

# RECLAMATION

*Managing Water in the West*



## Hydrology Central Valley

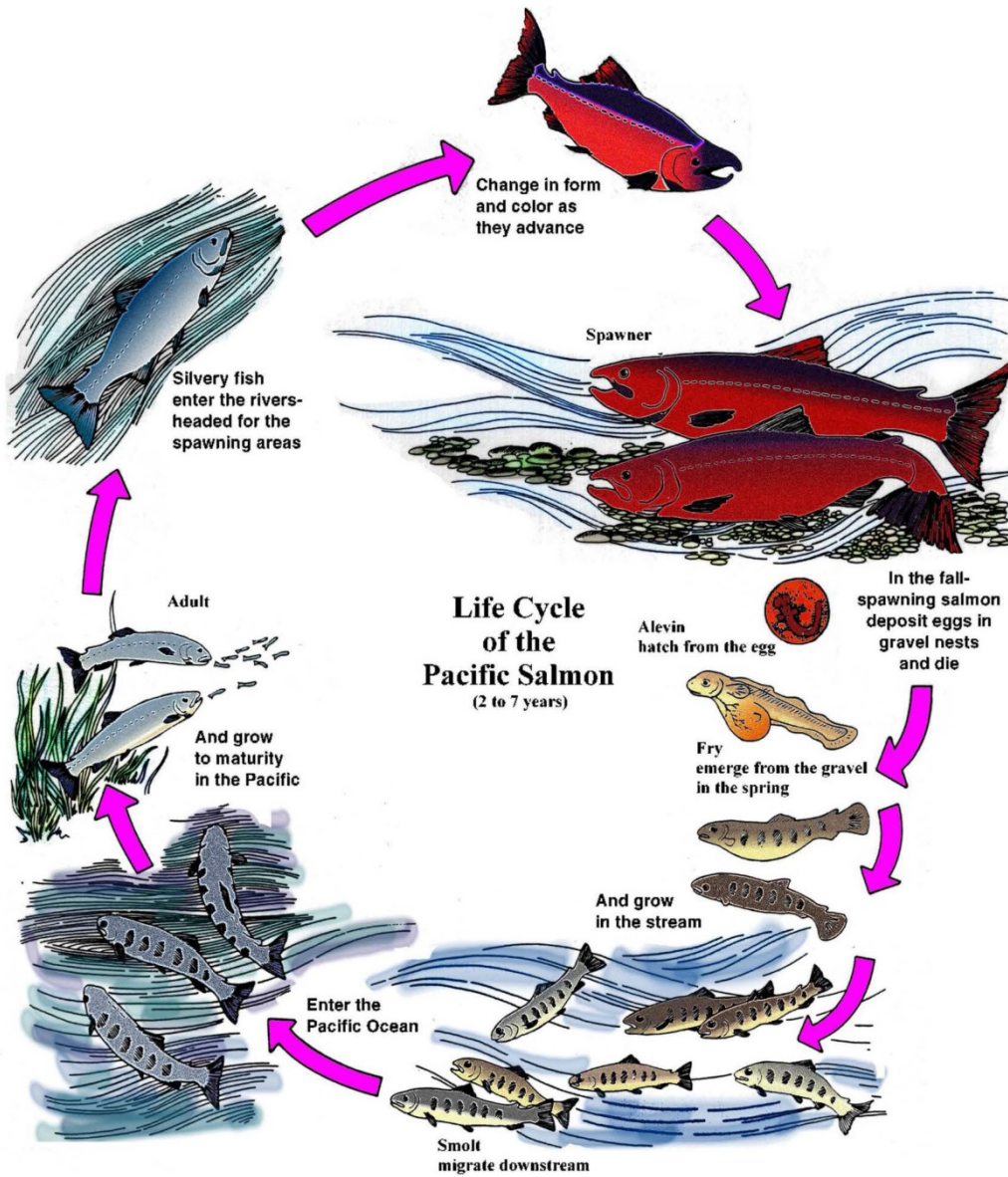
In addition to generating hydropower at several power plants, Trinity Reservoir water released from Keswick Dam is used to support the environmental, irrigation, and municipal and industrial needs of the Sacramento River Valley, extending through the Sacramento – San Joaquin Delta. Relative to environmental conditions, the cold water that is diverted via the Clear Creek Tunnel is important for meeting the water temperature requirements in Clear Creek, assisting in meeting the water temperature requirements in the mainstem Sacramento River below Keswick Dam, and managing the cold water pool behind Shasta Dam. The period of greatest temperature reduction need in the Sacramento River Basin occurs during the warmer months when irrigation, municipal, and industrial demands are highest and water temperature concerns of the mainstem Sacramento River exist for several fish species listed under the Endangered Species Act.

