

# Perspectives of managing, restoring, and conserving salmonids in the southern Pacific Northwest and northern California

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  - USFS-Pacific Southwest Research Station.
  - Fisheries and Fire
  - Tribal and Community forestry and restoration

## Land Area Affected by Endangered Species Act Listings of Salmon & Steelhead

\* 28 distinct population segments:  
6 endangered, 22 threatened

\* 176,000 sq. miles in Washington, Oregon, Idaho & California

\* 61% of Washington's land area,  
55% of Oregon's, 26% of Idaho's, &  
32% of California's



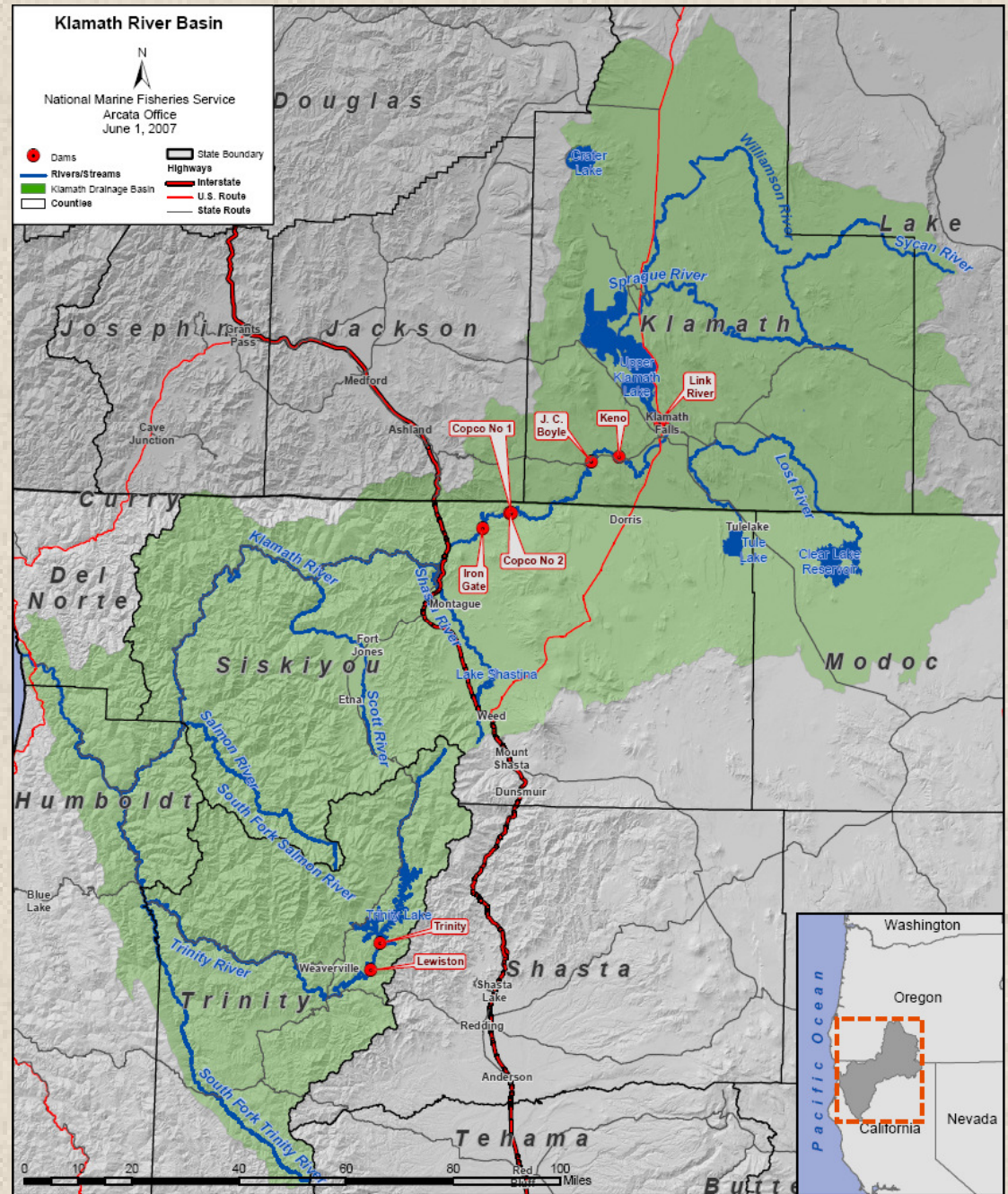
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# Klamath River Basin

