



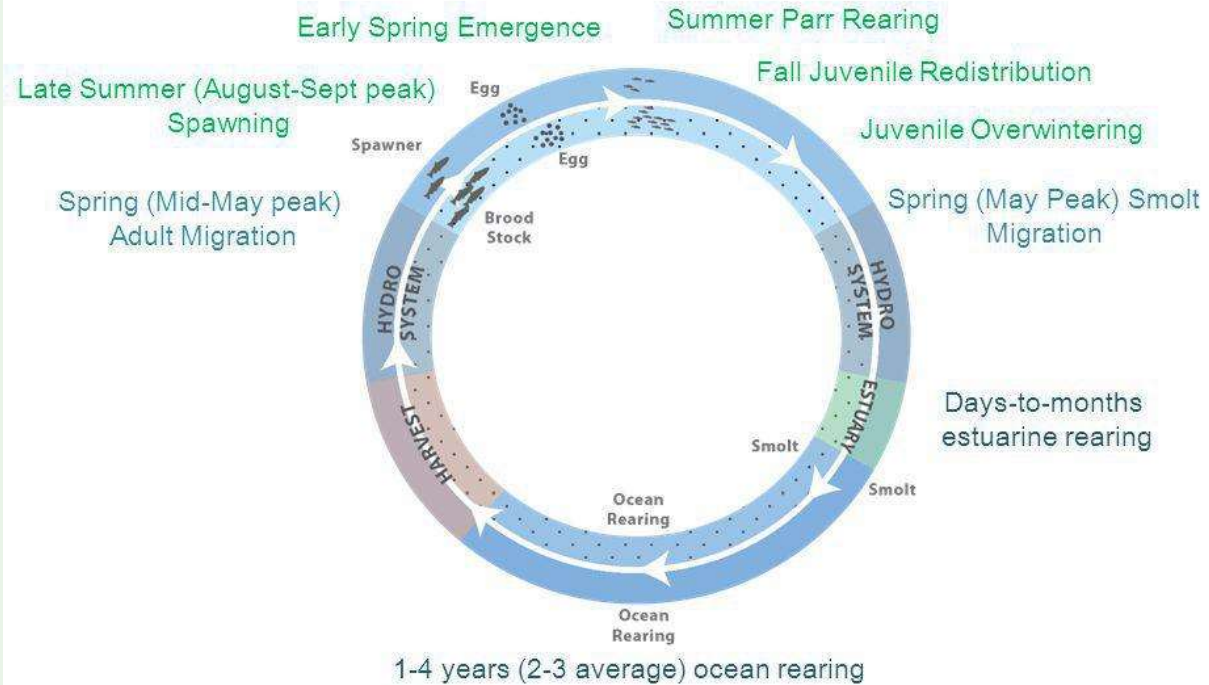
LIFE HISTORY AND LIMITING FACTORS OF SALMON RIVER SPRING-RUN CHINOOK SALMON



Dr. Joshua Strange, Sweet River Sciences
9th Spring Run Chinook Salmon Symposium

SPRING RUN CHINOOK SALMON

General Life History Patterns SPRING CHINOOK



SPRING RUN CHINOOK SALMON



Spring & Fall
Chinook salmon

June-December

Chinook Salmon Life History

Stream-Type

- Dominate the northerly part of the species range, from about 56 degrees North in British Columbia up through Alaska;
- Tend to return to freshwater a relatively long time before spawning;
- Run and spawn earlier in the year;
- Utilize the higher-elevation reaches of upper tributaries;
- Have a relatively long freshwater juvenile phase and migrate to sea as yearlings;
- Exhibit extensive offshore migration patterns.

Ocean-Type

- Dominate the southerly part of the species range, from down in California up through the coastal streams of Oregon and Washington;
- Tend to return to freshwater a relatively short time before spawning;
- Run and spawn later in the year;
- Utilize mostly the mainstem and lower tributaries of rivers;
- Have a relatively short freshwater juvenile phase and migrate to sea as subyearlings;
- Have a more coastal oceanic distribution.

