

Klamath Salmon Recovery Guided by Research and Monitoring

Klamath Science Workshop
December 14th, 2022

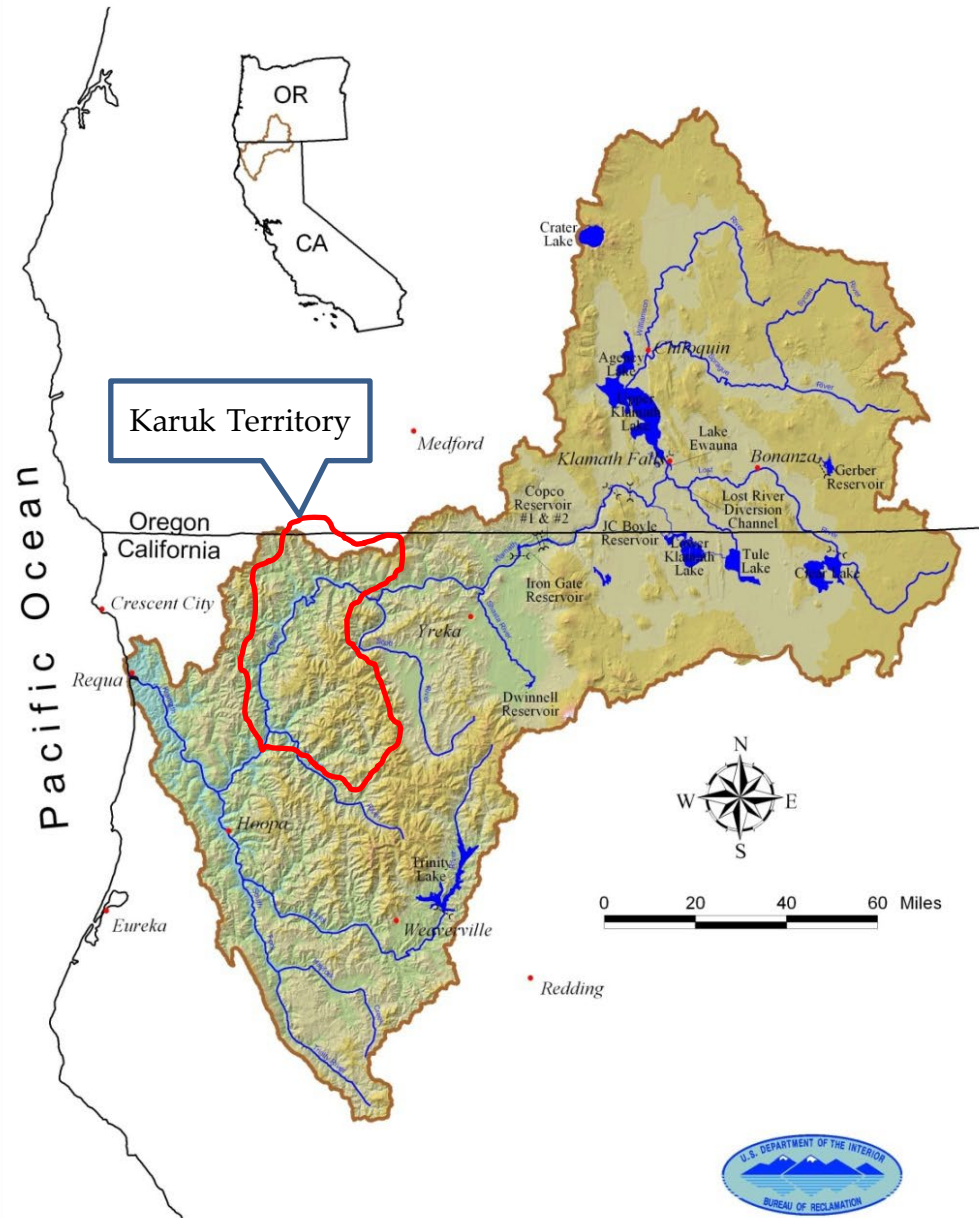


Karuk Have Lived in the Klamath Basin since Time Immemorial



And continue traditional fishing and cultural
practices today

Klamath River Basin



Klamath Fisheries Diversity supports Karuk Culture and Human Health



Akraah – Pacific lamprey



Ishyaat – Spring Chinook



Achvuun – coho salmon



Sa'ap - steelhead trout



Áama- Fall Chinook



Ishrixihara – Green sturgeon

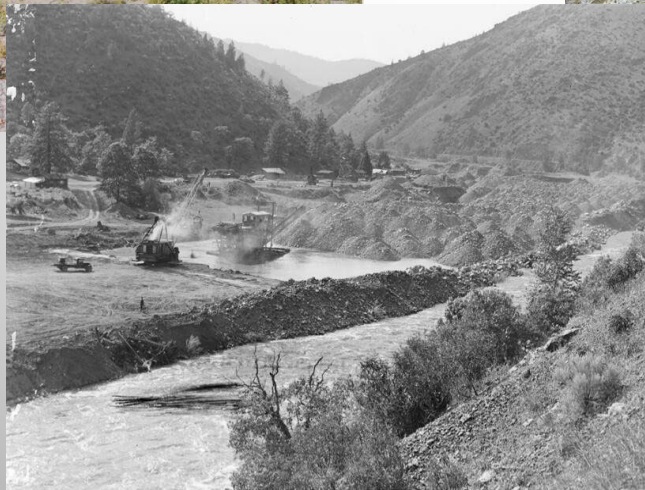
The Klamath River has been asked to do too much...Diverse Problems