## Topics:

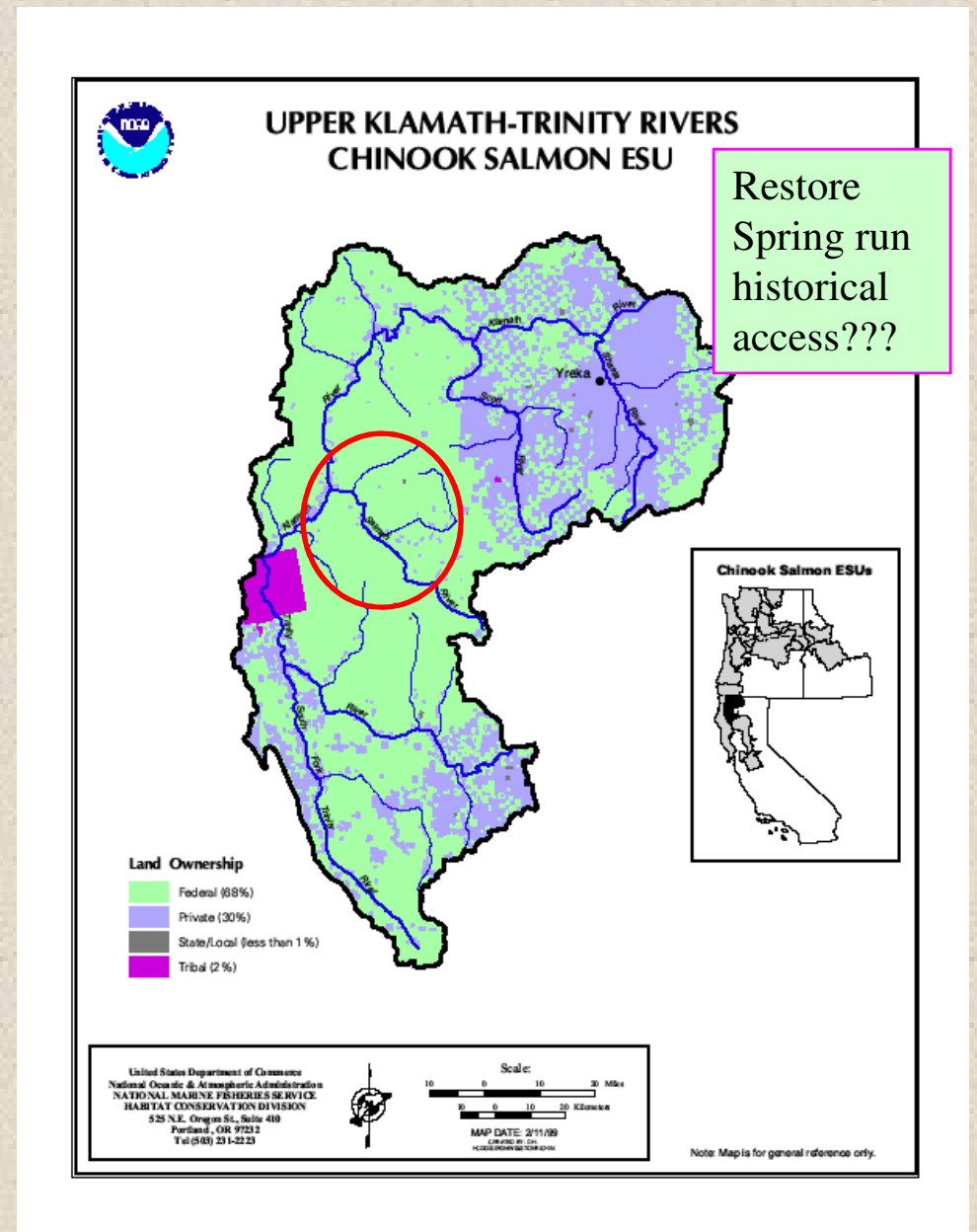
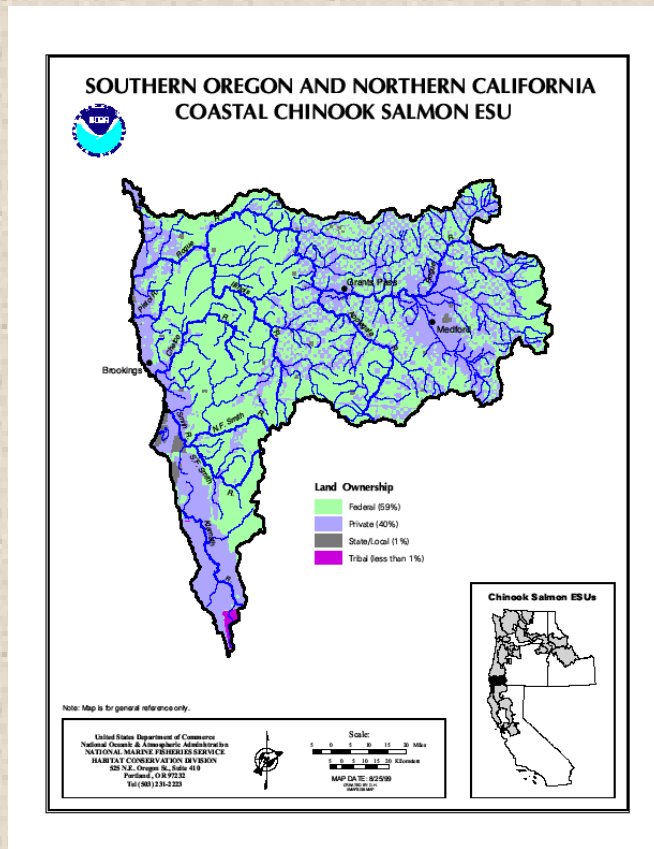
- Imperiled salmon stocks
- Dams and water allocations
- Climate and wildfires
- Agency, tribal and community efforts to restore habitat and conserve salmonids



