



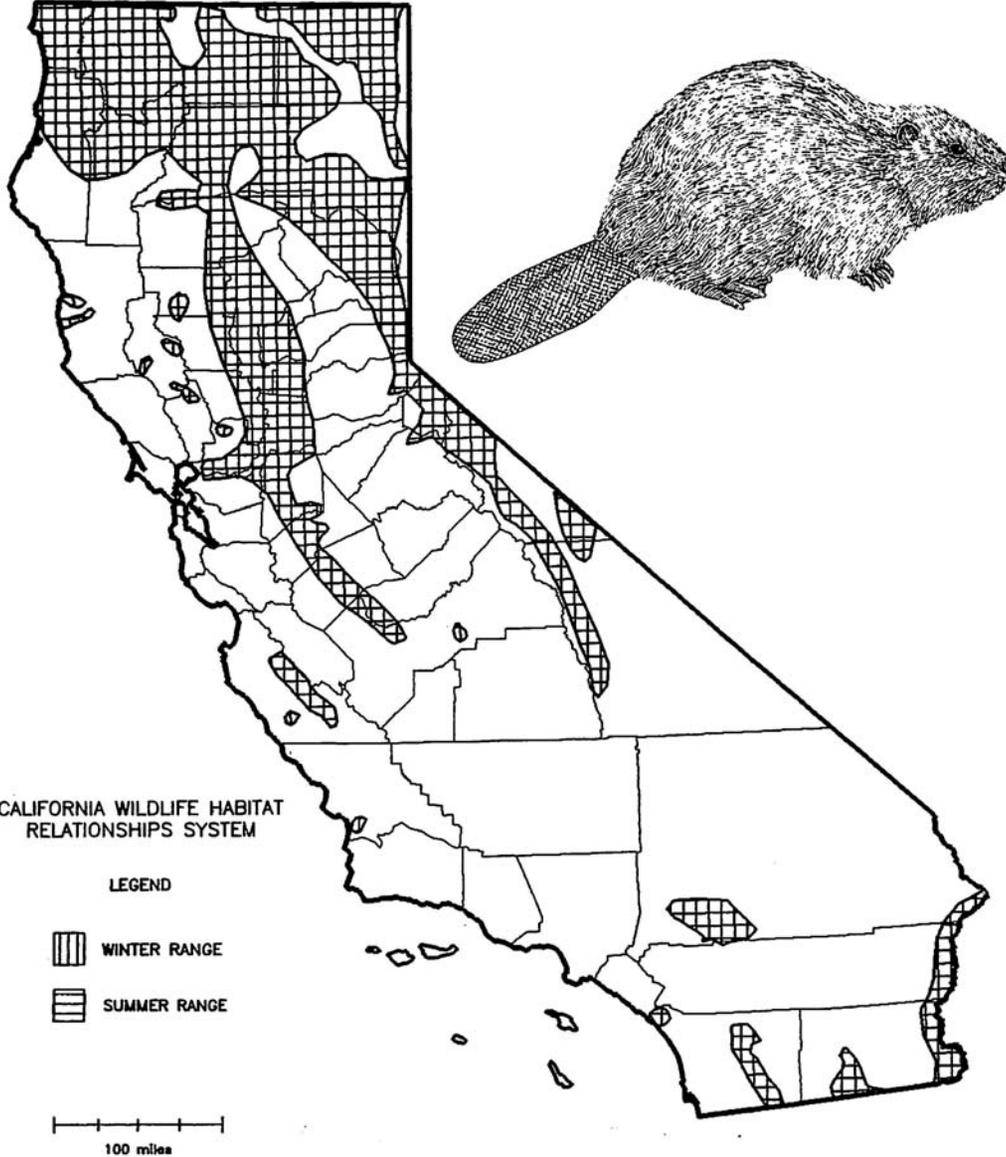
# North American Beaver and California Coho Salmon