Fish Kills



Poor Water Quality



Historic Gold Mining Impacts

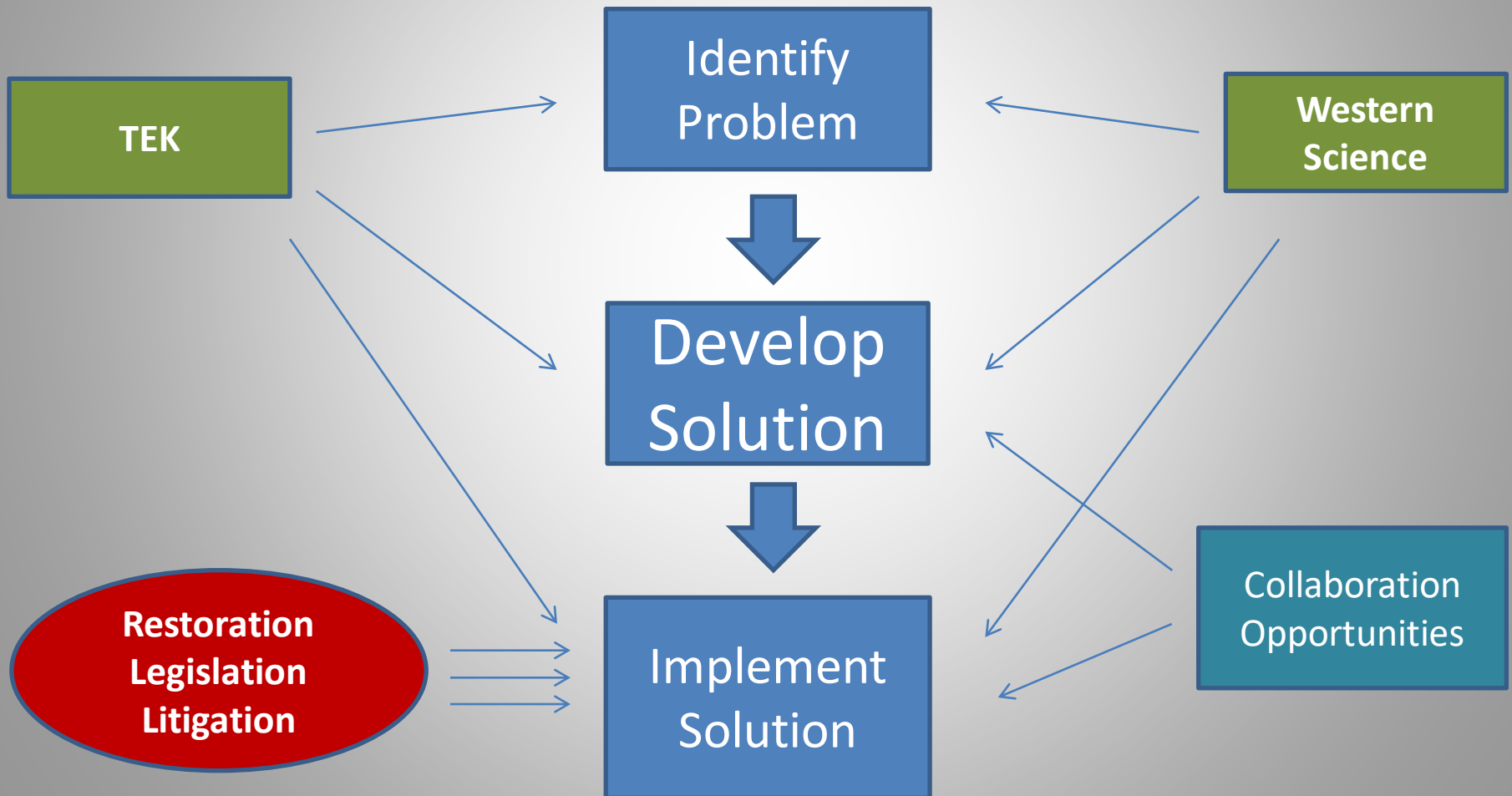
Karuk Cultural and Health Impacts

- Ceremonies are at-risk
- Inability to pass down traditions such as fishing