ECOLOGICAL CONTEXT





SALMONIDS



Steelhead

December-April



Coho

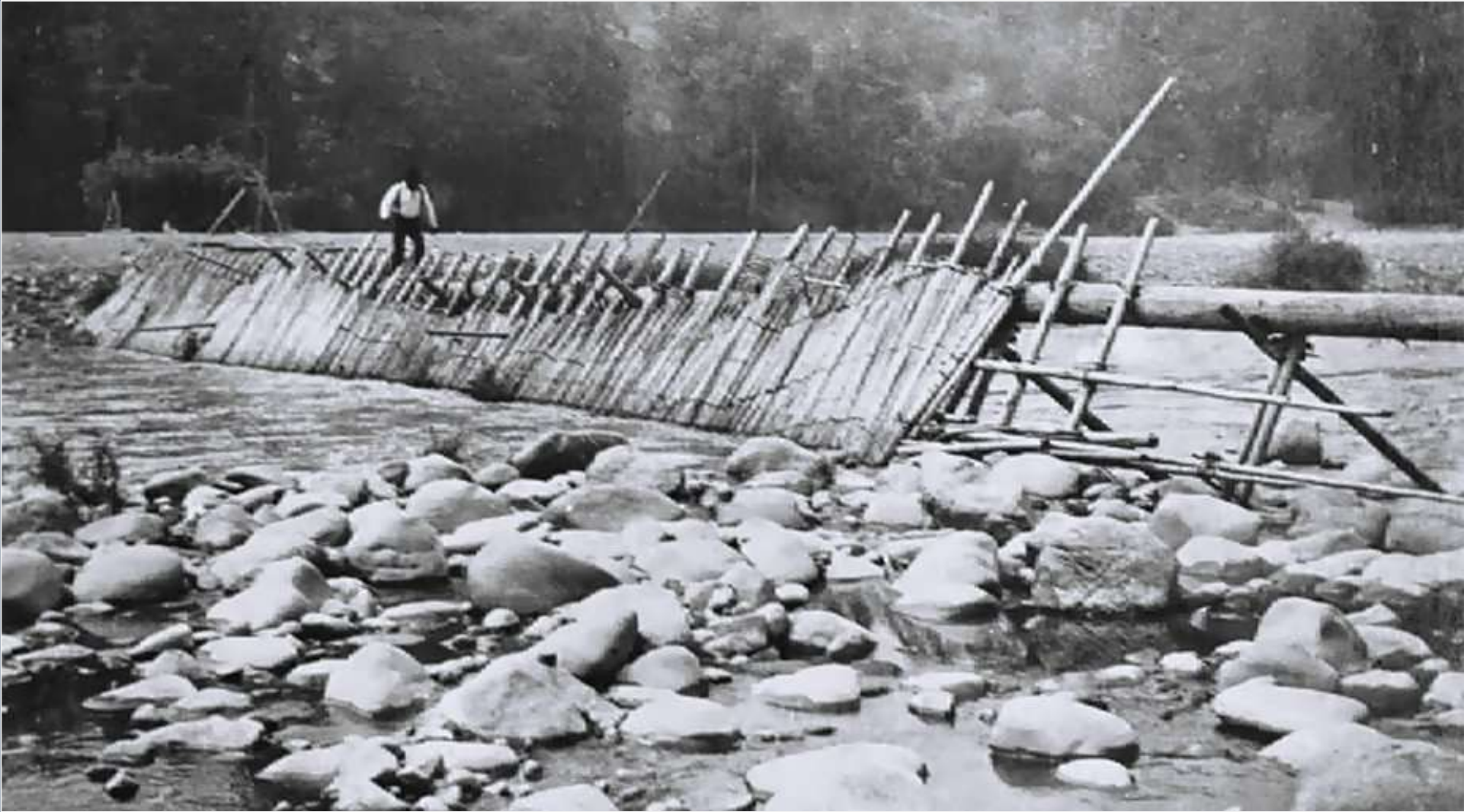
October-December



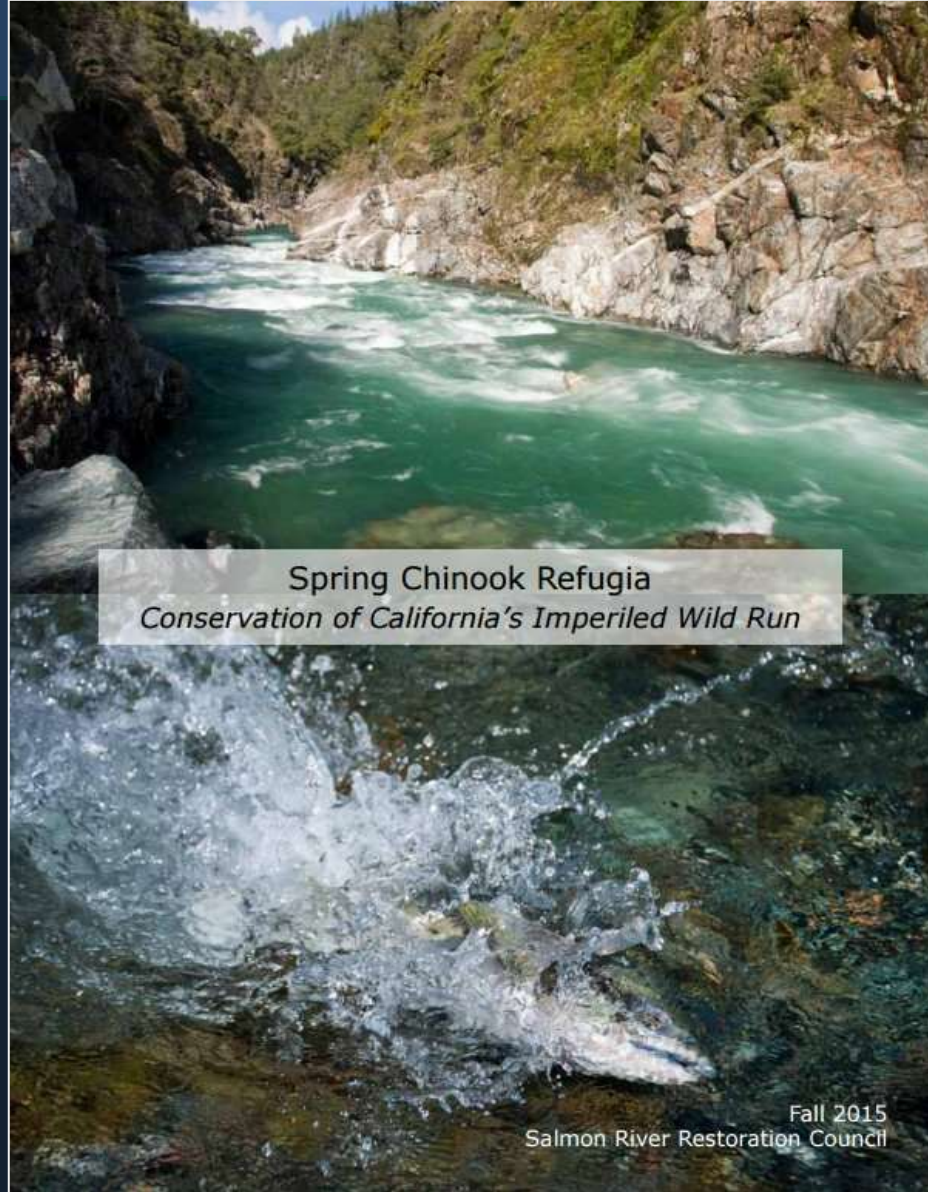
Spring & Fall
Chinook salmon

June-December



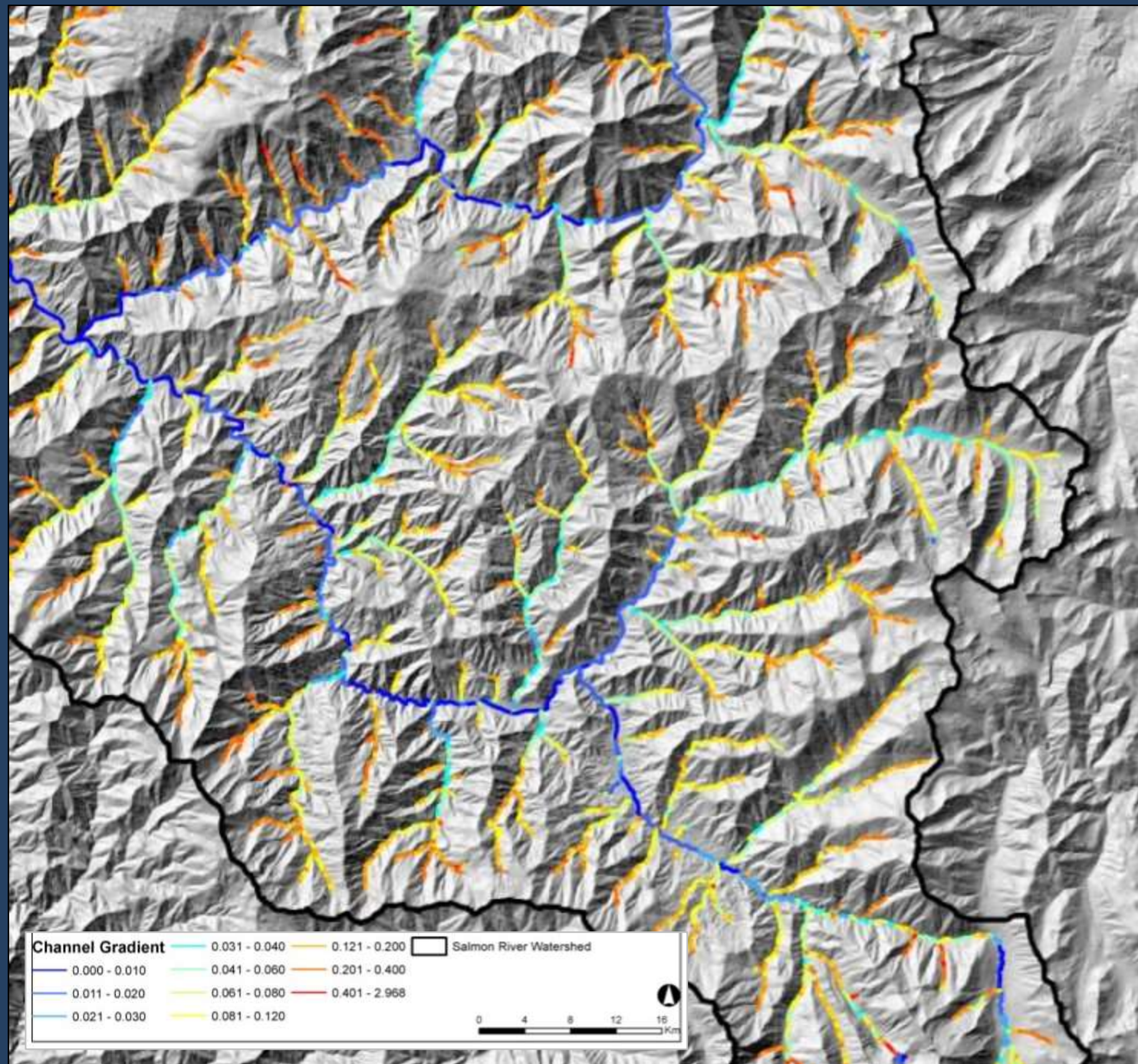


SALMON RIVER

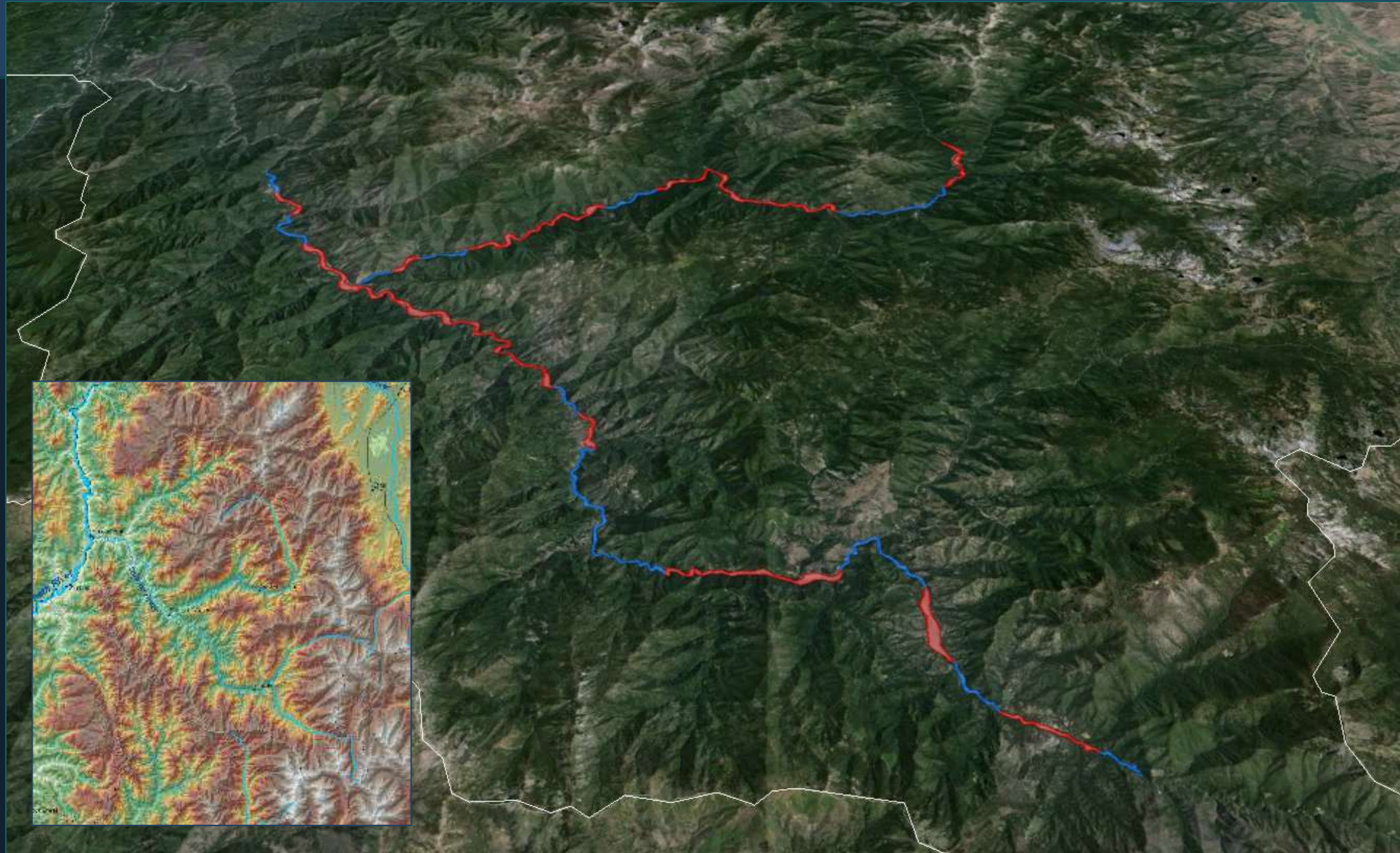


Spring Chinook Refugia
Conservation of California's Imperiled Wild Run

Fall 2015
Salmon River Restoration Council

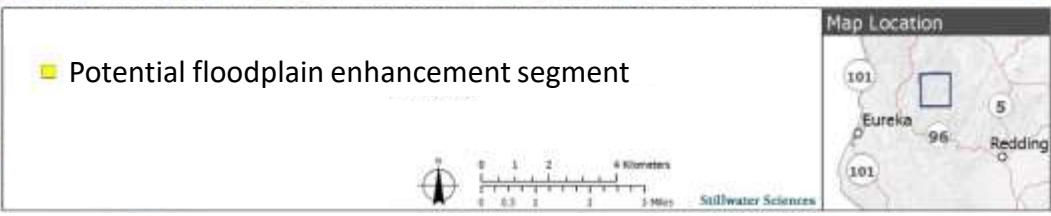
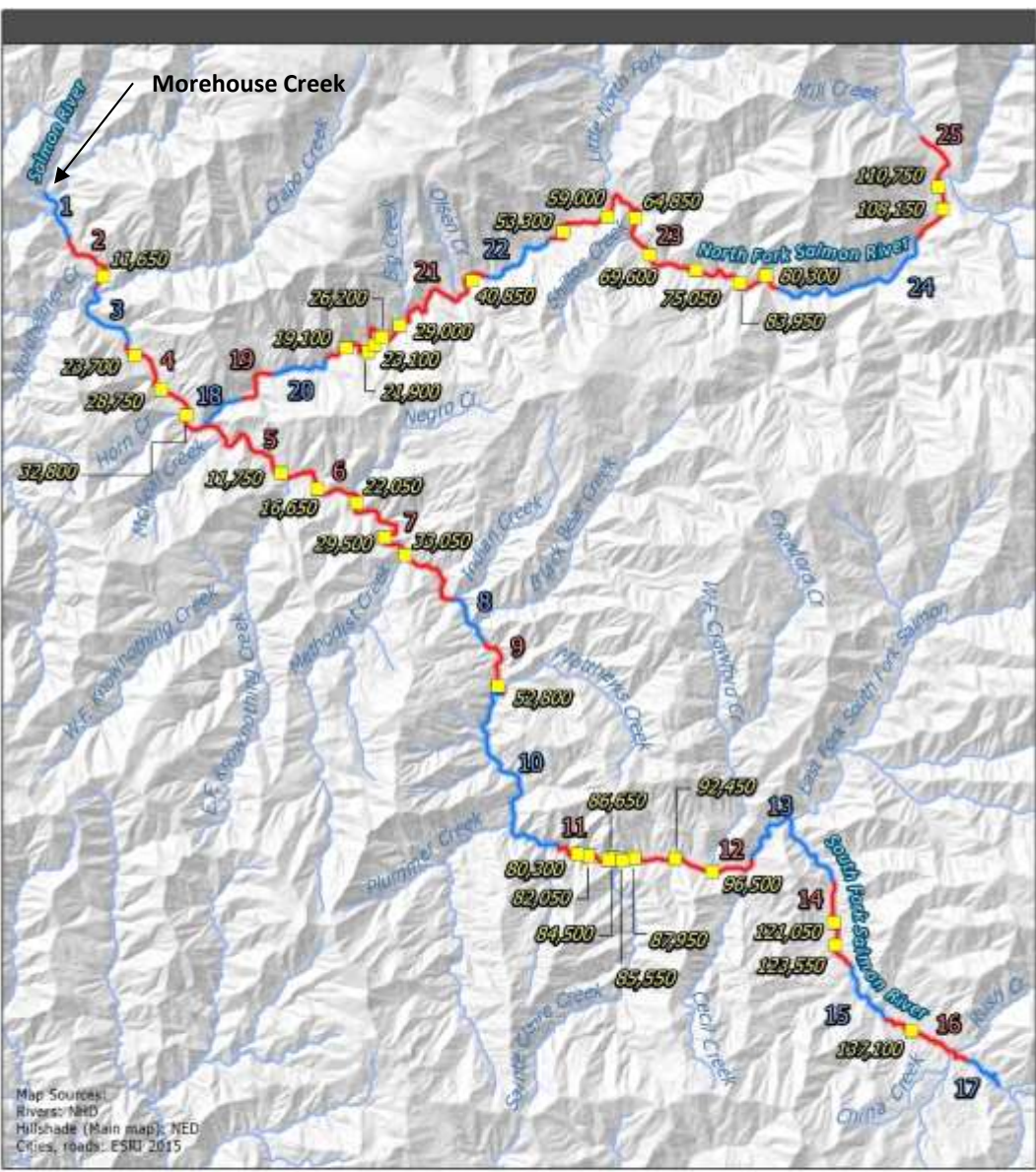


SALMON RIVER FLOODPLAINS









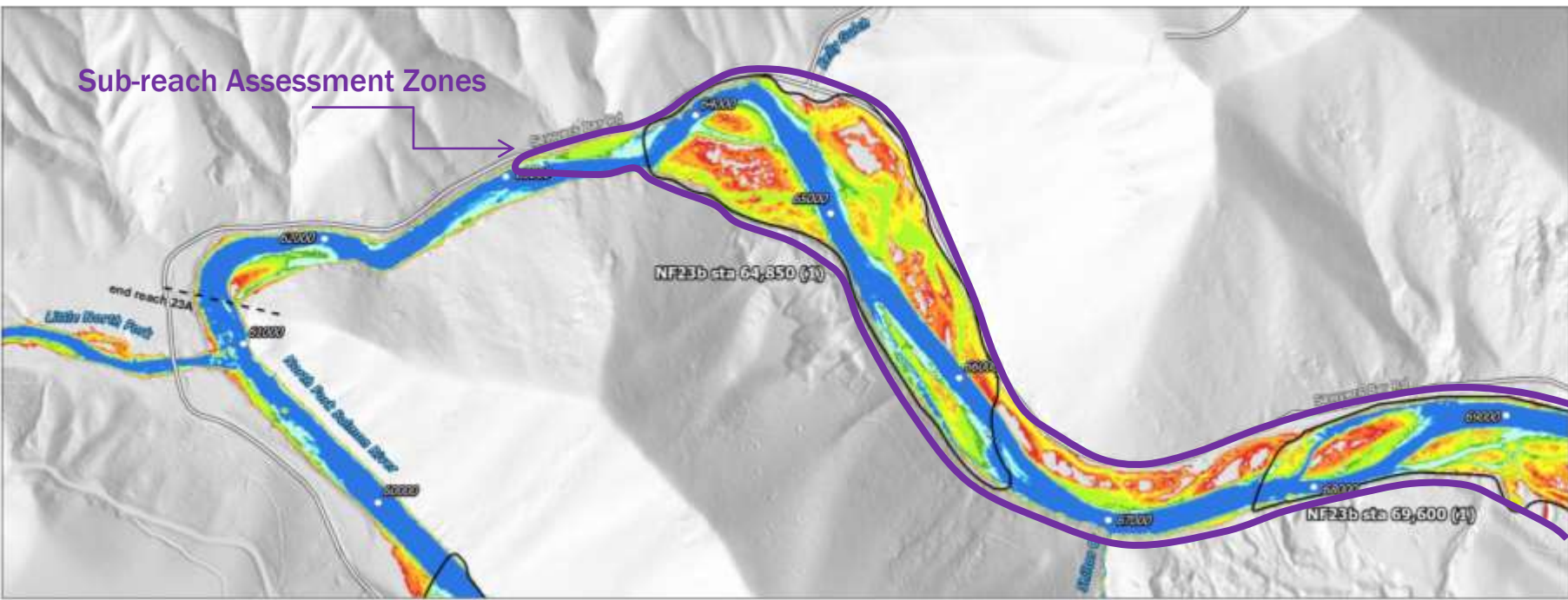
REACH-SCALE FLOODPLAIN ENHANCEMENT POTENTIAL

- Valley confinement
- Predominantly bedrock vs alluvial channel boundaries
- Extent of mining disturbance and existing infrastructure

SEGMENT-SCALE FLOODPLAIN ENHANCEMENT POTENTIAL

- Channel gradient and confinement
- Alluvial channel features
- Floodplain Inundation
- Existing riparian vegetation
- Summer mainstem thermal suitability
- Proximity to major tributaries and other cold water refugia
- Existing spawning and rearing habitat
- Priorities identified by Salmon River Collaborative In-stream Restoration Technical Advisory Committee

Sub-reach Assessment Zones



Salmon River Floodplain Habitat Enhancement and Mine Tailings Remediation Feasibility Study
Reach 23B (North Fork)

DATA SOURCES
 USGS, OpenStair System, 2004
 NOAA, 1:50,000, at scale 600 2011
 Imagery: 2010 2011

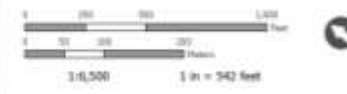
MAP PROJECTION
 NAD 1983 NAD83 StatePlane
 California 3 FIPS 5401 Feet

