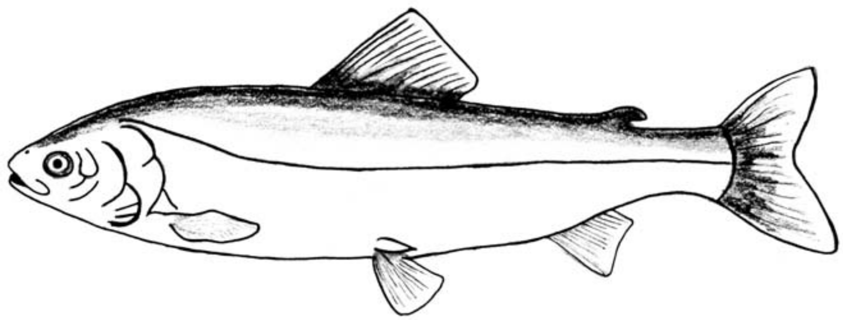
# COSEWIC
# Assessment and Update Status Report

on the

# Bering Cisco
## *Coregonus laurettae*

**in Canada**



**SPECIAL CONCERN**
**2004**


**COSEWIC**
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

**COSEPAC**
COMITÉ SUR LA SITUATION
DES ESPÈCES EN PÉRIL
AU CANADA

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Edge, Thomas A. 1990. COSEWIC status report on the Bering cisco *Coregonus laurettae* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 15 pp.

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COSEWIC would like to acknowledge Nick de Graff for writing the update status report on the Bering cisco *Coregonus laurettae,* prepared under contract with Environment Canada, and overseen and edited by Robert Campbell, the COSEWIC Freshwater Fish Species Specialist Subcommittee Co-chair.

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# COSEWIC
# Assessment Summary

**Assessment Summary – November 2004**

**Common name**
Bering cisco

**Scientific name**
*Coregonus laurettae*

**Status**
Special Concern

**Reason for designation**
This is an anadromous species that depends on barrier-free access to upstream spawning sites. In Canada, it is known only from the Yukon River. The numbers utilizing Canadian portions of the Yukon River are low compared to lower sections of the river in the United States parts of the range and could be negatively impacted by hydroelectric development and expansion of commercial or subsistence fisheries, targeting other species in the river.

**Occurrence**
Yukon Territory

**Status history**
Species considered in April 1990 and placed in the Data Deficient category. Re-examined in November 2004 and designated Special Concern. Last assessment based on an update status report.

COSEWIC
Executive Summary

# Bering Cisco
*Coregonus laurettae*

## Species Information

The Bering cisco is troutlike, having an elongate silvery body and terminal jaws. Adults may attain fork lengths of up to 48 cm; however, the average (fork) length of migrating fish in the Yukon River is about 37 cm. The species is distinguished from other cisco by the pale, almost colourless pelvic and pectoral fins and 18 to 25 gill rakers on the lower portion of the first gill arch. The Bering cisco is presumably anadromous, with extensive spawning migrations into the upper reaches of large rivers that flow into the Beaufort, Bering and Chukchi seas.

## Distribution

In North America, Bering cisco are more commonly encountered in coastal regions of Alaska in the Beaufort, Bering and Chukchi seas. Spawning migrations are almost exclusively limited to Alaska, although some migrants in the Yukon River reach Canadian waters with sporadic observations as far upstream as Dawson City, Yukon Territory. It is conceivable that the species may be found along the Yukon Territory portion of the Beaufort Sea coastline, but its presence there has not been confirmed.

## Habitat

The Bering cisco is typically found in nearshore coastal habitat of low salinity. It is thought to be less tolerant of the higher saline waters that occur offshore in marine environments. The species prefers river estuaries and brackish water lagoons along coastal Alaska, where they feed on a variety of benthic and planktonic foods. Large annual migrations are made to spawning locations in the mainstem portions of large rivers of Alaska.

## Biology

The biology of the Bering cisco has received little study in Canada. In Alaska, the life history of Bering cisco is thought to be analogous to Arctic cisco of the Mackenzie River. Fish apparently winter in brackish water near river mouths. Anadromous populations of Bering cisco are thought to have migrations of over 2100 km in the

Yukon River. Spawning occurs over loosely compacted gravel beds in swiftly flowing water. Eggs are typically broadcast and abandoned by their parents. After spawning, adults are believed to move downstream to the sea. It is unknown if adults are repeat spawners. The eggs presumably hatch in the spring and the young descend downstream to brackish estuarine habitat. Bering cisco are a schooling species that rear and feed in coastal waters before reaching sexual maturity. Sexual maturity is thought to be attained at 4 to 9 years of age. There is potential for some segment of the annual migration to possibly winter in freshwater.