- Sacred sites destroyed or polluted
- Denied access to traditional foods and medicines

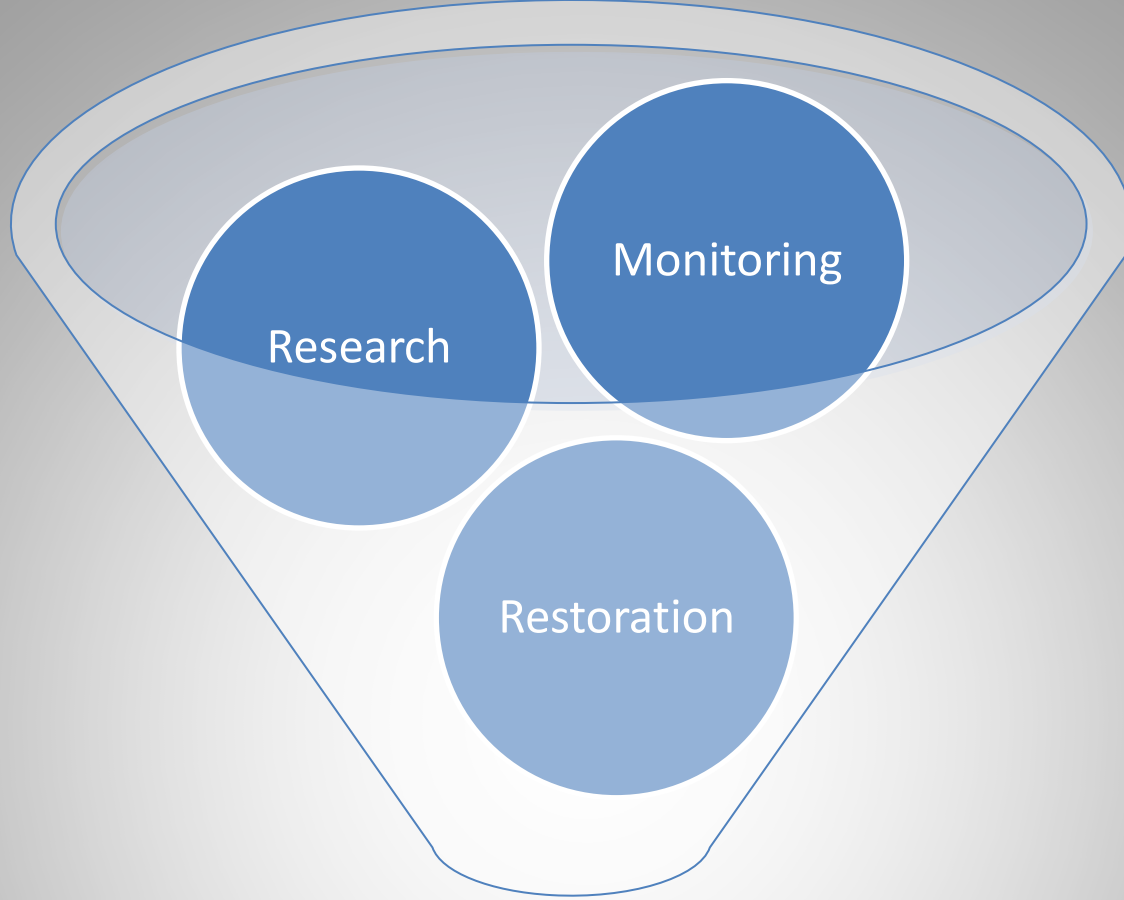
—See: *Affects of Altered Diet on the Health of the Karuk People*, Kari Norgaard, 2005.