Map: NMFS-NOAA 2007:3

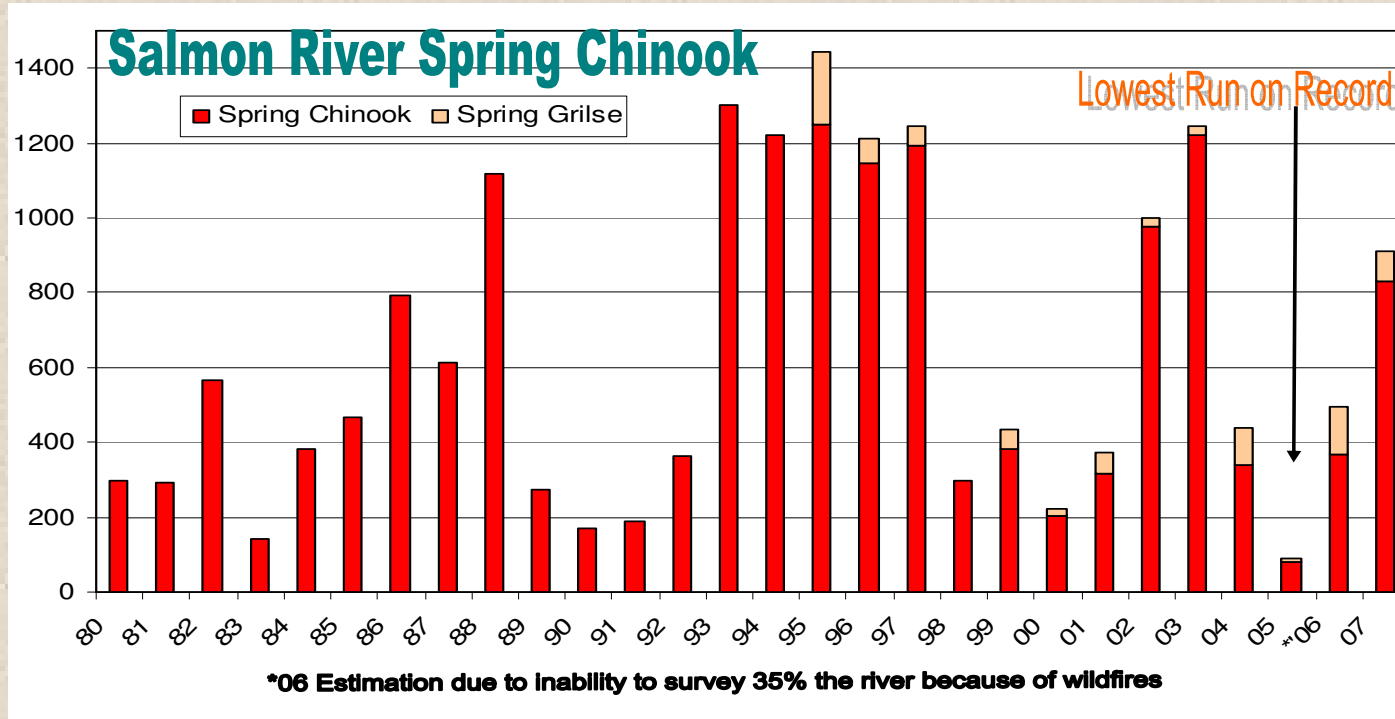


# Chinook-Spring: Imperiled, species of concern



- Spring run-Threats similar to Coho
  - Hatchery and wild stocks
  - In-stream water quality:
    - Flow and temperature conditions and diseases

# Spring Chinook of the Klamath-Salmon Rivers, Ca. Wild Population

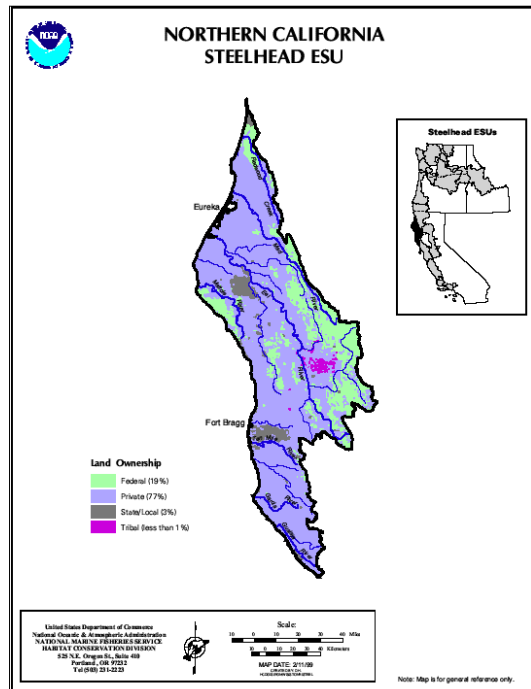


- Dive Counts: Coordinated efforts among parties.
- Declines from historical levels caused by:
  - Upper Klamath River dams block historical habitat.
  - Hatchery production supplementation
  - Threats to remnant wild populations: Klamath River migration conditions, Mining/habitat modification, Harvest/Poaching, Wildfires, Invasive weeds.