**Population Sizes and Trends**

There has been very little research, assessment or management effort focused on the Bering cisco throughout their range. Correspondence with management biologists and a literature search revealed little information specific to population size, catch or abundance. The majority of information related to this species is simply reports of their occurrence in a particular region, usually through fisheries investigations on other salmonid species.

**Limiting Factors and Threats**

The migratory behaviour of Bering cisco makes the species susceptible to obstructions such as causeways and dams. The reduction of water flow or alteration in discharge or water quality, in those rivers where they are known to spawn, could be a limiting factor and threat in the future. Present subsistence harvests are thought to be relatively small and conservative throughout their range, but species-specific harvest data are not available. It is possible that commercial fisheries for other species could threaten the Bering cisco.

**Special Significance of the Species**

In Alaska, large spawning movements in the Yukon River suggest Bering cisco play a significant role in the ecology of the Bering Sea. The species is presumably an important food source to a number of predators in coastal environments. In Canada, their occurrence may represent a population(s) on the farthest edge of its migratory range. The species is utilized in subsistence fisheries throughout its coastal range, although harvests are thought to be conservative relative to salmon.

## COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5th 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

## COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

## COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government members and the co-chairs of the species specialist and the Aboriginal Traditional Knowledge subcommittees. The Committee meets to consider status reports on candidate species.

## DEFINITIONS
## (NOVEMBER 2004)

| | |
|---|---|
| Wildlife Species | A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and it is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for atleast 50 years. |
| Extinct (X) | A wildlife species that no longer exists. |
| Extirpated (XT) | A wildlife species no longer existing in the wild in Canada, but occurring elsewhere. |
| Endangered (E) | A wildlife species facing imminent extirpation or extinction. |
| Threatened (T) | A wildlife species likely to become endangered if limiting factors are not reversed. |
| Special Concern (SC)* | A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats. |
| Not at Risk (NAR)** | A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances. |
| Data Deficient (DD)*** | A wildlife species for which there is inadequate information to make a direct, or indirect, assessment of its risk of extinction. |

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.
** Formerly described as “Not In Any Category”, or “No Designation Required.”
*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

Environment Canada / Environnement Canada
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Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

# Update
# COSEWIC Status Report

on the

# Bering Cisco
## *Coregonus laurettae*

**in Canada**

2004

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## SPECIES INFORMATION

### Taxonomy

| | |
|---|---|
| Class: | Actinopterygii |
| Order: | Salmoniformes |
| Family: | Salmonidae |
| Scientific name | *Coregonus laurettae* Bean 1882 |
| Common names | |
| English | Bering cisco. Lauretta, herring, lake herring, tulibee, sharp nose |
| Northern Tuchtone | *sunkay* |
| Han | *ik-canoo* |

Bickham *et al.* (1997) assessed the degree of differentiation between the Bering cisco and Arctic cisco (*C. autumnalis*) using mitochondrial DNA haplotypes of samples from the Colville River delta and concluded the forms are valid species. Reist *et al.* (1998) examined sequence variation in a portion of the d-loop of mitochondrial DNA in several coregonine fishes including Arctic cisco, Bering cisco and lake cisco (*Coregonus artedi*) to confirm the separate, but closely related status of these species.

### Description

The Bering cisco (Figure 1) is a coregonid, distinguished from other cisco species by the pale, almost colourless pelvic and pectoral fins and a lower number of gill rakers (18-25) on the lower portion of the first gill arch (Morrow 1980). Anadromous forms occurring in Arctic drainages and the lower mainstem of the Yukon River have a spotted back and dorsal fin (Mecklenburg *et al.* 2002). The body is more elongate and less laterally compressed than other species of cisco, with the greatest body depth in front of the dorsal fin. The dorsal fin is considered rather high and falcate, with 11 to 13 rays (Morrow 1980). Pelvic fins are characterized with a distinct axillary process similar to other ciscos. Coloration of adult fish can vary from brownish to green on back, with silvery sides and belly (Scott and Crossman 1973). Caudal and dorsal fins are dusky (Morrow 1980). Very little information is available to identify early life history stages. The average size of migrating Bering cisco sampled in the Yukon River near Fort Yukon in 1998, 1999, and 2001 was 37 cm in fork length and approximately 600 gm in weight (Brown, R., U.S. Fish and Wildlife Service, Fairbanks, Alaska; personal communication 2003).