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*Management of the river includes a variable flow regime based on five water year types ranging from critically dry to extremely wet to mimic more natural spring peak flows.*

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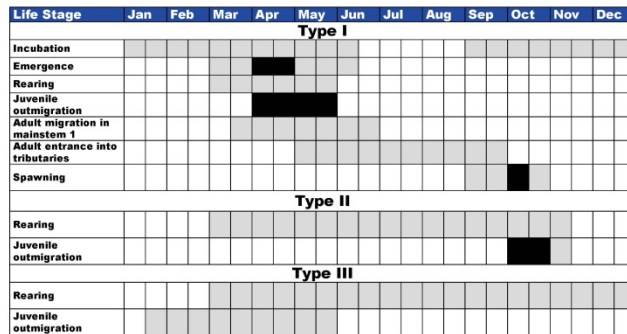
## Life Cycle of the Pacific Salmon



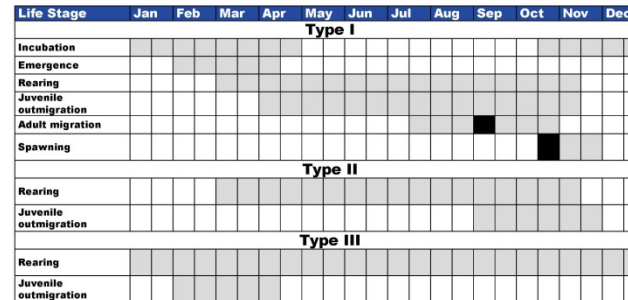
## Biology

**Life-history timing of anadromous fish in the Klamath River Basin downstream**  
 Peak activity indicated by black (Stillwater Sciences, 2009).

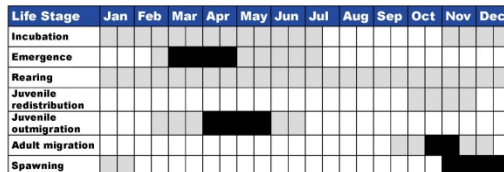
### Spring-run Chinook salmon



### Fall-run Chinook salmon



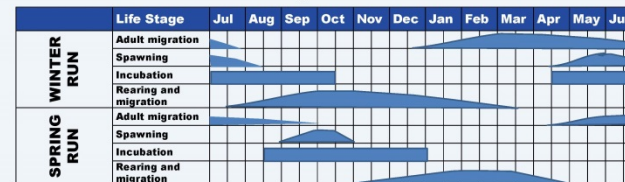
### Coho salmon



### Green sturgeon



### Sacramento Basin Central Valley Chinook salmon

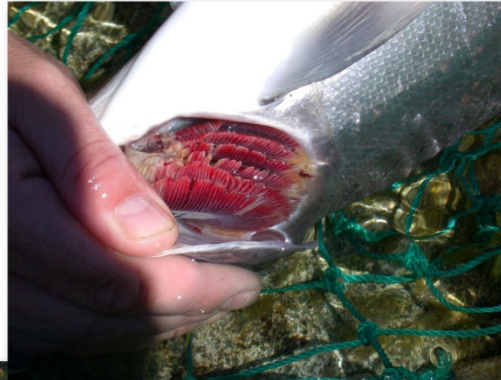


Denotes presence and relative magnitude  
 Denotes only presence

## Biology: 2002 Die-Off

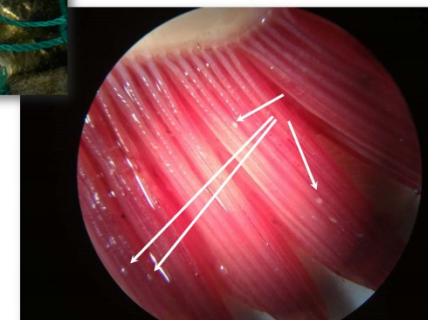
In September 2002, a substantial number of returning adult fall-run Chinook salmon died prematurely in the lower Klamath River. Biologists studying the die-off concluded that:

- Pathogens *Ichthyophthirius multifiliis* (*Ich*) and *Flavobacterium columnare* (*Columnaris*) were the primary causes of death to fish
- Warm water temperatures, low water velocities and volumes, high fish density, and long fish residence times likely contributed to the disease outbreaks and subsequent mortalities
- During the first half of August 2002, flows in the lower Klamath River were approximately 2,500 cubic feet per second (cfs), decreasing to approximately 2,000 cfs by September
- Approximately 33,000 Chinook salmon, 630 steelhead, and 345 Coho salmon perished



Left: *Columnaris* and *Ich* infected steelhead

Below: *Ich* on Chinook salmon gill from Klamath River, 2014. Arrows point toward individual *Ich* organisms. Approx. size of *Ich* organisms is 0.5 mm (visible to the naked eye).