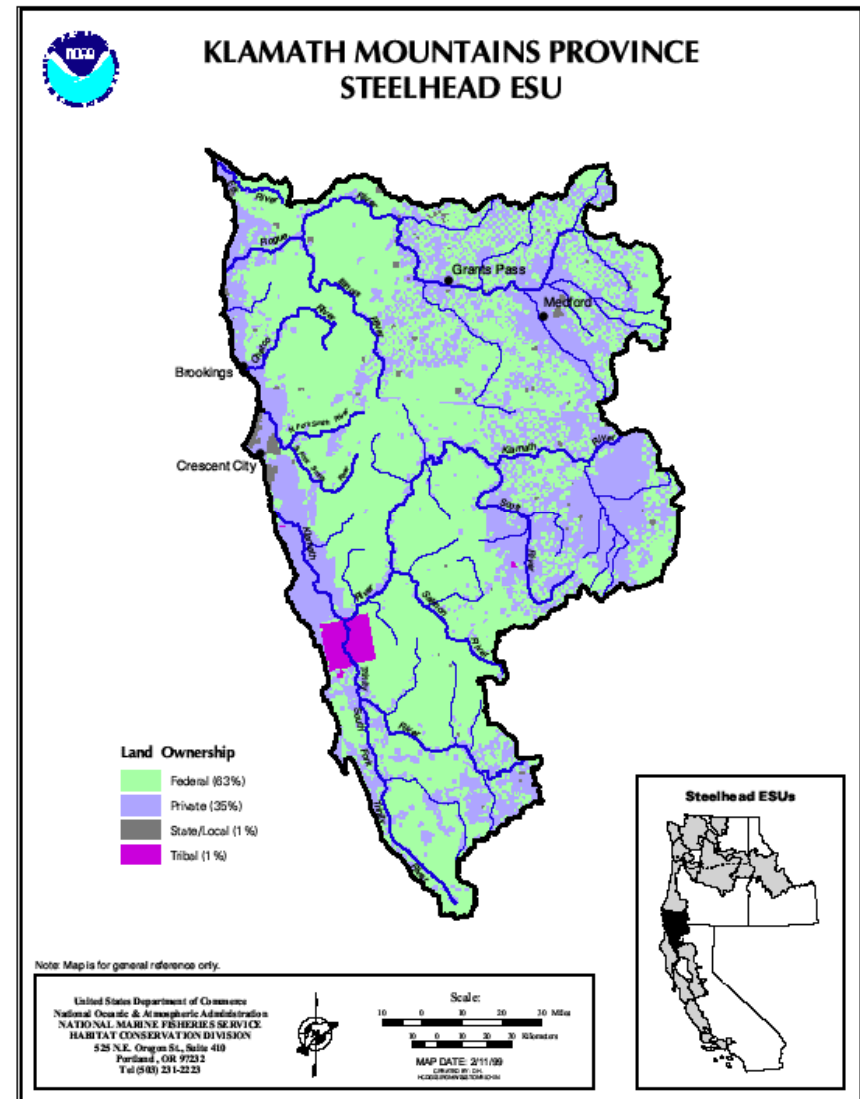
\*Lack of recognition of Spring Run by NOAA/ESA a concern to tribes and communities

