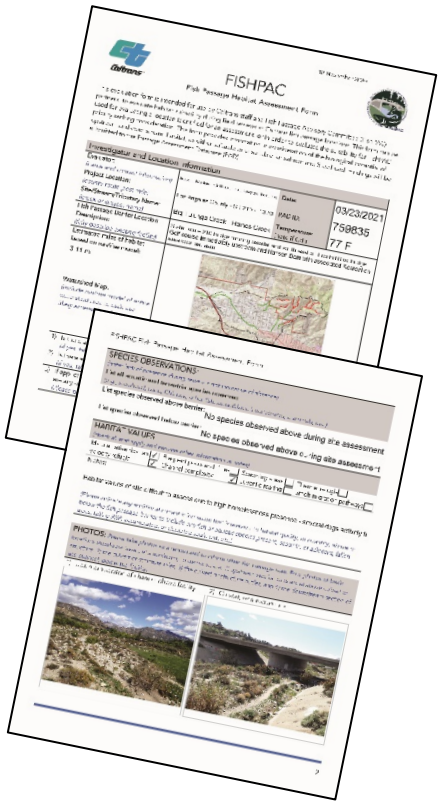
As of the time of this publication, a total of almost 1 million acres burned in California in 2021. Many of these fires were severe and catastrophic because of a legacy of fire suppression as well as the effects of climate change. Given the status of salmon and Steelhead populations in California, the effects of wildfires on these threatened and endangered species and their habitats have been catastrophic. The vulnerability of fish to fire depends on the quality of affected habitats, the extent of habitat fragmentation, and the habitat specificity of the fish species. In general, fish with narrow habitat requirements in degraded and fragmented systems are most vulnerable to fire and disturbances associated with fire. Fire can change instream conditions, including temperature, pH, large wood accumulations, and sediment load. Erosion control deployment helps to maintain sediment in burn areas and support recovery of vegetation and habitat qualities through time.

Multi-Species Camera Project Demonstrates Riparian Migratory Corridor Use of State Highway System Structures by Numerous Species

Caltrans districts began deploying wildlife cameras in 2021 to rivers and watersheds that also present opportunities for terrestrial wildlife corridor enhancement opportunities. The priority locations were identified by FishPAC's and are outlined in each FishPAC Multi-Species Camera Plan. Properly designed bridges and culverts have the potential to facilitate connectivity for all aquatic and terrestrial species that migrate, or spend portions of their life cycle, in watersheds. Caltrans biologists have been deploying cameras at completed, priority, and active locations as well as locations identified as having threatened and endangered species. District staff review photos and videos taken, select the highest quality and most representative photos, and submit them to update the multi-species storymap. Photos and videos submitted to date include a variety of large and small mammals that pass through the structures to meet their life history needs.



Habitat and Barrier Evaluation Forms Document Science and Informs Barrier Prioritization

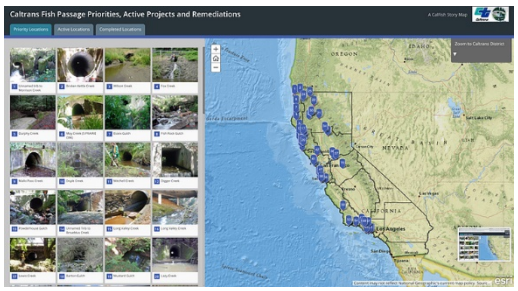


Having the right tool to get the job done is an efficient and effective approaching to managing any task. The FishPACs created and implement habitat and barrier evaluation forms to collect scientific information that informs the process FishPAC uses to prioritize barriers.

The Fish Passage Habitat Evaluation Form is used to assess habitat suitability and considers the biological potential of upstream and downstream habitat for salmon and Steelhead. The form, which has been converted to a digital format in ArcGIS *Survey123*, incorporates run/rise models of the watershed, photos, species observations, habitat values (e.g., frequent pools and riffles, smolt migration pathways), a summary of findings, and a determination of upstream habitat suitability for salmon and Steelhead.

To prioritize barriers, FishPACs use three primary criteria—species diversity (presence of salmon and Steelhead species), suitable habitat quality and quantity above each crossing, and best professional knowledge (discretionary value for science-based information known to fisheries and engineering subject matter experts).