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*Ichthyophthirius multifiliis* (*Ich*) is a protozoan naturally present in low concentrations during much of the year in many rivers and streams. In its free-swimming life stage, *Ich* is opportunistic, and spreads more rapidly among fish that are in close proximity in slow-moving water.

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## Indian Trust Assets

The Environmental Impact Statement will evaluate impacts to Indian Trust Assets, which are legal interests in assets that are held in trust by the United States Government for federally recognized Indian tribes or individuals. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. In some cases, Indian Trust Assets may be located off trust land.



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*If a large-scale fish die-off similar to 2002 were to occur ..., regardless of apparent causes, it would be devastating for the tribal trust fisheries in the Klamath and Trinity Rivers.*

*2013 Environmental Assessment*

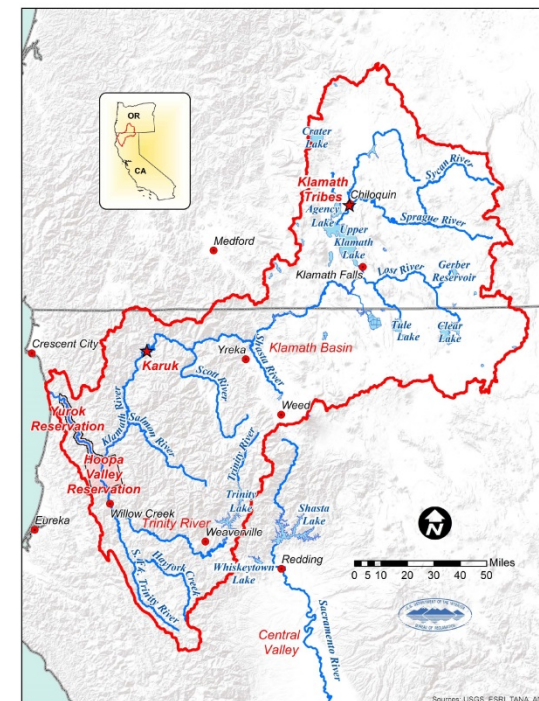
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*Flow augmentation to the lower Klamath River is expected to decrease the risk of disease vulnerability to fall Chinook salmon, therefore decreasing the risk to the tribal trust fishery.*

*2013 Finding of No Significant Impact*

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## Environmental Justice

Federal agencies are mandated by Executive Order 12898 to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and lower-income populations.

The Trinity and Klamath Rivers flow through rural areas. Additionally, these rivers both run through the Hoopa Valley Tribe and Yurok Tribe Reservations, as well as land associated with the Karuk Tribe in California and the Klamath Tribe in Oregon. The Reservations' populations traditionally rely on salmon and steelhead as an important part of their subsistence.

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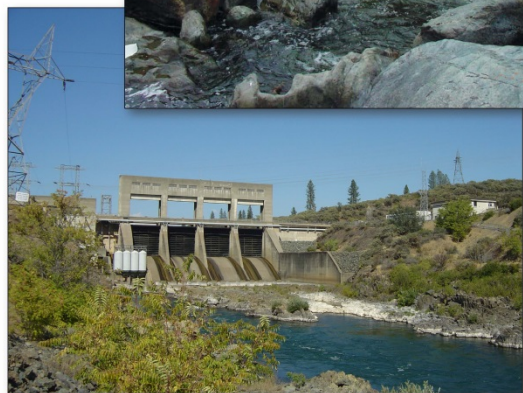
*NEPA requires federal agencies to identify all potential environmental effects, any adverse effects that cannot be avoided, and to evaluate alternatives to the proposed action.*

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## Socioeconomic Impacts

The Environmental Impact Statement will evaluate socioeconomic impacts of the Long-Term Plan to agricultural, recreational, commercial, and Tribal uses in the Trinity River Basin, Central Valley, and Sacramento River Basin.



## Environmental Impact Statement

The Environmental Impact Statement will:

- Assess the actions proposed in the “Long-Term Plan for Protecting Late Summer Adult Salmon in the Lower Klamath River,” including cumulative impacts
- Use a variety of modeling tools to forecast potential impacts from the proposed action
- Solicit public input about the actions under consideration



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*Public comments are encouraged and will be accepted until close of business on August 20, 2015.*

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