Graph/Data : SRRC

# Steelhead-Summer: Proposed threatened

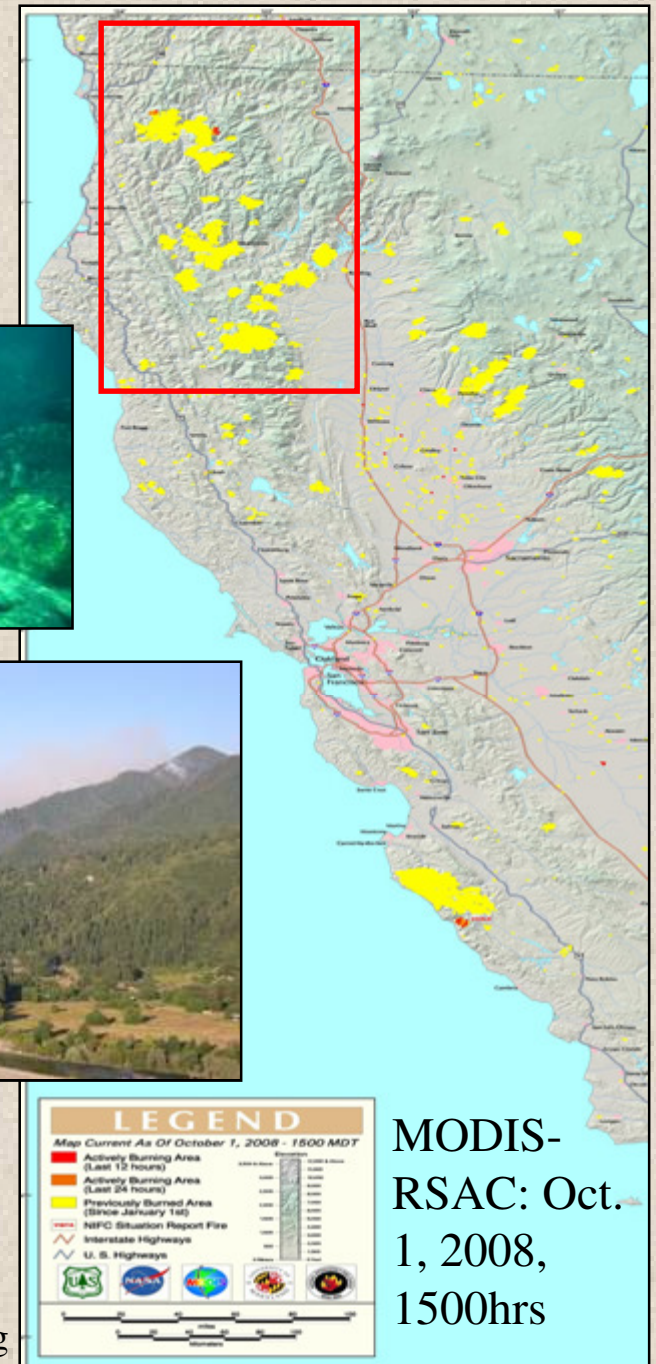


- Summer, Fall vs. Winter Runs:  
Threats similar to Coho and Spring Chinook salmon
  - Wild and Hatchery
  - Sport and tribal harvest
- \* Tribal perspectives include ecology of all fishes: Sturgeon, Lamprey eels, Candle fish, Suckers, Sculpins, etc.



# Climate and Wildfires: Threats to Salmonids

- Climate change
  - Precipitation delivery: Less snow pack- hydrologic regime change
  - Winter mean temperature to increase
  - Longer wildfire season affected by fuel moisture content
- Wildfires: Short and long term affects/impacts?
  - Extent and severity to increase
  - Direct and indirect effects to salmonid habitat quality
  - Fire suppression/repair activities
  - Need for sub-basin planning
  - Research to link direct and indirect effects to habitat or species populations.

