Klamath Fisheries Restoration in the Era of Climate Change, Dam Removal and Megafires

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Mid Klamath Watershed Council

MKWC plays a major role in building a restoration-based economy in the Western Klamath Mountains. We are results oriented and work through developed partnerships to plan and implement projects based on traditional cultural knowledge and the best available western science.
Presentation Outline

• Klamath River: Press Disturbances – Dying From a Thousand Cuts
  – Legacy of Roads, Logging, Mining, Dams, and Fire Exclusion/Suppression
• Why Solving the Fire Crisis is Essential to Fish Restoration
  – Implications of Recent Studies, and Solutions for Restoring Fire Processes
• Coho Habitat Restoration on the Klamath River
  – Lessons Learned from a Decade of Off-channel in In-channel Habitat Restoration
• Report Out on Recent Mid Klamath Fish Habitat Restoration
  – Boise Beaver Dam Analogues
  – Six Rivers NF Aquatics Ecosystem Analysis and Aquatic Restoration Action Plan
  – Middle Klamath River Floodplain Enhancement & Mine Tailing Remediation Plan
Somes Peak Looking Towards the Trinity Alps – Pyrodiversity Begets Conifer Diversity
NF Salmon River After 1987 Fires
2014 Whites Fire
(Re-defining Spot Fires)

August 11, 2014, 7pm PDT radar image showing precipitation and storm track from Whites Fire pyrocumulonimbus cloud which ignited the Man Fire and Happy Camp Complex.

Fire perimeters from August 18, 2014.
Lightning Fires from Whites Fire Pyrocumulus
Lightning Strikes 08/11/14
Area Burned 08/11/14

Figures: Scott Harding
Fire Overlaps - Whites Fire
February 2015 High Water in Whites Fire Footprint
Grider Creek at Pacific Crest Trailhead

Feb 2015  July 2015

Photos: Mark Motyka
Stage Zero Baby!

Grider Creek - Wilderness Bridge - 2002

Grider Creek - Wilderness Bridge - 2015
1931 Fire Perimeters – Hoopa Valley – Native Burning Patterns
Big Rock in Orleans, CA
Looking up the Klamath River

2006: Frank Lake
Grim Realities and Potential Opportunities from Fire History Analysis

- No areas are within their historic fire return intervals, or even remotely close. Major press disturbance for salmonids.
- With no fire exclusion and continued native burning patterns, we would see smaller self-limiting fire footprints, and some places with 30-100 fire overlaps.

<table>
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<th>Number of Fires</th>
<th>Sum of Acres</th>
<th>Percent of Planning Area</th>
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<tr>
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<td>638</td>
<td>0.1%</td>
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<tr>
<td>Total Acres</td>
<td>1,196,750</td>
<td>100%</td>
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Fire Perimeters by Decade with 2013-2014 Fire Severity

- Size and severity are increasing.
- Only recent fire footprints (<10yrs) are stopping or significantly slowing new fire spread.
- 42% of the entire Salmon River watershed has burned in the last decade.

Fire History

- 0 - 1900
- 1901 - 1910
- 1911 - 1920
- 1921 - 1930
- 1931 - 1940
- 1941 - 1950
- 1951 - 1960
- 1961 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2000
- 2001 - 2010
- 2011 - 2020

Composite Burn Severity

- Unchanged
- Low Severity
- Moderate Severity
- High Severity
Red Cap Creek Drainage >110 years since fire

- Lack of instream wood and spawning gravel
- Lack of sunlight to drive primary productivity
- Decreased summer base flow – 3-4 times historic stem density
- Entrenched degraded channel – vegetation armors stream bank
- Severe risk for large scale high severity wildfire
Elk Creek During the 2014 Happy Camp Complex Fire

Photo: Mike Hentz
Current Fire Suppression Policy:
Maximizing the Negative Impacts of Fire in the Klamath Mountains

- 98+ percent of all fire starts are suppressed.
- The few fires that escape suppression typically do so because they start at the hottest, driest times of year.
- Greater proportion of high intensity fire, greater risk to firefighters and communities.
- Nearly 500,000 acres burned, $550 million dollars spent on fire suppression in the Klamath Mtns in past decade.