In the Yukon Territory, Bering cisco are easily confused with other coregonines. Catch data from a rotary screw trap in the Yukon River near Dawson City, Yukon Territory, produced a significant cisco juvenile catch. However, until recently, technicians were unable to differentiate to species (J. Duncan, Yukon Salmon Committee, Dawson City, Yukon, personal communication 2003). In coastal regions they overlap in distribution with Arctic cisco, the species they most closely resemble (Edge 1991). Species differentiation may be difficult for the novice due to similar morphological characteristics based on a probable common ancestry. They can,

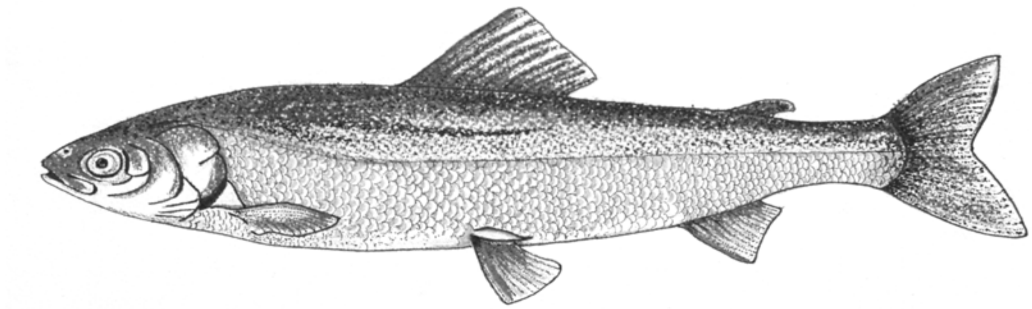

Figure 1. A Bering cisco depicted from a photograph of a mature adult captured in the Yukon River, Alaska.

however, be differentiated on the basis of gill-raker counts; 18-25 for *C. laurettae* and 25-31 for *autumnalis* (McPhail 1966; Alt 1973). In the Yukon River, confusion with riverine populations of least cisco (*C. sardinella)* is probable (Milligan, P., Department of Fisheries and Oceans, Whitehorse, Yukon, personal communication 2003).

### Designatable Unit

*Coregonus laurettae*.

## DISTRIBUTION

### Global Range

The Bering cisco is an anadromous coregonid with extensive spawning migrations into the upper reaches of large rivers that flow into the Beaufort, Bering and Chukchi seas. They range from the Chukotsk and Kamchatka coastal regions of the Siberian far east to the northwestern portion of North America. Their geographic range is virtually confined to the area of the Bering glacial refuge. It is believed that the Bering cisco survived the most recent glacial advance in the Bering refuge and has not significantly expanded its range postglacially (McPhail and Lindsey 1970). The species is thought to occur in Chukotsk and Kamchatka regions of the Siberian far east (Zoological Institute RAS 2002). Chereshnev (1984) described specimens taken from the mouth of the Chegitun River, Chukchi Penninsula.

In North America, Bering cisco are encountered along the Alaskan coast in the Beaufort, Bering and Chukchi seas. The species has also been found in the western region of the Gulf of Alaska (Figure 2). More specifically, occurrences have been reported in the coastal waters near Port Barrow, Alaska (McPhail 1966). Further east, they are known to occur in the river delta area of the Colville River (U.S. Bureau of Land Management 1998; Bickham *et al*. 1997) to Oliktok Point, Alaska (Mecklenburg *et al*. 2002). In the Bering Sea, the species has been reported in coastal areas of Kotzebue