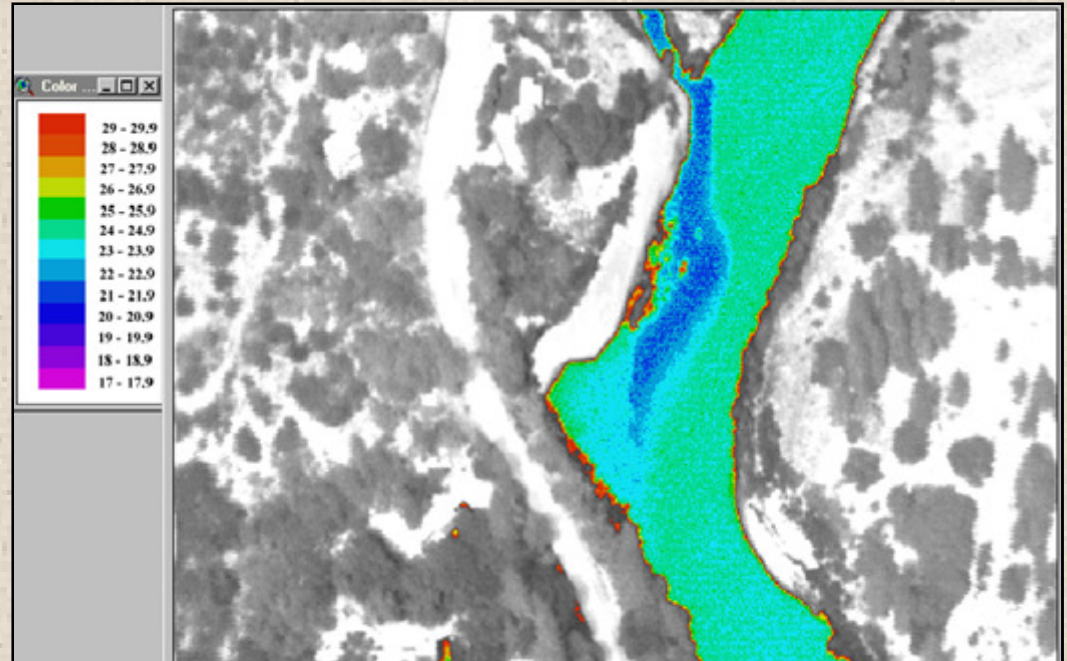


MODIS Image: [http://activefiremaps.fs.fed.us/fireplots/cgb2008275\\_1500.jpg](http://activefiremaps.fs.fed.us/fireplots/cgb2008275_1500.jpg)

# Monitoring and Research to Guide Restoration and Conservation