Karuk Approach to Pickyâyav*



* *Fixing it*



Klamath Salmon Recovery

Karuk Research Priorities

- Klamath Fish Disease
 - Understanding Mainstem Flushing Flows, Hatchery Management and Pre and Post Dam Removal
- Coho Ecology Studies
 - Coho Recovery and Habitat Restoration Projects and Flow Management
- Spring Chinook Ecology Studies -Genotyping and Population Dynamics
 - Understanding population dynamics for reintroduction post Dam Removal
- Mainstem Food Web Studies
 - Food supply for fish pre and post dam removal
- Scott and Shasta River Flow and Water Quality Studies
 - In-stream Flow, TMDL
- Understanding Fire Adapted Landscapes and Climate Change
 - Fire and Fuels Management, Prescribed Fire
- Fire Effects on Fish and Watershed Hydrology
 - In-streams Flows and Snow Pack



Klamath River Coho Ecology Study



Collaborative effort since 2007

- Diverse Coho life history patterns exist and non-natal stream rearing is common
- Seasonal movements of age 0+ juveniles to find suitable winter and summer rearing habitat is common.
- Quality winter and summer habitat along the Mid Klamath is in short supply due to floodplain degradation and stream channelization.
- Restoration goals should focus on habitat quality and consider constructed off channel habitats to improve survival of juveniles.