# BEAVER

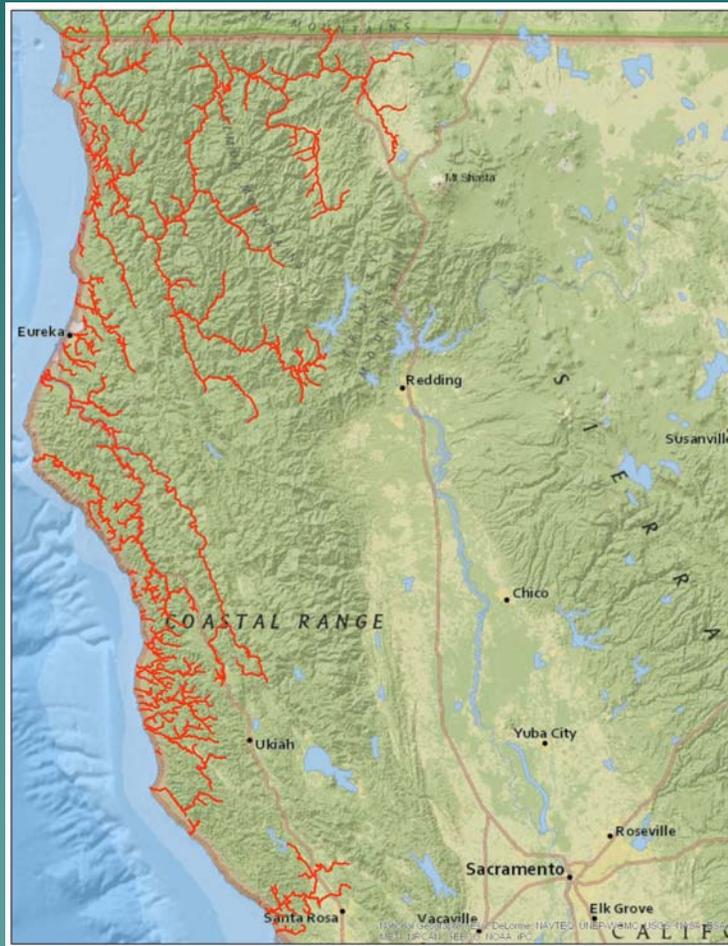
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The current distribution of beaver as depicted by the CDFG California Wildlife Habitat Relationships System (CDFG 1990)

# Coho Distribution in areas north of SF Bay



*"It is likely that due to similar preferences in stream gradients (<7%) that the distribution of beaver and coho salmon were historically overlapped throughout significant portions of their range. It is difficult to know where sympatric relationships existed between these species, or what degree of influence beavers may have had on the productivity or life history of salmonid populations"*

Total beaver reported trapped by licensed commercial fur/recreational trappers for Siskiyou County and the State from 2000 – 2010

<b>Year</b>	<b>Siskiyou Total</b>	<b>State Total</b>
<b>2000</b>	<b>31</b>	<b>193</b>
<b>2001</b>	<b>1</b>	<b>170</b>
<b>2002</b>	<b>0</b>	<b>160</b>
<b>2003</b>	<b>3</b>	<b>136</b>
<b>2004</b>	<b>7</b>	<b>276</b>
<b>2005</b>	<b>0</b>	<b>62</b>
<b>2006</b>	<b>0</b>	<b>168</b>
<b>2007</b>	<b>3</b>	<b>275</b>
<b>2008</b>	<b>0</b>	<b>98</b>
<b>2009</b>	<b>16</b>	<b>214</b>
<b>2010</b>	<b>70</b>	<b>220</b>

# Information Currently Available on the Benefits of Beaver

- ◆ *Beaver have been shown to be highly beneficial as a water conservation tool, especially in drought years.*
- ◆ *In addition to storing water and stabilizing stream flow, beaver dams contribute to elevating ground water tables. This promotes vegetative growth, which in turn helps stabilize stream banks and minimize erosion.*
- ◆ *Beaver ponds remove sediment, pollutants, and fecal coliforms on streams grazed by cattle, significantly improving water quality.*
- ◆ *Beaver dams have been shown to be a far better tool for enhancing salmonid production than standard restoration techniques such as establishing large woody debris in streams to slow flows and create pools for young salmonids.*
- ◆ *Beaver dams are not barriers to most salmon runs, although they may be restrictive seasonally during periods of low stream flows.*
- ◆ *Beavers are considered a keystone species due to the creation of high value wetlands for wildlife.*

