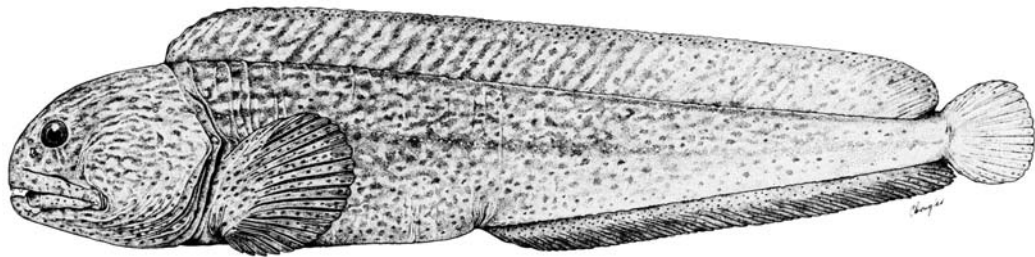


**COSEWIC**  
**Assessment and Update Status Report**

on the

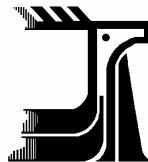
**Bering Wolffish**  
*Anarhichas orientalis*

in Canada



**DATA DEFICIENT**  
**2002**

**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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Également disponible en français sous le titre Évaluation et Rapport de situation du COSEPAC sur la situation du loup de Béring (*Anarhichas orientalis*) au Canada – Mise à jour

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## COSEWIC Assessment Summary

### Assessment Summary – November 2002

**Common name**

Bering wolffish

**Scientific name**

*Anarhichas orientalis*

**Status**

Data Deficient

**Reason for designation**

Information to establish any COSEWIC risk category with assurance is not available. Data on distribution, abundance and specific habitat, including any observed changes over time, are especially needed.

**Occurrence**

Arctic Ocean

**Status history**

Designated Special Concern in April 1989. Status re-examined in November 2002 and changed to Data Deficient. Last assessment based on an update status report.



**COSEWIC**  
**Executive Summary**

**Bering Wolffish**  
*Anarhichas orientalis*

**Species information**

Wolffishes of the family Anarhichadidae are large, elongate fishes characterized by large, protruding canine teeth and the lack of pelvic fins. The anal and dorsal fins are elongate and nearly join the caudal fin at its base. Adult Bering wolffish (*Anarhichas orientalis*) are dark brown with no distinct stripes or spots, and can reach lengths up to 112 cm.

**Distribution**

The Bering wolffish, *Anarhichas orientalis*, has a spotty distribution throughout the Northeastern Pacific from Hokkaido through the Sea of Okhotsk to Alaska, but its distribution across the Northwestern Pacific into the Bering Sea and the Arctic Ocean is poorly documented. It is known from only one location in Canadian waters, Bathurst Inlet.

**Habitat**

The Bering wolffish inhabits shallow inshore waters with rocky, algae-encrusted bottoms. Relatively little is known of the habitat requirements of this species, and even less is known of the availability of Bering wolffish habitat in Canadian Arctic waters.

**General Biology**

Little is known of the biology of the Bering wolffish. Wolffish exhibit nesting habits, and their very large eggs hatch into pelagic larvae sometime in the Arctic summer. Stomach content analysis reveals a diet of benthic invertebrates. Bering wolffish may reach lengths to 112 cm.

**Population sizes and trends**

The Canadian representation of this species is limited to three specimens captured in the Bathurst Inlet area, and a 1200-km gap exists between this population and the next reported population in Camden Bay on Alaska's North Slope, despite relatively extensive sampling throughout the area by various agencies. Therefore it is impossible to assess population trends.

### **Limiting factors and threats**

Bering wolffish may require a narrow range of habitat attributes that may limit their reproduction and distribution in Canadian waters. Wolffish exhibit a characteristic slow growth and nesting habits that may also limit population size. Threats may include inshore oil and gas exploration, development, and shipping activities.

### **Special significance of the species**

It is possible that Bathurst Inlet, an area the size of the Bay of Fundy or Strait of Georgia, harbours the only Canadian population of this fish. If this is the case, the population is one of national significance.



## COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

## COSEWIC MEMBERSHIP

COSEWIC comprises representatives 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 Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

## DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

\* 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.

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.