Building Juvenile Coho Habitat Guided by Coho Ecology Research

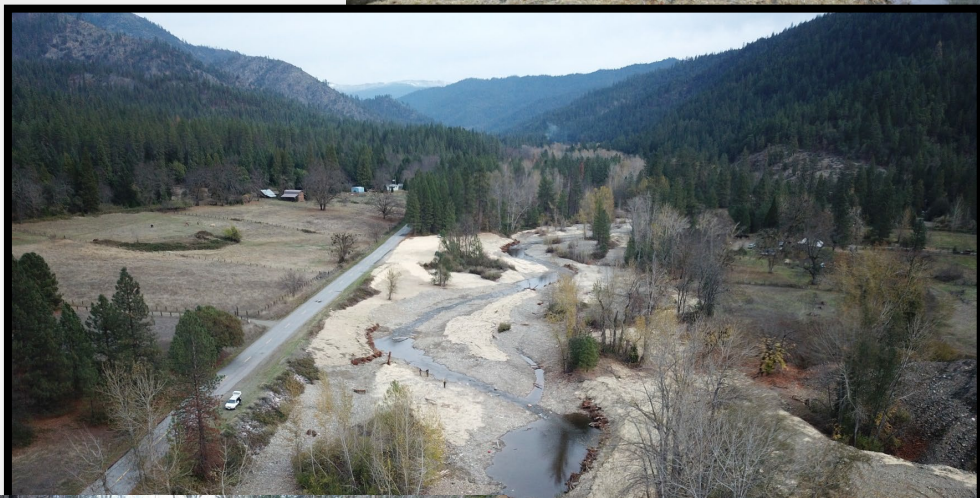


In-stream Habitat Project Types

- **Off-Channel Floodplain Ponds**-25 sites since 2010



- **Stream Channel Restoration Projects**



- **Large Wood Loading**



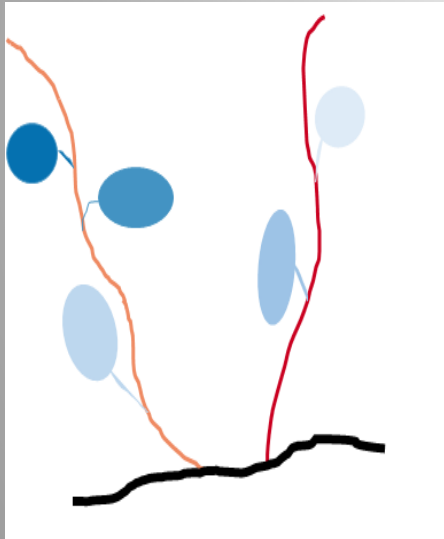
Salmon Population Monitoring



Post Project Research and Lessons Learned

Provide Feedback to Future Projects

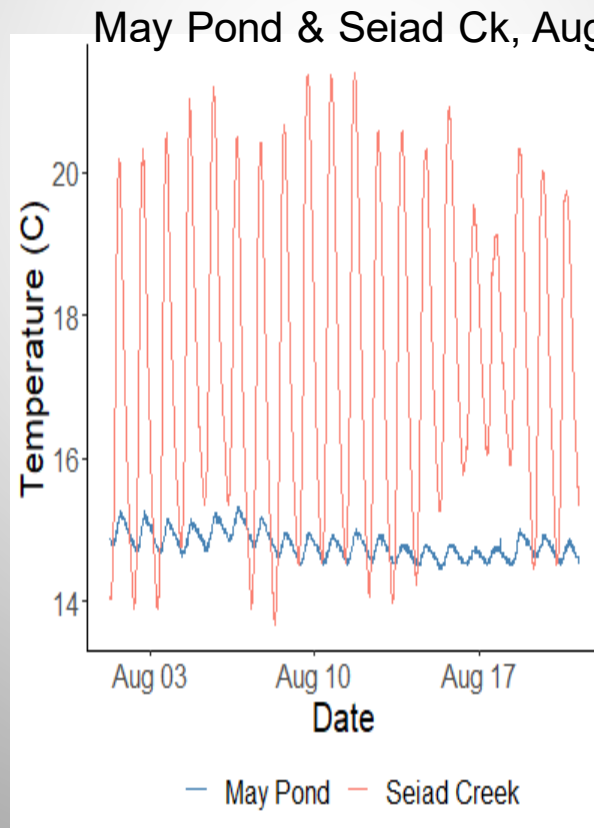
- All floodplain ponds and creeks have different temperature patterns



- Floodplain Ponds add thermal diversity to the riverscape

- Floodplain ponds provide thermal habitat stability

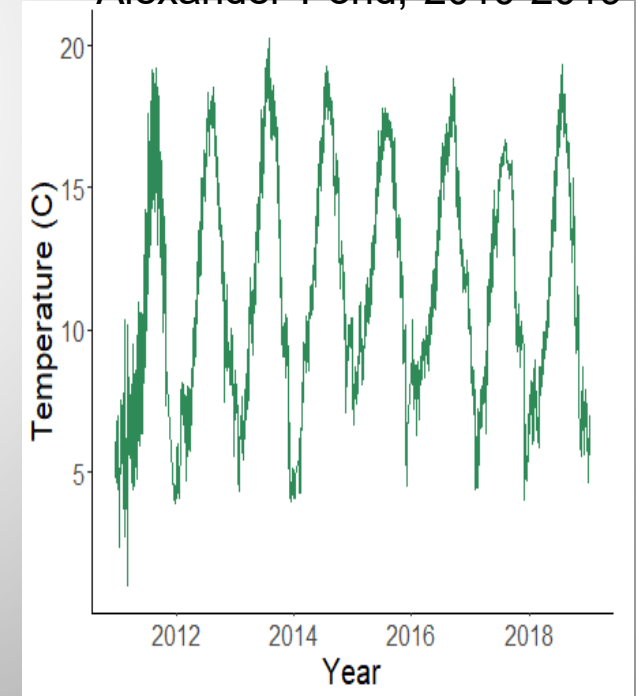
Daily temperatures were 9x more stable in May Pond than Seiad Creek