Efforts



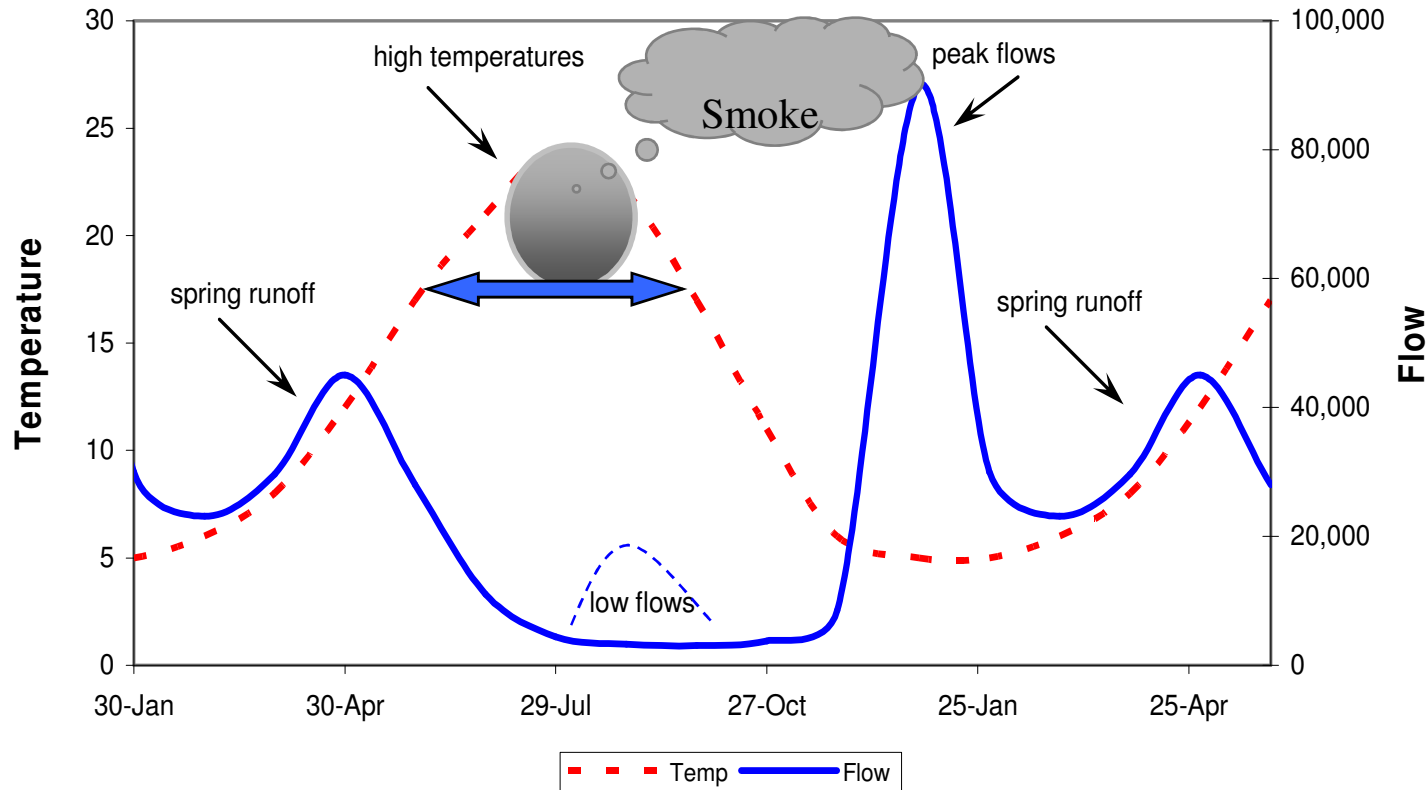
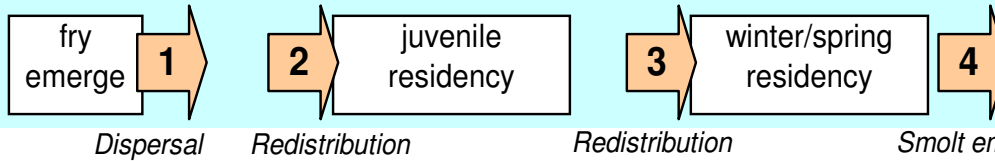
- Harvest management, adult escapement, spawning distribution and success
- Out-migrant monitoring
- Thermal refugia study
- Disease and density studies



