

# Kokanee Salmon, (*Oncorhynchus nerka*)

**Data: Alaska Department of Fish & Game**

**Partners: AK**

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## Species Status Review:

Kokanee are generally known as the much smaller form of the sockeye salmon *O. nerka* that completes its life cycle entirely in freshwater. Kokanee are differentiated from “residual sockeye salmon,” which are the non-anadromous progeny of anadromous fish. While kokanee are primarily found in landlocked lakes they also occur in anadromous systems. Kokanee typically exist independently from the anadromous form by segregating spatially and temporarily. The status of specific stocks of native kokanee populations in Alaska is unknown and few have ever been evaluated. The abundance of kokanee appears to vary significantly from very abundant in some lakes to very small populations in others. No specific explanation for the widely varying abundance is known.

## Sportfishing Status of Kokanee:

Throughout their native range, kokanee are a sport fish but are considered somewhat difficult to catch since they are primarily plankton feeders. While kokanee are occasionally targeted by sport anglers in Alaska they are generally caught incidentally by anglers targeting trout or Dolly Varden. In Southeast Alaska, these landlocked sockeye salmon seldom grow to more than 7 to 9 inches in length but their flesh is the same familiar deep-red color as sockeye salmon. It is estimated that only between several dozen to a 100 kokanee are harvested annually by Alaskan anglers. Outside of their native range, kokanee have been extensively stocked as a sport fish.

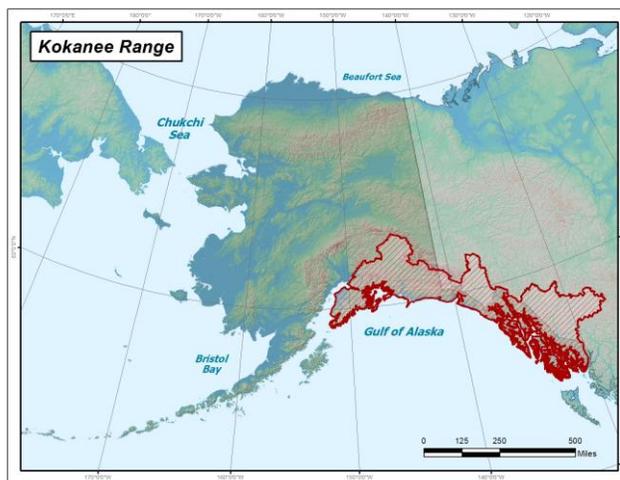
## Distribution of Kokanee:

Kokanee are uncommon in Alaska but are known to exist in 38 landlocked lakes in Southeast Alaska and several lakes throughout Southcentral Alaska. One viable population exists in Alaska’s interior at Copper Lake, located within the headwaters of the Copper River, and is likely the

most northern population in North America at latitude 62.42° North.

## Range of Kokanee:

The native range of kokanee salmon is from the Kenai Peninsula south through Southeast Alaska extending south to the Deschutes River in Oregon. Kokanee are also found in Asia ranging from Japan to Siberia.



## Kokanee Habitat Requirements:

Kokanee require spawning habitat with adequate gravel in inlet or outlet streams, or along lake bottoms. Lakes with clean cold water are necessary to sustain kokanee populations. Kokanee are poor swimmers and even small barriers can impede or completely block kokanee spawning migrations.

## Concerns, Issues, or Obstacles relative to the Conservation and Improvement of the status of Kokanee:

### Population Viability Concerns

Kokanee populations are primarily isolated to specific landlocked lakes and thus, individual populations are vulnerable to any habitat degradation.

# **Kokanee Salmon. (*Oncorhynchus nerka*)**

## **Genetic Considerations**

All native landlocked kokanee populations have presumably originated from anadromous sockeye salmon and are considered polyphyletic (a life history form which has independently arisen many times). Genetic analysis of sockeye salmon and kokanee populations indicate they can be genetically identical or divergent and that these two forms may occur either sympatrically or allopatrically. Genetic relationships among sockeye salmon and kokanee throughout their native range appear to be organized more by geographic proximity than by life-history type (Taylor et al. 1996).