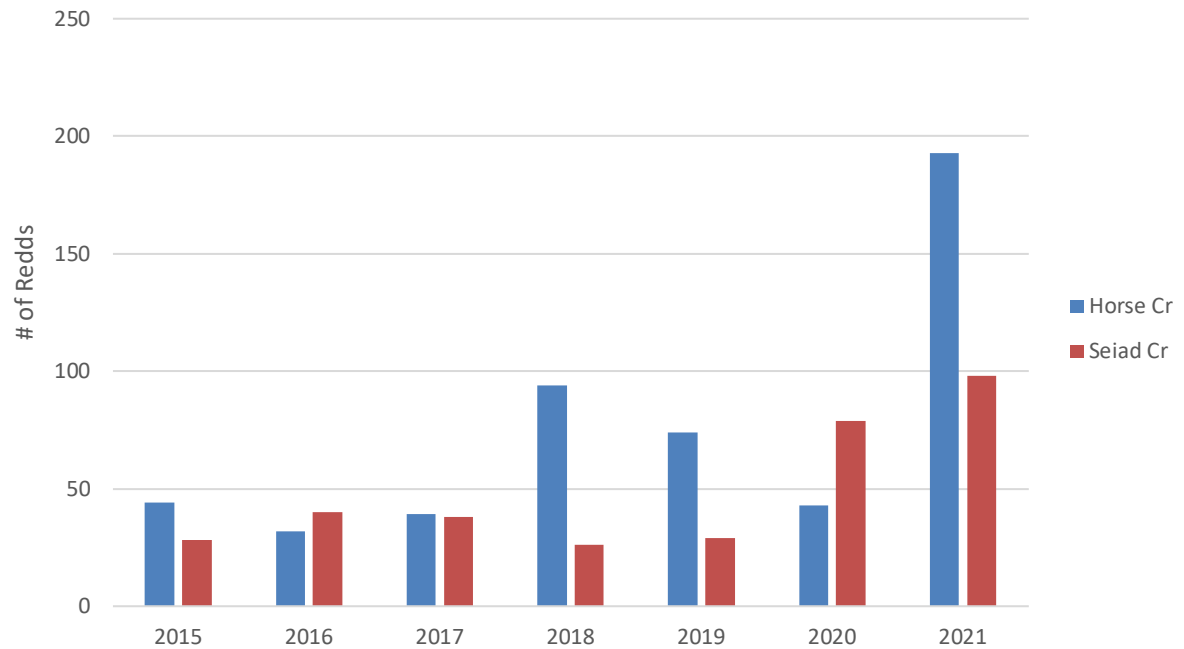
- Floodplain pond thermal stability increases over time

Alexander Pond temps become less “fuzzy” over time as daily temperatures stabilize.