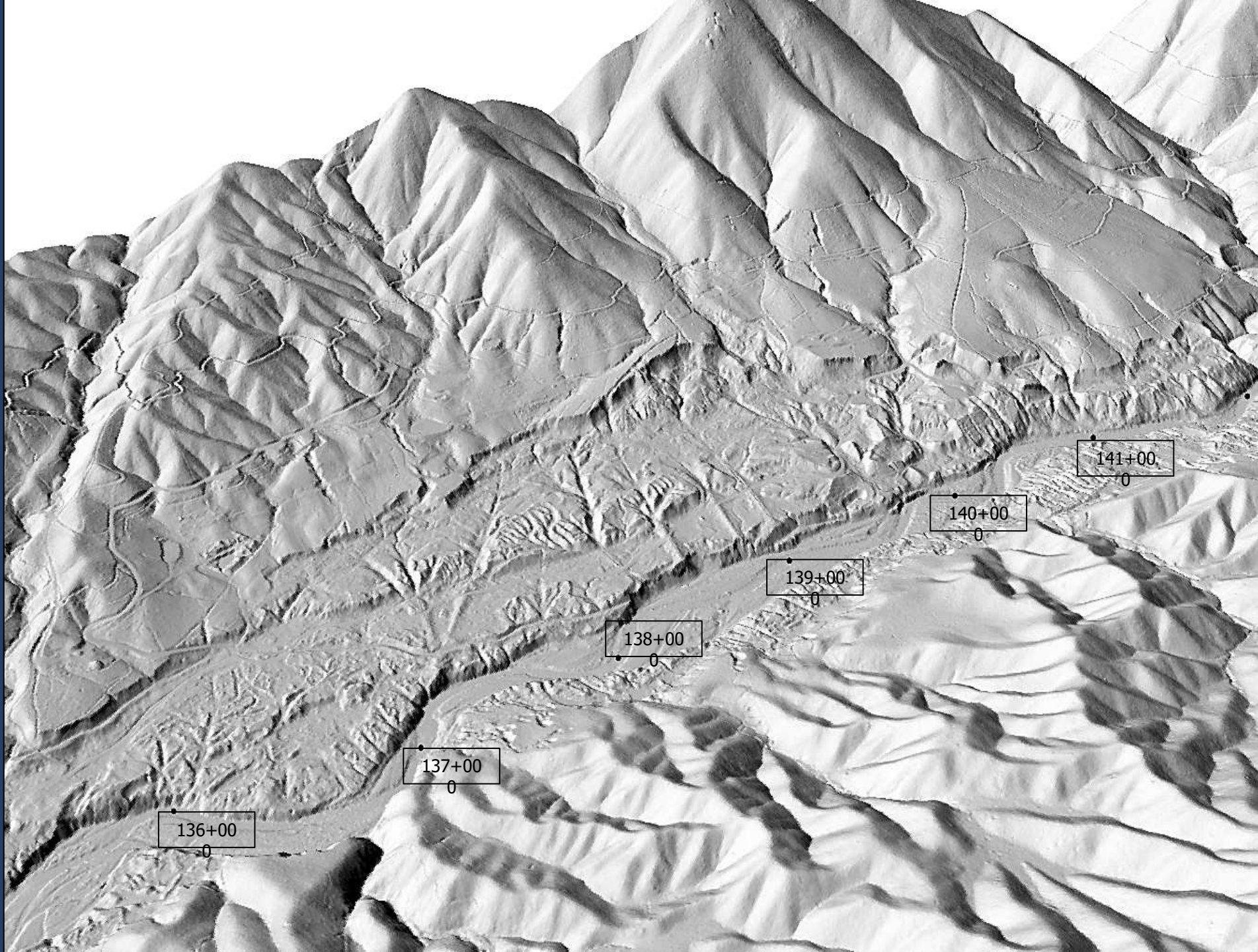
Stillwater Sciences

LEGEND

- Potential floodplain enhancement segment
- fork
- reach segment midpoint
- sublimity rating
- Potential terrace revegetation sites with mine tailings
- Existing and potential off-channel ponds with potential for channel connection
- 100 year floodplain
- Reach break
- 1000-ft stationing

- Modeled Inundation
- 20% exceedance flow
 - 1/2 of the 1.5 year peak flow
 - 1.5 year peak flow
 - 2 year peak flow
 - 5 year peak flow
 - 10 year peak flow
 - 25 year peak flow
 - 50 year peak flow
 - 100 year peak flow





136+00

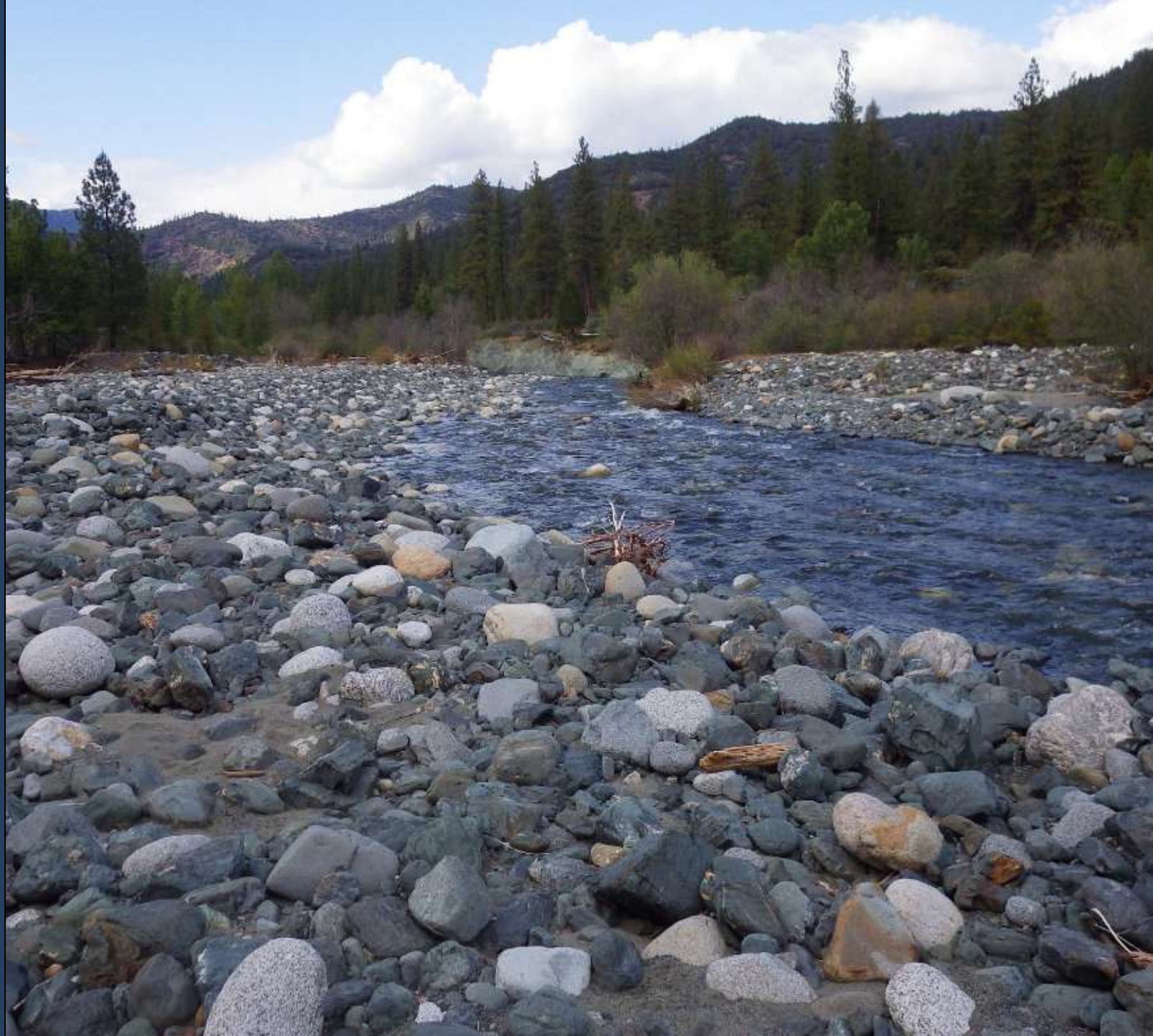
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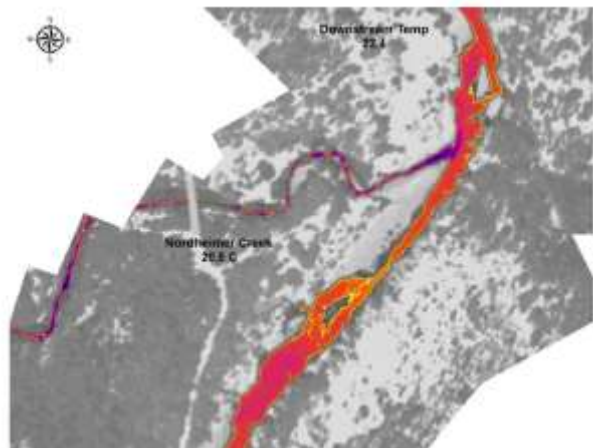
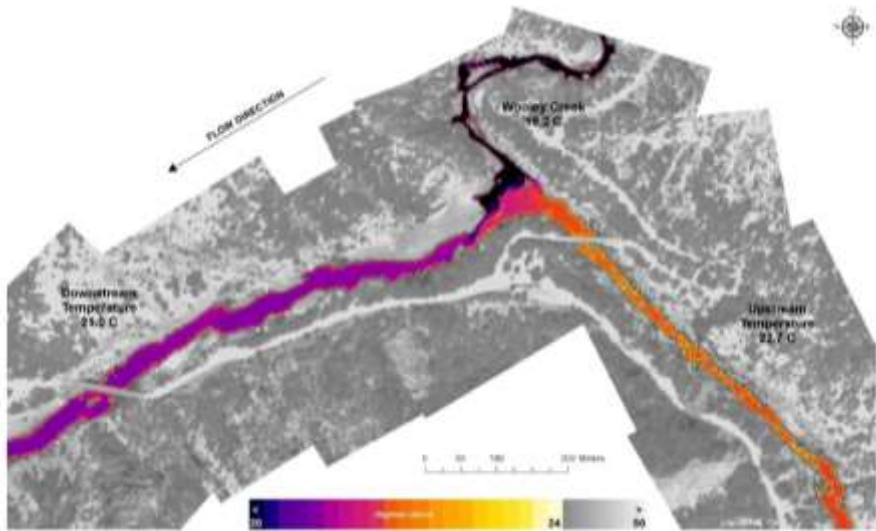
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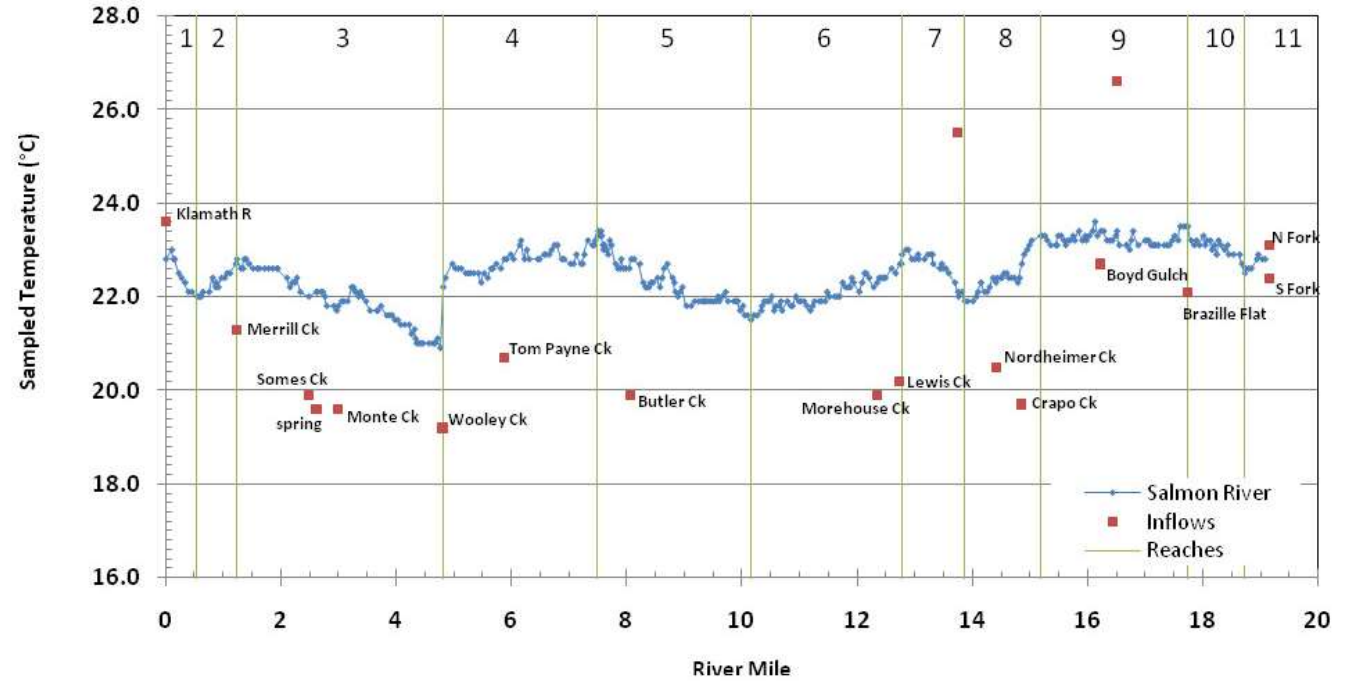
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STREAM TEMPERATURE

