

TOGIAK NATIONAL WILDLIFE REFUGE

Dillingham, Alaska

ANNUAL NARRATIVE REPORT

1996

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Calendar Year 1996

**U.S. Department of the Interior
Fish and Wildlife Service**

NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

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Gerald Stordale 10/21/97
Refuge Manager Date
NOTING

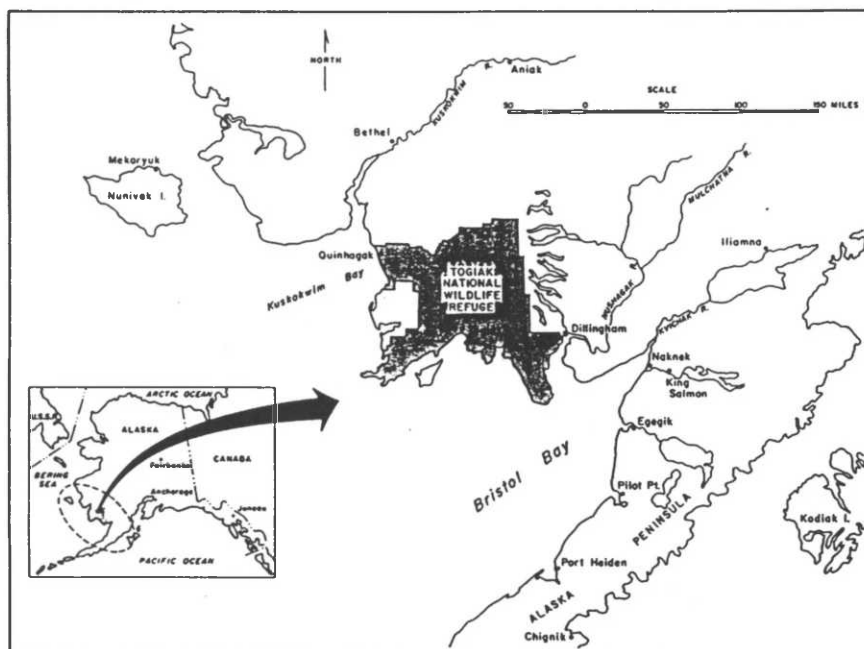
G. Jensen 10/21/97
Refuge Supervisor Review Date

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Regional Office Approval Date

INTRODUCTION

Togiak National Wildlife Refuge encompasses 4.7 million acres of land in southwestern Alaska between Kuskokwim Bay and Bristol Bay. The eastern boundary of the refuge is about 400 air miles southwest of Anchorage. The refuge is bordered on the north by Yukon Delta National Wildlife Refuge and on the east by Wood-Tikchik State Park.

The refuge contains a variety of landscapes, including tundra, lakes, wetlands, mountains, and rugged cliffs. The Kanektok, Goodnews and Togiak rivers provide habitat necessary for five species of salmon and other fish that spawn in the refuge. More than 30 species of mammals are present including brown bear, moose, caribou, wolves, and wolverine. Sea lions, walrus, and harbor seals inhabit the Pacific coast shoreline. The refuge's coastal lakes and wetlands are also heavily used by migrating waterfowl.



Southwest Alaska, Togiak National Wildlife Refuge is shaded.

The former Cape Newenham National Wildlife Refuge (created in 1969) became part of the present Togiak National Wildlife Refuge. The northern 2.3 million acres of Togiak Refuge are designated wilderness. Eighty percent of the refuge is located in the Ahklun Mountains, where large expanses of tundra uplands are cut by several broad glacial valleys expanding to the coastal plain. Like the majority of refuges in Alaska, Togiak Refuge is roadless.

Archaeological evidence indicates that the Cape Newenham/Togiak region of southwestern Alaska has been continuously occupied by aboriginal people for at least 2,000 years. One site, at Security Cove near Cape Newenham, shows evidence of possible human occupancy dating 4,000 to 5,000 years ago.

The aboriginal people in this area were of two different descents. Kuskwogmiut Eskimos occupied the area from Chagvan Bay north to the Kuskokwim River. Togiagamiut Eskimos lived within the area south of Chagvan Bay east to Togiak Bay. The people in the Nanvak and Osviak Bay areas were known as Chingigmiut, or Cape People, and were considered a branch of the Togiagamiut.

At the time of the 1880 census, approximately 2,300 Eskimos lived within what is now Togiak National Wildlife Refuge. Elliott (1866) stated that the Togiak River was remarkable with respect to the density of people living along its banks. At that time, 1,926 people lived in seven villages along the river from Togiak Lake to Togiak Bay. The size of this population reflected the great abundance of fish and wildlife that people relied upon as their sole sources of food and clothing.

The Togiagamiuts, unlike most coastal Eskimos, did not depend entirely upon the fish and wildlife resources of the sea for their subsistence. Sea mammals were hunted, but more effort was expended in pursuit of the moose, caribou, and brown bear found in the interior mountains and valleys. From their winter villages along the rivers near the coast, hunters and their families traveled into the interior, where they spent several months in the spring and fall, picking berries and hunting. In midsummer they would return to their villages to harvest salmon. They relied on the food gathered to survive the coldest months of winter, when the frigid weather conditions would prohibit any hunting/fishing activity.

Kuskwogmiuts, who occupied the area west and north of the Togiagamiuts, were more dependent on the sea's resources for their subsistence. They spent little time, if any, hunting land mammals of the interior. The people living in the vicinity of Cape Newenham, for example, obtained their meat, blubber, and oil from seals, beluga whales, and walrus. Walrus were especially prized for its ivory, which was used in the manufacturing of tools or as articles of trade. Seabirds were abundant, furnishing people with meat, eggs, and feathers for clothing. Salmon and trout were also important items in their diet.

Captain James Cook was probably the first white man to see this area. Entering Bristol Bay on July 9, 1778, he continued westward, reaching Cape Newenham on July 16, 1778. Somewhere north of Cape Newenham, possibly in the area of Goodnews Bay, Captain Cook was visited by a group of Eskimos in Kayaks. He believed that these people had not had any previous contact with whites because there were no tobacco or other foreign articles in their possession.

Russian explorers reached Bristol Bay in the 1790s, but the first contact they had with the Togiagamiuts did not occur until around 1818, when a party of Russian American Company traders established a fort on the Nushagak River. It was from this post that trade was established with Togiagamiuts. The area was rich in furs, and the post was soon handling more than 4,000 pelts annually. A great variety of animals were taken, including brown and black bears, wolves, wolverines, beaver, martin, mink, marmots, muskrats, river otters, ground squirrels, lynx, seals, and red and Arctic foxes. Interest in trapping around Bristol Bay did not decline until World War I. Trapping continues today, with fur prices dictating the degree of effort spent.

Of the various other industries created in the area during the 1800s, only the salmon fishery retains its original importance. In 1885, the Alaska Packing Company of Astoria established the "Scandinavian" cannery on the west side of Nushagak Bay. With a capacity of 2,000 cases per day, it operated until the end of World War II. Bristol Bay Canning Company, then called the Bradford Cannery, went into production a few miles from the Scandinavian cannery in 1886, at a site later to become known as Dillingham. By 1897, the fishing industry had invested \$867,000 in the bay. By 1908, there were ten canneries operating within the Nushagak Bay area.

Other industries dating from the 1800s were gold mining and reindeer herding. Gold mining declined during World War I. Most of the gold mines closed at the outbreak of World War II; however, platinum mining began in 1926 and continued until 1975. Reindeer herding practically became extinct by the mid-1940's due to near total extermination of reindeer by a series of hard winters.

The discovery of platinum at Fox Gulch near the present village of Platinum caused what was probably Alaska's last big stampede. Miners from all over Alaska and the "Lower 48" came to the mining camp along the tributaries of the Salmon River, which was heralded as the "Dawson of 1937." The platinum stampede was unlike any of those in the Klondike era. Airplanes brought stampedeers into Platinum several times a week and a few miners resorted to dog sleds for the long overland treks which were characteristic of "The Trail of '98." Also, power drills and tractors replaced single jacks and horse-drawn wagons. Since 1926, more than 640,000 ounces of precious platinum have been mined from the placers in the Goodnews Bay district.

By 1934, one company, the Goodnews Bay Mining Company had acquired nearly all of the claims in existence. Ownership later changed to Hanson Enterprises, and they worked a dredge continuously until 1975. Since then, the dredge has operated only intermittently. Hanson Enterprises was the only company in the United States that primarily produced platinum, and most of the platinum claims owned by Enterprises were located on lands selected by Native villages.

Prior to 1969, the area that was to become Togiak National Wildlife Refuge was part of the public domain, under the jurisdiction of Bureau of Land Management. On January 20, 1969, the Secretary of the Interior issued Public Land Order 4583, withdrawing 265,000 acres of that area and designating it the Cape Newenham National Wildlife Refuge. With this order, the Fish and Wildlife Service assumed its first refuge management responsibilities in the area to protect and preserve the "outstanding wilderness values" of Cape Newenham.

The majority of lands that were to become Togiak National Wildlife Refuge were withdrawn in 1971 under Section 17(d)(2) of the Alaska Native Claims Settlement Act (ANCSA). The withdrawals covered all forms of appropriation under the public land laws, including selection under the Alaska Statehood Act and the mining and mineral leasing laws. The Settlement Act directed the Secretary of the Interior to study all (d)(2) "national interest land" withdrawals as possible additions to the National Wildlife Refuge, Park, Forest, and Wild and Scenic River Systems.

The Secretary withdrew additional parts of what was to become Togiak National Wildlife Refuge under Section 17(d)(1) of the Settlement Act. These "public interest lands" were also withdrawn from all forms of appropriation under the public land laws, with the exception of metalliferous locations.

Congress failed to take action before the five-year deadline expired for the (d)(2) lands being considered for additions in the National Park, Refuge, Forest, and Wild and Scenic River Systems. So, on November 16, 1978, the Secretary of the Interior invoked his emergency withdrawal powers, under Section 204(e) of the Federal Land Policy Management Act, to protect these lands, and withdrew nearly 110 million acres of land throughout Alaska. Most of the present Togiak Refuge was covered by this Order, including the (d)(1) and (d)(2) lands and lands which had been available to the Natives but had not yet been selected.

Fifteen months later, on February 11, 1980, the Secretary issued Public Land Order 5703, under section 204 of the Federal Land Policy Management Act, establishing Togiak National Wildlife Refuge. This order withdrew all lands subject to existing rights for up to 20 years from all forms of appropriation under the public land laws. As a refuge, Togiak became subject to all of the laws and policies of the Fish and Wildlife Service which govern the administration of the National Wildlife Refuge System.

The Alaska Native Claims Settlement Act of 1971 chose a route vastly different from previous solutions to aboriginal land claims. Departing from "Lower 48" precedents of reservations and government-

subsidized industries, the compromise bill empowered Alaska's Natives with cash and land conveyances. It further provided that corporations would administer this division of wealth.

The settlement act abolished aboriginal title to lands in exchange for forty million acres and compensation totaling almost \$1 billion, creating perhaps the largest single transfer of wealth from a government to a group of indigenous peoples. Thirteen regional and 220 village corporations were established in 1981, and after a slow start and further legal wrangling, the majority of land entitlements have been conveyed to them. The Togiak Refuge is separated into part of two regional corporations. The Kuskokwim region is managed by the Calista Corporation and the Bristol Bay region is managed by the Bristol Bay Native Corporation.

On December 2, 1980, Congress enacted the Alaska National Interest Lands Conservation Act (ANILCA). This act, among other things, rescinded Public Land Order 5703 and designated all of the withdrawn land as a refuge. In addition, the Act made Cape Newenham National Wildlife Refuge a unit of Togiak National Wildlife Refuge. The first refuge manager subsequently reported for duty in October 1981.

Section 303(6)(B) of ANILCA sets forth the following major purposes for which the Togiak National Wildlife Refuge was established and shall be managed:

- (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, salmonoids, marine birds and mammals, migratory birds and large mammals (including their restoration to historic levels);
- (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
- (iii) to provide, in a manner consistent with purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and
- (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in subparagraph (i), water quality and necessary water quantity within the refuge.

ANILCA Section 101 states that Togiak Refuge and other conservation units in Alaska were established to preserve their "nationally significant" scenic, wilderness, recreational, wildlife and other values for the benefit of present and future generations. It further states that:

. . . it is the intent of Congress in this Act to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; . . . to protect the resources related to subsistence needs; to protect and preserve historical and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting, within large Arctic and subarctic wildlands and on free-flowing rivers; and to maintain opportunities for scientific research and undisturbed ecosystems.

ANILCA called for the Comprehensive Conservation Plan (CCP) to describe "special values" of the refuge. Special values of Togiak Refuge are the following:

The Togiak Wilderness covers about half of the refuge. The wilderness area includes pristine rivers, clear mountain lakes, and steep sloped mountains. It provides outstanding opportunities for solitude and primitive recreation. The rugged Ahklun and Wood River Mountains, partly within the wilderness area, are noteworthy for their scenic values.

The Kanektok, Goodnews, and Togiak drainages have important subsistence and sport fishery values, containing salmon, Dolly Varden, and rainbow trout among other species. The rivers are free flowing and possess excellent scenic, wildlife, riparian, and recreational values. They are important for subsistence uses. Parts of all three drainages are in the Togiak Wilderness.

Sport fishing is another special value of Togiak Refuge. The refuge attracts fishermen from around the world, including Germany, Japan, France, Denmark, and Canada, as well as Alaskans and other Americans. Sport fishing occurs in most refuge waters, with major concentrations of five species of salmon, grayling, rainbow trout, and Dolly Varden occurring in the Togiak, Kanektok, and Goodnews rivers. These rivers have pristine habitat, excellent freshwater rearing conditions, and limited access.



Photo - One of MANY scenic views of Togiak National Wildlife Refuge.

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INFORMATION PACKET (inside back cover)

A. HIGHLIGHTS

- ▶ The Public Use Management Plan revision is underway (See Section D. 2).
- ▶ Low productivities in seabirds recorded (See Section D. 5b).
- ▶ Reintroduced caribou herd has grown rapidly, 36 percent a year (See Section D. 5c).
- ▶ Despite -67° F windchill, staff and others conducted a Christmas Bird Count (See Section G. 7).
- ▶ For the third year in a row, walrus haul out atop cliffs (See Section G. 9c).
- ▶ Almost 800 students participate in calendar and duck stamp contests (See Section H. 2).
- ▶ Pathways to Fishing clinic was a terrific success (See Section H.2).
- ▶ Togiak Refuge rivers provide excellent sport fishing opportunities (See Section H. 9).
- ▶ National Geographic features Togiak in their magazine and television program (See Section J. 3).

B. CLIMATIC CONDITIONS

The refuge is located in a climatic transition zone. The primary influence is maritime; however, the arctic climate of interior Alaska also affects the refuge and the Bristol Bay coastal region. Prevailing winds are from the north and northeast October through March, and from the south and west April through September. The wind blows almost continuously along the coast, frequently reaching gale force velocities.

Recorded temperatures in Dillingham, Alaska, have ranged from -53° F to 92° F, with an average of 24.4 inches of rain and 73.5 inches of snow. Cape Newenham, by comparison, has recorded minimum temperatures of -28° F; maximum temperatures of 75° F; and an average of 37 inches of rain and 81 inches of snow. The frost-free period is approximately 120 days; ponds and smaller lakes usually freeze in October and thaw in May.

Fall is the wettest season in this area, while spring is the driest. The varied topography on the refuge creates microclimates which affect local temperatures, types of precipitation, and wind conditions.

Table 1. 1996 Weather Data

MONTHLY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Precipitation	2.5	3.1	0.6	1.4	1.9	3.4	2.7	2.4	1.2	0.6	2.0	1.5	23.3
Max Temp.	36	38	47	52	72	75	72	66	64	54	41	30	
Min. Temp.	-12	-18	12	5	23	34	37	36	21	9	-7	-10	
Average Max. Temp.	19	19	36	38	54	60	60	59	49	36	30	16	



Photo 1. Snow covers the Ahklun mountain range within the refuge.

C. LAND ACQUISITION

1. Fee Title

Nothing to report

2. Easements

Nothing to report

3. Other

There were no major land status changes this year. The following table shows the current land status acreage.