Science and Innovation Team Technology Enhances FishPAC Efficiencies and Collaboration



Scientific transparency and decision support tools are critical to the functioning of the FishPACs. Through time, Caltrans, Pacific States Marine Fisheries Commission, and the FishPACs have developed a variety of technologies and tools to advance goals and objectives.

ArcGIS *Survey123* software for first and second pass assessment forms have created efficiencies in the field as trained individuals collect habitat information at each location. iPADs are carried by field staff, making it efficient to take photos and upload information in real-time. Because of the success of ArcGIS *Survey123* software, FishPAC is creating a digital general inspection form to assess the function of past remediation projects.

Digital storymaps visually enhance Passage Assessment Database barrier information sharing. Storymaps contain information on priority, active, and completed fish passage locations, including photos, location information, status of the barrier, target fish species, estimated potential upstream habitat, and watershed area above the barrier. The Other Known Barriers storymap highlights barriers for which more information and photos are needed to evaluate the importance of the barrier location.

Digital cameras are being used by Caltrans districts to obtain data on terrestrial species use at specified State Highway System locations. A photo repository as well as a Multi-Species Benefits storymap are being developed to help tell the story of the importance of riparian migratory corridors to enhance wildlife connectivity.

Fish Passage Guidance Manual to be Published in 2022

A Fish Passage Guidance Manual is in the works and projected to be completed in early 2022. The comprehensive manual includes:

- Information on salmon and Steelhead habitat in California.
- Streets and Highways Code Section 156.1-156.5 (Senate Bill 857), highlighting the statutory requirements.
- Information on barriers to salmon and Steelhead on the State Highway System.
- Engineering and biological assessments, and their input to the Passage Assessment Database.
- Fish Passage Advisory Committees and their responsibilities.
- Prioritization of identified barriers, including the science and data.
- Caltrans project delivery for fish passage remediation.
- Fish passage engineering analysis, including long-profile surveys, 1D and 2 D modeling, and priority design

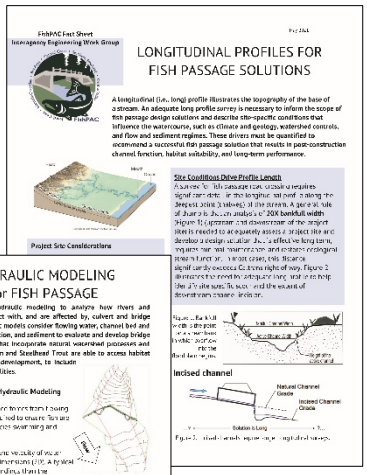
Stay tuned for the launch of the guidance in early 2022!

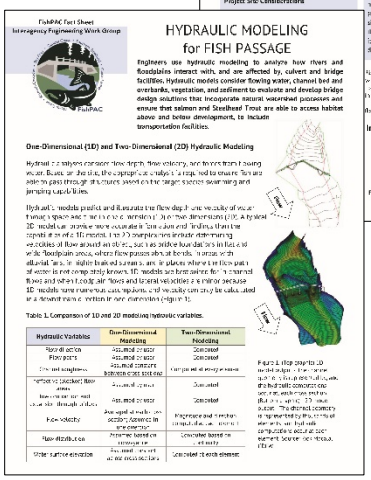
Tweet with Us!

The FishPAC has joined social media, launching its new Twitter page (@cafishpac) in October 2021. Follow the page to explore the accomplishments of the 200+ members of the California Fish Passage Advisory Committee!

FishPAC Engineers Contribute to Two New Fact Sheets

Fish passage engineering can be both complex and technical, however the Fish Passage Engineer Working Group made the topic a bit easier to understand through the creation of two new fact sheets on longitudinal profiles and hydraulic modeling.





"Longitudinal profiles for fish passage solutions" documents the importance of an adequate long profile survey to inform the most efficient and effective fish passage solutions. The fact sheet incorporates project site considerations and includes additional resources for long profile guidance.

"Hydraulic modeling for fish passage" describes the variables associated with 1D and 2 D modeling and provides helpful links to the software available to run both types of models as well as links to software and information on flow analysis with and without stream gage data, precipitation-runoff hydrological models, and others.

The FishPACs express their appreciation to NMFS' John Wooster and CDFW's Rick Macala for the expertise and guidance they provided to inform the development of the fact sheets.