2013 Salmon Complex Fire
Wildfire Smoke Cools Summer River and Stream Water Temperatures


- All 12 streams analyzed benefitted from smoke induced cooling.
- Smoke-induced cooling has the potential to benefit cold-water adapted species.
2015 Steinacher Fire in Wooley Creek

2013 Salmon River at Mouth of Crapo Creek
2013 Salmon River Drainage Post-Wildfire

2013 Butler Fire

2013 Salmon Complex

Photo: Thomas Dunklin
2014: Boulder Gulch – NF Salmon River – Spring Chinook Rotting Under Ledge
2012: Spring Chinook Holding Lower SF Salmon River
• Began facilitated upslope restoration workshops w US Fire Learning Network in Spring 2013.

• An open group comprised of Federal, Tribal, Non-governmental Organization (NGO) and local participants.

• Trust originally developed thru collaborative instream restoration.

• Collaboratively identified planning area (1.2 million acres)

• Goal: Restore “historic” (natural w people) fire regimes in the Western Klamath Mtns.
Wholistic Fire Management: Social, Cultural, Ecological, Economic Perspectives in Balance

- Building support at all levels for upslope restoration actions to expedite the creation of fire resilient communities and forests.
- Initiating large scale project planning and implementation through multi-agency Inter-disciplinary Teams.
- Workforce Development
- $5 Million CALFIRE grant 2018, submitted $40 million CFLRP proposal Aug 2019
From Conflict to Collaboration

USFS/Karuk NFWF Project Ribbon Cutting Event

OCFR Road Blockade
Somes Bar Integrated Fire Management Project
Final Environmental Assessment
2014-2018 Klamath TREX Accomplishments

- 2,000 acres burned in 100+ properties in the WUI of seven communities
- 300+ participants from local, tribal, state, national and federal organizations
- No escaped fires
Prescribed Fire

- Maximize opportunities for RX burning across ownerships.
- Interagency mobile burn teams.
- Collaborative rx burn database.
- Fund training: Invest in art and science of RX fire.

- Maximize opportunities for managed wildfires.
- Collaboratively identify where and under what conditions wildfires can be managed for resource objectives.
- ID and create landscape scale fuelbreaks based on shared values overlay assessment.
Coho Off-Channel Habitat Restoration in the Middle Klamath
A Half-assed History and Some Lessons Learned
Off-Channel Habitat Construction for Juvenile Coho Salmon (2010 – Present)

- 2010: Stender, Buma, Alexander Ponds – All on Seiad Creek
- 2011: Lower Seiad and West Grider Ponds
- 2012: May Pond on Seiad Creek
- 2013: Ponds on Tom Martin, O’Neil, Camp, and Stanshaw Creeks
- 2014: DeCoursey Pond (Middle Creek – trib to Horse Creek) and Durazo Ponds on Seiad Creek.
- 2015: Goodman Pond on Middle Creek
- 2017: Lawrence Ponds on Horse Creek
- 2018: Fish Gulch Ponds on Horse Creek

Primary objective is to rapidly increase coho winter rearing habitat, however summer use has been documented in all ponds.

Extensive Monitoring: water quality (DO, temp), snorkel surveys, mark/recap popn estimates, maintaining habitat connectivity.

Shari Anderson MS thesis (2014) on coho growth, density, and abundance in constructed habitats, as well as tributary and beaver influenced habitats. HSU grad student Michelle Krall about to publish MS thesis.

Funding: USFWS Partners Program, NFWF/PacifiCorp, FishAmerica/NMFS, Caltrans/USFS and CDFW.
• Key coho stream in Mid Klamath.

• Heavily impacted by channelization (levees) to make room for ag/domestic use, and past mining.

• Willing landowners in a hostile landscape.

• Working in an altered landscape.