Of the 4,704,000 acres of land within the refuge boundary, approximately 4,011,000 acres (85%) are under Federal jurisdiction. About 513,000 acres (approximately 11%) have been patented or conveyed to eight Native corporations [Clark's Point (Sagayak), Ekuk, Dillingham (Choggiung), Manokotak, Platinum (Arviq), Quinhagak (Qanirtuuq), Togiak, and Twin Hills], individual Natives, private parties, and one Native group (Olsonville). About 150,000 acres in the refuge have been selected, but they are still under Federal jurisdiction; some of these lands may or may not be interim conveyed.

Figure 1. Map of Togiak National Wildlife Refuge

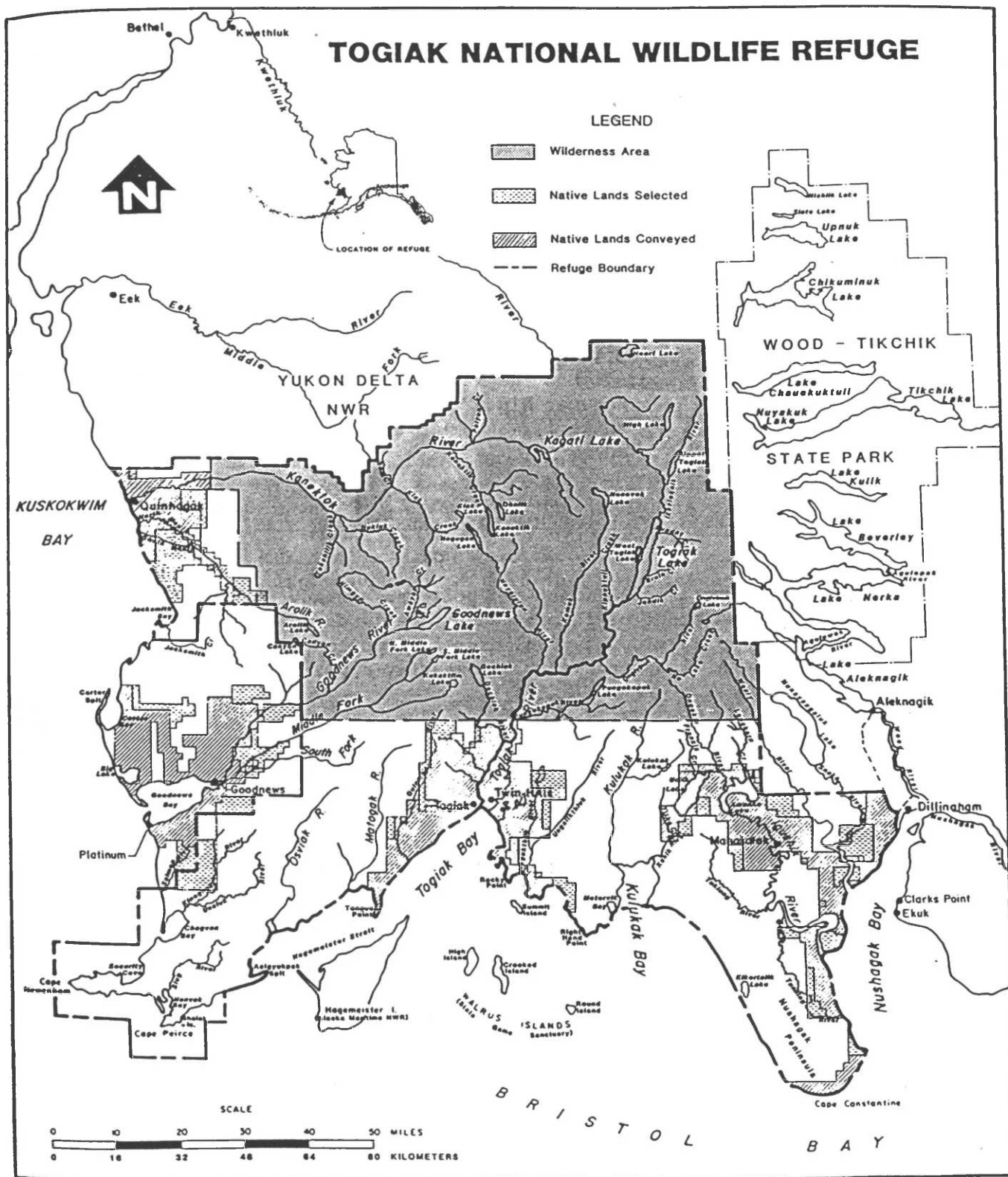


Table 2. Land Status of the Togiak National Wildlife Refuge ¹

Ownership	Acres	Percent of Refuge
FEDERAL	4,011,000	85%
NATIVE VILLAGE CORP/GROUP:		
*Selections	151,000	3%
*Conveyances	480,000	10%
REGIONAL CORPORATIONS:		
*14(h)(1) Selections	12,000	≤1%
*14(h)(1) Conveyances	0	0
*14(h)(8) Selections	5,000	≤1%
*14(h)(8) Conveyances	0	0
NATIVE ALLOWANCES:		
*Applications	11,000	≤1%
*Conveyances	33,000	≤1%
PRIVATE PARTIES:		
*Selections	0	0
*Conveyances	600	≤1%
TOTALS	4,704,000	100%

¹ Acreage is approximate as identified in the Comprehensive Conservation Plan (1986). This table does not include submerged lands.

D. PLANNING

1. Master Plan

The Togiak National Wildlife Refuge Comprehensive Conservation Plan with Environmental Impact Statement (CCP) was completed in June of 1986. The CCP designates areas within the refuge according to their resources and values, outlines programs for conserving fish and wildlife resource values, and specifies uses within each area that may be compatible with the major purposes of the refuge. In addition, the plan discusses opportunities that will be made available for fish and wildlife oriented recreation, ecological research, environmental education and interpretation, and economic use of refuge lands.

In addition to presenting the Service's long-range management strategy for Togiak Refuge, the CCP evaluates the effects of proposed management alternatives on subsistence uses and needs, as required by Section 810 of Alaska National Interest Lands Conservation Act (ANILCA).

2. Management Plan

Management of Togiak Refuge is guided by a series of documents. As with all refuges in Alaska, ANILCA provides the primary direction. In addition, several other national, regional, and site plans and advices provide directives and guidance. The following documents have been approved for Togiak Refuge:

Biological Program Review - Wildlife (1992) - This document represents the recommendations of the review team and the decision document that establishes the future of the wildlife program at Togiak Refuge.

Fishery Management Plan (1990) - This document provides the management direction necessary to insure conservation of refuge fishery resources and habitat. In addition, the plan provides for continued use of refuge fishery resources by subsistence, commercial, and recreational users which are consistent with the purposes for which the refuge was established and is managed.

Public Use Management Plan (1991) - This plan was prepared to implement certain provisions of the Togiak Refuge Comprehensive Conservation Plan and to outline the management of public use on the refuge. The plan also includes guidelines for the management of State of Alaska shorelands within the refuge and along the lower Goodnews River.

It was determined last year that the Public Use Management Plan (plan) needed revision based on comments received from the public and changes in the public use detected through monitoring. Major issues in the revision are guided sport fishing opportunities in Unit 12 - Upper Goodnews River and increased levels of non-guided use refuge-wide. Team members consist of DRM Stovall, RI Dyasuk, FB Lisac, and WB Aderman (Togiak Refuge); Helen Clough (Regional Planner); Mike Coffing, Dave Fisher, and Helga Eakon (Regional Subsistence Management), Mary Faustini (King Salmon Fisheries Research Office), and Dan Dunaway (Alaska Department of Fish and Game). Stovall and Clough are team leaders.

In preparation for revising the plan, National Environmental Policy Act (NEPA) training was presented to team members at Togiak Refuge by Helen Clough. The sessions were taped so that those who were not able to attend could also benefit from the training.

A revision planning team meeting was held in Dillingham March 25-29. Issues to be addressed in the revision were discussed, public comments received were reviewed including meeting minutes notes from village meetings, and a draft report of the Kanektok, Goodnews, and Togiak rivers user survey was reviewed. The following issues/topics were addressed: litter/human waste, trespass, fisheries/fishing, crowding, Cape Peirce management, sport fish guiding in new areas, motorboats, lower river management, and wildlife concerns. The group held a teleconference with Alaska Department of Natural Resources (DNR) to discuss areas of mutual concern and DNR's participation in the revision.

The team met again in Dillingham April 9-11. The purpose of the meeting was to generate preliminary alternatives. The team reviewed the no action and four action alternatives previously identified for the Upper Goodnews River. They used the action alternatives to generate detailed preliminary alternatives for the revision. DRM Stovall and RS Clough met with Regional Supervisors Glenn Elison and George Constantino on July 31 to discuss the preliminary alternatives. Five alternatives were presented which included a range of options from increasing commercial sport fish guiding opportunities to limiting non-guided use.

Revision team members DRM Stovall, MW Doyle, RO Planner Clough, and ASM Fisher conducted a float trip on the Kanektok River August 7-13. Stops were made at high use gravel bars, pre-arranged meetings were conducted at base camps of commercial sport fishing guides, evening discussions were held with the Service's river rangers, and IRA Administrator Anthony Caoele with family, IRA Natural Resource Manager Frank Fox, and Quinhagak River Ranger

Edward Mark boated up river for a spaghetti dinner with the team members and Service rangers to discuss river issues on a more informal basis. It was a very beneficial and educational trip for all.



Photo 2. Quinhagak IRA representatives discuss river issues with team members.

The team met again on December 16-18. This was the first meeting a representative from DNR attended. DNR has been kept informed of the activities through out the revision process, and they are trying to be as active as possible even with limited funds and resources. The team discussed alternatives for each unit and a draft preferred alternative was developed. The next step is to conduct an impact analysis.

3. Public Participation

Substantial public involvement has been incorporated into refuge biological programs and public use planning efforts. Village meetings and media resources are the primary methods for outreach. Villages most affected by refuge management include, Dillingham, Aleknagik, Manokotak, Togiak, Twin Hills, Quinhagak, Goodnews Bay, and Platinum.

4. Compliance with Environmental and Cultural Resource Mandates

When making environmental and cultural compatibility determinations, Togiak Refuge relies on sections of ANILCA other than those delineating the specific refuge purposes. Section 101 of ANILCA established the general purposes of the Act, which included, ". . . preserving wilderness resource values and related recreational opportunities including but not limited to hiking,

canoeing, fishing, and sport hunting . . . " Compatibility determinations exist for all permitted uses of the refuge and ANILCA Section 810 contains compliance determinations evaluating the effects of refuge activities on subsistence uses.

Determinations exist for the Comprehensive Conservation Plan, Public Use Management Plan, guided sport fishing, guided big game hunting, guided waterfowl hunting, air taxi services, set net operations, wildlife viewing, scientific research, and administrative activities.

5. Research and Investigation

a. ABUNDANCE AND DISTRIBUTION OF MARINE MAMMALS IN NORTHERN BRISTOL BAY

Togiak Refuge's rocky coast and sandy beaches support a diverse and abundant marine mammal population. The Cape Peirce/Cape Newenham area and the Walrus Islands State Game Sanctuary are two areas particularly rich in marine mammals, providing haulout areas for walrus (Odobenus rosmarus divergens), harbor seals (Phoca vitulina), spotted seals (Phoca largha), and Steller sea lions (Eumetopias jubatus).

Cape Peirce and Round Island are the only two regularly used land-based haulouts for Pacific walrus in the United States. Walrus periodically haul out at Cape Seniavin and Cape Newenham; however, these areas are not used every year. Female and young walruses that winter in and near Bristol and Kuskokwim bays migrate north in the spring. Many of the males remain behind and haul out at Cape Peirce and/or Round Island. Cape Peirce was historically used as a haulout site but was abandoned sometime during the first half of this century. Walruses began reusing the haulout in 1981 and have returned every summer since.

In 1987 and 1988 the number of walruses hauling out at Cape Peirce and Round Island declined. During this time the yellow-fin sole fishery began in northern Bristol Bay, with fishing activities concentrated in the Round Island area. Concern that the decline in the number of walruses hauling out might be related to the initiation of the yellow-fin sole fishery resulted in the North Pacific Fisheries Management Council's (NPFMC) decision to restrict the activities of the yellow-fin sole fishery. In August of 1991 the NPFMC voted to continue indefinitely the 12-mile closure around Cape Peirce and Round Island, with a three-mile transit zone around Right Hand Point. The Service has verbal agreements with NPFMC, National Marine Fisheries Service (NMFS), and ADFG to continue monitoring walrus at Cape Peirce as part of the effort to assess effects of the fishery.

Togiak Refuge's 1996 marine mammal program focused on monitoring the abundance and distribution of walruses, seals and sea lions in northern Bristol Bay and southern Kuskokwim Bay. For the first time since 1993, funding permitted regular monitoring of Cape Newenham walrus and sea lion haulouts from early June to mid-August. Ground counts of walruses at Cape Peirce, Cape Newenham and Round Island produced peak numbers of 3,105 on October 6, 1,280 on July 13, and 6,331 on July 25, respectively. The peak count at Cape Peirce this year occurred later than usual and was lower than the peaks of the last three years. The greatest number counted on any one day during 1996 in northern Bristol Bay-southern Kuskokwim Bay was 6,691 on July 15. Other high total counts of the area occurred on July 25 with 6,614 walruses and on July 23 with 6,388 walruses, counted at all three haulouts.

For the third consecutive year, walrus hauls out atop cliffs overlooking Maggy and Parlier beaches. At least 47 fell to their deaths in 1996 in late August (see Section G. 9c).

Staff at Cape Peirce assisted U. S. Geological Survey - Biological Resources Division (USGS-BRD) personnel in tagging walrus with radio and satellite-linked transmitters from July 20 - August 8. A biological technician from USGS-BRD remained at Cape Peirce to monitor tagged walrus until camp was closed on November 1.

Harbor and some spotted seals haul out along the refuge's coast, with highest concentrations at Nanvak Bay and Hagemeister Island. Nanvak Bay is the northernmost pupping area and the largest haulout for harbor seals in northern Bristol Bay. The number of seals hauling out in Nanvak Bay has declined since the mid 1970s. Population trends examined in the Gulf of Alaska indicate a similar population decline. Limited data from Prince William Sound and the southeastern Bering Sea also suggest that since the mid 1970s harbor seal numbers have declined.

Cape Newenham and Round Island support the two largest Steller sea lion haulouts in northern Bristol Bay. Sea lion populations have been monitored by ADFG staff at Round Island since the late 1970s. Monitoring sea lions at Cape Newenham by refuge staff, with funding from NMFS, began in 1990 and continued through 1993. In 1991 concentrated efforts determined that Cape Newenham is a haulout and that pupping is rare. From the late 1950s to the mid 1980s, sea lion numbers have declined in Alaska. In 1990, Steller sea lions were listed as a threatened species and in 1995 NMFS proposed listing the population west of Cape Suckling as endangered, making this a critical time to monitor sea lion haulout sites and rookeries.

Nanvak Bay near Cape Peirce continues to be the largest seal haulout in northern Bristol Bay. A peak count of 581 seals was recorded there on August 21. This year's peak is similar to the peaks of the past several years but much lower than the peak count of 3,100 in 1975. This decline parallels harbor seal population trends observed in other parts of Alaska; the causes of the decline are unknown and must be further investigated. Harbor seal pups were observed in Nanvak Bay; a high count of 6 pups was recorded on July 1.

b. STATUS OF KITTIWAKES, MURRES, AND CORMORANTS AT CAPE PEIRCE AND CAPE NEWENHAM, BRISTOL BAY

At four locations along the northern Bristol Bay coast (Cape Peirce, Cape Newenham, Shaiak Island, and Bird Rock), staff at Togiak Refuge has monitored populations and reproductive performances of Black-legged Kittiwakes (*Rissa tridactyla*), Common Murres (*Uria aalge*), and Pelagic and Double-crested Cormorants (*Phalacrocorax pelagicus* and *P. auritus*) irregularly since 1971 and annually since 1984. The objectives of this annual monitoring program are to detect changes and determine causes of changes in population size and reproductive performance of these ledge-nesting seabirds for comparison with similar efforts elsewhere in Alaska.

Black-legged Kittiwakes, Common Murres, and Pelagic Cormorants are long-lived species that serve as indicators of fluctuations in the marine environment. Kittiwakes feed on prey near the ocean surface, while murres and cormorants dive for prey. If adequate prey is not available either before or during the breeding season, reproductive performance can be low. Climatological factors and disturbances can also affect reproductive performance.