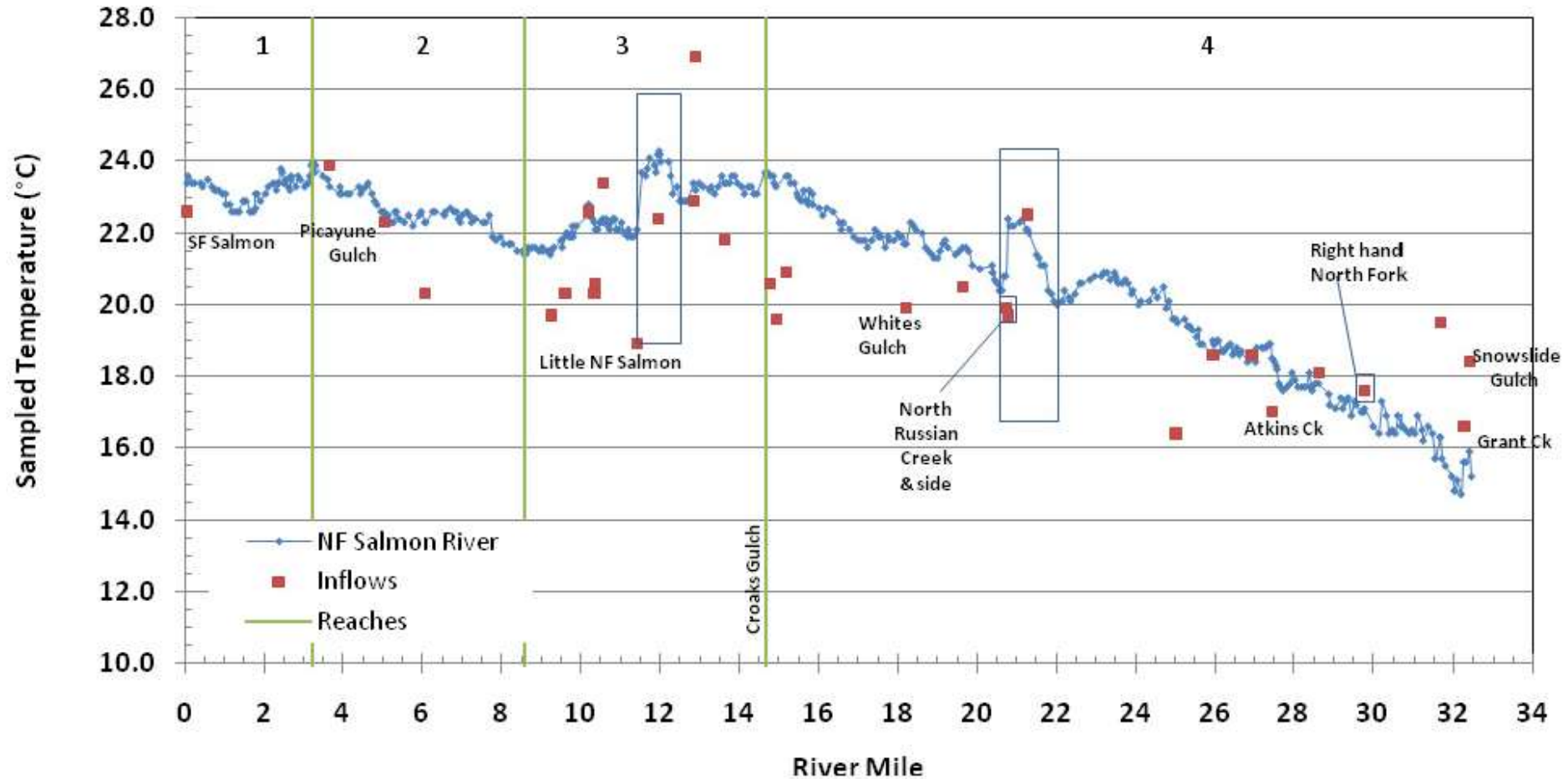


Mainstem (July 2009)