Alexander Pond, 2010-2019



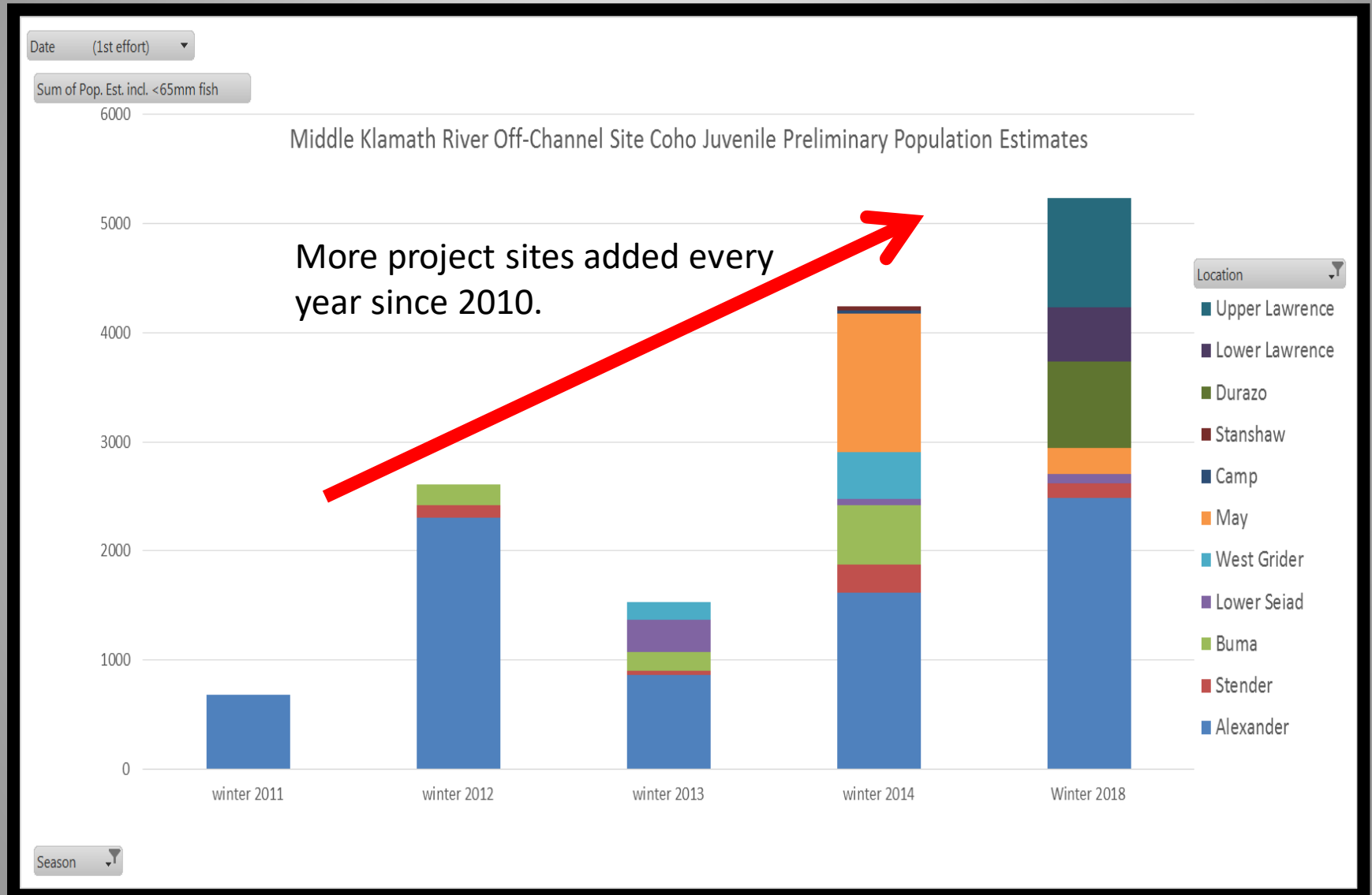
Coho Spawner Survey Results: Horse Creek and Seiad Creek



Middle Klamath Adult Coho Population

- ESA listed species since 1997
- Most spawning occurs in just a few tributaries- Horse Creek and Seiad Creek
- The adult spawning population is small- usually less than 300 spawners.

Post Project Monitoring-Annual Juvenile Population Estimates of Constructed Floodplain Ponds



Karuk Tribe Seeks Stable Funding for Priority Research and Monitoring

- Spring Run Chinook Research and Monitoring
 - Understanding spring run chinook genetics and population dynamics and repopulation after dam removal.
- Fish Population and Distribution Monitoring
 - How is salmon repopulation working after dams come out?
- Fish Health and Disease Research and Monitoring
 - What effect will dam removal have on disease pathogen life cycles?
 - What are the effects of flow augmentations, flushing flows or late summer pulses, having on salmon health?
- Forest and Fire Research
 - What effect is fire suppression having on species diversity, hydrology and fisheries productivity? Understanding fire as a natural process fish are adapted to.
 - Can we make communities safer and increase water yield with more fire on the landscape with prescribed fire?
- Water Quality Monitoring
 - Understanding current conditions and long term trends and effect of Climate Change.
- In-stream Habitat Restoration Effectiveness Monitoring
 - Are habitat projects having a meaningful benefit on target fish populations?
 - Are we doing the right thing and how can we adapt to do better?