Photo 3. Pelagic Cormorants with chicks at Cape Peirce.

Together, these four colonies support up to 1.5 million seabirds and comprise one of the largest mainland seabird colonies in the Bering Sea. Other species that breed here are the following: Double-crested and Red-faced cormorants (Phalacrocorax auritus and P. urile), Glaucous-winged Gulls (Larus glaucescens), Pigeon Guillemots (Cepphus columba), Horned and Tufted puffins (Fratercula corniculata and F. cirrhata), and Parakeet Auklets (Cyclorhynchus psittacula).

At Capes Peirce and Newenham in 1996, shore-based populations (adults and nests) of kittiwakes were among the lowest recorded since 1985 and 1991. Kittiwake breeding chronology was similar to past years at Cape Peirce, but later than in 1993 at Cape Newenham. Breeding parameters were the lowest recorded since 1981 and 1992 at both Capes. Shore-based populations (adults) of murres were similar to past years, but among the

lowest recorded since 1990 at both Capes. Murre breeding chronology was later than in most past years, and some breeding parameters were significantly lower than past years at both Capes. At Cape Peirce, shore-based populations (adults and nests) and breeding chronology of cormorants were similar to past years, but most breeding parameters were among the lowest recorded since 1986. Food shortages appear to be the most plausible explanation for low populations and productivities. This implies the Bering Sea ecosystem may be undergoing significant changes, and integrated studies are necessary to evaluate the affects of these changes on seabirds.

c. NUMBERS, COMPOSITION, RECRUITMENT, MOVEMENTS, AND SEASONAL DISTRIBUTION OF THE REINTRODUCED NUSHAGAK PENINSULA CARIBOU HERD

Historically, a large caribou herd roamed the coast of the Bering Sea from Bristol Bay to Norton Sound. Archaeological excavations near the village of Togiak in 1960 suggested that caribou were important to the Native population (Kowta 1963). Presumably, caribou once concentrated in the mountains upriver from Togiak Bay and in the rocky headland toward Cape Newenham. Large caribou herds were also observed "roaming over the mountains of the Nushagak Peninsula" (Petrov, 1900). Petrov (1884) noted that caribou were virtually absent from the lower Yukon-Kuskokwim River area by 1880. While still numerous in the upper Kuskokwim drainage (Capps, 1929), caribou were absent in the Togiak and Goodnews drainages as early as 1900. Alaska Game Commission noted only small scattered herds in the Kilbuck Mountains by the mid 1930s. Caribou disappeared during a period of human population growth, which included an influx of Caucasians and intense commercial trade.

Caribou were reintroduced to the Nushagak Peninsula in February 1988, after an absence of more than 100 years. The purpose was to reestablish a herd in the area which would eventually provide local residents with the opportunity to hunt caribou. The Nushagak Peninsula caribou herd has grown rapidly from 146 reintroduced caribou to more than 1,500 in eight years, a rate of increase of about 36% per year. The dramatic growth of the herd has been attributed to the initial high percentage of females in the herd, high calf production and survival rates, the pristine condition of the range, a lack of predators, and the fact that no hunting has been allowed. The abundance of high quality forage on the Nushagak Peninsula is probably responsible for the enhanced body condition of the animals and the high natality rate, even among 2-year-olds, and it has most likely contributed to the high calf survival and recruitment rates. The lack of predators and the prohibition hunting have allowed calf and adult mortality to remain low.

Although the size of the herd has grown steadily over the past eight years, no significant dispersal from the peninsula has occurred. The population density of the herd was estimated to be 1.5/km² in 1996. We believe the herd will continue to grow and could reach a density of 2.1/km² by 1998 at a herd size of 2,000 caribou. While the current growth rate of the herd makes the reintroduction a success, the increasing density of animals, the lack of dispersal, and the potential for over-grazing present managers with hard decisions. Although the management plan calls for a maximum of 1,000 caribou on the Nushagak Peninsula, we recommend a conservative approach to managing the herd to slowly increase harvest to levels that will eventually reverse the current growth trend. This will allow the herd to remain at higher densities for now and encourage dispersal without impacting the range.

The second legal hunt of the Nushagak Peninsula Caribou Herd took place January 1 - March 31, August 1 - 31, and December 1 - 31, 1996 with 55 caribou reported killed.

d. BROWN BEAR DENSITY, MOVEMENTS, AND POPULATION PARAMETERS IN THE SOUTHWESTERN END OF THE KUSKOKWIM MOUNTAINS AND ADJACENT RANGES, WESTERN ALASKA

The six-year long study to examine the ecology of the brown bear population in the Kuskokwim Mountains remains "on-hold". Activities have been limited to tracking existing radiocollared bears.

Togiak Refuge, Yukon Delta NWR, BLM-Anchorage District, and ADFG staff have voiced concerns each year since 1980 regarding the uncertain status of brown bears in the region and the incomplete harvest information. Potential threats to refuge brown bears include increased human activities related to mineral development, fish camps, sport and subsistence hunting, poaching, illegal exchange in bear parts, and recreation. The Federal Subsistence Board set new brown bear harvest regulations in 1992 which liberalized the subsistence harvest. One brown bear may be taken per year, instead of one every four years, and the skull and hide are not required to be sealed; only the kill must be reported. It is suspected that subsistence harvest is significant, and in some years believed to substantially exceed the reported take. Knowledge gained from this study would have given a solid basis for management and monitoring of refuge brown bears.

All capture, marking, and radiocollaring of brown bears was discontinued by the Service Director in May 1995 upon appeal by the village of Kwethluk. A cooperative brown bear planning group was established to formulate an alternative, less intrusive study plan. Despite hiring a consultant, the cooperative planning group has not identified an alternative study design to conduct a statistically valid brown bear census.

January 1996 had 27 bears with functioning radiocollars and by June 1996 only 26 were functioning. Only 25 were believed to be functioning in December 1996. Only 17 brown bear biotelemetry flights were made during 1996 which resulted in only 261 aerial radio relocations. Den emergence could not be documented in 1996; den entrance took place between October 11 and November 8. One 11-year old female was still up on November 8, however. On December 27 a seven-year old female was found out of her den. Unlike 1994 when three brown bears marked in this study were harvested by hunters, none were reported by ADF&G in 1995. The 1996 harvest information is not yet available from ADFG.

e. AROLIK RIVER RAINBOW TROUT SAMPLING

Three sampling trips were conducted on the Arolik River this field season. The first trip was from June 21-26 with 134 rainbow trout sampled. Twenty-two of these fish were recaptures. The second trip was from July 24-29 with 174 rainbow trout sampled. Sixty-two of these fish were recaptures. The third trip was from August 28 to September 1 with 16 rainbow trout sampled. Two of these fish were recaptures. For each trout sampled, the sex was determined if possible, length and weight were measured, and scales were collected from the preferred area.

Rainbow trout having a length of 300 mm or greater were marked with individually numbered Floy™ spaghetti tags. Scale ages from this trip ranged from a 3-year-old fish to a 10-year-old fish. The following table is a breakdown of the number of rainbow trout sampled from each scale age:

Table 3. Trout Sampled on the Arolik River in 1996

Age	Number of Fish
Unknown	91
3	7
4	18
5	27
6	87
7	46
8	40
9	7
10	1
Total	324



Photo 4. In the process of sampling a rainbow trout.

f. GECHIAK CREEK RAINBOW TROUT SAMPLING

Three sampling trips were conducted on Gechiak Creek this field season. The first trip was on May 24-27 with 42 rainbow trout sampled. Six of these fish were recaptures. The second trip was from June 5-8 with 21 rainbow trout sampled. Two of these fish were recaptures. The third trip was from July 13-16 with 174 rainbow trout sampled. Nine of these fish were recaptures. For each trout sampled, the sex was determined if possible, length and weight measured, and scales were collected from the preferred area.

Rainbow trout having a length of 300 mm or greater were marked with individually numbered Floy™ spaghetti tags. Scale ages from this trip ranged from a 2-year-old fish to an 9-year-old fish. The following table is a breakdown of the number of rainbow trout sampled from each scale age.

Table 4. Trout Sampled on Gechiak Creek in 1996

Age	Number of Fish
Unknown	18
2	14
3	31
4	123
5	14
6	21
7	6
8	8
9	2
Total	237

g. MATOGAK RIVER RAINBOW TROUT SAMPLING

One sampling trip was conducted on the Matogak River this field season. The trip was from August 20-22 and was the first trip performed on this river. There were no rainbow trout sampled.

h. ONGIVINUCK RIVER RAINBOW TROUT SAMPLING

Two sampling trips were conducted on the Ongivinuck River this field season. The first trip was from June 17-20 with no rainbow trout sampled. The second trip was from July 31 to August 3 with two rainbow trout sampled. There were no recaptures on this trip. For each trout sampled, the sex was determined if possible, length and weight measured, and scales were collected from the preferred area.

Rainbow trout having a length of 300 mm or greater were marked with individually numbered Floy™ spaghetti tags. Scale ages of these two rainbow trout were 5 and 7.

i. ONGOKE RIVER RAINBOW TROUT SAMPLING

One sampling trip was conducted on the Ongoke River this field season. The trip was from July 9-11 and was the first trip performed on this river. There were no rainbow trout sampled.

j. OSVIAK RIVER RAINBOW TROUT SAMPLING

One sampling trip was conducted on Osviak River this field season. The trip was from August 20-24 with 5 rainbow trout sampled. This was the first trip down this river and there

were no recaptures. For each trout sampled, the sex was determined if possible, length and weight measured, and scales were collected from the preferred area.

Rainbow trout having a length of 300 mm or greater were marked with individually numbered Floy™ spaghetti tags. Scale ages from this trip ranged from a 5-year-old fish to an 8-year-old fish. The following table is a breakdown of the number of rainbow trout sampled from each scale age:

Table 5. Trout Sampled on Osviak River in 1996

Age	Number of Fish
5	1
7	3
8	1
Total	5

k. PUNGOKEPUK RIVER RAINBOW TROUT SAMPLING

Three sampling trips were conducted on Pungokepuk Creek this field season. The first trip was on May 16-20 with 47 rainbow trout sampled. Nine of these fish were recaptures. The second trip was from June 5-6 with 2 rainbow trout sampled. There was one recapture on this trip. The third trip was from July 19-21 with 53 rainbow trout sampled. Eight of these fish were recaptures. For each trout sampled, the sex was determined if possible, length and weight measured, and scales were collected from the preferred area.

Rainbow trout having a length of 300 mm or greater were marked with individually numbered Floy™ spaghetti tags. Scale ages from this trip ranged from a 2-year-old fish to an 11-year-old fish. The following table is a breakdown of the number of rainbow trout sampled from each scale age.

Table 6. Trout Sampled on Pungokepuk Creek in 1996

Age	Number of Fish
Unknown	8
2	3
3	6
4	29
5	15
6	26
7	9
8	3
9	2
11	1
Total	102

1. REFUGE SALMON SPORT AND ESCAPEMENT SAMPLING

Escapement age-sex-length (ASL) samples from chinook salmon carcasses were collected during refuge fisheries surveys and by refuge river rangers stationed on the Goodnews and Kanektok rivers. There were 15, 3, and 4 chinook salmon escapement samples collected from the Arolik River, Matogak River, and Osviak River, respectively. The Goodnews River rangers collected 100 chinook salmon escapement samples. The Kanektok River rangers collected 150 chinook salmon escapement samples. The escapement ASL data will be used by ADFG. The age composition of the chinook escapement can be used to build brood year tables and to forecast future runs if all components are consistently collected.

m. ANGLER SURVEYS

Refuge river rangers conducted angler surveys on the Goodnews and Kanektok rivers. Surveys were not performed on the Togiak River in 1996 as the refuge did not staff the ranger camp there. The Goodnews River rangers did not conduct angler surveys with the guided motorboat based camp because the owner asked that his guides and clients not be bothered while fishing. The camp did fax in daily catch and harvest information which provided the same information.

Angler surveys consisted of interviewing as many anglers as possible on a daily basis during the chinook and coho salmon runs. Fishermen were asked how many hours they had fished so far in the day, how many fish were caught, and how many fish were kept. From this information the catch per unit effort and harvest per unit effort were calculated. The results were reported to Dillingham during daily radio checks. The information was then turned over to the ADFG Sport Fish Biologist. This angler survey data was used to assess the level of sport fishing effort and success on each river and indicated movement of salmon into the river. By looking at the performance of the commercial and sport fishing effort, in river management can be undertaken when necessary. Other than aerial surveys and the weir on the Middle Fork of the Goodnews River, these angler surveys provide the only indicator of in river abundance.

On the Kanektok River, five angler surveys were conducted during the chinook salmon run interviewing 174 anglers from June 22 to July 8. An average CPUE of 0.48 was documented which is about one fish every 125 minutes. During the coho salmon run, nine angler surveys were conducted interviewing 117 anglers from July 28 to August 29 with an average CPUE of 2.25 or one fish every 27 minutes.

n. GOODNEWS RIVER WEIR

The Alaska Department of Fish and Game operates a salmon counting weir approximately three miles upriver on the Middle Fork of the Goodnews River. This weir was in operation from June 19 to August 23. The counts are used to regulate in season fishing times by allowing adequate salmon stocks to return upriver to spawn. High water washed out the rigid weir and didn't allow coho run monitoring. Catch sampling of sockeye, chinook, and chum salmon was performed at the weir to gather escapement data and on a tender in Goodnews Bay to acquire data of the commercially caught fish.

o. KUSKOKWIM BAY COMMERCIAL FISHERIES CATCH MONITOR

In addition to the Goodnews River weir, the ADFG office in Bethel conducts monitoring projects on the Kanektok River. A State technician was stationed in Quinhagak from mid June to mid August. This technician was responsible for monitoring commercial and subsistence catches, collecting age, sex, and length samples; dissemination of fisheries information to the public; assisting Fish and Wildlife Protection with enforcing regulations; and compiling historical data on the fishery. Similar duties were performed by personnel stationed at the Goodnews River weir. A new escapement project, the Kanektok River Tower, was operational for 16 days from July 3 to July 25 and provided expanded estimates for the runs of chinook, sockeye, and chum salmon.

E. ADMINISTRATION

1. Personnel

The following table identifies permanent staff members at Togiak Refuge.

Table 7. Permanent employees at Togiak National Wildlife Refuge

NAME	TITLE	GRADE	EOD
Aaron M. Archibeque	Refuge Manager	GS-13	06/29/90
Donna Stovall	Deputy Refuge Manager	GS-12	03/23/92
Michael T. Hinkes	Wildlife Biologist/Pilot	GS-12	01/22/90
Andrew Aderman	Wildlife Biologist	GS-11	08/21/94
Mark J. Lisac	Fisheries Biologist	GS-11	02/14/85
Robert MacDonald	Biological Technician - Fisheries	GS-07	04/19/92
Jonathan A. Dyasuk*	Interpreter	GS-09	09/02/87
Lee Ann Andrew*	Administrative Technician	GS-06	05/31/93
Robert Doyle*	Maintenance Worker	WG-08	01/22/95
Allen Miller	Park Ranger	GS-09	08/18/96
Michelle Smith	Administrative Technician	GS-05	06/23/96
Pete Abraham*	Refuge Information Tech. - Togiak	GS-07	08/26/93
Ferdinand Sharp*	Refuge Information Tech. - Manokotak	GS-06	03/26/95
Charlie Evans*	Refuge Information Tech. - Quinhagak	GS-07	02/22/88

*Local hire employees

The long awaited PFT Park Ranger, Allen Miller, was officially on payroll as of August 18th. He and his family arrived in Dillingham on August 29th and moved into their brand new government quarters. Allen came from NBS - Columbia River.

Administrative Technician (local hire) Michelle Smith started work on July 1. She was hired on to a position not exceeding one year. However, later in the year, a PFT local hire position was authorized and the job opportunity notice was posted closing December 20, 1996. Michelle was the only qualified applicant and was selected for the position.



Photo 5. Togiak Refuge staff (left to right) Standing - PR Miller, BTW Moran, RM Archibeque, WB Aderman, RI Dyasuk, MW Doyle, WB/P Hinkes, FB Lisac Kneeling - BTW Wilson, AT Smith, BTF MacDonald, AT Andrew and DRM Stovall.