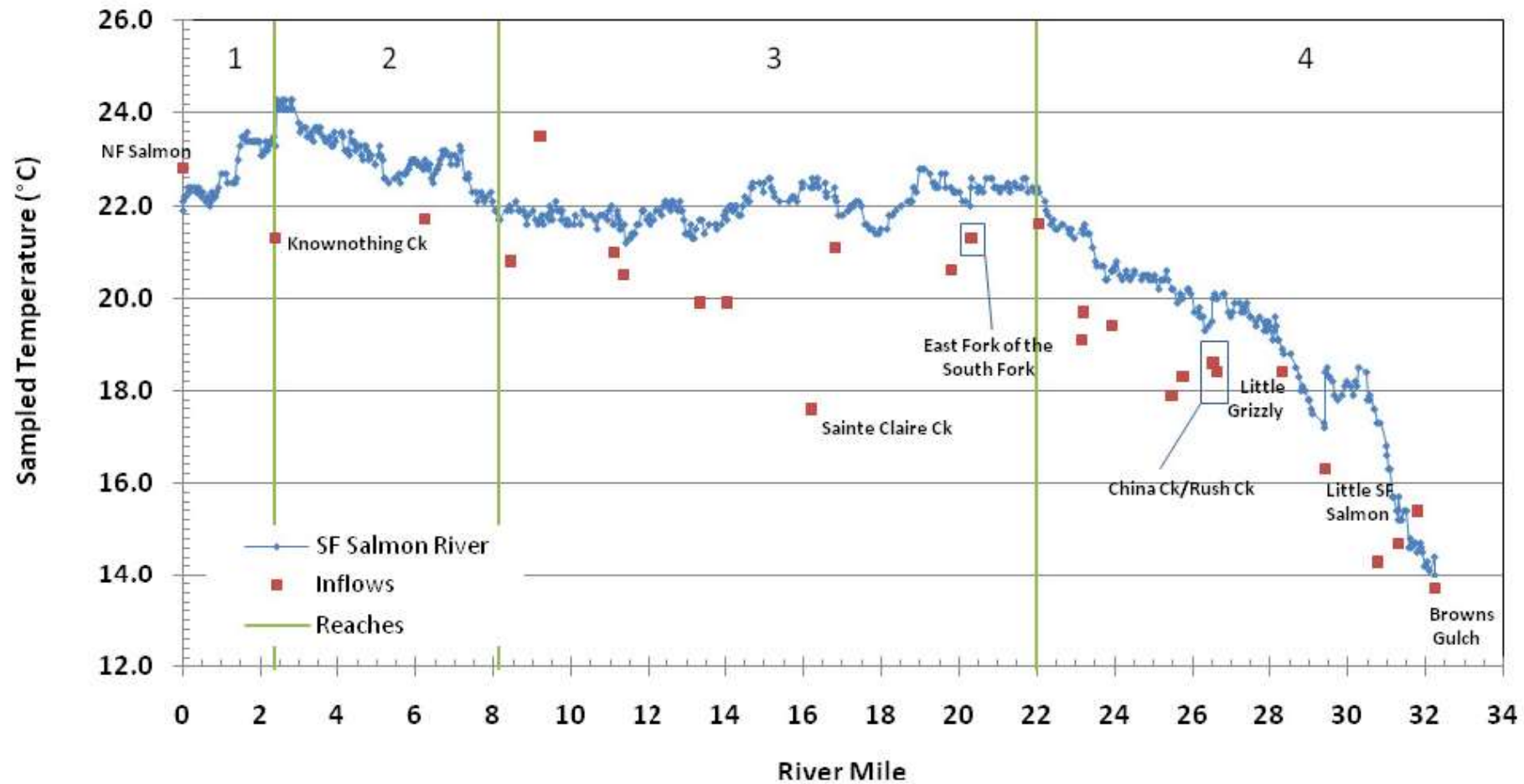
STREAM TEMPERATURE

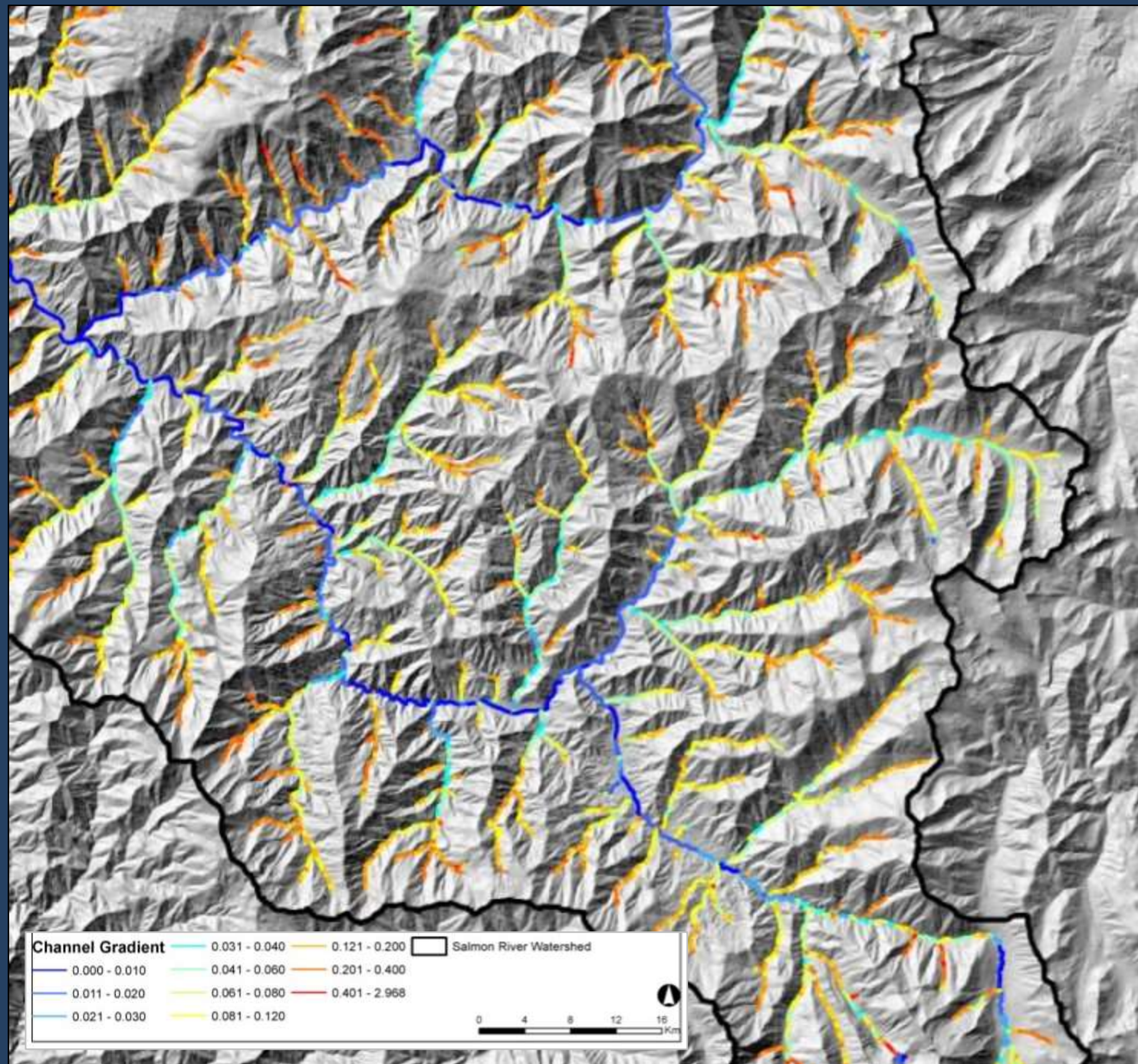
North Fork



STREAM TEMPERATURE

South Fork





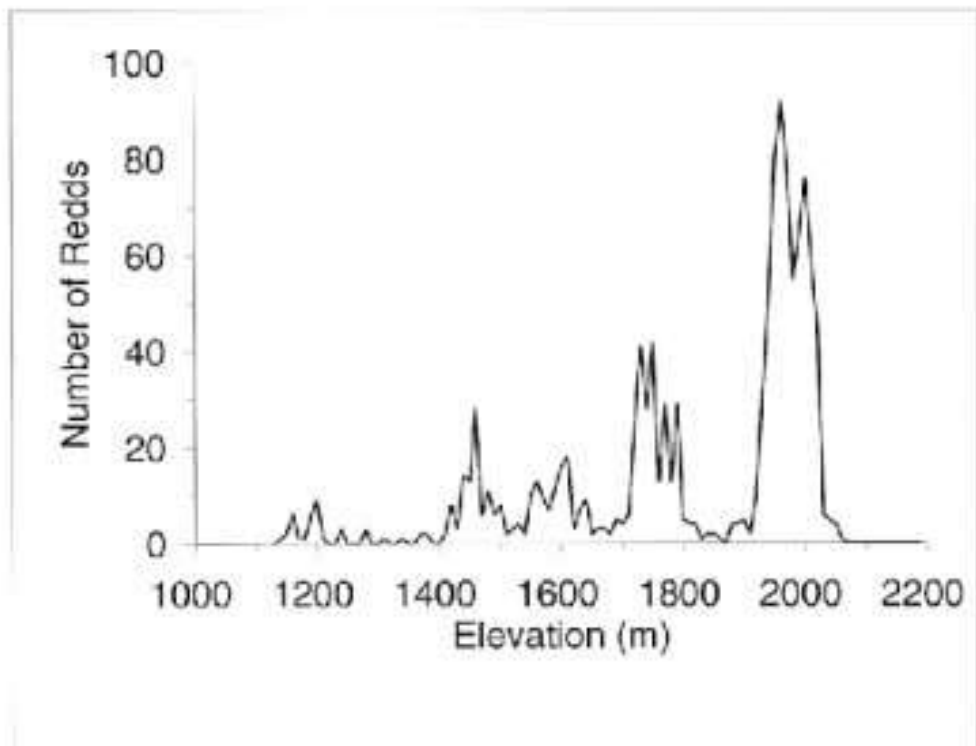
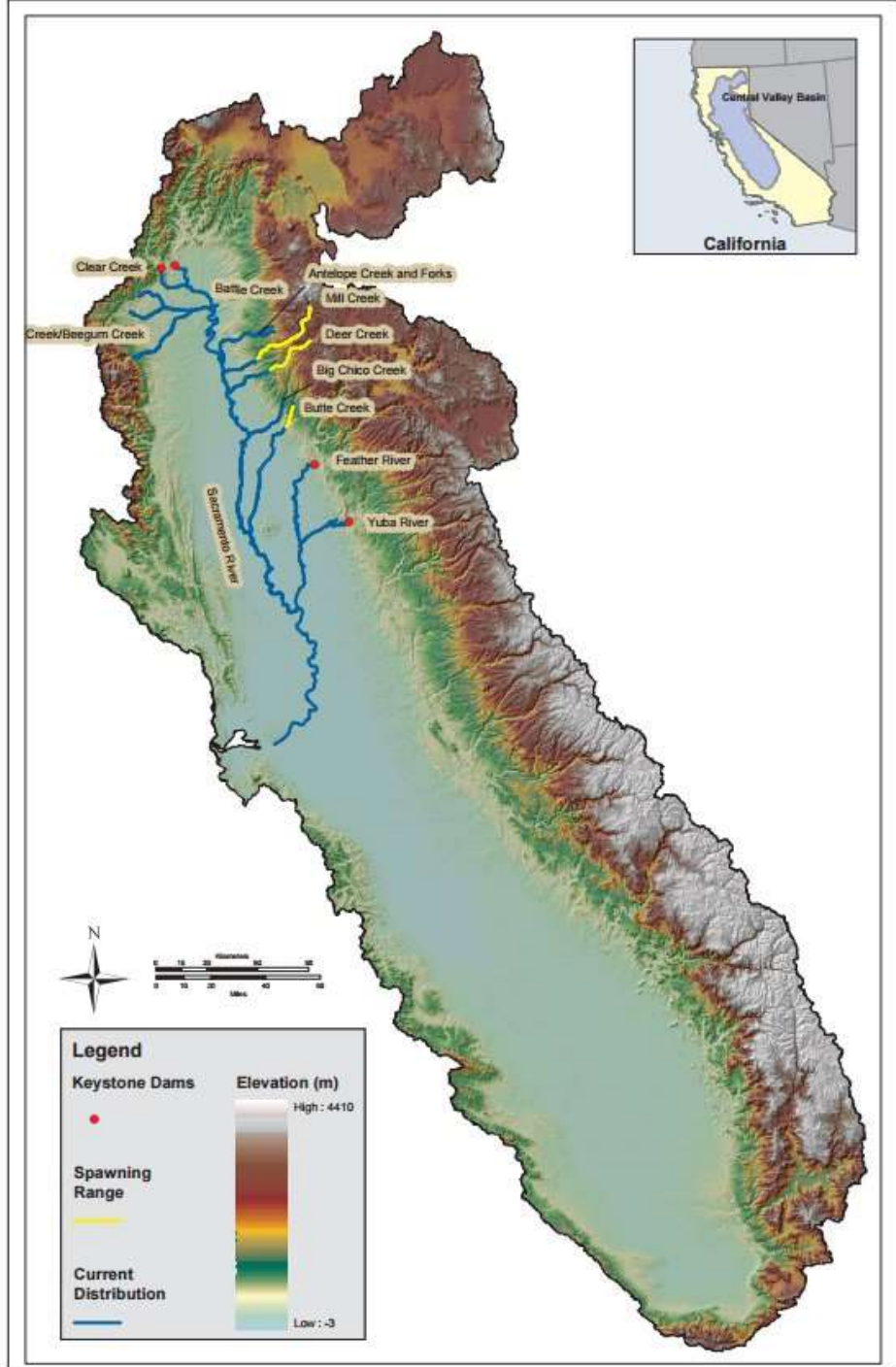
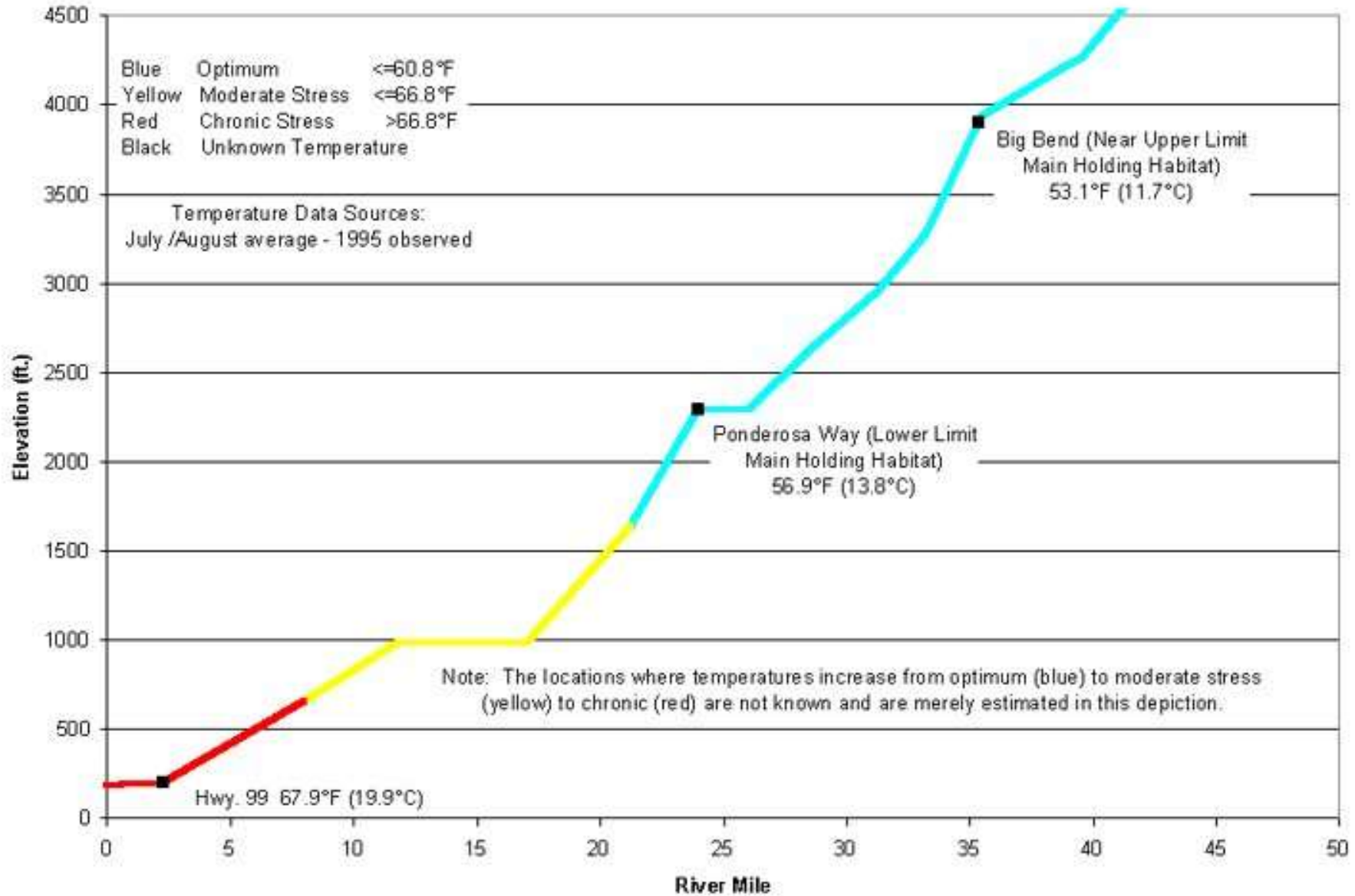


Figure 2—Elevation of 1,188 redds observed in the Middle Fork Salmon River, Idaho, 1995-1998.