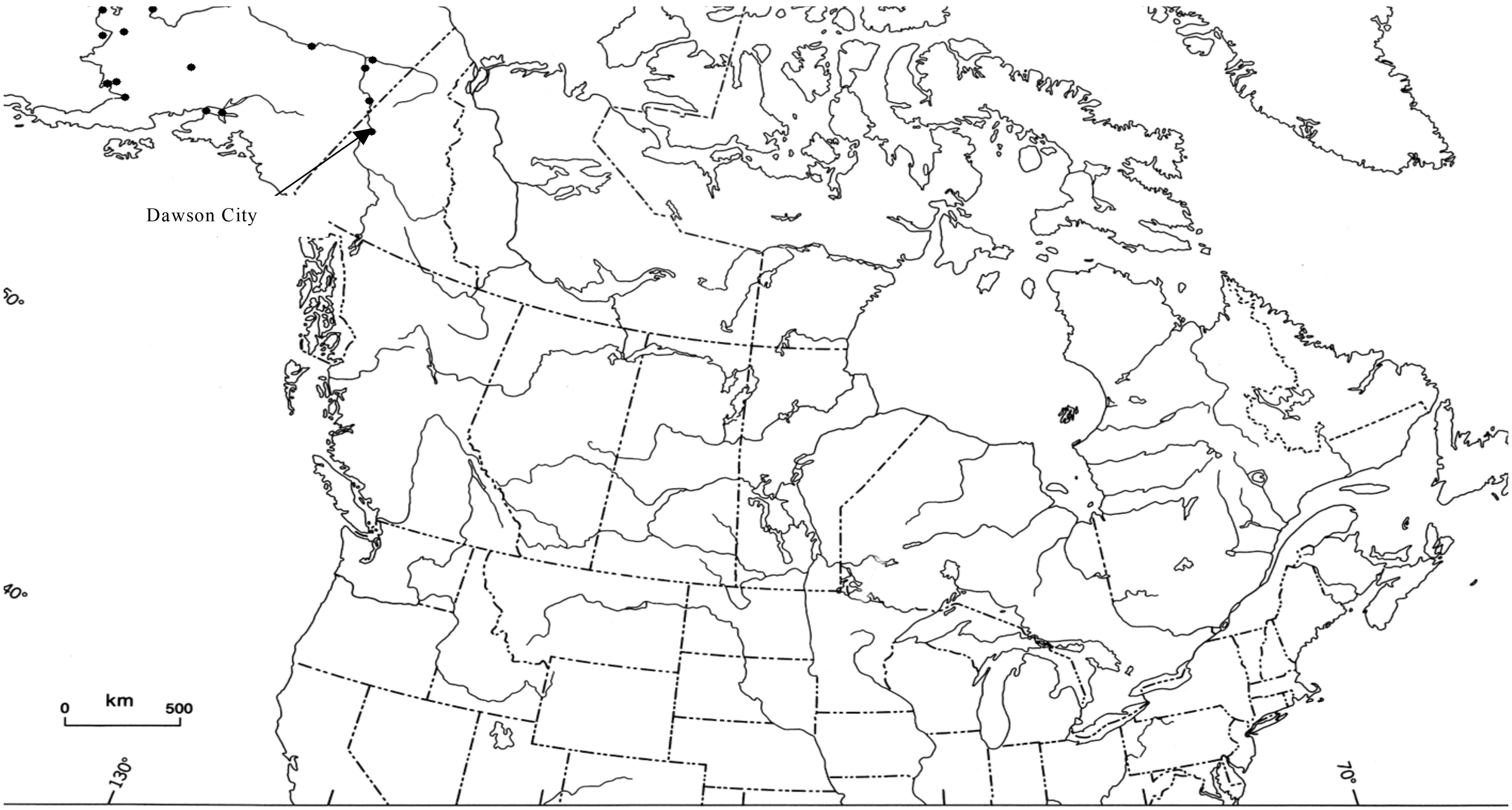


Figure 2. Location of reported occurrences of Bering Cisco in Alaska and Yukon Territory.

Sound, Norton Sound, Yukon Delta National Wildlife Refuge, and along the Bristol Bay coast associated with the Tagiah National Wildlife Refuge. They have also been reported in the Gulf of Alaska inhabiting the Cook Inlet in the Kenai River delta area.

Alaskan spawning migrations have only been reported in the Kuskokwim River and the Yukon River near the confluence with the Tanana River in Alaska. Numbers of Bering cisco in these runs are thought to greatly outnumber those of any other salmonid species (Brown, pers. comm., 2003). Bering cisco migrations have been reported in the lower section of the Porcupine River, a large tributary of the Yukon River. It is unclear if migrations occur in any of the other larger tributaries of the lower Yukon River.

### Canadian Range

While Bering cisco have not been documented in the Mackenzie drainage, conceivably they may be found farther west in Yukon coastal waters where their range may overlap with Arctic cisco, *C. autumnalis* (S. Stephenson, Department of Fisheries and Oceans, Inuvik, NT, personal communication 2003; Lawrence, M., North/South Consultants, Winnipeg, Manitoba, personal communication 2003). Although there has been no documentation of the species along the Yukon coastal portion of the Beaufort Sea (Bond and Erickson 1989), little effort specific to establishing their presence has been made in this region.

Presence of Bering cisco in the Yukon River mainstem near Dawson City was first confirmed in 1977 (de Graaf 1981). Sporadic observations since have continued at fishwheels operated by the Canadian Department of Fisheries and Oceans near the United States/Canadian border (Milligan, pers. com., 2003). These reports are the only occurrences reported in Canada. The notable absence in the commercial catch near Dawson City is thought to be due to the large mesh gillnets used in the salmon fishery (J. Couture, Yukon Fish and Wildlife Management Board, Whitehorse, Yukon, personal communication 2003). Considering its anadromous behaviour and scarcity of observations in Canadian waters, Dawson City may be the upper migratory range of this species in the Yukon River. It is conceivable that Bering cisco could migrate into the Canadian portion of the upper Porcupine River, a large tributary of the Yukon drainage basin, but have not been documented from there.