Photo 6. (Left to Right) RIT's Sharp, Abraham, and Evans.

Each summer, the refuge hires several seasonal employees depending on the number of approved projects. Five of the eight seasonals listed in the following table were returning from the previous year(s).

Table 8. Seasonal employees at Togiak National Wildlife Refuge - 1996

NAME	TITLE	GRADE	EOD
Mike Mumau	Park Ranger	GS-06	05/28/96
Dominic Malenfant	Park Ranger	GS-06	05/28/96
Josh Peirce	Park Ranger	GS-05	06/01/95
Kellie Nolan	Park Ranger	GS-05	06/01/95
Ronnie Stanley	Park Ranger	GS-05	05/28/96
John Moran	Biological Technician - Wildlife	GS-07	05/02/93
Laura Burke	Biological Technician - Wildlife	GS-05	05/13/96
Toby Burke	Biological Technician - Wildlife	GS-06	05/13/96
Jeff Ahrens	Biological Technician - Wildlife	GS-05	05/22/96
Lisa Haggblom	Biological Technician - Wildlife	GS-07	05/06/89

2. Youth Programs

The refuge participated in an "On the Job Training" (OJT) program through Dillingham High School. Under this program, the school district pays the student's salary, and the student works an hour or so during school hours. OJT student Sun Small finished up his work term in January of 1996. A variety of projects including entering fisheries data and processing scales were completed. OJT gives students an opportunity to learn about the Fish and Wildlife Service, gain work experience, and to find out about various job opportunities.

3. Other Physical Labor Programs

Nothing to report.

4. Volunteer Program

Togiak Refuge received assistance from several volunteers in 1996. The following table identifies the individuals that participated in this year's volunteer program.

Table 9. Volunteers at Togiak National Wildlife Refuge - 1996

NAME	FROM	SERVICE DATES
Phil Caswell	Roxbury, NY	April 15 - May 23
Dominic Malenfant	Fairbanks, AK	May 23 - May 25
Joshua Peirce	St. Albans, UT	April 28 - May 11

5. Funding

Table 10. Funding History for Togiak National Wildlife Refuge

FY	1261	1262	1331	1971	1120/1210 /1230	4960	TOTAL
1986	322,000	-	60,000	-	-		382,000
1987	501,000	-	60,000	-	1,500		562,000
1988	675,000	-	60,000	-	-		735,000
1989	377,000	225,000	60,000	-	-		662,000
1990	434,000	255,000	79,000	-	-		768,000
1991	609,000	330,000	59,000	3,000	5,000		1,006,000
1992	541,000	347,000	80,000				968,000
1993	738,000	411,000	80,000				1,229,000
1994	810,000	442,000	80,000			38	1,332,000
1995	767,000	386,000	80,000	30,000		2,314	1,265,305
1996	1,033,000	151,000	80,000	31,249	2000	3000	1,300,249

Since 1994, the refuge has collected Special Use Permit Client Use Fees for commercial guiding, outfitting, and transporting on National Wildlife Refuges in Alaska. These fees will be adjusted every three years based on the Department of Commerce Implicit Price Deflator Index. Current fees were established in 1994 and will be effective through 1996. The following client use day fees on Togiak Refuge are as follows:

- * Brown bear hunting - \$10 per client use day
- * Waterfowl hunting - \$5 per client use day
- * Sport fishing - \$2 per client use day
- * Transporting - \$2 per client use day (includes only drop off and/or pick up days)
- * Photography/Birding/Other - \$2 per client use day

Reserved site fees will remain at the \$100 flat fee until Division of Realty completes the survey.

6. Safety

Monthly safety meetings were conducted and reports sent to the Regional Safety Officer. The topics varied, and the staff benefited from each topic presented. Other safety issues were discussed at weekly staff meetings.

As part of the ranger training, a 16-hour Wilderness First Aid course was provided through Wilderness Medical Associates, Anchorage. This is the third time instructor Sandy Call was contracted to teach a wilderness course to Togiak Refuge personnel. Each time she got excellent reviews. The course is much more practical for crews in a remote field setting than a standard First Aid course and allows for hands-on practice. It is highly recommended.



Photo 7. PR Pierce assists MW Doyle with his traumatic injuries.



Photo 8. RIT Sipary (Yukon Delta NWR) helps RIT Evans with his broken arm.

7. Technical Assistance

Nothing to report.

8. Other

a. Special Use Permits

A special use permit was issued to William Manley, Ph.D., INSTAAR Research Associate, University of Colorado at Boulder and Darrell Kaufman Asst. Professor, Utah State University. They have received funding from the National Science Foundation to conduct a three-year study entitled "Pleistocene Sea-Level and Glacial Fluctuations, Coastal Ahklun Mountains, Southwest Alaska." They will examine and describe river and coastal bluff exposures of stratigraphic sequences and analyze marine and glacial sediments. This year they plan to examine the Kanektok River banks and coastal areas along Quinhagak, Twin Hills, Hagemeister Island, and Crooked Island. They also hope to conduct a reconnaissance flight and to collect core samples from various lakes within the refuge all by August 5. This is the first year of the three-year project.

As identified by Service policy, all commercial operators authorized to conduct activities on refuge lands and waters do so via Special Use Permits. In 1996, there were 39 Special Use Permit operators. Several operators had multiple permits depending on services provided

and number of management units authorized. Of those, there were 22 sport fishing guides, 3 big game guides, 4 waterfowl guides, and 10 air taxi operators.

Table 11. Commercial Operators Authorized by Special Use Permit -1996

No.	Permit Type	Permittee	Business
T-14	Sport fishing	Paul Allred	Ouzel Expeditions, Inc.
T-15	Sport fishing	Chuck Ash	Hugh Glass Backpacking
T-23	Sport fishing	Bus Bergman	B&B Fishing Adventures
T-21	Sport fishing	Mike Cusak	King Salmon Lodge
T-06	Sport fishing	Dale DePreist	Aleknagik Mission Lodge
T-22	Sport fishing	Dave Duncan	Dave Duncan and Sons
T-26	Sport fishing	Paul Hansen	Ice Water Adventures
T-25	Sport fishing	George Heim	Alaska River and Ski Tours
T-20	Sport fishing/Waterfowl	Bud Hodson	Tikchik Narrows Lodge
T-63	Sport fishing	Bud Hodson/Ron McMillan	Togiak River Fishin Adven.
T-01	Sport fishing	Ron Hyde	Alaska River Safaris
T-10	Sport fishing	Barry Johnson	Alaska Fishing Adventures
T-08	Sport fishing	Rene Limeres	Ultimate Rivers
T-18	Sport fishing/Waterfowl	Bill Martin	Fish Alaska
T-17	Sport fishing/Waterfowl	Ron McMillan	Bristol Bay Lodge
T-66	Sport fishing/Waterfowl	Dan Michels	Sport Lodges, Ltd.
T-62	Sport fishing	Charles Miknick	Alaska Adventures
T-68	Sport fishing	John Nicholson	Rainbow Expeditions
T-16	Sport fishing	John Ortman	Wood River Lodge
T-13	Sport fishing	Dan Rawding	Alaskan Silver Highlander
T-09	Sport fishing	Lou Rosgen	Frontier River Adventures
T-07	Sport fishing	Mike Trotter	Beyond Boundaries
T-05	Big Game	John Peterson	
T-04	Big Game	Chris Goll	Rainbow River Lodge
T-02	Big Game	N.E. Hautanen	
T-30	Air Taxi		Yukon Aviation
T-39	Air Taxi		Shannon's Air Service
T-32	Air Taxi		Starflite
T-34	Air Taxi		Yute Air Alaska
T-31	Air Taxi		Kusko Aviation
T-28	Air Taxi		Katmai Air Service
T-51	Air Taxi		Branch River Air Service
T-36	Air Taxi		Tikchik Airventures
T-38	Air Taxi		Bay Air
T-58	Air Taxi		Fresh Water Adventures

Thirty-six commercial sport fish guiding proposals were submitted in response to the Prospectus issued March 19, 1996. All proposals had to be postmarked by the 18th or hand delivered by the 22nd. DRM Stovall, R.O. Planner Helen Clough, and DRM Mike Hawkes (Kodiak NWR) evaluated the proposals at the Kodiak bunkhouse. There were sixteen different applicants of which ten were awarded a special use permit or permits, five applicants were unsuccessful, and one applicant was disqualified for failure to disclose a compliance violation. The following identifies all successful applicants who responded to the Togiak National Wildlife Refuge Prospectus and Request for Proposal.

Offering Number 1: Guided Fly-in Sport Fishing - Wilderness Lakes
(Unit 13A and 13B - only includes headwater lakes)

Term of permit(s): January 1, 1997 - December 31, 2001 (5 years)

All applicants for this offering will receive a special use permit.

In alphabetical order:

Bud Hodson - Tikchik Narrows Lodge
Bill Martin - Bill Martin's Fish Alaska, Inc.
Ron McMillan - Bristol Bay Lodge
Dan Michels - Sport Lodges Ltd. dba Crystal Creek Lodge
John Ortman - Wood River Lodge

Offering Number 2: Guided Fly-in/Motorboat Sport Fishing - Kulukak River (Unit 2)

Term of permit: January 1, 1997 - December 31, 2001 (5 years)

Of four applicants, the following operator will receive a special use permit for this offering.

Bud Hodson - Tikchik Narrows Lodge

Offering Number 3: Guided Fly-in/Motorboat Sport Fishing - Kulukak River (Unit 2)

Term of permit: January 1997 - December 2001 (5 years)

Of four applicants, the following operator will be awarded a special use permit for this offering.

Bill Martin - Bill Martin's Fish Alaska, Inc.

Offering Number 4: Guided Fly-in Sport Fishing - Wilderness Lakes
(Units 13A & 13B - only includes headwaters lakes)

Term of permit(s): June 1, 1996 through December 31, 1996 (1 season)

All applicants for this offering will receive a special use permit.

In alphabetical order:

Dennis Gearhart - Mission Lodge at Aleknagik
Dan Michels - Sport Lodges Ltd. dba Crystal Creek Lodge
John Ortman - Wood River Lodge

Offering Number 5: Guided Fly-in/Motorboat Sport Fishing - Upper Togiak River
Kemuk River zone (Unit 5)

Term of the permit: January 1, 1997 through December 31, 1997 (1 season)

Of three applicants, the following operator will be awarded a special use permit for this offering.

Dan Michels - Sport Lodges Ltd. dba Crystal Creek Lodge

Offering Number 6: Daily Guided Motorboat Sport Fishing Access to the Upper Togiak River (Unit 5)

Term of the permit: June 1, 1996 through December 31, 1997 (2 seasons)

Of four applicants, the following operator will be awarded a special use permit for this offering.

Bud Hodson/Ron McMillan - Togiak River Fishing Adventures

Offering Number 7: Guided Float Boat Sport Fishing - Upper Togiak River (Unit 5)

Term of the permit: June 1, 1996 through December 31, 1997 (2 seasons)

Of four applicants, the following operator will be awarded a special use permit for this offering.

Paul Hansen - Ice Water Adventures

Offering Number 8: Guided Float Boat Sport Fishing - Kanektok River (Unit 9)

Term of the permit(s): June 1, 1996 through December 31, 1998 (3 seasons)

The following start dates were offered:

June 30, July 14, August 29, September 4, September 6, and September 8

Of nine applicants, the following operators will be awarded a special use permit for this offering.

In alphabetical order:

Paul Allred - Ouzel Expeditions

(start date awarded: September 8)

Bus Bergmann - B & B Fishing Adventures

(start dates awarded: July 14, August 29, September 4, and September 6)

John Nicholson - Rainbow Expedition

(start date awarded: June 30)

b. River Ranger Program

The river ranger program was conceived during the public use management planning process and was first implemented in 1991. The program serves many purposes. River rangers are the primary contact source for sport fishermen and local residents. Knowledge obtained or distributed through these contacts is essential if resources are to be properly managed. Information distributed to the public includes Service policies, regulations, resource management practices, State sport fish regulations, bear safety, wilderness ethics, low impact camping, and information about private Native lands to prevent trespass. Information rangers document includes the level of sport fishing and subsistence use occurring on the river along with the location and timing of activities, conflicts between recreational and subsistence users, conflicts between different recreational users, sport fish catch/harvest per unit effort, neotropical bird sightings and other wildlife sightings. In addition, they contact all float parties, patrol campsites for litter, dispose of abandoned set nets, monitor compliance of commercial sport fishing operators, collect water samples, and offer assistance as needed.

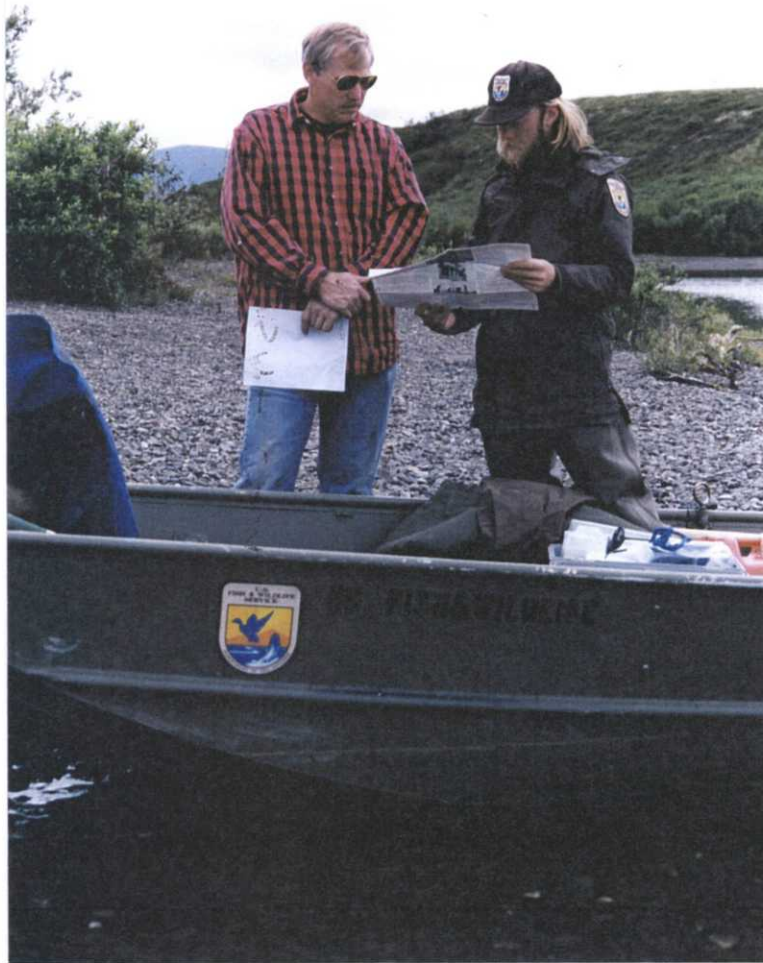


Photo 9. Ranger Peirce reviews the river brochure map with a sport fisherman.

River rangers collect information which is instrumental in developing fishery management strategies. Angler surveys conducted by river rangers during the king and coho sport fisheries provide an instantaneous look at angler success/harvest and strength of the salmon run. This information is shared with State fishery managers. There has been an increasing need for any piece of data concerning the status for coho runs. In the past, coho salmon sport fishery bag reductions have been implemented by emergency order. Rangers also collect scale samples from spawned king salmon to be aged in the Dillingham office to be entered into a data base identifying long-term trends.

Prior to going into the field, all rangers are provided instruction regarding the Public Use Management Plan; ranger ethics, duties and conduct; emergency procedures; and watercraft, aircraft, bear, and firearm safety. By mid June, they are ready to set up camp at designated sites. Rangers live in remote field camps and work in pairs. Their means of transportation is via boat (16-18' skiff) with 40 hp outboard motor. Camp consists of a weatherport for a

cook tent/office and personal tents for sleeping quarters. On a regular basis, fresh food and supplies are flown in from Dillingham or are purchased in the village along with gasoline.

By the end of the season, mid September, rangers know every river bend and gravel bar and become as one with their outboard motor and skiff. After camp is broken down, gear is cleaned and put away, and information obtained throughout the summer is documented in a River Ranger Summary Report. Visitor use is calculated and graphed.