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

**Update  
COSEWIC Status Report**

on the

**Bering Wolffish**  
*Anarhichas orientalis*

in Canada

2002

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## SPECIES INFORMATION

### Name and classification

The wolffishes, or sea catfishes, of the family Anarhichadidae are supposed relatives of the inshore blennies (Blenniidae) (Wheeler, 1975). Their name is derived from the characteristic protruding canine teeth, used to ingest the benthic invertebrates and crustaceans that are their primary food source. Four species of wolffish occur in Canadian waters, including the North Pacific, North Atlantic, and Arctic Oceans, as well as the Beaufort Sea. The Atlantic Wolffish (*Anarhichas lupus*, Linnaeus, 1758) and the spotted wolffish (*Anarhichas minor* Olafsen, 1774) are of some commercial importance, while the Northern wolffish (*Anarhichas denticulatus*, Krøyer, 1845) and the Bering wolffish (*Anarhichas orientalis* Pallas, 1814) are poorly documented in Canadian waters. Along the Pacific coast south of Alaska, the family is represented by the wolf-eel (*Anarhichthys ocellatus*, Ayres 1855).

The Bering wolffish is the subject of this report, and its known Canadian range is limited to one location in the Western Arctic - Bathurst Inlet. Inuit of the area have limited knowledge of the wolffish. They do not distinguish between *Anarhichas orientalis* and *Anarhichas denticulatus* (Northern wolffish), calling both by the name *akoak* or *akoaksaluk* (old woman fish) (Smith, 1977).

### Description

The Bering wolffish is an elongated, laterally compressed fish with a slender caudal peduncle. It has been documented to a length of 112cm (Andriyashev, 1954), and to 15kg in weight (Houston and McAllister, 1990), but most literature acknowledges that larger specimens may exist. Pelvic fins are absent, the dorsal and anal fins are elongate and nearly join the caudal fin near its base, and the lateral line may be absent or reduced (Houston and McAllister, 1990). Reports of coloration differ, with some authors citing age-dependent coloration changes (Andriyashev, 1954). Adult Bering wolffish are reported to be dark brown in colour, with no obvious spots or stripes (Andriyashev, 1954). Andriyashev reports that the head in juveniles has numerous dark spots, while the upper body is marked with four or five dark longitudinal stripes that may be discontinuous. Head length is 19-21% of total body length (Andriyashev, 1954), with a steep snout and large canine teeth that extend past the tips of the jaws.

The Bering wolffish is differentiated from the five other species in the genus by having 53 or more anal rays, 81-86 dorsal fin spines, deeper rounded caudal fins, and by a geographical distribution that is limited to the northern Pacific and western Arctic Oceans (Houston and McAllister, 1990).

## DISTRIBUTION

### Global range

The Bering wolffish has a confirmed distribution from Hokkaido and Shikotan Island to the Sea of Okhotsk in the northwestern Pacific (Barsukov, 1959), but the distribution of this species in the northeastern Pacific and Arctic Oceans is little known. Specimens have been recorded in Norton Sound, as well as in the Pribolof and Commander Islands in Alaskan waters (Barsukov, 1959). The only confirmed specimens in Canadian waters are from Bathurst Inlet in the western Canadian Arctic (Fig. 1; Houston and McAllister, 1990). Fruge and Wiswar (1991) have recorded the first specimens of Bering wolffish from the Camden Bay area in the Alaskan Beaufort Sea, helping fill in what was a 2700 km gap in the known distribution of the species (from Bathurst Inlet in the western Canadian Arctic to Norton Bay in Western Alaska).

### Canadian range

Only three specimens of Bering Wolffish have been recorded in Canadian waters — all in Bathurst Inlet. Specimens have been recorded in the Alaskan Beaufort Sea, the Bering Sea, and the Commander and Pribolof Islands. This appears to be the southeastern limit to the range of the species. The species is not present along the Pacific coast of North America.