• Experimenting with site longevity based on connectivity during flood events.
- Dug into side channel through flow in 5-10 year flood event.
- Very low cost of construction (~$10,000).
- Beaded channel design.
- Early issues with connectivity. Entered Seiad Creek mid-riffle...
Buma Pond – High Retention - High Numbers of Large 1+ Coho

To the Ocean!!!

SIZE MATTERS!!!
How can you interpolate DO and pond temperatures before implementation to post-implementation? Only good to tell GW levels.
Alexander Pond
~ 2 mi. up Seiad Creek

Before – November 2009

During – October 2010

After – February 2011

Pond Area: 8,167 feet
Pond Perimeter: 554 feet
• Located just downstream of a key spawning reach on lower Canyon Creek.
• Eight feet deep at summer base flow.
• Suitable summer temperatures and dissolved oxygen levels.
• Complex wood structures
• High plankton levels may help to deter predation.
• Connection to Seiad Creek increases from two feet to nearly 20 feet during high flows. This may increase the ability for juvenile coho to find the site during high water events.
Tom Martin Creek

- First thermal refugia below Scott River
- 748 coho observed in 200’ section below Hwy 96 culvert (Summer 2012).
- First project with specific focus to expand summer thermal refugia.
- Implemented November 2013
Tom Martin Pond After Feb 2015 High Flow Event
Summer Growth Rates in Tom Martin Creek Pre- and Post-Construction

Data from Shari Witmore MS Thesis (2014)

Data from Michelle Krall MS Thesis (preliminary)
2012 Goff Fire
Stender Off-Channel Pond on Seiad Creek
2012: Post-Debris Flow
Horse Creek Drainage: Post-fire 2016

- Historical oak woodland forest converted to even-aged conifers.
- Extreme risk for stream evulsion into ag lands in lower valley.
- Potential to relax levees, increase floodplain capacity to sort sediment and wood, and provide off-channel habitat for rearing juvenile coho salmon.
- Social license lacking for restoration at the scale needed.
Lower Seiad Creek Beaver Dam...Analogue???
Six Rivers Aquatic Restoration Project Environmental Assessment
Final Environmental Assessment completed in December 2018

Programmatic in Scope and Scale

Covers entire Six Rivers NF

Coastal Conservancy funded MKWC to enter into a Collection Agreement with Six Rivers NF to complete the

Restoration Actions can occur anywhere in fish bearing streams, lakes and ponds, as well as adjacent riparian areas, as identified on the project area maps
SRNF NEPA is programmatic and covers 2 kinds of project locations:

1/ Specific Project Locations or previous instream restoration locations and sites identified through collaboration. This includes locations....
   • where cultural resource surveys have occurred such that site specific design features are developed.
   • where projects are smaller in size where no ground disturbance would occur.

2/ New Project Locations within the analysis footprint (example: polygons found around fish bearing streams and lake/pond features)
   • Sites where no on-the-ground cultural surveys have occurred, however, non-ground disturbing projects could still be implemented.
Aikens Creek Coho Habitat Restoration Project

- Post-’64 Flood Bluff Creek “Ghost Channel” converted to USFS Campground.
- Aikens Creek put into ditch on side of valley.
- USFS, Karuk and Yurok Tribes and MKWC worked for 7 years to get to implementation phase.
**Fish Habitat Connectivity** – Aquatic Species Passage Restoration

- Instream Habitat Enhancement
  1/ Large wood and boulder placement
  2/ Existing structure improvements/removal
  3/ Beaver habitat restoration
  4/ Gravel Augmentation
  5/ Off-/Side-Channel Restoration

- Riparian and Streambank Restoration
  6/ Streambank Restoration
  7/ Riparian Vegetation Treatments
  8/ Non-Native Invasive Plant Control
  9/ Reduction/Relocation of Recreation Impacts
Restoration Toolbox

- Riparian and Streambank Restoration
  6/ Streambank Restoration
  7/ Riparian Vegetation Treatments
  8/ Non-Native Invasive Plant Control
  9/ Reduction/Relocation of Recreation Impacts
Figure 5. Reach enhancement suitability and rank relative to floodplain area 1 ≥ 5 ft above the riffle crest thalweg datum.