Rangers have the opportunity to meet and get acquainted with many different types of individuals on the river. They contact sport fishermen from all over the United States and around the world. Native villages located at the outlet of each river consist of mostly Yup'ik Eskimos who provide a unique source of historical and cultural information. Reports received from the public, sport fishing guides, and local residents regarding river ranger personnel and the overall program are very positive.

Two of last year's rangers returned; they were Kellie Nolan and Josh Peirce and stationed on the Goodnews River. New hires were Dominic Malenfant and Ronnie Stanley who operated the Kanektok River camp and Michael Mumau was the expeditor in Dillingham. As the case last year, a cut in project funds limited us to only two field camps. The current issues on the Goodnews and Kanektok rivers were more pressing than those on the Togiak River so the Togiak camp was cut from operations. We hope to have full funds next year in order to operate all three camps.



Photo 10. (Left to Right) River Rangers Nolan, Malenfant, Stanley, Peirce and Mumau prepare to head into the field.

F. HABITAT MANAGEMENT

1. General

The refuge includes a variety of land forms including mountains, U-shaped valleys with sheer walls, beaches, sea cliffs, glacial lakes, and moraines. Most of the refuge's interior is dissected mountainous uplands, stretching from the Ahklun Mountains in the west to the Wood River Mountains in the east. The Wood River Mountains rise in elevation from 1,000 feet in places around Kulukak Bay to more than 5,000 feet in the northeastern corner of the refuge. In the northeastern Ahklun Mountains, elevations rise above 4,000 feet, but summits in the southwest are more widely separated and taper down to lower, smoother hills.

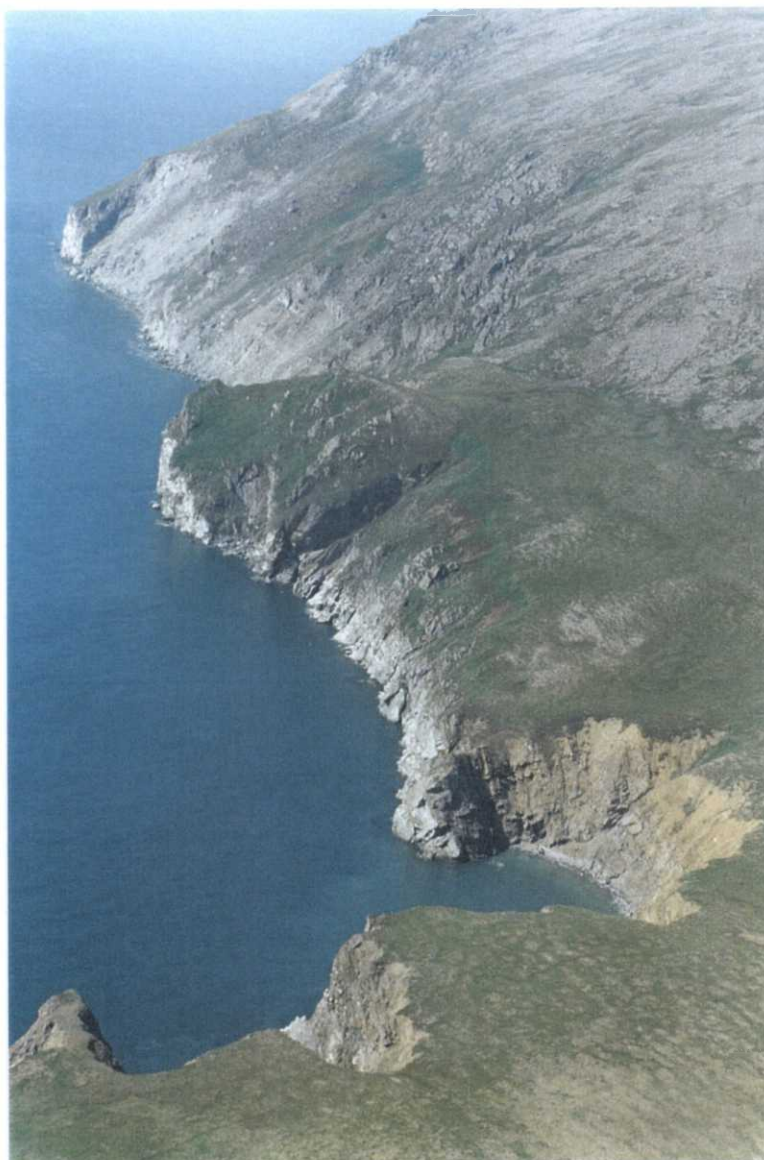


Photo 11. Togiak Refuge's coastline at Cape Newenham.

The refuge coastline includes precipitous cliffs, sand and gravel bars, lagoons, beaches, estuaries, and littoral and pelagic waters. The most notable lowland areas are adjacent to Jacksmith, Chagvan, Osviak, and Nanvak bays, as well as the Nushagak Peninsula. These lowlands rise from

sea level to a maximum of 560 feet near the mountains. Plateaus and benches found on these lowlands contain many small lakes and sloughs. Local relief of the lowlands varies from 50 to 360 feet.

Drainages tend to flow to the southwest, parallel to the grain of the mountains. The wide Togiak River Valley below Togiak Lake marks an otherwise indistinguishable separation of the Ahklun and Wood River mountains. Many of the broad U-shaped glacial valleys interspersed throughout the mountains contain large, deep glacial lakes and snow-melt streams.

Vegetation on the refuge includes plants common to both arctic and subarctic regions. Tundra, which occurs on nearly all of the refuge, is classified into three general types:

Moist tundra is found on approximately 50% of the refuge and usually forms a complete ground cover. This is the most productive of the tundra habitats. It consists of cotton grass, sedges, mosses, grass tussocks, and shrubs, which include willow, Labrador tea, mountain cranberry, and bog blueberry.

Alpine tundra is the second most common type and is found on the higher mountains and ridges. It consists of low-growing mats of lichens and of herbaceous and shrubby plants, interspersed with patches of barren shelf or broken rock. Plant species found here will primarily include crowberry, dwarf willow, Labrador tea, mountain cranberry, bearberry and blueberry.

Wet tundra, which comprises only about 2% of the area, is the least common type of tundra on the refuge. It is mostly found in low coastal zones, in drainages with shallow lakes, and in extensive marsh areas with standing water. The vegetation is made up of a mat of lichens, mosses, and sedges and may include a few woody species, such as bog cranberry and bog rosemary. On the drier portions of this type of tundra, dwarf birch and dwarf willow may occur.

Volunteer Phil Caswell left Dillingham on May 23 to begin collecting and documenting plant specimens at Lake Clark. While in Dillingham, he finalized his report "Togiak Refuge Botanical Activity". Using existing records and specimens and seven months of collecting in Togiak Refuge (1992, 1994, and 1995), Phil produced a list of approximately 510 species. The number of vascular plant species in the refuge appears to be around 600 species. Thus, the current list might be considered 90% complete. Only plants that grow in restricted habitats or in limited numbers have escaped detection. Before Phil left, he identified a Togiak Refuge Plant Hit List (identifying approximately 125 plants) that field personnel are on the look out for.

2. Wetlands

Most of the coastal areas, and to some extent the low lying interior valleys, are pristine wetlands. Coastal wetlands include brackish and fresh water lakes, ponds, and marshes with both stabilized and active dunes. Large inland areas of wide, shallow valleys are studded with shallow lakes, ponds, marshes, and wet meadows, interspersed with dry uplands on buttes, hills, and plateaus.

3. Forests

Nothing to report.

4. Croplands

Nothing to report.

5. Grasslands

Nothing to report.

6. Other Habitats

Willow and alder thickets occur along creek drainages up to elevations of 1,900 feet msl (mean sea level). Scattered stands of cottonwood, and a few well scattered white spruce trees are found along the Togiak River drainage. Cottonwood, willow, birch, and alder thickets occur along the Goodnews and Kanektok river drainages.

The eastern portion of the refuge, between the Togiak River drainage and Dillingham, has several relatively large stands of white spruce and birch. These stands are islands of trees representing areas free of permafrost, surrounded by moist or wet tundra plains.

7. Grazing

Nothing to report.

8. Haying

Nothing to report.

9. Fire Management

The refuge is divided into two fire management districts: the Yukon/Togiak Planning Area and the Kuskokwim/Iliamna Planning Area. With cool rainy summers, wildfires are rare.

10. Pest Control

Nothing to report.

11. Water Rights

Nothing to report.

12. Wilderness and Special Areas

The Togiak Wilderness (approximately 2.3 million acres) covers about half of the refuge and is included as one of the refuge's "special values" in the Comprehensive Conservation Plan. The wilderness area includes pristine rivers, clear mountain lakes, and steep sloped mountains. It provides outstanding opportunities for solitude and primitive recreation. The rugged Ahklun and Wood River mountains, partly within the wilderness area, are noteworthy for their scenic values.

The wilderness area provides opportunities for local residents to engage in traditional subsistence activities such as hunting, fishing, berry picking, wood gathering, and trapping. The unique clear water rivers with diverse and abundant fisheries result in ever increasing demands for recreational sport fishing opportunities.

Wilderness additions proposed in the preferred alternative of the refuge Comprehensive Conservation Plan would add approximately 357,000 acres to the already existing wilderness acreage. The proposed area includes the old Cape Newenham Refuge area and lands surrounding the headwaters of the south fork of the Goodnews River. This proposal would bring the remainder of the Goodnews River drainages, found within the refuge boundary, under the extra management protection afforded through wilderness designation. It would also provide the same protection to the watershed areas of Cape Newenham and Cape Peirce. This could become extremely important in the future in protecting the segment of the ecosystem which helps to support walrus, sea lions, and seal haulout areas, as well as the extensive seabird nesting colonies found at both Cape Newenham and Cape Peirce. The natural diversity protected by wilderness designation will serve as an invaluable source of data for scientific investigations for future fish and wildlife needs.

13. WPA Easement Monitoring

Nothing to report.

G. WILDLIFE

1. Wildlife Diversity

Togiak Refuge is a crossroad for waterfowl and shorebirds coming from wintering areas as far away as Russia, Japan, Mexico, South America, New Zealand, and several of the South Pacific Islands. Bristol Bay, which forms a portion of the southern boundary of the refuge, has been described as the southern terminus of the Arctic Bird Migration Route. Birds from the Asiatic Route, Mid-Pacific Route, and North American Pacific Flyway funnel through the area.

The diversity of habitats within Togiak Refuge, from coastal cliffs to alpine tundra, attracts a wide variety of wildlife. Two hundred and fifty species of resident and migratory wildlife are believed to occur on or adjacent to the refuge: 33 fish; 169 bird; 31 terrestrial mammal, and 17 marine mammal species. A list of wildlife species inhabiting the area can be found in the refuge Comprehensive Conservation Plan.

2. Endangered and/or Threatened Species (Also See Section D.5)

Threatened or endangered species present within the refuge include the American Peregrine Falcon, the gray whale, and the Steller sea lion. Gray whales can be seen from April through July along the northern Bristol Bay coastline as they migrate from wintering grounds to the Bering and Beaufort seas. Up to 100 whales per day can be seen in the Togiak Bay area in May, and smaller numbers are seen in the Cape Peirce/Cape Newenham area. Cows with calves, as well as single adults, are regularly seen.

Steller sea lion populations have been declining rapidly in the western Gulf of Alaska and Bristol Bay. The cause of this decline is unknown, but State and Federal agencies are researching possible causes. Refuge staff began working cooperatively with National Marine Fisheries and Alaska Department of Fish and Game in 1990 to collect sea lion population counts along the coastal regions of the refuge.

Other endangered species that historically occur in this area include the Aleutian shield-fern, Aleutian Canada Goose, Eskimo Curlew, Short-tailed Albatross, and several whale species (blue, bowhead, finback, humpback, right, sei, and sperm).

3. Waterfowl

Because of its location along the coast in southwestern Alaska, Togiak Refuge is host to a wide variety of migrant and resident waterfowl. Lakes, rivers, tundra ponds, and coastal wetlands offer nourishment and resting areas for staging, breeding, and molting waterfowl. The refuge serves as the apex of a funnel for waterfowl on the Pacific Flyway corridor, heading to or from nesting grounds of the Arctic coast and the Yukon-Kuskokwim River Delta. As many as a quarter-million waterfowl have been counted in bays, lagoons, and lakes along the coast of Togiak Refuge, one of the last stopping areas for waterfowl awaiting spring breakup in the Arctic.

Large eel grass beds in the saltwater lagoons of Osviak Slough, Nanvak Bay, Jacksmith Bay, and Chagvan Bay are important staging and feeding areas. Nanvak and Chagvan bays are the two most important spring and fall staging areas on the refuge; the latter contains an estimated five square miles of eel grass beds. Other areas of importance to waterfowl include the Nushagak Peninsula, Kulukak Bay, and Carter Bay.

During spring breakup, early migrants began to appear. Sandhill Cranes, Northern Pintails, and Tundra Swans are usually the first to arrive. Open water is usually scarce at this time causing early arriving waterfowl to congregate on available water bodies consisting of overflows on lakes and coastline tidal pools.

Subsistence uses of waterfowl, including Arctic nesting geese, are important to residents in most rural villages and camps where people have long relied upon them.

a. Swans and geese

All four species of arctic-nesting geese (Pacific Black Brant, Emperor Geese, Canada Geese, and Greater White-fronted Geese) use the refuge as a primary spring and fall staging area.

Pacific Black Brant are the most prevalent species in Nanvak and Chagvan bays. Numbers usually peak at 50,000 in April and/or May. Movements and concentrations of Brant within

the bays vary with tides. During high tide, flocks tend to congregate in the marsh and then disperse into the bays to feed in the eelgrass beds as the tide recedes.

More prevalent during the fall migration, Emperor Geese and Canada Geese are often observed in mixed flocks on mud flats, eelgrass, and marsh areas. They are also commonly observed feeding in berry patches in the tundra surrounding the sloughs. Peak numbers of each species normally range around 2,000. Canada Geese often show a preference for an overland migration route when exiting the bays. Greater White-fronted Geese are the least numerous of the four species with peak numbers around a few hundred.

Tundra Swans are common breeders in southwest Alaska and nests can be found scattered throughout the refuge from mid April through September.

b. Ducks

Mallards can be seen in small numbers regularly through May in Nanvak and Chagvan bays. Northern Pintails are commonly seen through spring and early summer; numbers are greatest during fall migration. Green-winged Teals are common local breeders. In late April and May, small numbers of American and Northern Shovelers are seen. Greater Scaup are observed regularly in small numbers throughout the spring. Oldsquaws are seen regularly from late April through the beginning of June, then infrequently until late August, when they are seen regularly again. Harlequin Ducks are common in water at the base of the cliffs throughout the season. Steller's Eiders are common during spring and fall migration. Common Eiders are seen regularly through the beginning of August. King Eiders are common throughout the season. Black Scoters are more common than White-winged Scoters in spring and summer; White-winged Scoters are more frequent in the fall. Surf Scoters are infrequently seen in July and August. Red-breasted Mergansers breed locally and broods are commonly seen on rivers.

Other waterfowl normally observed at some time during the spring migration include American Wigeon, Barrow's Goldeneye, Common Goldeneye, Spectacled Eider, Gadwall, Common Merganser, Bufflehead, and Eurasian Wigeon.

4. Marsh and Water Birds

Sandhill Cranes are usually the harbingers of spring. Consequently, their arrival is closely watched for. During the spring and fall, Sandhill Cranes are frequently found in groups of 10-30, in moist tundra habitat, tidal sloughs of the coastline, and along coastal water bodies. During the period of May through July, these birds disperse to establish their breeding territories.

Other species in the marsh and waterbird category that utilize the refuge as a migration stop over, feeding area, or breeding ground include Pacific Loons, Common Loons, Red-throated Loons, and Red-necked Grebes. The Red-throated Loon is predominately found using the refuge coastal and tidal area. The other species are usually found on freshwater lakes and wet tundra on the refuge.