# Benefits of beaver to fish

A meta-analysis of the scientific literature indicated that the main positive impacts of beaver activity on fish were;

- ◆ increased habitat heterogeneity,
- ◆ greater area for rearing and overwintering
- ◆ higher invertebrate production
- ◆ provision of refuge from high and low flows

The main negative impacts of beaver activity cited were;

- ◆ barriers to fish movement due to the construction of dams
- ◆ loss of spawning habitat due to siltation
- ◆ reductions in oxygen levels in beaver ponds, leading to fish kills

# Potential adverse effects of beaver on coho salmon

- ◆ Beaver dams may interfere with the movements of both upstream migrating adult spawners and downstream moving juveniles
- ◆ High levels of instream siltation due to beaver activity may also lead to damage to spawning habitats. The loss of riparian vegetation through beaver activity may also lead to an increase in water temperature, which may be detrimental to juvenile salmonids
- ◆ Beaver activity can also have detrimental effects on water quality within and below impoundments, with reductions in dissolved oxygen levels being often cited
- ◆ Beaver dams create pool habitat that provide refuge for fish during periods of low flow. However, dewatering of the stream section downstream of dams has been suggested to pose a problem for juvenile salmonids
- ◆ The changes in flow regime due to beaver dams, from a lotic to a more lentic system may prove negative for some salmonid species such as juvenile steelhead

# "Damages" to Landowners in NR Coho Range

- ◆ DWR stream-flow structures have been blocked, damaged, and prevented from taking accurate flow measurements.
- ◆ DFG fish screens have been blocked and damaged.
- ◆ Blocking of culverts, streams, or other water delivery systems that cause flooding of property or roadways.
- ◆ Fallen or potentially fallen trees that have impacted roadways, utilities, access, property, or structures.
- ◆ Depredated trees with wildlife, fisheries, agricultural, or ornamental values.
- ◆ Blockage of agricultural diversions or irrigation devices including head gates, culverts, or ditches.

# Roles and Constraints of Beaver Relocation

- ◆ It is not legal for individuals to transport or possess (and thus relocate) most live wild mammals (including beavers) in California without a permit from DFG (FGC §2118, 14 CCR §671).
- ◆ Beavers are classified as “non-native nuisance” species by DFG

# Relocation requirements

A program to relocate beaver would require funding and personnel assignments for the following:

- ◆ CEQA preparation.
- ◆ Outreach and development of a collaborative process with private landowners.
- ◆ Preparation of a qualitative research design.
- ◆ Preparation of a capture plan and protocols for safe handling.
- ◆ Development of release site selection criteria.
- ◆ Materials and equipment costs.
- ◆ Research implementation and monitoring.
- ◆ Reports and publications.

# Potential questions re. beavers

- ◆ *Will protecting beavers to enhance coho production take precedent over damage to private property and current depredation policy?*
  - ◆ *Will funding be available for mitigating private land impacts from beaver restoration?*
  - ◆ *What specific benefits to coho can be expected from increased beaver populations?*
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# Do beaver have a role in coho recovery?

- ◆ In their classic study of coho salmon in Waddell Creek (no beaver were recorded in the creek at the time), Shapalov and Taft (1954) stated: *"The introduction of fishes, and mammals such as beaver, is easier to accomplish, but is a very complex matter, with manifold ramifications within the field of ecological relationships, and must be studied carefully.... If a native game or commercial fishery has produced unsatisfactory results, it will usually be found either that various man-introduced factors have produced depletion, or that natural environmental conditions are responsible for the unsatisfactory conditions. Consequently, the introduced species are liable to be affected in the same manner by the depletion-creating factors or the adverse environmental conditions. The remedy then obviously lies in improving such factors and conditions for the native species "*