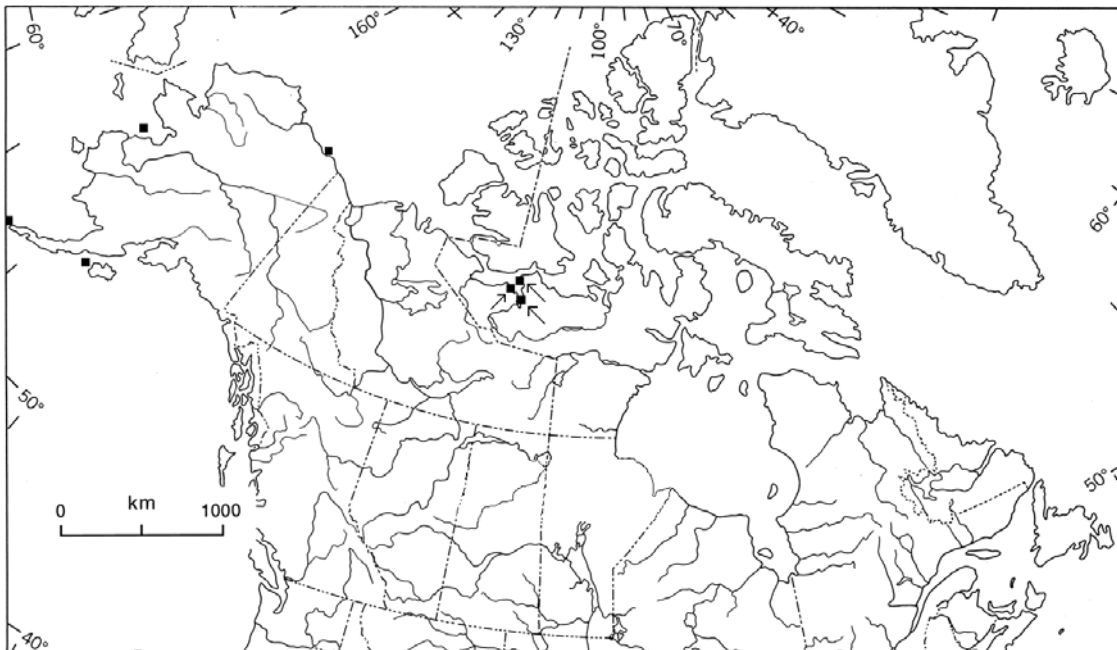


Figure 1. General Distribution of North American Bering wolffish populations (Canadian records indicated with arrows).

## HABITAT

### Habitat requirements

Little is known of the habitat requirements of the Bering wolffish. Andriyashev (1954) reports that Bering wolffish are the most shallow-water species of the genus *Anarhichas*, and that the species inhabits coastal zones on rocky bottoms among stones covered with algae. Three sub-adult specimens were collected in water depths of 1.2 meters from Camden Bay in the Alaskan Beaufort Sea (Früge and Wiswar, 1991). During ice-free seasons (spring to late fall), they keep to the shallower coastal habitat, likely moving offshore only during the winter months when the shallow coastal regions are ice-bound (Andriyashev, 1954). Früge and Wiswar (1991) suggest that areas that are directly influenced by freshwater plumes from river mouths, e.g. Mackenzie Delta, may not be favourable for wolffish.

### Habitat protection/ownership

Bathurst Inlet, an area the size of the Bay of Fundy and home to the only known Canadian population of Bering wolffish, is not protected by either the territorial government of Nunavut or the federal government. The area is fished by a local fishing guide/outfitter and by the local Inuit.

## GENERAL BIOLOGY

### Reproduction and growth

Very little is known about the biology of the Bering wolffish. What is known has been compiled through analysis of specimens captured in the northwestern Pacific. Andriyashev (1954) reports a large female (112cm) with well-developed eggs, taken in late May from Avachinskaya Bay, Kamchatka. As is typical for the family, the eggs are large, with diameters reported to be 4.0 to 4.5cm (Barsukov, 1959). The number of eggs produced by females is unknown. A report of a larva cast aboard a ship during a storm in May in the Bering Sea (Andriyashev, 1954) indicates that larvae are pelagic. Young Bering wolffish were described by Kobayashi (1961) based on two specimens that were collected in June and August from the Sea of Okhotsk in the late 1950s. A 21-mm specimen has been illustrated by Matarese et al. (1989).

Barsukov (1959) estimated that maturity may be reached at 15 to 17cm. Fishes of 41cm, 70cm, 112cm were aged to be 4+, 8+, and 17+ years old, respectively. The species is relatively long-lived and slow-growing.

## Nutrition and interspecific interactions

Analysis of stomach-contents reveals a diet of benthic invertebrates such as crabs and molluscs. Knowledge of dietary requirements of the Bering wolffish is very limited. Andriyashev (1954) reports that hermit crabs and shells of *Buccinum* and *Neptunea* were found in the stomachs of wolffish. Benthophagy in the Arctic may limit the Bering wolffish to highly localized sites where shallower water, reduced ice scour and warmer temperatures allow sizeable benthic invertebrate populations to develop. This may be the reason for the apparent patchy distribution of the species, as well as a potential explanation as to why the Bering wolffish is not found in the eastern Arctic, where deeper, colder inshore habitats predominate (Houston and McAllister, 1990).