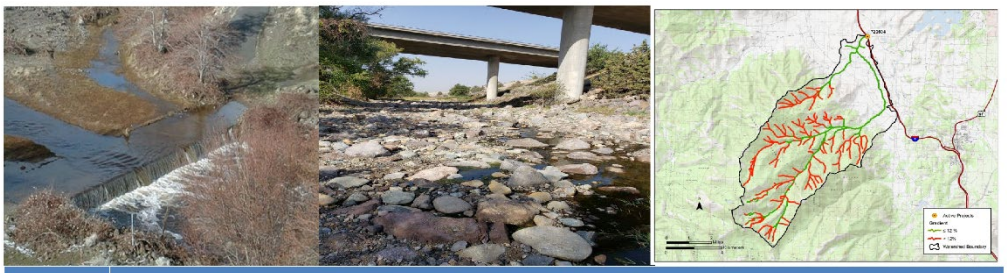
2020 Completed Fish Passage Remediation Projects

Little Lost Man – Humboldt 101, PM 124.49

Double-bay reinforced concrete box barrier was replaced with a full-span bridge to include channel restoration.

Species	Southern Oregon/Northern California Coast Coho (Threatened), Northern California Steelhead (Threatened)
Habitat	Improved access to an estimated 1.21 miles of upstream habitat.

Parks Creek – Siskiyou 5, PM 27.2



Species	Southern Oregon/Northern California Coast Coho (Threatened).
Habitat	Improved access to an estimated 19.1 miles of upstream habitat.

A historic low-water crossing was removed, and a complex channel design was implemented to restore the channel.

Laguna de Santa Rosa– Sonoma 161, PM 31.14

Double-bay reinforced concrete box barrier was replaced with a full-span bridge to include channel restoration.

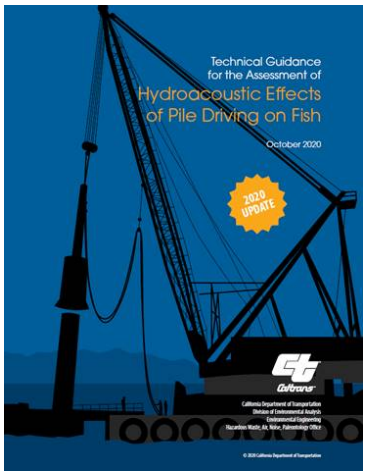
Species	Northern California Steelhead (Threatened), Central California Coast Coho (Endangered), California Coastal Chinook (Threatened)
Habitat	Improved access to an estimated 2.24 miles of upstream habitat.

Salsipuedes Creek – Santa Barbara 1, PM 15.61

Species	Southern California Coast Steelhead (Endangered).
Habitat	Improved access to an estimated 101.81 miles of upstream habitat

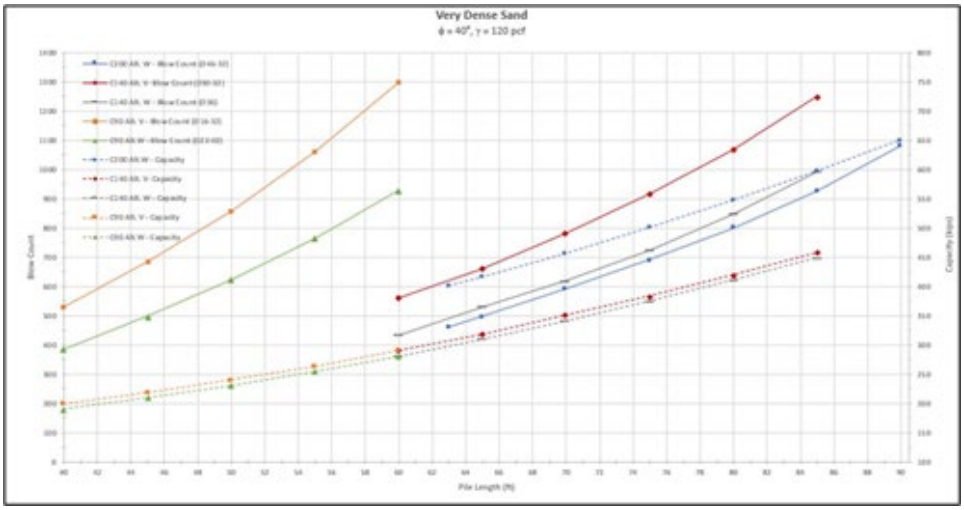
New full-span bridge constructed to remediate barrier. Old bridge foundations and revetment were removed to deploy complex long-term channel stabilization and restoration work.