The practice of stocking anadromous forms of juvenile sockeye salmon to meet aquaculture objectives or removal of anadromous barriers could impact the biodiversity and genetic integrity of kokanee populations.

## **Disease Concerns**

Introductions of other salmonid species through barrier removal or aquaculture practices could introduce infectious hematopoietic necrosis (IHN) or bacterial kidney disease (BKD) into disease free kokanee populations. Disease testing prior to a proposed introduction of juvenile sockeye salmon into Turner Lake revealed that the native kokanee population was disease free; only a handful of known disease free populations exist worldwide.

## **Habitat Concerns**

The habitat of native kokanee is probably limited to less than 100 lakes in Alaska. The primary concern is habitat degradation in these isolated landlocked populations due to barrier removal, introduction of other juvenile salmonids into these lakes, or changes to lake water levels from hydroelectric development or water extraction.

## **Introduced Species Concerns**

The practice of stocking hatchery incubated juvenile sockeye or coho salmon into landlocked lakes has been employed by state and private aquaculture entities in an effort to increase the number of adult salmon available for sport, commercial and subsistence users. This practice could negatively impact existing kokanee populations.

## **Overutilization Concerns**

Currently there are no overutilization concerns for kokanee in Alaska.

## **Oil and Gas Development Concerns**

The development of oil and gas resources in Alaska should not negatively impact native kokanee populations in Alaska. However, any hydroelectric development associated with any resource extraction could alter lake levels and impact local populations of kokanee.

## **Opportunities for Improvement of the Status of Kokanee:**

- Identify landlocked lakes with kokanee populations and maintain barriers to anadromous immigration in these systems.
- Conduct baseline genetic analysis of kokanee populations to evaluate unique populations.
- Monitor exploitation and evaluate fishing regulations to maintain kokanee populations.
- Enforce existing sport fishing and habitat regulations (water use, land management, etc.) to maintain kokanee habitat.

## **Population Surveys, genetic analyses, and fish population manipulation:**

### *Key Actions:*

Identify additional kokanee populations and assess those populations.
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## **Kokanee Salmon. (*Oncorhynchus nerka*)**

Maintain current distribution and genetic diversity of existing populations.
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Maintain habitat characteristics of landlocked lakes with kokanee.
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Educate public and agency personnel about the importance of protecting kokanee populations.
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Enforce habitat and disease policies and regulations to maintain kokanee populations.
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### **Kokanee Habitat Manipulations:**

#### *Key Actions:*

Protect habitat in lakes with existing populations of kokanee.
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Maintain water levels in lakes with kokanee populations.
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Identify additional kokanee populations.
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### **Regulatory and Administrative Actions to enhance kokanee status:**

Maintaining the sport fish status of kokanee and utilizing regulations to maintain habitat and to control overutilization will be an important component of maintaining the health of kokanee populations. In addition, working with public and private agencies to maintain appropriate regulations for prevention of disease, water quality impairment, and habitat disturbance are important considerations.

#### *Key Actions:*

Provide technical information, administrative assistance, and financial resources to achieve listed objectives.
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Maintain and protect kokanee habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.
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Enforce regulatory mechanisms that prevent impacts associated with recreational angling.
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Enhance and maintain regulatory mechanisms that prevent diseases or introduction of other species.
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### **Recommended Actions to improve the status of Kokanee:**

1. Conduct surveys to identify additional populations of kokanee.
2. Protect existing habitat from development and other impacts.
3. Protect kokanee populations by reviewing, and if necessary changing, the current practice of stocking juvenile salmonids into landlocked lakes.

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### **Completed or on-going WNTI Projects <sup>a</sup>**

1. Protect Coastal Cutthroat habitat via Water Reservations in SE AK (71440-2009-916).
2. Protect Coastal Cutthroat Habitat in SE Alaska Water reservations Phase II (71440-2012-938).

<sup>a</sup> Both Dolly Varden and kokanee habitat will be protected by obtaining water reservations under these coastal cutthroat trout projects.

### **References:**

Taylor, E. B., C. J. Foote, and C. C. Wood. 1996. Molecular genetic evidence for parallel life history evolution within a Pacific salmon (sockeye salmon and kokanee, *Oncorhynchus nerka*). *Evolution* 50:401-416.



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