Photos: Karuk Tribe

# Linking coho life history migration, thermal refugia, and wildfire research

## Movement of juvenile coho within the mainstem river corridor



Graph: Karuk Tribe,  
 Top Photo: MODIS,  
 Collaborative ideas and data sharing

# Monitoring and Research to Guide Restoration and Conservation Efforts

- Flow and temperature scenario modeling
  - With and without dams
  - Species life history requirements
  - With reduced agricultural use
- Collaborative Dives-  
Adult and juvenile surveys
- River geomorphology, bedload transport, and flow conditions.



Photos: Karuk  
Tribe &  
Google Earth



# Multiparty Restoration and Monitoring: *Is it working?*

- Road decommissioning
  - Geologically unstable watersheds
- Fish passage enhancement
  - Roads and irrigation diversions
- Stream flow management and conservation. Fish centric
- Entrapment prevention
  - Fish screens and flow management
- Riparian Improvements
  - Creek mouth modification, plantings, and thinning.
- Post-fire repair work
  - Soil stabilization and fuel treatments



Photos: USFS,  
MKWC, Yurok Tribe

# Klamath Basin Dam Removal: Political, Social and Ecological Tradeoffs

- Started with Framework Agreement
  - Klamath River Basin Restoration Agreement
    - A multiparty agreement involving federal, state, county, tribal, agricultural-industry, and community organizations
  - Anticipated-Major funding basin wide:
    - Dam removal
    - Better flows
    - Improve water quality and wetlands,
    - Fish restoration and re-introduction in to upper basin.
- \*Agreement in Principle-** To remove four dams and restoration efforts: Pacific Corps., Federal, and States

# Conclusions:

- Coho, chinook and steelhead continue to decline, though difficult to quantify because abundance has not been systematically monitored at the basin scale over time
- Other species important for tribal culture and subsistence are declining or extirpated from historic habitats that are linked to salmon.
- Climate change is supported by fire frequency and intensity data, but the effects on salmonids are not well understood.
- Klamath River Basin Agreement and all of the collaborative research leading up to it hopefully represents a turning point in fate of this salmon ecosystem

Thanks to Karuk and Yurok Tribes, USFS, MKWC, SRRC, and River Keeper input, photos, and data.

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