5. Shorebirds, Gulls, Terns, and Allied Species (Also See Section D.5)

a. Shorebirds

Of the 22 species of shorebirds known to pass through the refuge, the following have been observed during the nesting season, either with broods or exhibiting nesting behavior: Black-bellied Plover, Lesser Golden Plover, Semipalmated Plover, Bar-tailed Godwit, Whimbrel, Black Turnstone, Ruddy Turnstone, Greater Yellowlegs, Red-necked Phalarope, Common Snipe, Short-billed Dowitcher, Western Sandpiper, Pectoral Sandpiper, and Dunlin. In addition, groups of Bristle-thighed Curlews have been observed feeding in tidal mud flats along the refuge coastline. Many shorebird species using the refuge are migrants, stopping in to feed and rest for short periods before continuing their migration. Some of these species come from wintering grounds in New Zealand, Japan, and the South Pacific Islands. Most shorebirds begin arriving upon spring break up (mid-to-late April) and head south again by mid-September.

b. Jaegers, Gulls, Terns and Allied Species

Glaucous Gulls are common in Chagvan Bay in the spring and less common in Nanvak Bay. Glaucous-winged Gulls are common breeders, particularly on Shaiak Island and Bird Rock. Mew Gulls are common, possibly breeding in the area. Herring Gulls are common spring migrants, particularly in Chagvan Bay, and can be seen in July and August near Nanvak Bay. Bonaparte's Gulls are common fall migrants.

Arctic Terns range widely over the refuge, nesting along coastal zones and gravel bars, as well as on islands in freshwater lakes and rivers. They nest singly or in colonies.

Parasitic, Pomarine, and Longtail jaegers can also be found migrating along the coast, rarely coming ashore except to nest; the exception being the Pomarine Jaegar which is not known to nest on the refuge at all. Nesting occurs in low, wet tundra or tidal flats and beaches. Jaegers are predatory birds and sometimes appear to be parasitic on gulls and terns, by chasing them until they drop or disgorge food items.

c. Alcids and Cormorants

The steep sea cliffs along the coast, between Togiak Bay and Chagvan Bay, provide valuable nesting habitat for numerous seabird colonies; one of the most outstanding wildlife features on the refuge. The population of mainland nesting seabird species (Black-legged Kittiwake, Common Murre, Glaucous-winged Gull, and Pelagic Cormorant) using these cliffs is approximately 650,000. Black-legged Kittiwakes (numbering over 100,000) and Common Murres (over 500,000) are predominate.

Staff at Togiak Refuge has monitored populations and reproductive performances of kittiwakes, murres, and cormorants from shore-based plots at Cape Peirce annually since 1984 and at Cape Newenham since 1990. Boat-based population monitoring of kittiwakes and murres began in 1990 and also included Shaiak Island and Bird Rock. Together, these four colonies seasonally support more than a million seabirds and together comprise one of the largest mainland seabird colonies in the Bering Sea.

Black-legged Kittiwakes, Common Murres, and Pelagic Cormorants are long-lived species that serve as indicators of fluctuations in the marine environment. Kittiwakes feed on prey

near the ocean surface, while murre and cormorants dive for prey. If adequate prey is not available either before or during the breeding season, reproductive performance can be low. Climatological factors and disturbances can also affect reproductive performance. Monitoring the Bering Sea ecosystem has been identified as a high priority task within the Service.



Photo 12. Black-legged Kittiwakes are one of the common cliff nesters.

Other seabirds known to commonly nest on these cliffs are Double-crested and Red-faced Cormorants, Pigeon Guillemots, Parakeet Auklets, Horned Puffins, and Tufted Puffins. Horned and Tufted Puffins are both eloquent and awkward residents of the cliffs, and nest in rock cavities and grassy burrows. Puffins roost in the uppermost regions of the cliffs leaving the lower portions to the other seabirds.

6. Raptors and Owls

Raptors are predators at the top of complex food chains and are sensitive indicators of the health of the environment. Therefore, they are an important species to monitor. At least 13 raptor species have been identified on the refuge including the threatened American Peregrine Falcon. The Bald Eagle and the Northern Harrier are the most visible raptors on the refuge.

Nine raptor species that nest within the refuge are: Bald Eagle; Golden Eagle; Peregrine Falcon; Gyrfalcon; Northern Harrier; Rough-legged Hawk; Osprey; Great Horned Owl; and Short-eared Owl. Other raptors such as the Merlin, Hawk Owl, Boreal Owl and Snowy Owl are regular visitors, but no nesting activity has been observed within the refuge.

The first effort at locating and mapping bald eagle nest sites for annual production surveys took place during the winter of 1983-84. This effort was continued during the winters of 1984 through

1988. Follow-up nesting and production surveys were partially completed during the 1984, 1985, and 1986 field seasons. Only a partial was completed in 1989. There were no raptor surveys conducted since 1989, although incidental observations have been made in association with other field work.

At Cape Peirce and Cape Newenham, Rough-legged Hawks and Bald Eagles are common local breeders. Northern Harriers are seen regularly in early spring and late summer/early fall, primarily in the Nanvak Bay area. Short-eared Owls are seen regularly, particularly in the spring and fall around Nanvak Bay.

7. Other Migratory Birds

Passerine or landbirds are an important component of the avian diversity in Alaska. Within the United States, more than 75% of the breeding range of several species that migrate to the Neotropics occurs in Alaska. Nine species of songbirds, or 10%, that nest in Alaska and migrate to the Paleotropics breed nowhere else in the United States.

Recent evidence suggests that some landbird species are declining in abundance, fueling much speculation upon the causes of these declines, the species involved, and their habitat preferences. Principle to the management of migratory landbird resources is an understanding of their occurrence within the landscape. Baseline information of bird distribution is a primary need to preserve a natural diversity and abundance of fauna and flora on refuge lands.

Species known to migrate to and breed on the refuge include several species of sparrows (predominately Savannah, Golden-crowned, White-crowned, and Fox sparrows), Black-capped Chickadee, Boreal Chickadee, American Dipper, Dark-eyed Junco, American Pipit, Lapland Longspur, Common Raven, Snow Bunting, Rosy Finch, Common Redpoll, Hoary Redpoll, Gray Jay, five species of thrushes (Varied, Gray-cheeked, Swainson's, Hermit, and American Robin), Arctic Warbler, Wilson's Warbler, Yellow-rumped Warbler, Yellow Warbler, Ruby-crowned Kinglet, Yellow Wagtail, and Rusty Blackbird.

Tree Swallows are uncommon local breeders, but are common spring migrants. Bank Swallows are common local breeders; Barn and Cliff swallows are uncommon and rare spring migrants, respectively.

Very little work has been done on migratory landbirds in southwest Alaska. Petersen et al. (1991) assessed the relative abundance, seasonal occurrence, distribution, and habitat use of birds in the Kilbuck and Ahklun mountain region. During the field season, all field camp personnel now keep a daily log of the breeding status and abundance of bird species observed. Now that an efficient and consistent form of documenting birds on the refuge during the field season has been established, we hope to update the bird list and be able to determine some trends.

Despite a windchill to -67° F (air temp -18° to -14° F and winds to 25-30 mph), volunteers braved the weather to venture forth and see what birds might also be brave enough to show themselves on January 4th for the third annual Dillingham Christmas Bird Count (CBC). BTW's Moran and Wilson, BTF MacDonald, and ADM Smith coordinated 49 participants to scout a 15-mile wide circle centered around Dillingham for birds during daylight hours. Volunteers searched on foot, snowmachines, skis, snowshoes, in cars and at feeders, and saw a total of 19 species and 643 birds. Less birds overall were seen this year, probably due to the severe cold, windy weather, and less open water in the bird count area.

The Breeding Bird Survey (BBS) - Dillingham route was conducted by BTF Rob MacDonald (observer), DRM Stovall, and WB Aderman on July 4. There were 33 species and 421 individual birds recorded. The most common species observed included the Common Redpoll and Arctic Warbler. The Kanektok and Togiak river BBS routes were unfortunately not conducted this year.

8. Game Mammals (Also See Section D.5)

a. Moose

Moose are often observed throughout the eastern portion of the refuge during the summer months. Some have even been observed in the vicinity of Cape Peirce and Cape Newenham.

During the winter months, moose are the most common in the Killian Creek, Youth Creek, Sunshine Valley, Weary River areas.

Recent increases in moose in the Togiak River drainage along with a deficiency of adequate information on present and historical abundance, necessitated the need to conduct a more thorough examination of this area. Little written information on moose abundance on or near Togiak is available prior to the 1970's. In 1971, ADFG began surveying moose in Game Management Unit 17. In 1981, the first major survey of Unit 17A was conducted. (The majority of Unit 17A lands are in Togiak Refuge.) During 5.5 survey hours, only three moose were observed, resulting in the Board of Game's decision to close the hunting season. To date the season has remained closed. The majority of Unit 17A lands is in the refuge.

Aerial surveys of the Togiak River drainage revealed seven moose in 7.8 hours of flying during January 1987; four moose in 1.3 hours of flying during April 1991; six moose in 3.5 hours of flying in January 1992; 84 moose in 10.8 hours of flying in January 1994; and 100 moose in February 1995. Moose numbers in 1996 appeared to be similar to 1995. However, sightability during 1996 was reduced due to poor snow conditions making comparisons difficult. Unfortunately, unless methodologies and areas surveyed are similar from survey to survey, inferences made about population trends is limited. However, the general consensus from these surveys is that moose in the Togiak River drainage exist in a density well below what the habitat appears to be able to support.

Each year, snow and ice conditions exist during February, March, and early April which allow easy access to the refuge interior by local villagers on snow machines. Moose are taken illegally each year during this period.

b. Caribou

In February 1988, 146 caribou were reintroduced to the Nushagak Peninsula under a cooperative agreement between the Service, ADFG, Choggiung Limited, and the villages of Togiak, Manokotak, and Dillingham. The reintroduction was intended to reestablish caribou in an area where they had been an important subsistence resource for area residents. The principle objective was to establish a population large enough to sustain a reasonable hunt, while still allowing the herd to grow.

The Nushagak Peninsula Caribou Herd has grown rapidly from the reintroduced caribou to over 1500 animals at an average rate of increase of 36%. The dramatic growth of the herd was attributed to the initial high percentage of females in the herd, high calf production and

survival, pristine range, few predators and no hunting. Abundant high quality forage on the Nushagak Peninsula is the probable reason for the enhanced body condition and high natality rate even among 2-year-olds, and it has allowed calf and adult mortality to remain low. At the current rate of growth, the herd could exceed 2000 animals by 1998. Although the herd has grown steadily, it has not expanded its range much beyond the Nushagak Peninsula. The success of the reintroduction is due largely to the cooperation that has occurred between resource agencies and area residents.

In 1996, hunters reported harvesting 55 Nushagak Peninsula caribou during open seasons (January 1 - March 31, August 1 - 31, and December 1 - 31).

The Kilbuck Caribou Herd is a small resident herd that is found most of the year in Unit 18, south and east of the Kuskokwim River within the Yukon Delta National Wildlife Refuge. Since 1981, the Mulchatna Caribou Herd (east of Togiak Refuge) has increased at an annual rate of approximately 17%, now over 180,000 animals. This increase can be attributed to a succession of mild winters, low predation rates, and since 1971, an annual harvest rate of less than 5%. The herd has begun to expand its range and has encompassed over 40,000 square miles. Large portions of the herd have used new winter, calving, and summer ranges, all of which contain good to excellent caribou habitat.

Recently animals from both herds have begun to use Togiak Refuge lands. Observations of caribou have increased in the vicinity of Togiak Lake and are assumed to be Kilbuck animals. The Mulchatna caribou herd moved onto the refuge during the winter of 1994-95 and again in 1995-1996. Approximately 40,000 animals were counted in the northern half of the refuge. It is anticipated that eventually the ranges of all three herds will overlap. It has been approximately 100 years since any significant numbers of caribou have moved through the Togiak River drainage.

c. Bear

During the summer, brown bears are the most abundant big game animal found on the refuge. They have been found ranging from coastal beaches inland to high mountain ridges. Most of the bear observations occurred during flights over the refuge for other missions. Black bears are uncommon to rare.

The density, key denning areas, and other aspects of the brown bear population are not well understood. Bears are seasonally abundant along salmon spawning areas, particularly along tributaries of the Togiak and Kulukak rivers and the eastern portion of the refuge. Bear observations by sport fishermen are common in these areas. Bears have also been seen in the vicinity of moose and caribou during calving periods. The incidence of bear predation on these ungulate populations is unknown.

Brown bears in Togiak Refuge are generally neither as abundant nor as large as those on the Alaska Peninsula, so there has not been as much hunting pressure on this population. Harvest records maintained by ADFG indicate the average annual harvest in Game Management Unit 17A has been 5.4 (1985-1990). Not included in this total are illegally killed bears. Subjective data suggest that the number of unreported kills may greatly exceed the number of reported kills in this area.

9. Marine Mammals (Also See Section D.5)

The marine estuaries of Bristol and Kuskokwim bays constitute one of the most productive marine systems in the world. Nutrient laden waters from the Bering Sea, marine upwellings, and ground water run off from the major river systems contribute to the high productivity of the bays and the Bering Sea. Rich in plankton and forage benthos, the bays support an intricate food chain of which marine mammals are at the top. Bristol Bay is a migration corridor for most of Alaska's marine mammals.

Togiak's 600 miles of rocky coast and sandy beaches support a diverse and abundant marine mammal population. The Cape Peirce/Cape Newenham area and the Walrus Islands State Game Sanctuary are two areas particularly rich in marine mammals, providing haulout areas for walrus, harbor seals, spotted seals, and threatened Steller sea lions.

Spotted and harbor seals inhabit the coastal waters throughout the year. During the winter, bearded, ringed, and ribbon seals are occasionally found along the ice edge. Walrus and Steller sea lions haul out on Cape Newenham and Round Island during the spring, summer, and fall. Gray, orca, minke, and beluga whales and harbor porpoises are also found in Bristol Bay.

a. Seals

Associated species include the ringed, bearded, spotted, harbor and ribbon seals. These species occur from the northern Chukchi Sea to the Bering Sea. In the winter, all of these species occur along the ice edge adjacent to the refuge coastline. During the spring, when the ice recedes, only the spotted and harbor seals do not follow the ice northward and can be observed on haulout sites in Nanvak Bay. Much of the refuge's coastline is also utilized by these two species as they follow the concentrations of spawning herring, capelin, or smelt. Spotted seals generally maintain a more northern range, with Bristol Bay serving as the overlap area of the two species.

Harbor and some spotted seals haul out along the refuge's coast, with highest concentrations at Nanvak Bay and Hagemeister Island. Nanvak Bay is the northernmost pupping area for harbor seals and the largest seal haulout in northern Bristol Bay. The number of seals hauling out in Nanvak Bay has declined significantly from 3,100 in 1975 to 581 in 1996. This decline parallels population trends observed in many parts of Alaska.

b. Sea Lions

About 70% of the worldwide Steller sea lion population resides in Alaska. Counts of Steller sea lions between the mid-1970's and the present indicate about a 70% decline in the Alaska population. The causes of the decline are unknown, but may include disease, environmental change, and the effects of commercial fisheries, including direct mortality and reduction in the availability of sea lion food. The 1989 estimate for the Alaska portion of the Steller sea lion population is about 64,000 animals. In 1990, the Steller sea lion was listed as a threatened species, and in 1995 NMFS proposed listing the population west of Cape Suckling as endangered.

The two largest sea lion haulouts in northern Bristol Bay occur at Cape Newenham and Round Island. Sea lion populations have been monitored by ADFG staff with funding from National Marine Fisheries Service beginning in 1990.

Sea lions gather annually at traditional haulouts to pup and breed. Sea lions usually begin using the haulout area in April and are seen feeding along the coast and in the bay channels during the herring spawning migration which usually occurs in May. They normally feed heavily on herring in Chagvan Bay during May and June.

c. Walrus

The majority of the Pacific walrus population inhabits the shelf waters of the Bering and Chukchi seas. Female and young walruses that winter in and near Bristol and Kuskokwim bays migrate north to the Chukchi Sea in the spring but many males remain behind and haul out in Bristol Bay. Cape Peirce and Round Island (State Game Sanctuary) are the primary haulout areas for walruses in Bristol Bay. Walruses periodically haul out at Cape Seniavin and Cape Newenham, however, these areas are not used every year.