Smith (1977) hypothesizes that the Bering wolffish may be a part of the ringed seal (*Phoca hispida*) diet, based on his observations of ringed seal predation on *Anarhichas denticulatus* (Northern wolffish), another species of Arctic/subarctic wolffish.

## POPULATION SIZE AND TRENDS

Little more than presence/absence data exist for the Bering wolffish throughout its range (Houston and McAllister, 1990). It is said to be common near the Bering Strait and occurs through the Bering Sea and northwestern Pacific (Andriyashev, 1954). However, its lack of commercial importance in comparison to other species of the genus leads one to believe that it may not be as abundant as the word “common” implies (Houston and McAllister, 1990).

Only three documented records of Bering wolffish in Canadian waters exist — all in the Canadian Museum of Nature collections (see Appendix 1). Inuit of the area seem to have limited knowledge of the wolffish. They do not distinguish between *Anarhichas orientalis* and *Anarhichas denticulatus* (Northern wolffish), calling both by the name *akoak* or *akoaksaluk* (old woman fish) (Smith, 1977). One fishing guide/outfitter in Bathurst Inlet claims to catch wolffish on a regular basis, but does not distinguish between *A. orientalis* and *A. denticulatus* specimens (Warner, pers. comm., December, 2001).

The unique appearance of the Bering wolffish should have made it well-known to the Inuit if it were common on any of their traditional grounds. However, this is not the case, leading one to believe that the wolffish is in fact rare and exists in extremely localized ecological situations. This conclusion is supported by negative results for the species from extensive sampling programs undertaken by Fisheries and Oceans, Canadian Museum of Nature, and various consultants reporting to oil and gas exploration interests. Fisheries data from the Arctic Biological Station spans the years 1947 to 1979, and the Canadian Museum of Nature alone undertook 5 major field expeditions under the leadership of Dr. D.E. McAllister, between the years 1961 and 1977. These sampling programs failed to find any *A. orientalis* specimens anywhere in the Canadian Arctic outside the three specimens already recorded from the Bathurst

Inlet area (Houston and McAllister, 1990). Certainly there is not enough data on this species to document numerical increase or decline, and the negative results for the species obtained in the widespread surveys mentioned above seem to indicate that it is actually rare in Canadian Arctic waters outside of Bathurst Inlet.

### **LIMITING FACTORS AND THREATS**

Range and distribution of the species may be severely limited by specific habitat requirements. So little is known about the habitat requirements and reproductive biology of the species that any inferences regarding threats to available habitat in Canadian waters are impossible.

Dunbar (1970) lists the three other wolffish species as worthy of serious consideration for commercial fisheries, but makes no mention of *Anarhichas orientalis*. The supposed limited area of occurrence of the Bering wolffish as well as the harsh and remote nature of the Arctic coast make it unlikely that it will ever be threatened by a commercial fishery.

Inshore petroleum development may hold the highest risk to Bering wolffish populations of any human activity in the area. These activities are at present concentrated near the Mackenzie Delta in waters that are somewhat brackish, and may not directly threaten undocumented wolffish populations. However, it will be important to monitor future activities as exploration moves east and west from the Mackenzie Delta into areas that may support Bering wolffish populations.

There are reports that Bathurst Inlet has been selected as the site for the development of a deepwater Arctic port (Nunavut Wildlife Management Board, pers. com.). This could pose a substantial threat to the habitat of the Bering Wolffish.

### **SPECIAL SIGNIFICANCE OF THE SPECIES**

So little is known of the Bering wolffish in Canadian waters that it is difficult to attribute significance beyond a need for further investigation into its distribution and population size. While wolffish have been documented to be a part of the diet of marine mammals such as the ringed seal (Smith, 1977), the extent of this, and related age/size factors are unclear. Although wolffish generally are excellent eating and have hides that can be tanned, the patchy distribution of the Bering wolffish, coupled with the logistical challenges of exploitation, make it an unlikely candidate for a commercial fishery. In Canada, only one isolated population of this species has been identified, with a distance of over 1200km to the next known population in Alaska. This renders recruitment unlikely to be significant, and suggests this unique population is one of national significance.