## HABITAT

### Habitat Requirements

The current knowledge of the distribution of Bering cisco suggests the species has an origin in Beringia (McPhail and Lindsey 1970). The Bering cisco is a common fish in Alaskan coastal habitats. It is believed to display a life history and habitat requirement similar to those of the Arctic cisco (see Scott and Crossman 1973) that inhabit the Mackenzie Delta region of Canada. The species is anadromous, leaving the sea or estuarine waters in spring and summer, ascending freshwater rivers to spawn, and then returning to the sea following spawning. Spawning runs have been reported in the Yukon River mainstem in Alaska, and possibly upstream in some of the larger tributaries (Alt 1973; Brown, pers. comm., 2003). Bering cisco apparently spend more time in saline waters than other known anadromous populations of coregonines. While detailed spawning descriptions have not been reported, field observations imply the use of gravel beds in swiftly flowing water (Brown, pers. comm., 2003). The Bering cisco apparently does not feed during spawning migrations (Morrow 1980; Brown, pers. comm., 2003). Microchemical analyses of otoliths indicates that the species reach marine water early in life, where they feed and rear in brackish coastal waters until sexual maturity (Brown, pers. comm., 2003).

### Trends

Unknown.

### Protection/Ownership

Since the Yukon River flows through or borders five national wildlife refuges in Alaska, a significant portion of the migratory route is encompassed under some level of protection. The Yukon Flats National Wildlife Refuge, for example, encompasses one of the only known spawning areas on the Yukon River. Although there are no exclusive marine preserve designations along the Alaskan coast, there are several terrestrial wildlife refuges and preserves of varying size, offering some level of scrutiny to any potential alteration of aquatic habitat from onshore industrial development.

## BIOLOGY

### General

The Bering cisco is known for extensive migrations related to spawning (Morrow 1980). The species is one of several anadromous coregonid fish to migrate upstream to spawn in large rivers during spring and summer (Figure 3). Bering cisco are thought to be anadromous with no freshwater non-migratory forms (Brown, pers. comm., 2003). Upon completion of spawning, spent fish migrate downstream to overwinter beneath the ice in coastal river deltas and estuaries. Feeding is thought to occur in coastal areas especially near river mouths and brackish lagoons (McPhail and Lindsey 1970). Rearing and sexual maturation of juveniles occurs within coastal waters. The species is widely dispersed over a large geographical range along the Alaskan coastline. The cyclic pattern of migrations between the river and ocean occurs annually. The extent of fidelity to specific spawning areas by the species is unknown.


Figure 3. Comparison of a Bering cisco to other coregonines found in the Yukon River.

## Reproduction

Sexually mature Bering cisco sampled in fishwheels located in the Yukon River approximately 1,200 river km from the sea in Alaska were between 31 and 45 cm in fork length and were 4 to 9 years in age (Brown, pers. comm., 2003). Alt (1973) reported that the species reaches maturity at 4 years of age and may live to 7 years or older. Male fish averaged slightly smaller in size than females and were of a younger age. Spawning is thought to occur over loosely compacted gravel beds in swiftly flowing water. A known spawning area on the Yukon River in Alaska is within a 120 km section of highly braided river (Figure 4). Eggs are typically broadcast and abandoned, after which spent adults presumably move downstream to the sea. The eggs hatch in the spring and the young descend downstream to brackish estuarine habitat to rear.

## Survival

Very little is known about survival and mortality rates for this species. The Bering cisco is likely an important food source for predacious fish, especially along the coastal rearing and overwintering areas. The extent of utilization by avian and mammalian predators is unknown. Bering cisco are harvested along with other salmonids in subsistence fisheries throughout the range (R. Nagano, Lands and Resource Development, Dawson City, Yukon, personal communication 2004).

## Physiology

There is no information on established physiological preferences of Bering cisco. Research conducted on Arctic cisco, a closely related species with presumed similar physiology, shows avoidance of cold highly saline marine environments, with growth directly related to water temperatures (Griffiths *et al.* 1992; Fechhelm *et al.* 1993). The premise that both species utilize similar coastal habitat suggests a similar physiological preference for seasonally warmer, brackish nearshore waters. They can tolerate salinity of 27-31%, and some may overwinter in the Yukon River drainage (Alt 1973).