Cape Peirce was historically used as a haulout but was abandoned sometime during the first half of this century. Walruses began reusing the haulout in 1981 and have returned every summer since. The number of walrus using the Cape Peirce haulout steadily increased from 1981 to 1985, when a high count of 12,500 walrus was recorded. In 1987 and 1988, the number of walrus hauling out at Cape Peirce and Round Island declined. During this time, fishing for yellow-fin sole in northern Bristol Bay began, with fishing activities concentrated in the Round Island area. Concern that the decline in numbers of walrus hauling out might be related to the initiation of the yellow-fin sole fishery resulted in the North Pacific Fisheries Management Council's (NPFMC) decision to restrict the activities of the yellow-fin sole fishery. In August of 1991 the NPFMC voted to continue indefinitely the 12-mile closure around Cape Peirce and Round Island with a three-mile transit zone around Right Hand Point. The Fish and Wildlife Service has verbal agreements with NPFMC, National Marine Fisheries Service and ADFG to continue monitoring walrus at Cape Peirce as part of the effort to assess the effects of the fishery.

For the third year in a row, walruses at Cape Peirce hauled out atop cliffs adjacent to their normal haulout area, resulting in a minimum of 47 animals falling to their death on August 27-28, 1996. Staff observed 225 walruses beyond their normal haulout area at 11:00 a.m. and during the night, the walruses had traveled up to the cliff tops. They were in two groups with 70 already along the cliff's edge. Staff members were able to turn the other group of 155 walruses around and herd them down out of danger. By the next day, 47 walruses were confirmed dead from falling off the cliffs.

As in the two previous years, when at least 42 (1994) and 17 (1995) walruses fell to their deaths, walruses reached the cliff top via a tundra and grass covered incline, extending up from large sand dunes surrounding Maggy Beach. Since walruses returned to Cape Peirce in 1981, they have gradually destabilized large sand dunes by destroying beach grasses, allowing high winds to blow away sand. By 1994, walrus haulout activity had caused enough erosion to allow walruses to haul out near the top of the dunes adjacent to the tundra leading to the cliffs. Eventually the walruses went over the lowest dune during a storm to the higher tundra, trampling down vegetation and flattening out the dune. Despite experimental efforts by staff to deter them, walruses continued to haul out higher than usual on the dunes in 1995. Erosion continued through 1996, making the cliff tops even more accessible.

Staff have "herded" walruses out of dangerous areas, if conditions allowed little chance of harm to the animals or of disturbances to walruses hauled out below. Staff have also actively discouraged walruses from hauling out high on the dunes whenever possible by stringing or

staking large plastic trash bags along the upper reaches of the haulout. The rustle of plastic materials has been observed to frighten walrus away from the sheer cliffs. The trash bags temporarily deterred walrus from ascending to the high dunes. They hauled out near the bags but did not cross them until either the winds died down, the bags deteriorated, or the walrus grew bold enough to test them out. These interferences may have altered natural haulout configurations, but did not seem, in general to drive the walrus from the haulout.



Photo 13. A false barrier will hopefully prevent more walrus from hauling out atop cliffs.

It seems likely that storms with high winds (> 50 mph) were instrumental in originally prompting walrus to travel up to cliffs at Cape Peirce in 1994 and 1995. The offshore direction of these severe storms and the sea state may have presented the walrus with unusual conditions that caused them to react by trying to find cover from the winds in the leeward (i.e. the cliffs) side of the haulout behind the dunes. Unlike the previous two incidents, the weather on August 26 and 27, 1996 was mild and clear with very light (> 5 mph) winds.

While walrus were atop the cliffs, staff closely monitored the animals during daylight hours. The walrus wandered along the cliff edge and some attempted to return to the beach by going off cliffs which overlooked the ocean or the beach where other walrus were hauled out. They seemed unable to discern the height (20-125 feet) of the cliffs, and often willingly began to descend the steep cliffs, many ending in fatal falls. Others often followed, as walrus typically do when hauled out in cohesive herds. Some walrus were crowded out and inadvertently pushed off as their closely packed herd mates moved closer to the cliff

edge. Slippery, wet grass and unstable cliff edges may have been contributing factors in these mortalities. Some animals survived long enough to reach the water, but probably died from severe internal injuries after swimming away.

Upon examination many of the animals were found with severely broken skulls, often with one or both tusks broken off. Internal and external injuries indicated the animals had died from their falls. Teeth, whiskers, and skin tissue samples have been collected from the carcasses each year. Tusks collected by refuge staff were donated to the Eskimo Walrus Commission through ADFG for auction to Alaska Natives.

The phenomenon of walruses ascending up to cliffs and falling, often to their death, as they did in 1994-1996, is unusual and has never before been documented at Cape Peirce, nor elsewhere to our knowledge.

d. Whales

The endangered gray whale (*Eschrichtius robustus*) migrates through Unmiak Pass and follows the Bristol Bay shoreline on its way north. These animals are often observed in the summer feeding offshore in the near-coastal waters of the refuge. Group sizes range from singles to 20 whales, with several groups containing calves. Cow/calf groups generally hold over in coastal waters feeding and resting before continuing their journey up the coast.

This year, groups of grey whales were sighted 262 times during May, 32 times during June, and twice in early July traveling north along the coast of the Cape Peirce and Cape Newenham peninsulas. At least 14 of the sightings were females with calves. Most whales swam within 100m of the shoreline and some appeared to be feeding. Fifty to 100 grey whales were seen in Togiak Bay by a State biologist on April 20.

A large, clean, baleen whale skull, measuring 348cm in length and 221cm in width, was found on North Spit at Cape Peirce on July 26. The skull was almost completely buried. Refuge staff unearthed it, took photos, and are in the process of identifying it. (Photo 14)

Other whales passing through Bristol Bay along the refuge coastal area, en route to the Bering Sea, are the minke and on rare occasions the Baird's beaked whale. Beluga whales, orcas, harbor porpoise, and Dall porpoise are relatively common throughout the summer. Five orcas including a large adult male were seen in Nushagak Bay near Dillingham on August 8.

Beluga whales are one of the most abundant cetaceans in the North Pacific and are commonly found in areas of fish concentrations like the mouths of rivers and in bays with high tidal fluctuations. When herring and capelin hit the beaches to spawn, salmon smolt make their annual out migration, and/or adult salmon begin to migrate to near shore waters and river mouths, the belugas are not far behind.

Conflicts occur from mid June to late August between belugas and float planes utilizing the public dock near the mouth of the Wood River. This area is often used as a loading point for float planes as well as a boat launch. On occasion, landings must be aborted to avoid hitting feeding whales. The carcass of an adult male beluga whale was found July 8 on the shore of Squaw Creek in Dillingham. Measurements and skin tissue samples were taken and forwarded to NMFS.



Photo 14. BTWs Laura and Toby Burke rest after unearthing the whale skull.

10. Other Resident Wildlife

Willow Ptarmigan are common on the refuge. Flocks of several thousand birds are commonly observed in dwarf willow and alder thickets on mountainsides and in alder thickets along interior rivers and lakes.

Fur-bearing animals of the refuge include: red fox, muskrat, mink, beaver, river otter, marten, lynx, and wolverine. Mink occur throughout the lake and stream systems. Wolf, wolverine, and lynx, although uncommon, are occasionally seen on refuge lands. Parka squirrels, hoary marmots, porcupines, and snowshoe hares are common throughout the refuge. Rare occurrences of southwest Alaska resident species are the tundra hare and Arctic fox.

The occurrence and distribution of small mammals (lemmings, voles, shrews) are not well understood on the refuge. Tundra hares, Arctic ground squirrels and red squirrels are present in varying numbers.

11. Fisheries Resources

Refuge waters contribute significantly to the salmon stocks in Bristol Bay and Kuskokwim Bay. Refuge streams and rivers support anadromous runs of five species of Pacific salmon: king or

chinook (*Oncorhynchus tshawytscha*), coho or silver (*O. kisutch*), chum or dog (*O. keta*), sockeye or red (*O. nerka*), and pink or humpback (*O. gorbuscha*). One of the State's largest herring fisheries also occurs in Togiak Bay. The vessel commercial value, or the value of catches to commercial fishermen of all Bristol Bay salmon, refuge-bound Kuskokwim Bay salmon, and near shore spawning herring in 1996 was \$20,133,578.

In addition, anadromous runs of Dolly Varden (*Salvelinus malma*) and resident populations of rainbow trout (*Oncorhynchus mykiss*), lake trout (*Salvelinus namaycush*), Arctic grayling (*Thymallus arcticus*), Arctic char (*Salvelinus alpinus*), pike (*Esox Lucius*), burbot (*Lota lota*), and whitefish (*Coregonus* spp.) contribute to both subsistence and sport harvests from refuge waters. The sport fishery occurring in refuge waters is estimated to generate more than \$6,000,000 in annual cash flow to the various service industries.

Populations of sticklebacks, blackfish, pipefish, and other species (32 total) exist in the refuge's thousands of unnamed lakes, rivers, tundra streams, sloughs, ponds, and bays. Little or no information is known about their numbers or distribution.

a. Subsistence Fishing

On July 1, 1990, the Federal government assumed responsibility for the management of subsistence fishing on Federal public lands in Alaska. Navigable waters are still managed by the State with the exception of those areas that were withdrawn for Federal purposes before Alaska's statehood. Appeals and court filings have brought about actions by the Federal Subsistence Board to change or review some regulations related to Federal/non-navigable waters. Other court cases are pending which contend that the Federal government must exert management authority over all waters and resources within the refuge.

Residents of six villages within refuge boundaries and others living in rural areas adjacent to the refuge utilize the fishery resources for subsistence purposes. Subsistence users harvest both anadromous and resident species, but they primarily rely on rich salmon runs.

Under Alaska National Interest Lands Conservation Act (ANILCA), creation of national parks and refuges was not to change the subsistence lifestyle in rural Alaska. The act specifically addresses this issue in Section 804:

"...the taking on public lands of fish for non-wasteful subsistence uses shall be accorded priority over the taking on such lands of fish and wildlife for other purposes."

Therefore, in the event that it became necessary to restrict the harvest of fish and wildlife on refuge lands, subsistence users are to be afforded the priority use of all surplus not needed to maintain viable healthy populations. Currently, ADFG permits and regulates subsistence fishing activities on navigable waters within the refuge. It has become necessary to regulate some subsistence practices to maintain a separation between commercial and subsistence practices. Subsistence fishing activities are restricted directly before, during and after commercial fishery openings to discourage commercial fishing in subsistence zones. The practice of catching fish further up the rivers and selling them in the bay has occurred and is the purpose behind most subsistence regulations.

Subsistence fishermen harvest during specific periods of the year. Generally, these harvests coincide with the availability of salmon as they enter the rivers. Resident freshwater species are most often sought for fresh protein during the winter. Very little information is available on the number of each non-salmon species harvested from the refuge for subsistence.



Photo 15. The village of Quinhagak is located along the Kanektok River on Kuskokwim Bay.

Some of the fishermen in the villages of Togiak, Twin Hills, and Manokotak (Bristol Bay side) obtain the required subsistence permit from ADFG, Subsistence Division, or from agents in each village. The permit is returned at the end of the season with the number of fish taken by date for each species. Subsistence personnel from ADFG also travel to the villages to collect permits that were not returned and to interview permittees. Kuskokwim Bay villages (Quinhagak, Goodnews, and Platinum) by contrast are not required to have subsistence permits. They are surveyed during the season by ADFG Commercial Fisheries Division personnel. Data collected is extrapolated to provide an estimate of the subsistence salmon harvest for an entire village as seen in Table 12.

Data for Togiak and Manokotak is extrapolated to the number of permits issued and may not reflect the actual harvest. Data for Quinhagak, Goodnews and Platinum is expanded data to reflect village harvest.

Table 12. Subsistence Salmon Fishery Harvest -1996*

<u>Village</u>	<u>Sockeye</u>	<u>Chinook</u>	<u>Coho</u>	<u>Chum</u>	<u>Pink</u>	<u>Total</u>
Togiak	662	471	199	285	59	1,676
Manokotak	3,327	189	348	17	5	3,886
Quinhagak	405	3,164	1,497	988	NA	6,054
Goodnews Bay	411	403	293	214	NA	1,321
Platinum	7	12	59	5	NA	83
Totals:	4,812	4,239	2,396	1,509	64	13,020

* Twin Hills information not available

b. Sport Fisheries

Most sport fisheries occurring within the refuge target peak runs of chinook and coho salmon. Other characteristics of refuge fisheries which make sport fishing popular are the variety of anadromous and resident fisheries, the high density of rainbow trout, the refuge's location at the northern edge of the rainbow trout range, the anadromous char (Dolly Varden) runs consisting of large numbers and large individual sizes, the presence of lake trout in the Kuskokwim Bay drainages, the largest coho salmon in Bristol Bay are in the Togiak River, and the small clear water systems with abundant fish resources. A more complete description of the recreational sport fisheries is included in Section H.9.



Photo 16. RM Archibeque shows future sport anglers the art of casting.

Sport fisheries on the refuge are primarily volunteer catch and release. Consumptive use of salmon and to a lesser extent of resident species occurs primarily in the lower rivers where shorter trip length and easier access allow for timely processing and transport. Harvest levels are relatively low for all species, but they are greatest for chinook and coho salmon. Use reports provided by sport fish guides operating under Special Use Permits and a statewide harvest survey administered by ADFG provide the only estimates of sport fish harvest of each species by river system. For the years when complete estimates are available, the sport fish average harvest has constituted between 0.1% and 5.0% of the total runs of salmon. This harvest is considered insignificant.

In 1996, sport fish guides reported catching 32,492 salmon, 19,342 char (spp.), and 7,083 resident species (Arctic grayling, rainbow trout, and lake trout). Of these, 2,503 salmon, 203 char (spp.), and 2 resident species were harvested. Catch and harvest of coho salmon (20,155 and 1,864 respectively) dominated report data.

c. Commercial Fishing

Since the late 1800s, commercial fishing has been the mainstay of the economy in communities adjacent to the refuge. Recently, this economy has spread to all villages located within the refuge and has become their primary source of income.

Salmon stocks bound for refuge waters are harvested on a terminal fishery basis (runs are targeted for catch at or near the mouth of a river system). This insures that individual runs are afforded maximum management protection. Achieving the escapement goal (desired number of spawners) into individual rivers is possible if data is collected on a timely basis and used to regulate the commercial fishing seasons.

Commercial fisheries which target refuge salmon stocks are managed by two ADFG Division of Commercial Fisheries offices. The Bethel office manages the commercial harvest of species bound for the western portion of the refuge in the Kuskokwim Management Area. This area is divided into District 4, Quinhagak (includes the Kanektok, Arolik and Oyak Rivers) and District 5 (Goodnews Bay). Both districts are fished on a set schedule dictated by date and day of the week. These fisheries are regulated by comparison of the relatively short historical data base to aerial survey point observations of escapement numbers, escapement numbers past a weir on the Middle Fork of the Goodnews River, and a daily monitoring of the commercial harvest sold to buyers/processors. Only if a particularly poor run is indicated, is there any modification to the fishing schedule.

The Dillingham office manages the commercial harvests of fish stocks bound for the Togiak and Nushagak districts bordering the southern portion of the refuge. The Togiak district includes all the waters from Cape Newenham to Cape Constantine (Togiak, Kulukak, Osviak, Quigmy, Matogak, Ungalikthluk and Negukthlik rivers). Only two sections of the Nushagak District (Igushik and Snake rivers) target fish bound for refuge waters. Togiak and Kulukak sections are managed by scheduled fishing times during most of the season and by emergency order during critical or peak times. A counting tower at Togiak Lake, catch reports as reported by local processors, and frequent aerial surveys allow for a closely monitored salmon escapement and management.

Commercial fishing in the Nushagak District is primarily by emergency order, dictated by escapement monitoring through a sonar counter on the Nushagak River, counting towers on the Wood and Igushik rivers, and aerial surveys. The historical database for Bristol Bay

drainages dates back to the 1800s and provides a more accurate picture of salmon escapements for these larger runs.

The two Kuskokwim fishing districts which target refuge fishery stocks are relatively new, and commercial harvest records do not exist prior to 1968 for Goodnews and 1960 for Quinhagak. The fishery in Goodnews was opened by emergency order due to public pressure and the determination of a harvestable salmon surplus by ADFG surveys.

The commercial catch bound for these rivers was worth \$756,194 to participating fishermen in 1996 (Tables 13 and 14). The wholesale value of these fisheries is probably worth several million dollars more, making them economically important for the region and to the country as a large proportion is exported to Japan.

Quinhagak (W-4) Commercial Fishing District

Sockeye, chum, and coho salmon made up the majority of the Kanektok River fishery this year. A total of 273,573 fish worth \$533,605 were harvested by commercial fishermen in the Quinhagak District in 1996 (Table 13). This fishery accounts for approximately 17% of the total Kuskokwim Area commercial harvest of fish and 25% of the total dollar value.

