

Damon H. Goodman provided a presentation on the Pacific Lamprey implementation planning work that is ongoing in California recognizing co-authors Stewart B. Reid (Western Fishes) and Javier Linares (USFWS). The presentation focused on Regional Management Units (RMUs) in California that have been completed or are nearing completion including the North Coast, South Central Coast and South Coast. However, the presentation included implementation needs for all RMUs in California.

Historically Pacific Lamprey populations occurred in all primary anadromous HUCs in California but currently occupy less than half (Goodman and Reid 2012). Changes from historic distribution were identified with no known populations south of the Big Sur River. In addition, Pacific Lamprey have been isolated from historic upstream habitats by impassible dams in many rivers. Passage was the primary threat to Pacific Lamprey populations in the state followed by dewatering and streamflow management.

North Coast –includes 19 anadromous HUCs, 14 of which are currently occupied. The North Coast Implementation Plan was completed in 2015 developed from 19 stakeholder meetings and workshops. Primary projects discussed in the presentation included

- 1) Guidance is needed to improve Pacific Lamprey passage at salmonid fish ladders and other small scale passage obstacles. This guidance is currently under development in collaboration with CDFW, Hoopa Valley Tribe, PG&E and the Wiyot Tribe.
- 2) Development of approaches to manage streamflow to conserve Pacific Lamprey are needed. This work is underway in collaboration with the Trinity River Restoration Program.
- 3) Monitoring of desiccation and mid-summer mortality events. Mid-summer mortality events have been observed in North Coast River associated with dewatering events related to diversions and ground water extraction. The magnitude of this issue is unclear and should be investigated. In addition in areas where it is occurring steps are needed to protect Pacific Lamprey and other riverine fauna affected by these events. This project is underway in collaboration with the Cahto and Karuk tribes.
- 4) Removal of the Klamath dams would substantially increase the distribution of Pacific Lamprey and anadromous salmonids in the North Coast RMU. Efforts to evaluate the feasibility of dam removal are currently underway driven primarily by conservation goals for anadromous salmonids but would be of great conservation benefit to Pacific Lamprey.

South Central Coast – includes 12 anadromous HUCs, 7 of which are currently occupied. The South Coast Plan was completed in 2015 developed from 16 stakeholder meetings and workshops. Primary projects discussed in the presentation included

- 1) Mass stranding of Pacific Lamprey macrophthalmia occurred in the Salinas River and other rivers in the RMU due to streamflow management. The extent of this issue should be evaluated and streamflow management alternatives should be developed that would benefit Pacific Lamprey. This work is underway in collaboration with CDFW and the Monterey Peninsula Water Management District.

- 2) Pacific Lamprey passage was restored in San Luis Obispo drainage with the installation of a “lamp ramp” in 2013. The materials and installation cost was \$312 indicating conservation benefits can be realized for low cost in some cases. We are currently monitoring for recolonization and considering re-introduction efforts. This work is underway in collaboration with the San Luis Obispo Lamprey Working Group including members from the City of San Luis Obispo, CDFW and San Luis Obispo Resource Conservation District.
- 3) San Clemente Dam is being removed in the Carmel River returning 25 miles of anadromous habitat to Pacific Lamprey and Steelhead. The dam removal is driven primarily by Steelhead conservation needs. However, this effort will provide great benefit to Pacific Lampreys in the RMU. Monitoring is needed to document recolonization and evaluate passage opportunities above Los Padres Dam (upstream of San Clemente Dam).

South Coast – includes 15 anadromous HUCs, none of which are currently occupied. The South Coast Plan is in review and will be completed in 2015 developed from 13 stakeholder meetings and workshops. We visited all known lamprey collection sites during development of the plan. Primary projects discussed in the presentation included

- 1) Monitoring for Pacific Lamprey recolonization of the South Coast RMU and evaluations of potential for reintroduction efforts.
- 2) Providing upstream and downstream passage for Pacific Lamprey and the Freeman Diversion. This is currently underway in collaboration with United Water District as part of an HCP process. This will likely resolve the primary threat to Pacific Lamprey in the Santa Clara River.

North Central Coast - includes 5 anadromous HUCs, all are currently occupied.

Implementation planning efforts are underway and will be completed by 2016.

- 1) Inflatable dams are used in the mainstem Russian River for streamflow management. It is uncertain if these are impediments for the upstream migration of adult Pacific Lamprey. This is under investigation in collaboration with the Sonoma County Water District.
- 2) Many of the North Central Coast rivers have a history of extensive modification from historic logging practices. Land use approaches have evolved significantly over the last few decades with added environmental protections. Habitats in these streams are in recovery with restoration occurring in some cases done in collaboration with local resource companies.

San Francisco Bay - includes 4 anadromous HUCs, all are currently occupied.

Implementation planning efforts are underway and will be completed by 2016.

- 1) Many highly urbanized streams are common in this RMU. An assessment of Pacific Lamprey use of these highly modified streams is underway. The Napa River is a primary example where efforts are underway to understand lamprey distribution in this drainage which is considered a “keystone” of the RMU. This is being investigated in collaboration with the Napa Resource Conservation District.

- 2) Removal of Searsville Dam in the San Francisquito drainage. Plans for the removal of the dam are underway and would restore ~ 10 miles of anadromous habitat for Pacific Lamprey and other native species.

Sacramento and San Joaquin – The Sacramento and San Joaquin are separate RMUs but are presented together for the purposes of these notes. The Sacramento RMU includes 33 anadromous HUCs, 21 are currently occupied. The San Joaquin RMU includes 14 anadromous HUCs, 7 are currently occupied. Implementation planning efforts are underway and will be completed by 2016.

- 1) Anadromous distribution is highly constrained within the RMUs from impassible dams. Providing passage at the many impassible dams in the RMUs would greatly increase the distribution of Pacific Lamprey.
- 2) Streamflow management at large storage dams deviates from natural streamflow regimes to meet anthropogenic needs. The altered hydrographs provide misleading environmental cues that may be detrimental to Pacific Lamprey. Management approaches are needed that create streamflow regimes that would benefit lampreys.
- 3) Water diversions are common in the RMU but none in California are as large as the pumps in the San Francisco Delta which divert water to the south. Preliminary assessments identified that current screening technologies at these pumps (louvers) are ineffective for Pacific Lampreys. New screens have been installed at the Tracy Pumping Facility and tests to evaluate their effectiveness are scheduled for the winter of 2015 and 2016. This work is being conducted in collaboration with USBOR at the Tracy Fish Research Facility.