## Movements/Dispersal

Spawning runs begin in late May to early June near river mouths. Catch data from Alaskan fishwheels situated in the Yukon River approximately 1,200 river km from the sea indicate two distinct migratory peaks. The first, during late June, is followed by another in late August and into September. The later peak appears to coincide with more extensive migratory travel and is thought to contain a segment of the population that is bound for Canadian waters. In Alaskan fishwheels, up to 200 Bering cisco are enumerated each day during migratory peaks (Brown, pers. comm., 2003).

Migrating Bering cisco are also occasionally captured in Canadian fishwheels situated near the United States/Canada border, located 2,100 river km from the sea. The run is more prevalent in some years than others (Milligan, pers. comm., 2003). Observations of less than 100 fish each year are reported as an incidental catch in two fish wheels used by Fisheries and Oceans Canada to capture and mark migrating fall chum salmon (*Oncorhynchus keta*).

Figure 4. Bering cisco spawning habitat located in the National Yukon Flats Wildlife Refuge on the Yukon River between Fort Yukon and Circle, Alaska.

This program has been conducted since 1982. Since the Bering cisco are captured in the fall of the year, September to mid-October, it has been assumed they are undertaking a spawning migration; however, spawning locations within Canadian sections of the Yukon River have not been identified (Milligan, pers. comm., 2003).

After spawning, adults are thought to move downstream to the sea. The eggs presumably hatch in the spring and the young descend downstream to brackish estuarine habitat where they are partially dispersed by prevailing currents and winds. Rearing and sexual maturation occur along coastal waters of Alaska over a large geographical region. The only drainages in Alaska known to contain spawning runs are the Kuskokwim and Yukon rivers (Brown, pers. com., 2003).

**Nutrition and Interspecific Interactions**

They are thought to feed on invertebrates (probably amphipods) and other small fish (McPhail and Lindsey 1970; Alt 1973). Feeding is thought to occur primarily in the productive and food-rich nearshore coastal waters containing a diversity of invertebrates and cottid fishes (Lee *et al.* 1980; Morrow 1980). Bering cisco are not known to feed during their spawning migrations up the Yukon River. There currently is no information on nutrition requirements or interspecific interactions for either freshwater or coastal environments.

**Behaviour/Adaptability**

Bering cisco are known for migrating great distances. Migrating fish require access to large swift-flowing rivers to reproduce. While migratory behaviour in freshwater streams and rivers can generally increase a species' vulnerability to natural disturbances, the use of spawning habitat associated with the mainstem of large rivers is perhaps a strategy that minimizes these risks. Disturbances such as slumping permafrost, forest fires, extreme precipitation events or drought, temperature fluctuations and natural obstructions such as beaver dams or landslides have a more pronounced effect on smaller streams. The tolerance of Bering cisco to environmental degradation is unknown. The species has never been reared for use in aquaculture.

## POPULATION SIZES AND TRENDS

Alaskan fisheries biologists, who work on lower portions of the Yukon River, believe that Bering cisco spawners far outnumber any other salmonid species during the late summer and fall. Their scarcity in Canadian waters of the Yukon River is probably because the majority of spawning activity is farther downstream in Alaska. The fact that they continue to be occasionally captured in the Canadian portion of the Yukon River suggests some stability in their pattern of movement.

The number of fish entering Canadian waters is unknown. However, Aboriginal Traditional Knowledge (ATK) indicates that the species is known to elders in Dawson City and has a historical presence (Nagano, pers comm., 2004). Numbers counted at the fishwheels since the 1980s have been low (< 100/yr). However, counting is not consistent, and technicians are not trained to recognize the species, which may be easily confused with other sympatric coregonids.

There has been very little research, assessment or management effort specific to Bering cisco throughout its range. Information that is available is more of a presence or absence nature and ancillary to the study of other salmonid species. Alaskan cisco harvest statistics are inconsistent between regions. Specific catch trends are difficult to establish as catches of Bering cisco are combined with other coregonines (Buklis 2002).

In the Yukon Territory, a hundred or less continue to be encountered each year in fishwheels near Dawson City, although not all fish passing the wheels are sampled. Until recently, record keeping has only been concerned with salmon migrations; for the most part catches of other species were not recorded. Since 1999 some effort has been made to capture information on species other than salmon, but until now this has been sporadic and often the technicians cannot differentiate Bering cisco from other sympatric whitefishes, although it is assumed that some spawn in Canadian waters (Milligan, pers. comm., 2003). Recent captures of unidentified adult ciscos in fishwheels upstream of Dawson are presented in Table1; however, one must bear in mind that this is not a record of all ciscos that may have passed through the wheels in those years, only those that were recorded*.* Based on the time of spawning, it would appear that least cisco would be more likely captured in the summer months of June, July and August and Bering cisco during September and October.