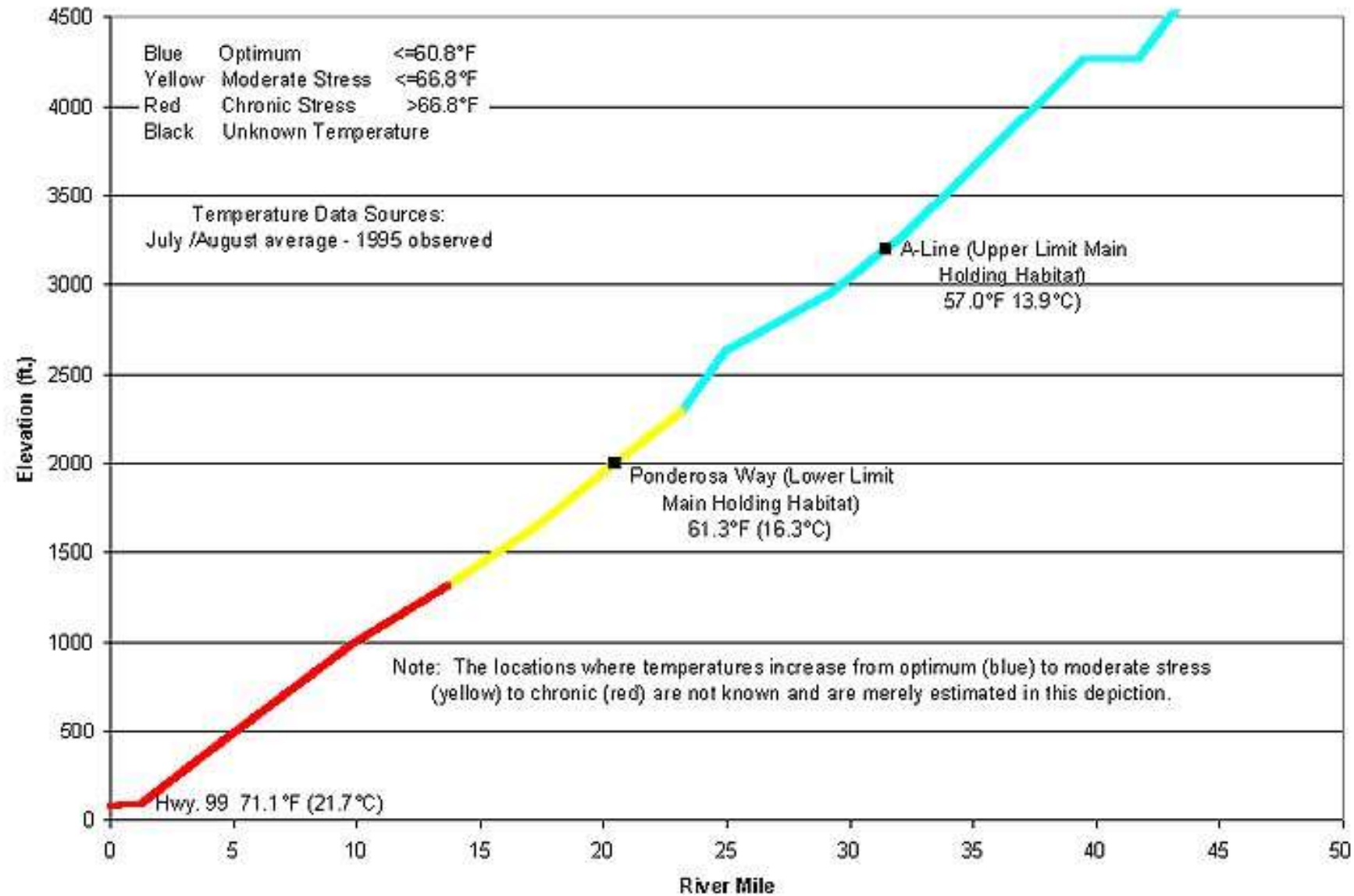




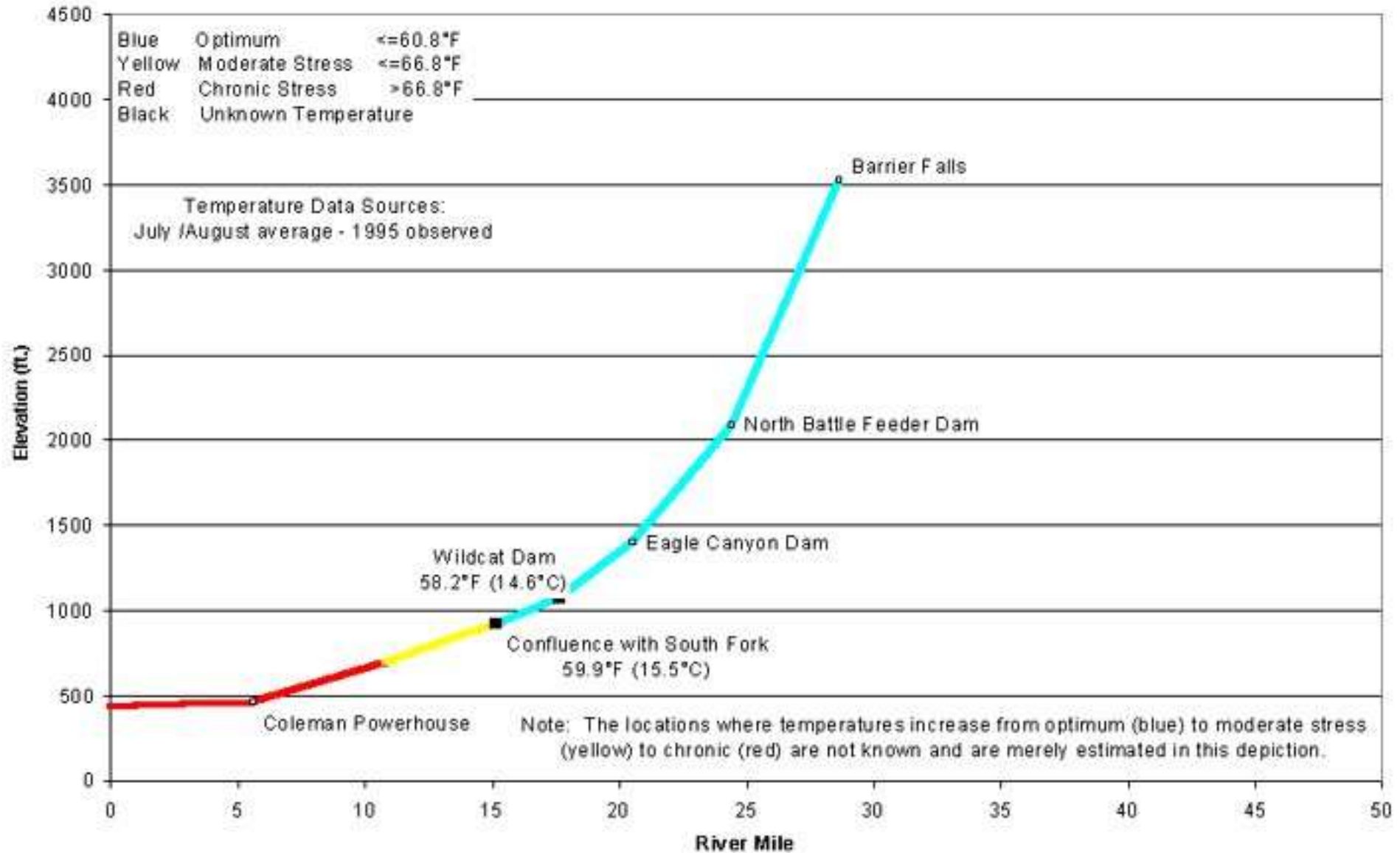
Mill Creek



Deer Creek

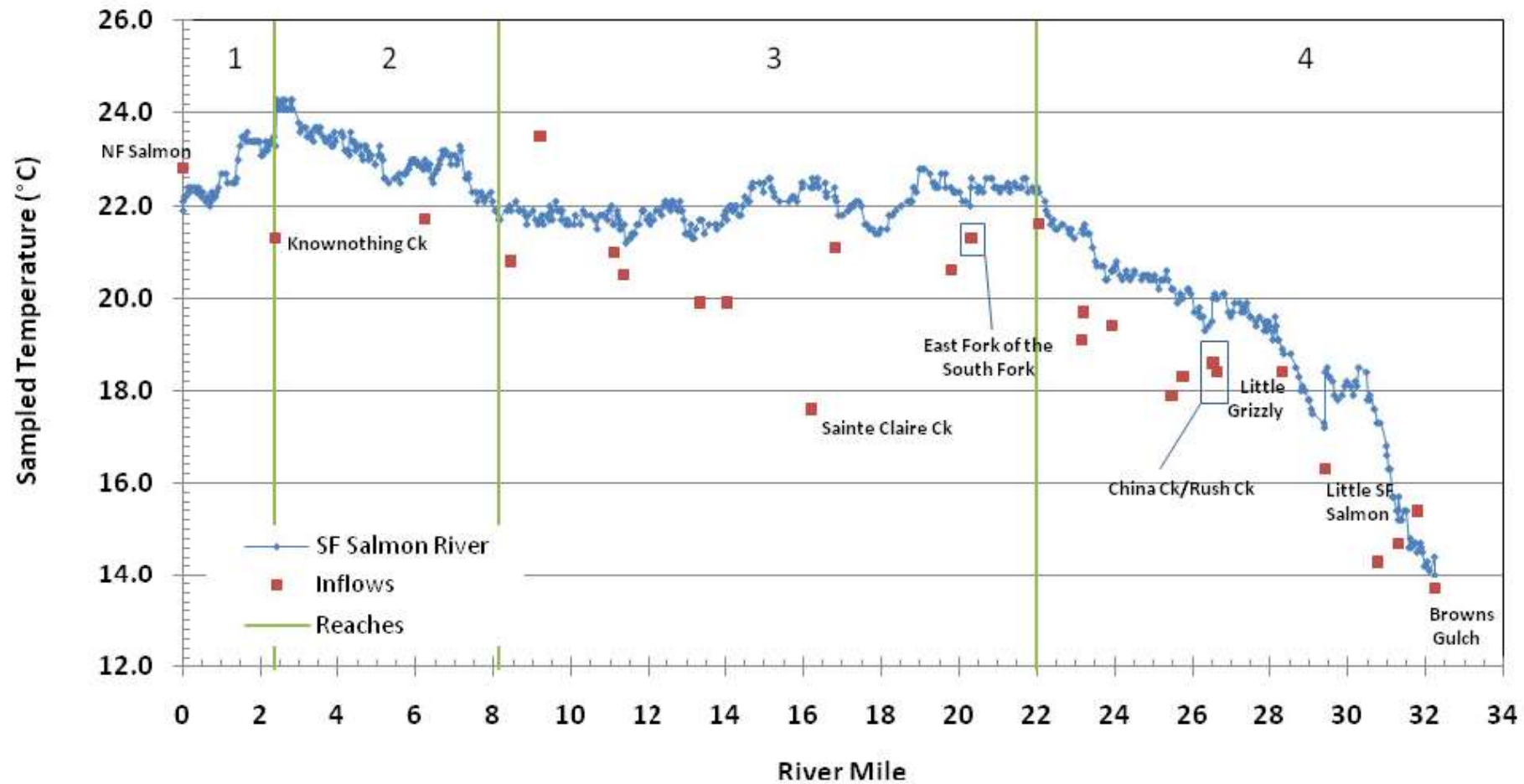


Battle Creek

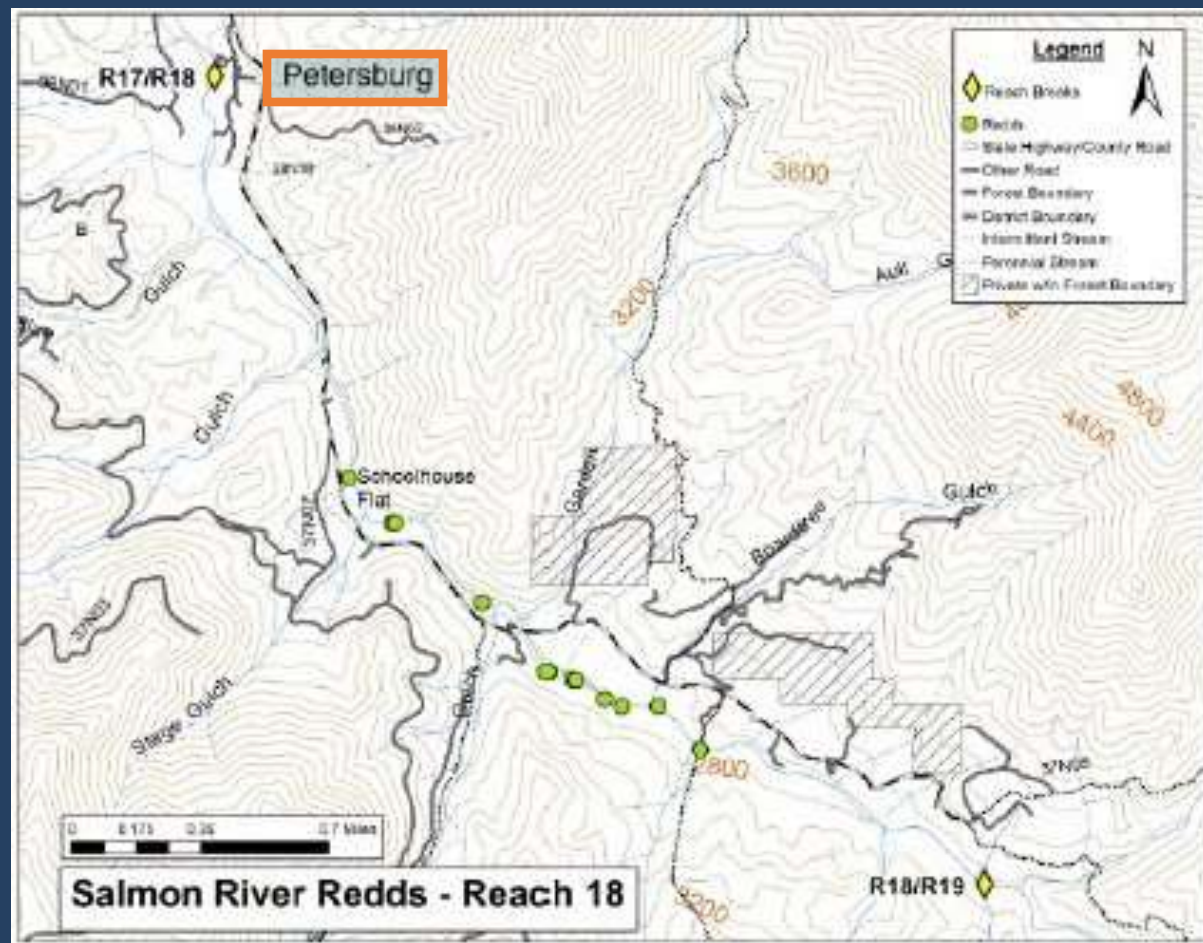
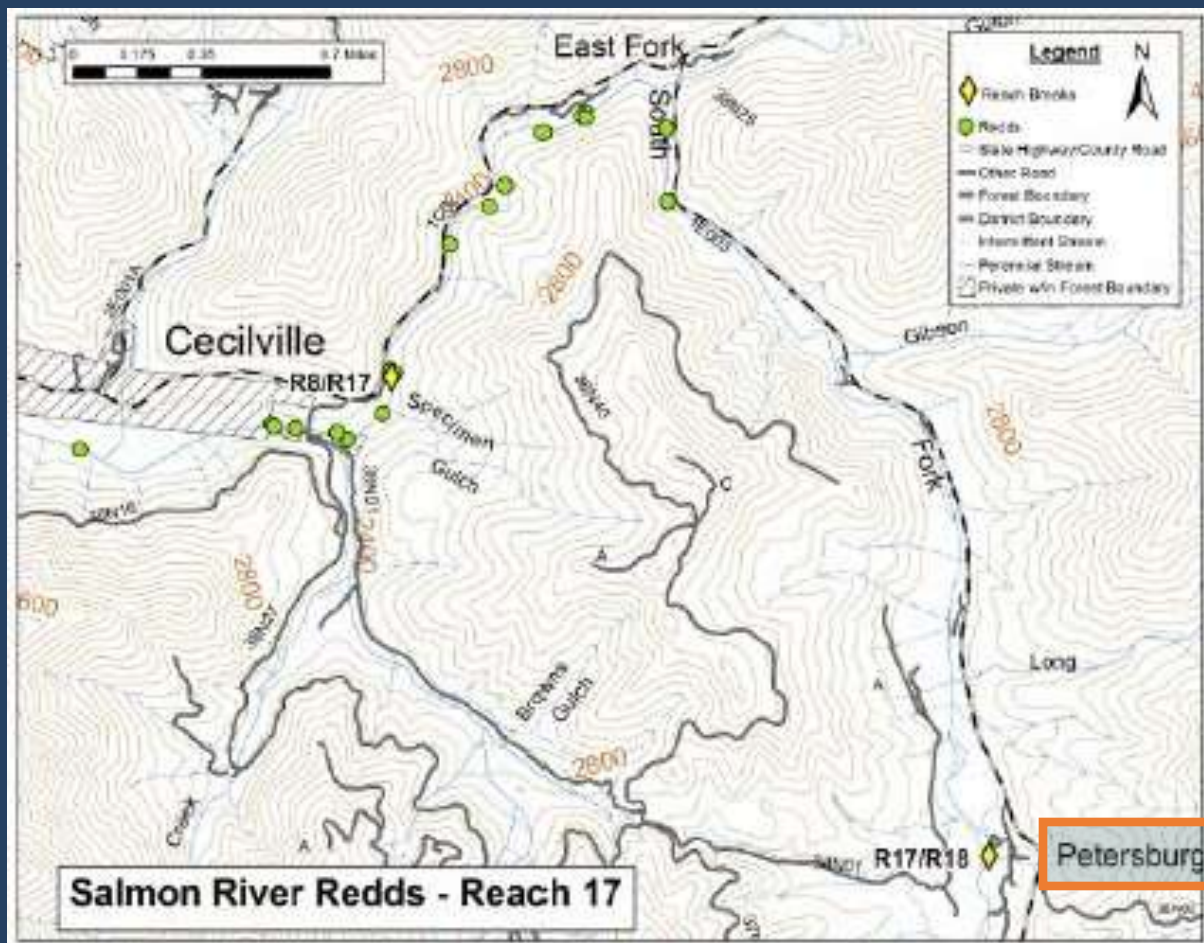