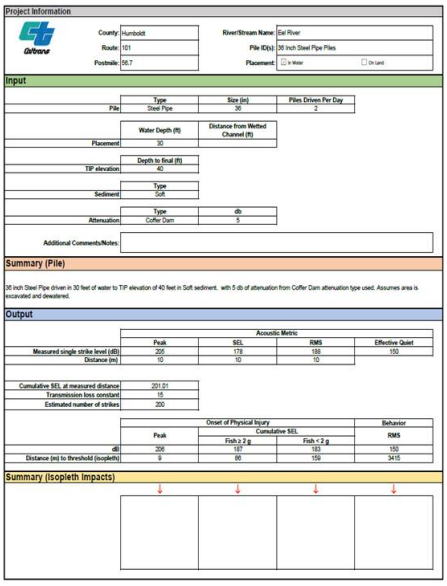
The New Proposed Caltrans Compendium Tool Incorporates Structures Pile Drivability Analysis



Caltrans is working toward developing a hydroacoustic analysis tool, called the Compendium Tool, that will reduce error and improve accuracy of the findings of hydroacoustic analysis for pile driving. The Compendium Tool is the visual of the dropdown database below and combines all data collected over the last 20+ years. It is more than 300 pages in the current hydroacoustic manual, Appendix A. The Compendium Tool includes the NMFS XL calculator tool (essentially three moderately complex equations) and a pile strike drivability study that is being completed by Caltrans Division of Engineering Services, Structures. During the past two years, Hernan Perez (Senior Foundations Engineer) has led the research that will inform the compendium tool. The graph below shows a snapshot of the research analysis of pile drivability in very dense sand.

The Compendium Tool incorporates the calculations the National Marine Fisheries Service uses, and is expected to be available in late 2022.





Project Information

County:	Humboldt	River/Stream Name:	Eel River
Route:	101	Pile ID(s):	36 Inch Steel Pipe Piles
Postmile:	56.7	Placement:	☑ In Water ☐ On Land

Input

	Type	Size (in)	Piles Driven Per Day
Pile:	Steel Pipe	36	2

	Water Depth (ft)	Distance from Wetted Channel (ft)
Placement:	30	

	Depth to final (ft)
TIP elevation:	40

	Type
Sediment:	Soft

	Type	db
Attenuation:	Coffer Dam	5

Additional Comments/Notes:

Summary (Pile)

36 inch Steel Pipe driven in 30 feet of water to TIP elevation of 40 feet in Soft sediment. with 5 db of attenuation from Coffer Dam attenuation type used. Assumes area is excavated and dewatered.

Output

	Acoustic Metric			
	Peak	SEL	RMS	Effective Quiet
Measured single strike level (dB)	205	178	188	150
Distance (m)	10	10	10	

Cumulative SEL at measured distance	201.01
Transmission loss constant	15
Estimated number of strikes	200

	Onset of Physical Injury			Behavior
	Peak	Cumulative SEL		RMS
		Fish ≥ 2 g	Fish < 2 g	
dB	206	187	183	150
Distance (m) to threshold (isopleth)	9	65	156	3415

Summary (Isopleth Impacts)

↓	↓	↓	↓

A Hearty Sendoff to Two Fish Passage Champions!

The FishPAC community celebrates the careers of Caltrans' Phil Stolarski and California Department of Fish and Wildlife's Mary Larson as they recently announced their retirements from their respective agencies.

Phil is a staunch supporter of the FishPACs, using his influence to collaborate with Caltrans' Structures Division on the ABC pre-design bridges. As a Caltrans Division Chief of Environmental Analysis, Phil supported incorporating fish passage into the State Highway System Management Plan.

Mary Larson retired after serving as a Senior Biologist Supervisor for California Department of Fish and Wildlife. Mary was instrumental supporting Southern Steelhead FishPAC and was particularly instrumental in providing the needed oversight to accelerate assessments of fish passage barriers in Southern California.

The FishPACs wish the best to both fish passage champions in retirement!