**Table 1. Captures of unidentified adult cisco in fishwheels in the Yukon River near the Canada-US border upstream of Dawson City, Yukon 1999 to 2004.**

| Year | June | July | August | September | October | Total |
|---|---|---|---|---|---|---|
| 1999 | 1 | 1 | | | | 2 |
| 2000 | 3 | | | 1 | 2 | 6 |
| 2001 | | | 1 | 8 | | 9 |
| 2002 | 3 | 6 | 1 | 7 | | 17 |
| 2003 | 1 | 1 | | | | 2 |
| 2004 | | | | 1 | | 1 |

Source: Pat Milligan, DFO Whitehorse.

Since 2002 the Yukon Salmon Commission has been using rotary screw traps (Figure 5) to capture juvenile fish in the Yukon River in the vicinity of Dawson, and the author has assisted in the development of criteria for the identification of juveniles. Using these criteria 379 juveniles were identified in 2004 (Table 2), which suggests that the species is reproducing in Canadian waters. The reader is cautioned to note that these are preliminary findings that have yet to be confirmed by genetic analysis, which is in progress.

Figure 5. Photograph of the rotary screw trap on site in the Yukon River near Dawson City (courtesy Jim Duncan, Yukon Salmon Commission).

**Table 2. Count of species sampled using the rotary screw trap 2002 - 2004.**

| Species | # Sampled 2002 | 2003 | 2004 | Sum |
|---|---|---|---|---|
| Arctic Grayling | 585 | 646 | 478 | 1,709 |
| Arctic Lamprey | 18 | 79 | 71 | 168 |
| Bering Cisco | | | 379 | 379 |
| Broad Whitefish | 215 | 51 | 29 | 295 |
| Burbot | 7 | 28 | 12 | 47 |
| Chinook | 1,583 | 1,169 | 5,713 | 8,465 |
| Chum | 159 | 268 | 599 | 1,026 |
| Coho | | 4 | | 4 |
| Inconnu | 264 | 88 | 80 | 432 |
| Lake Chub | 60 | 69 | 36 | 165 |
| Lake Whitefish | 1,406 | 763 | 958 | 3,127 |
| Least Cisco | 499 | 164 | 359 | 1,022 |
| Longnose Sucker | 499 | 364 | 301 | 1,164 |
| Northern Pike | 16 | 3 | 8 | 27 |
| Pygmy Whitefish | | | 74 | 74 |
| Round Whitefish | 1,751 | 738 | 410 | 2,899 |
| Slimy Sculpin | 6 | 10 | 9 | 25 |
| un-ID | 16 | | | 16 |
| unidentified cor. species | 2,107 | 648 | 365 | 3,120 |
| Grand Total | 9,191 | 5,092 | 9,881 | 24,164 |

Data courtesy Jim Duncan, Yukon Salmon Commission.

## LIMITING FACTORS AND THREATS

The migratory behaviour of Bering cisco could make populations susceptible to potential adverse effects of industrial development. Passage along nearshore coastal habitat may be delayed by shoreline structures and offshore activities associated with the petroleum industry. In the Yukon River, hydroelectric development, mining and sewage discharges may be a threat in the future. Oil spills and radioactive waste may be a current threat in the Siberian far east. It is possible that mining and commercial fishing interests in the Yukon River could be of some threat to the Bering cisco.

The extent of harvest throughout its range is currently unknown, with sporadic records maintained only in Alaska. Although it is recognized as distinct from other whitefishes, Aboriginal fishers in the Yukon group these fish with whitefish, and do not differentiate between species in the subsistence fishery. The fish and eggs are used for food, fresh or dried, and are often used to feed dogs. The species is not targeted and is captured incidentally, usually while fishing for salmon (Nagano, pers. comm. 2004).

## SPECIAL SIGNIFICANCE OF THE SPECIES

The anadromous nature of this species makes their migration into the Yukon Territory of some significance, especially considering the large distances involved. Their occurrence in Canada may represent a peripheral spawning population on the farthest edge of their migratory range (Milligan, pers. comm., 2003). Peripheral populations are routinely given special consideration in conservation (Lesica and Allendorf 1995). The large Alaskan spawning migrations are believed to sustain coastal populations that are thought to significantly contribute to the ecology of the Bering Sea. The species is known to elders of the First Nations peoples in the Dawson area and recognized as distinct from other whitefishes. They refer to it as the small-mouth whitefish or *ik-canoo,* but do not fish specifically for it (Nagano, pers. comm., 2004).