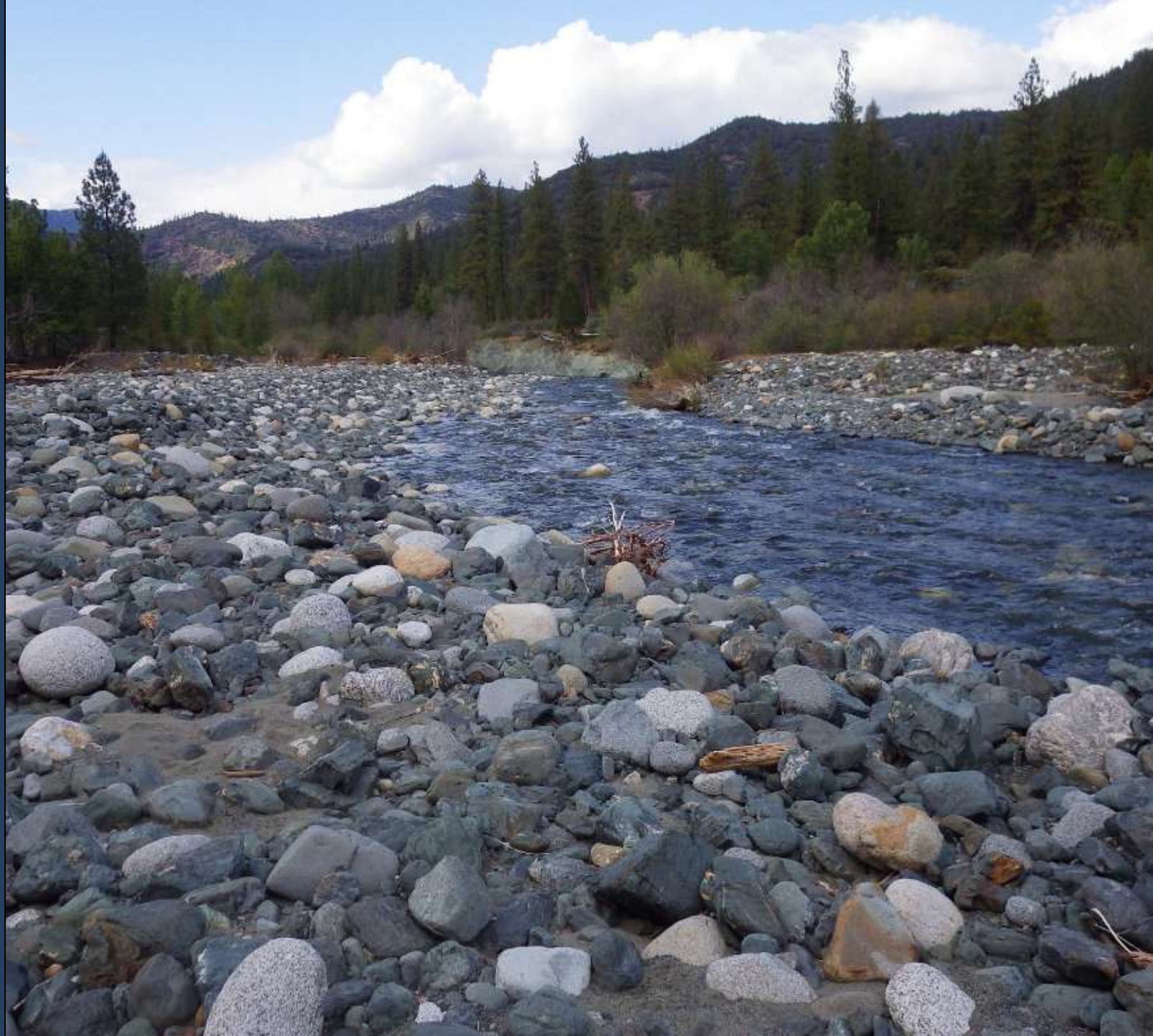
STREAM TEMPERATURE

South Fork

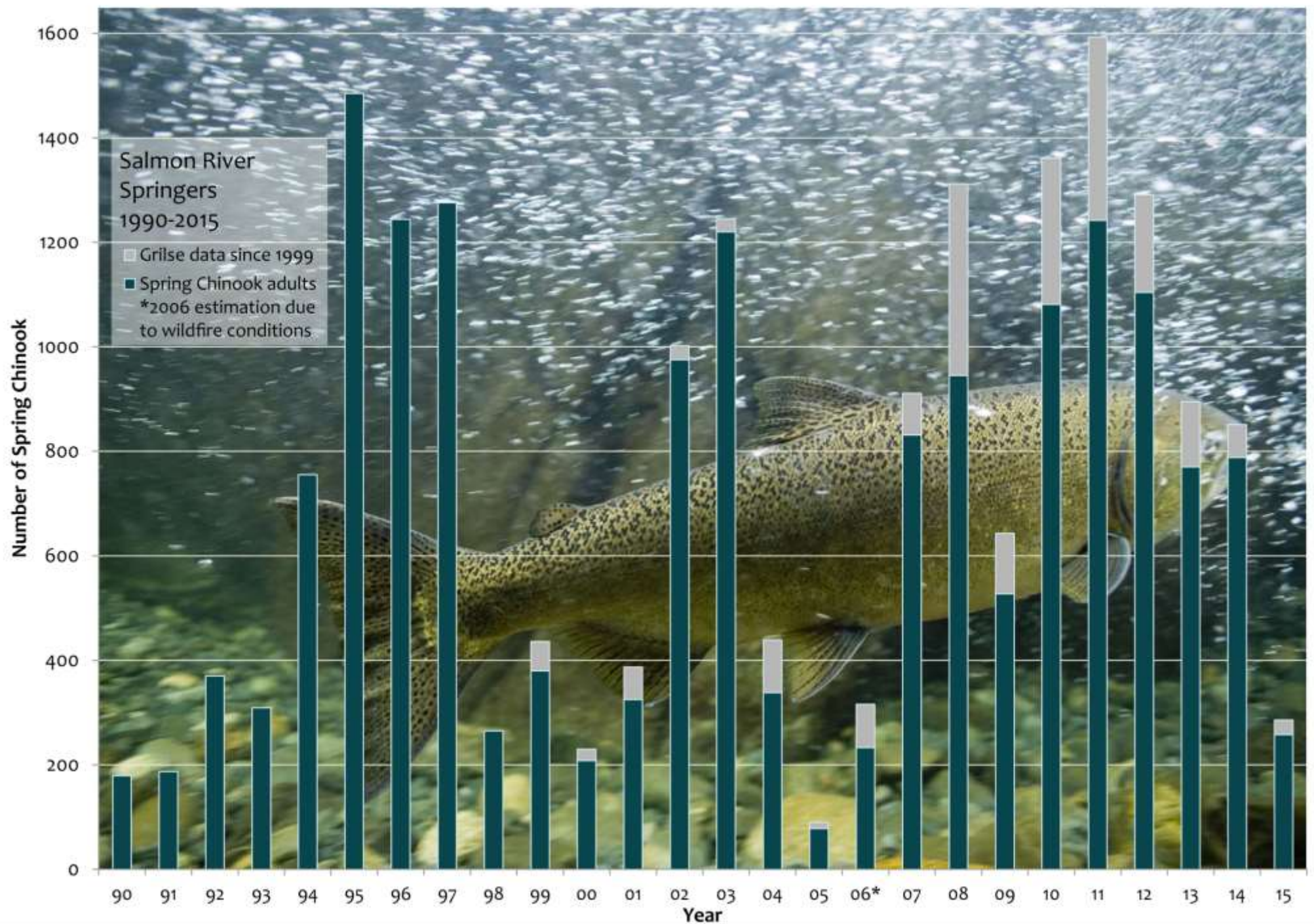




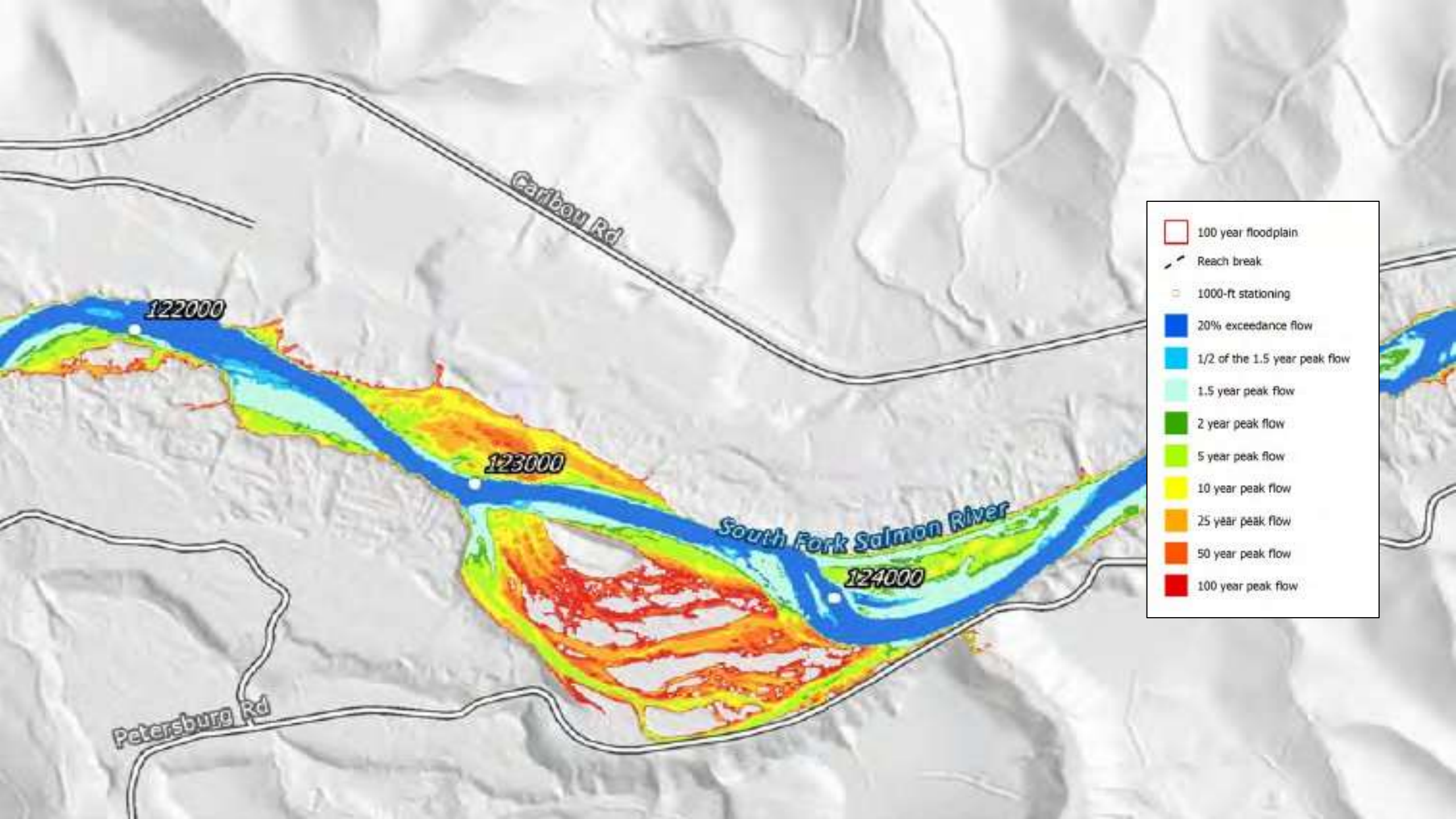




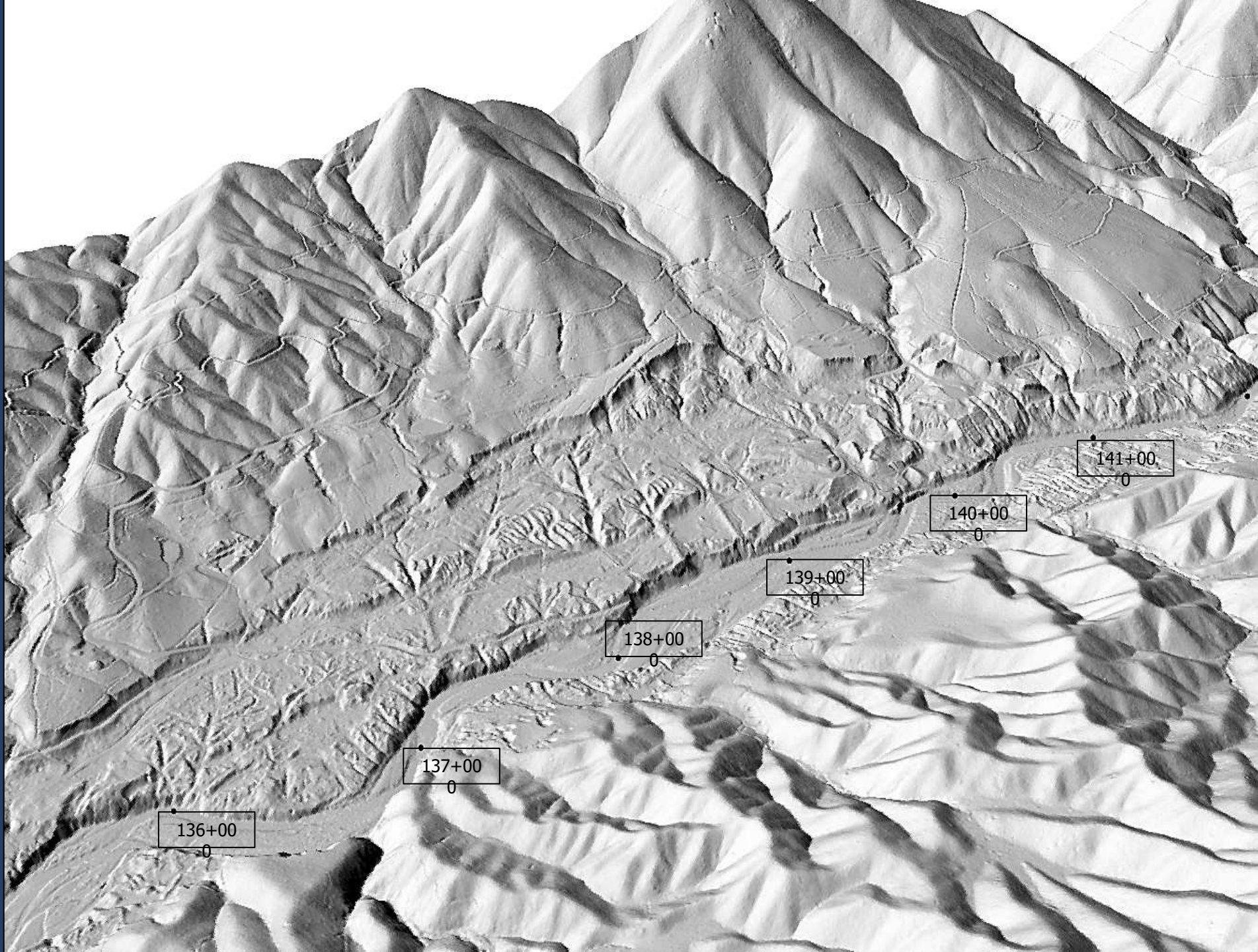


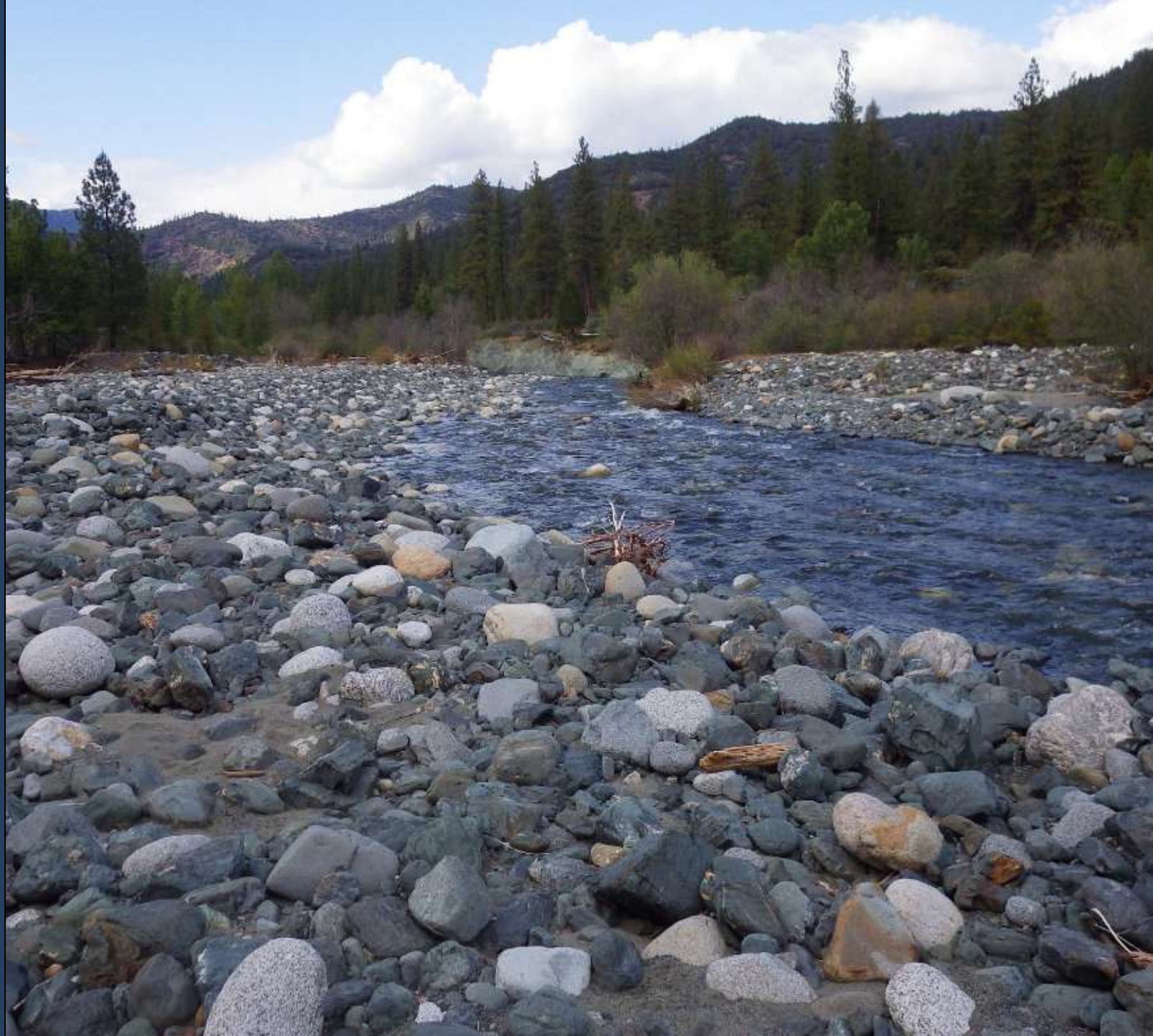














MINE-TAILINGS



FLOODPLAIN AND MINE TAILINGS REVEGETATION



Pre-Project 2009



June High Water 2010 Post-Project



September 2010



August 2011

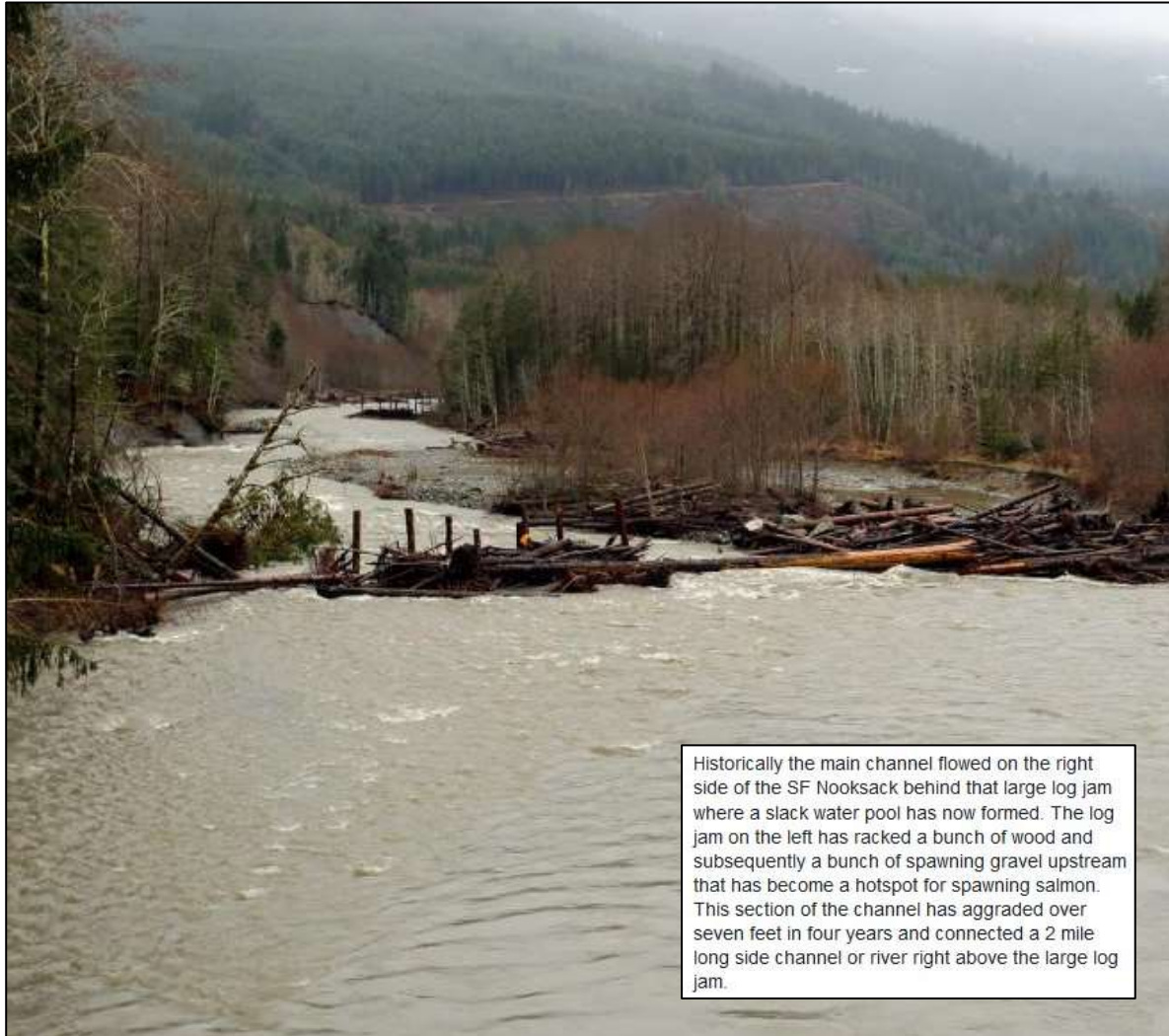
Floodplain and Mine Tailing Restoration



FLOODPLAINS



IN-CHANNEL TREATMENTS



Historically the main channel flowed on the right side of the SF Nooksack behind that large log jam where a slack water pool has now formed. The log jam on the left has