## **EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS**

In the documented area of occurrence of the Bering wolffish in Canadian waters, there is no large commercial fishery. There is, however, an extremely limited local subsistence fishery and a guided sport fishery. Both are likely to have little or no impact on the species.

## **SUMMARY OF STATUS REPORT**

Bering wolffish distribution has been well documented throughout the western parts of its global range. Good presence/absence data are available from Hokkaido, and the Sea of Okhotsk (Russia) east to Norton Sound and the south coast of Alaska. Until recently, a 2700km gap in documented populations existed from Norton Sound to the only known Canadian population in Bathurst Inlet. The recent capture of three Bering wolffish from Camden Bay (Früge and Wiswar, 1991) helps fill this gap, and indicates that, despite extensive surveys, undocumented populations of this species may utilize localized inshore habitat in Canadian waters outside Bathurst Inlet.

It is likely that unique habitat requirements that favour benthic invertebrates and crustaceans limit the Bering wolffish to highly localized populations. A lack of knowledge regarding the seasonal movements of the Bering wolffish may also contribute to the gaps that exist in the Canadian distribution for the species. Indeed, the entire extent of our knowledge of this species in Canadian waters rests in three specimens captured in Bathurst Inlet. Further investigation is needed if we are to learn more about the species.

## TECHNICAL SUMMARY

### ***Anarhichas orientalis***

Bering Wolffish

Loup de Béring

Only known Canadian population occurs in Bathurst Inlet, Nunavut (Arctic Ocean)

<b>Extent and Area information</b>	
• extent of occurrence (EO)(km <sup>2</sup> )	Unknown
• specify trend (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in EO (> 1 order of magnitude)?	Unknown
• area of occupancy (AO) (km <sup>2</sup> )	Unknown
• specify trend (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in AO (> 1 order magnitude)?	Unknown
• number of extant locations	Bathurst Inlet
• specify trend in # locations (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in # locations (>1 order of magnitude)?	Unknown
• habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat	Unknown
<b>Population information</b>	
• generation time (average age of parents in the population) (indicate years, months, days, etc.)	Unknown
• number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)	Unknown
• total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals	Unknown
• if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)	N/A
• are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?	Unknown
• is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?	Very likely
• list each population and the number of mature individuals in each	Bathurst Inlet: population size unknown
• specify trend in number of populations (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in number of populations (>1 order of magnitude)?	Unknown
<b>Threats (actual or imminent threats to populations or habitats)</b>	
- Habitat damage by commercial bottom trawling activities	
- By-catch in commercial fishery in North Pacific	
- Future oil and gas exploration and development activities along inshore areas of the Western Arctic.	
<b>Rescue Effect (immigration from an outside source)</b>	
• does species exist elsewhere (in Canada or outside)?	Low
• status of the outside population(s)?	Yes
• is immigration known or possible?	No protection
• would immigrants be adapted to survive here?	Not known
• is there sufficient habitat for immigrants here?	Most likely
<b>Quantitative Analysis</b>	

## ACKNOWLEDGEMENTS

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## **BIOGRAPHICAL SUMMARY OF CONTRACTOR**

David A. Quinn graduated from the University of British Columbia in 1997 with a degree in Animal Science and Wildlife Ecology from the Faculty of Agriculture. He has spent the last seven years working with endangered and threatened species, including the American Badger (in the Rocky Mountain Trench), Mountain Caribou (in the Southern Purcell Mountains), Swift Fox (in and around Grasslands National Park), and Lynx (in and around Kootenay, Yoho, and Banff National Parks). He is a freelance writer and photographer whose work has appeared in publications such as *Seasons* (Magazine of the Ontario Federation of Field Naturalists), as well as a professional sea kayak guide, leading trips to the Queen Charlotte Islands, as well as Great Slave Lake, Banks Island, and Ellesmere Island in Canada's Arctic. He lives with his partner, Kelly, in Kimberley, BC.

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**Appendix 1. *A. orientalis* Specimens in the Canadian Museum of Nature Collections**

<b>Locality Collected</b>	<b>Number of Spec</b>	<b>Date Collected</b>
Bathurst Inlet (Canada)	1	1964
Bay Chimo, Bathurst Inlet	1	Aug. 1965
Bathurst Inlet	1	Sept. 1969
Hooper Bay, Alaska, USA	1	Aug. 1957
Alaska, USA	1	Mar. 1962
Resurrection Bay, Alaska	1	May, 1961