## EXISTING PROTECTION OR OTHER STATUS

Currently there is no known legislative regulation or guideline specific to the harvest or protection of habitat utilized by Bering cisco. In the United States some migration corridors and spawning habitat are under designation as a national refuge. In Canada, fish habitat is protected from harmful alterations and destruction under the *Federal Fisheries Act*. The Bering cisco is not included in the International Union for Conservation of Nature and Natural Resources Red List (Hilton-Taylor 2000). NatureServe (2003) has a global status ranking of the species as apparently secure (G4).

## TECHNICAL SUMMARY

Coregonus laurettae
Bering Cisco Cisco du Bering
Range of Occurrence in Canada: Yukon Territory

| | |
|---|---|
| **Extent and Area information** | |
| • Extent of occurrence (EO)<br>• [estimated from Figure 2] | <1000 $km^2$ |
| • Trend in EO | Unknown |
| • Are there extreme fluctuations in EO? | Unknown |
| • Area of occupancy AO<br>• [estimated from Figure 2, the river is nowhere more than 1km wide] | <1000 $km^2$ |
| • Trend in AO | Unknown |
| • Are there extreme fluctuations in AO? | Unknown |
| • Number of known or inferred current locations (see Figure 2) | 1 |
| • Trend in # locations | Stable |
| • Are there extreme fluctuations in # locations? | Unknown |
| • In area, extent or quality of habitat? | Unknown, but probably Stable |
| **Population Information** | |
| • Generation time (average age of parents in the population) | 4-6 yr |
| • Number of mature individuals | Unknown |
| • Total population trend | Unknown |
| • % decline over the last/next 10 years or 3 generations | Unknown |
| • Are there extreme fluctuations in number of mature individuals? | Unknown |
| • Is the total population severely fragmented? | No |
| • Trend in number of populations | Unknown |
| • Are there extreme fluctuations in number of populations? | Unknown |
| • List populations with number of mature individuals in each | Not Applicable |
| **Threats (actual or imminent threats to populations or habitats)** | |
| - low to moderate, possibility of increased oil development and habitat alterations in coastal regions throughout its range<br>- potential for hydroelectric development on rivers where they are known to migrate<br>- potential for increased commercial utilization<br>- possible threats to the species in Canadian waters would be related to harvest and any activities which might restrict migration such as the building of power dams. | |
| **Rescue Effect** | High |
| • Status of the outside population(s)?<br>• Asia<br>• USA | <br>Unknown<br>Secure |
| • Is immigration known or possible? | Not known if Canadian migrants are separate stock from US population |
| • Would immigrants be adapted to survive in Canada? | Yes |
| • Is there sufficient habitat for immigrants here? | Probably |
| **Quantitative Analysis** | Not Applicable |

**Existing Status**

**Nature Conservancy Ranks**

**Global – N4**

**National**

US – N4

Canada – N1

**Regional**

US – Alaska – S?

Canada – Yukon S?

**COSEWIC – Data Deficient, 1990**

## Status and Reasons for Designation

| **Status:** Special Concern | **Alpha-numeric code:** Not Applicable |
|---|---|
| **Reasons for Designation**<br>This is an anadromous species that depends on barrier-free access to upstream spawning sites. In Canada, it is known only from the Yukon River. The numbers utilizing Canadian portions of the Yukon River are low compared to lower sections of the river in United States parts of the range and could be negatively impacted by hydroelectric development and expansion of commercial or subsistence fisheries, targeting other species in the river. | |
| **Applicability of Criteria**<br><br>**Criterion A** (Declining Total Population) – Not applicable, no evidence of population decline.<br><br>**Criterion B** (Small distribution, and Decline or Fluctuation**)** – Not applicable, although the species has a small Canadian distribution, its extent and nature of the range is uncertain, and there is no evidence of decline or fluctuation.<br><br>**Criterion C** (Small Total Population Size and Decline) – Not applicable, population size and trends not known. Numbers counted annually since the 1980s have been low, but counting is not consistent and the species may be easily confused with other sympatric coregonids.<br><br>**Criterion D** (Very Small Population or Restricted Distribution) – Not applicable. Although the species does meet the numeric thresholds under Threatened D2, i.e., restricted distribution, known only from 1 location. However, there are no immediate threats exposing the species to imminent extirpation and there is a high potential for rescue from U.S. populations.<br><br>**Criterion E** (Quantitative Analysis) – Not applicable, - no data. | |

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