racked a bunch of wood and subsequently a bunch of spawning gravel upstream that has become a hotspot for spawning salmon. This section of the channel has aggraded over seven feet in four years and connected a 2 mile long side channel or river right above the large log jam.

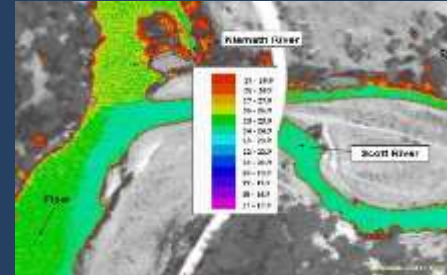
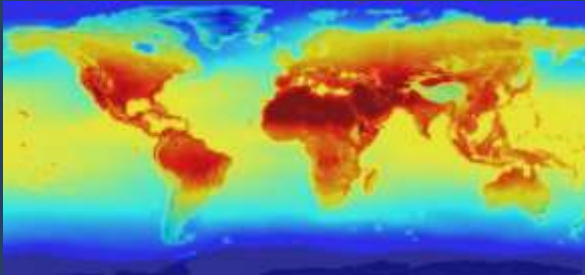


IN-CHANNEL TREATMENTS



IN-CHANNEL TREATMENTS





OCEAN ACIDIFICATION
Impacts on Sea Life

Corrodes Shellfish



Day 1



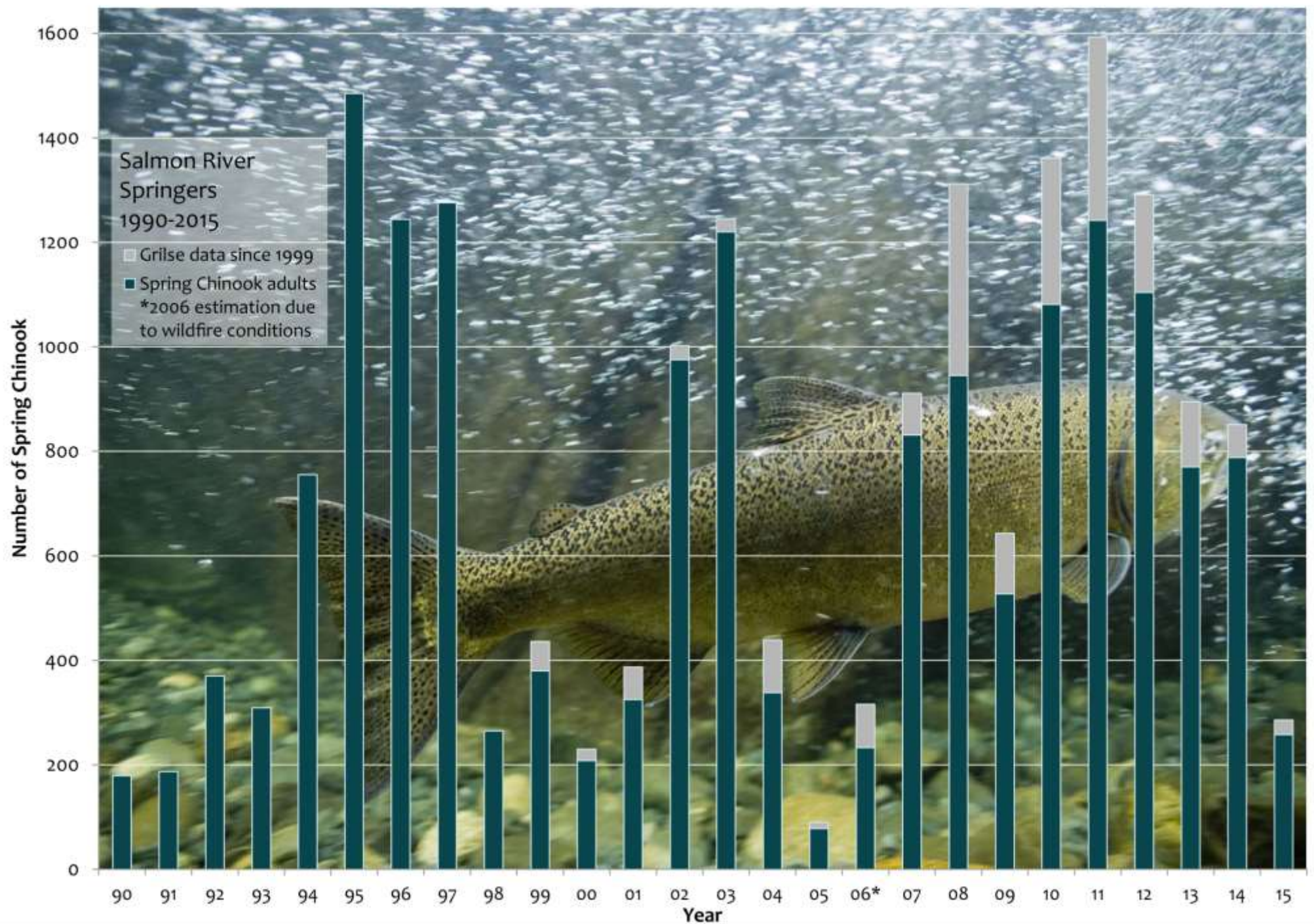
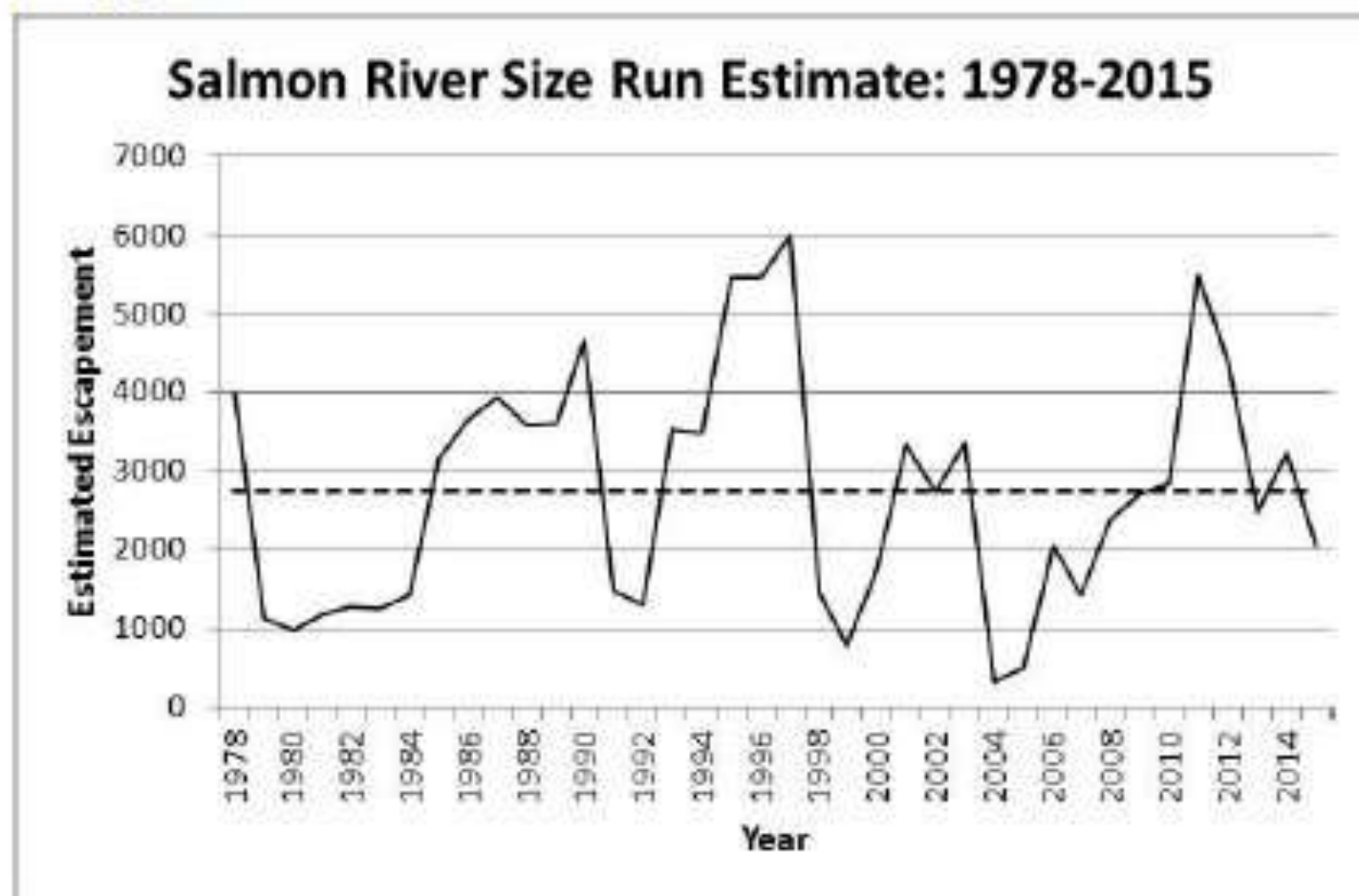


Figure 2. Salmon River fall-run size estimates for 1978 to 2015. Dashed line is average over long-term survey period.



QUESTIONS?