The total chinook commercial catch in the Quinhagak District was 14,165 in 1996, which was 29% below the most recent ten-year average. Chinook salmon fetched a total price of \$61,296 (\$0.27 per pound) and accounted for 11% of the total commercial fisheries value. An escapement of 6,827 chinook salmon was documented in the Kanektok River at the counting tower which is above the escapement objective of 5,000.

The commercial harvest of sockeye salmon was 57,665 in 1996 was 17% above the ten-year average. A total of \$165,318 (\$0.40 per pound) was paid for sockeye which accounted for 31% of the total commercial fishery value. An escapement of 71,637 sockeye salmon was documented in the Kanektok River at the counting tower which is well above the escapement objective of 15,000. The objective was lowered from 30,000 to 15,000 in 1990.

Chum salmon are caught incidentally to the chinook and sockeye salmon commercial fisheries. A total of 83,005 chum salmon was commercially harvested in 1996 and is the highest catch on record. A total of \$61,323 (\$0.10 per pound) was paid out to fishermen for chum salmon which accounted for 12% of the total commercial fishery value. An escapement of 70,617 chum salmon was documented in the Kanektok River at the counting tower which is above the escapement objective of 30,500. The chum salmon harvest is usually tied to the sockeye salmon run.

Pink salmon runs occur during even numbered years and are harvested incidentally during the season. In 1996, 20 pinks were caught. No escapement objective or estimates exist for pink salmon in this district. The pink salmon catch was well below the average due to the lack of a market for this species.

Coho salmon begin dominating the commercial fishery harvest around the end of July and continue as long as a buyer is interested, usually early September. The 1996 coho salmon commercial harvest of 118,718 and is the second highest on record. A total of \$245,662 (\$0.25 per pound) was paid to commercial fishermen for their coho catch, which accounted for 46% of the value of this district's commercial fishery. Weather and aircraft availability prevented a coho salmon escapement survey in 1996.

Table 13. District 4 - Quinhagak, 1996
Commercial/Subsistence Salmon Catch/Escapement

	Sockeye	Chinook	Coho	Chum	Pink	Total
Com. Harvest	57,665	14,165	118,718	83,005	20	273,573
10-Year Average	49,980	20,080	58,246	46,613	28,427	203,346
Subsistence	405	3,164	1,497	988	NA	6,054
Escapement	71,637	6,827	NA	70,617	NA	149,081
Esc. Objective.	15,000	5,000	NA	30,500	NA	50,500
Total Run	129,707	24,156	120,215	154,610	20	428,708
Ex-Vessel Value	\$165,318	\$61,296	\$245,662	\$61,323	\$6	\$533,605

ADFG Data, Bethel - Encompasses the Oyak, Kanektok, and Arolik Rivers

Goodnews Bay (W-5) Commercial Fishing District

Coho and sockeye salmon make up the majority of the Goodnews River commercial fishery. A total of 92,043 fish worth \$222,589 was harvested by commercial fishermen in the Goodnews Bay District in 1996. The Goodnews River weir is located on the Middle Fork of the Goodnews River and was operated from June 19 to August 23.

The total chinook commercial catch in the Goodnews Bay District was 1,375 in 1996, which was below the ten-year average of 3,224, but this helped the chinook salmon reach their escapement objective at the weir for the fourth time since 1984. Chinook salmon fetched a total price of \$5,952 (\$0.25 per pound) and accounted for 3% of the total commercial fisheries value. An escapement of 2,930 chinook counted at the weir fell short of the 3,500 desired count.

The commercial harvest of sockeye salmon was 30,717 fish in 1996 and is below the most recent ten-year average of 35,888. A total of \$87,427 (\$0.40 per pound) was paid for sockeye which accounted for 39% of the total commercial fishery value. Sockeye escapement past the weir is estimated to be 58,264 which is well above the escapement objective of 25,000.

Chum salmon are caught incidentally to the sockeye salmon commercial fisheries. In 1996 a catch of 11,093 chum salmon was commercially harvested. This incidental chum catch was 40% below average. A total of \$9,015 (\$0.11 per pound) was paid out to fishermen for chum salmon which accounted for 4% of the total commercial fishery value. Chum salmon escapement of 40,450 was documented at the Goodnews River weir and is well above the objective of 15,000 fish.

Pink salmon runs occur during even numbered years and are harvested incidentally during the season. In 1996, 22 pinks were caught and was well below average due to a lack of a market. An estimated 1,450 pink salmon passed upstream of the weir in 1996. No escapement objective exists for pink salmon in this district.

Coho salmon begin dominating the commercial fishery harvest in early August and continue as long as a buyer is interested, usually early September. The 1996 coho salmon commercial harvest of 48,836 is above the ten-year average of 23,750. A total of \$120,191 (\$0.28 per pound) was paid to commercial fishermen for their coho catch, which accounted for 54% of the value of this district's commercial fishery. The Goodnews River weir (and earlier years the tower) is traditionally closed prior to the completion of the coho run. No escapement objective has been set for Goodnews River coho salmon. Coho escapement estimates were not possible due to weather and high water.

Table 14. District 5 - Goodnews Bay, 1996
Commercial/Subsistence Salmon Catch/Escapement

	Sockeye	Chinook	Coho	Chum	Pink	Total
Com. Harvest	30,717	1,375	48,836	11,093	22	92,043
10-Year Average	38,953	2,937	23,750	18,399	8,582	92,621
Subsistence ¹	418	415	352	219	NA	1,404
Escapement ²	58,264	2,930	9,699	40,450	1,450	112,793
Esc. Obj.	25,000	3,500	NA	15,000	NA	43,500
Total Run ³	89,399	4,720	58,887	51,762	1,472	206,240
Ex-Vessel Value	\$87,427	5,952	\$120,191	\$9,015	\$4	\$222,589

ADFG Data, Bethel

¹ Includes harvest estimates from villages of Platinum and Goodnews Bay.

² Escapement is only an index and may only represent 1/4 to 1/2 of actual escapement.

³ Total run conservative due to low escapement estimate.

Togiak Commercial Fishing District

The Togiak, Kulukak, Osviak, Matogak, Quigmy, Negukthlik and Ungalikthluk rivers are included in this management district. Sockeye salmon, and to a lesser degree chinook and coho salmon, are the prime management species within this district. A total of 765,821 fish was harvested by commercial fishermen in the Togiak District in 1996. This fishery accounts for approximately 2% of the total Bristol Bay Area commercial harvest of fish. The commercial fishery and salmon escapement is managed using information gathered by a counting tower at Togiak Lake, tabulated catch delivered to processors, and aerial surveys of individual river systems.

The total chinook commercial catch in the Togiak District was 8,725 in 1996, which was below the ten-year average of 12,720. The average chinook salmon harvested in Bristol Bay weighed 18 pounds. Bristol Bay chinook salmon fetched a price of \$0.50 per pound. There is no escapement goal for the entire fishing district, just the Togiak River. In 1996, the 11,476 chinook salmon escapement was above the goal of 10,000 fish.

The commercial harvest of 460,063 sockeye salmon in 1996 is well above the ten-year average of 458,100. Bristol Bay sockeye salmon fetched a price of \$0.75 per pound. Sockeye escapement is estimated to be at 212,524 which is greater than the escapement objective of 150,000.

Chum salmon are caught incidentally to the sockeye salmon commercial fisheries. In 1996 a catch of 207,094 chum salmon was commercially harvested. The average chum salmon harvested in Bristol Bay weighed 7.3 pounds. Bristol Bay chum salmon fetched a price of \$0.10 per pound. Chum salmon escapement of 117,240 was below the goal of 200,000 fish.

Pink salmon runs occur during even numbered years and are harvested incidentally during the season. In 1996, 30,588 pinks were caught. The average pink salmon harvested in Bristol Bay weighed 3.5 pounds. Bristol Bay pink salmon fetched a price of \$0.30 per pound. No escapement objective exists for pink salmon in this district.

Coho salmon begin dominating the commercial fishery harvest in early August and continue as long as a buyer is interested, usually early September. The 1996 coho salmon commercial harvest of 59,351 is well above the ten-year average of 25,518. The average coho salmon harvested in Bristol Bay weighed 6.8 pounds. Bristol Bay coho salmon fetched a price of \$0.30 per pound. There was no estimated escapement for coho salmon in the Togiak District for 1996 though the escapement objective was 50,000 fish.

Table 15. Togiak District, 1996
Commercial/Subsistence Salmon Catch /Escapement

	Sockeye	Chinook	Coho	Chum	Pink	Total
Com. Harvest	460,063	8,725	59,351	207,094	30,588	765,821
10-Year Avg.	458,100	12,720	25,518	248,692	50,955	795,985
Subsistence ¹	662	471	199	285	59	1,676
Escapement	212,524	11,476	NA	117,240	NA	341,240
Esc. Obj.	150,000	10,000	50,000	200,000	NA	410,000
Total Run	673,249	20,672	59,550	324,619	30,647	1,108,737
Ex-vessel Value ²	\$2,176,098	\$78,525	\$121,076	\$151,179	\$5,506	\$2,532,384

ADFG data, Dillingham; includes Togiak, Kulukak, Quigmy, Matogak, and Osviak Rivers

¹ Subsistence data from ADFG permits issued in Togiak and returns. Data does not represent total harvest figures for the village.

² Estimated by using prices and weights for the average Bristol Bay salmon.

Igushik Section of the Nushagak Fishing District

ADFG does not record complete data from the Igushik Section of the Nushagak Fishing District on a yearly basis and in 1996 only sockeye data is present.

The 1996 commercial harvest of sockeye salmon in the Igushik Section was 1,101,599 fish. The estimated escapement of sockeye salmon in the Igushik Section was 400,746 which is well above the escapement objective of 200,000.

Table 16. Igushik Section, 1996
Commercial/Subsistence Salmon Catch/Escapement

	Sockeye	Chinook	Coho	Chum	Pink	Total
Com. Harvest ¹	1,101,599	-	-	-	-	
Subsistence	3,327	189	348	17	5	3,886
Escapement	400,746	-	-	-	-	
Esc. Objective	200,000	-	-	-	-	
Total Run	1,505,672	-	-	-	-	
Ex-vessel Value ²	\$5,210,563					

ADFG data, Dillingham - This table is incomplete. ADFG does not record complete Igushik data on a yearly basis.

Runs of chinook, coho, and chum are small in comparison to sockeye runs. Of the five commercial fishing districts, the Togiak District accounts for the second or third largest catches in Bristol Bay (Table 17). A late season fishery for coho has developed in the Togiak District. Late season markets became available in Bristol Bay in 1977, and fishermen started actively targeting coho. From 1977 to 1985, coho catches have almost tripled those of early years 1883 to 1922 peak level periods. During this time period, the Togiak District has produced approximately 28% of the total coho harvest in Bristol Bay. The 1987 run was very weak and the commercial fishery was canceled. Again in 1988 indicators pointed to the possibility of a weak run and the fishery was again closed to commercial fishing to meet the lower end of a minimum escapement goal of 25,000 fish. Sportfishing was left open. During 1989 the fishery appeared to be strong, however no surveys were flown to determine if the escapement was met.

Table 17. Bristol Bay Salmon Harvest, 1996
District Comparison for Coho, Chinook, Chum, and Sockeye

District	Coho	%	Chinook	%	Chum	%	Sockeye	%
Naknek/Kvichak	3,816	3	4,050	5	124,137	15	8,187,720	27
Egegik	39,919	32	960	1	83,339	10	10,842,251	37
Ugashik	9,169	7	520	1	103,392	12	4,410,073	15
Nushagak	12,477	10	73,365	83	324,261	38	5,749,619	19
Togiak	59,351	48	8,725	10	207,094	25	460,063	2
Totals	124,732		87,620		842,223		29,649,726	

*ADFG data, Dillingham

d. Herring

Pacific herring spawn in various coves and bays along the refuge coastline. This species is an important link in the Bristol Bay food chain, although it is not well understood.

Subsistence users have long utilized these fish, but more recently, herring have been commercially exploited. Togiak Bay, Goodnews Bay, and Security Cove are the three major herring spawning areas with associated commercial fisheries along the refuge's coastline.

The Togiak Bay area adjoins the southern coast of the refuge and is the only commercial herring fishery in Bristol Bay. This fishery began in 1967 and maintained a low profile for several years. Through 1975, it averaged only one to three processors, 24 gill net operators, and an occasional purse seiner.

The interest in harvesting Alaska herring stocks increased significantly in 1977 due to a decline in world herring stocks and the subsequent reduction in offshore foreign trawling, as well as the elimination of the Alaska coastal near-shore Japanese gill net fishery. As a result of this increased interest, the Togiak District experienced such an increase in effort that the Alaska Board of Fisheries responded by creating commercial fishing districts at Security Cove and Goodnews Bay.

Herring were first observed by the State biologists in the Togiak District on April 28 and the first spawn was observed on May 1. More than 73 linear miles of spawning were observed by ADFG during aerial surveys. The majority of the spawning occurred April 2-13. The fishing comprised of five openings for gill nets totaling 18 hours and five openings for purse seiners totaling 2.42 hours. A total of 24,702 short tons of herring was harvested, worth 14.4 million dollars.

Table 18. Togiak District, 1978-1996
Estimated Biomass & Commercial Harvest of Pacific Herring

Biomass Year	Harvest Est(st)	Waste Catch	Total (st)	Harvest/gear(st)	Gill Nets	Purse Seines	Roe %	Dollars (1000s)	Exp. Rate
1978	190,300	7,734	-	7,734	08	92	8.2	1,300	4
1979	239,000	11,558	-	11,558	40	60	8.6	6,700	5
1980	68,700	18,886	5,700	24,586	16	84	9.2	3,055	35
1981	158,600	12,542	30	12,572	18	82	9.1	3,989	8
1982	97,900	21,489	380	21,869	31	69	8.8	6,175	22
1983	141,800	26,287	600	26,887	19	81	8.8	10,517	19
1984	114,900	19,300	170	19,450	25	75	9.8	7,211	18
1985	131,400	25,616	250	25,886	17	83	9.6	13,696	20
1986	94,800	16,260	50	16,310	21	79	9.7	8,660	19
1987	88,400	15,204	?	15,204	17	83	8.8	8,663	19
1988	134,717	13,986	?	13,986	25	75	10.3	14,451	13
1989	98,965	12,258	-	12,258	24	76	8.4	4,983	18
1990	88,105	12,253	-	12,253	25	75	9.6	6,523	17
1991	83,229	14,970	-	14,790	79	21	9.9	6,577	21
1992	156,955	25,808	-	25,808	19	81	9.2	8,818	19
1993	193,847	17,925	-	17,925	20	80	9.7	5,218	12
1994	185,454	30,300	-	30,300	25	75	10.2	9,302	19
1995 ¹	N/A	26,733	-	26,733	26	74	10.6	17,075	20
1996	135,585	24,702	-	24,702	27	73	9.7	14,400	21

ADFG data. (st) - Short ton. Exp. rate - exploitation rate

¹ Aerial surveys for 1995 were hampered by poor weather preventing an estimate of total run.

A spawn-on-kelp fishery, associated with the herring fishery has also developed along the refuge coastline. This fishery is regulated by State emergency order. The Board of Fisheries adopted a management plan in 1984 which allows a harvest quota of up to 350,000 pounds or the equivalent of 1,500 short tons of spawning herring, with a 2-3 year rotational harvest of kelp beds. The roe-on-kelp (rockweed) harvest during 1996 yielded 455,800 pounds of harvestable kelp valued at \$510,000.

Table 19. Togiak District, 1968-1996
Commercial Roe-on-Kelp Harvest

Year	Processors	Number of Fishermen	Pounds Harvested	Short tons Harvested	Ex Vessel Value
1968	1	1	54,600	27.3	NDA
1969	1	3	10,125	5.1	"
1970	1	5	387,885	19.4	"
1971	1	12	51,795	25.8	"
1972	1	12	64,165	32.0	9,000
1973	1	10	11,596	5.8	2,000
1974	3	26	125,646	62.8	19,000
1975	2	44	111,087	55.5	22,000
1976	5	49	295,780	148.0	127,000
1977	5	75	275,774	38.0	116,000
1978	11	160	329,858	164.9	120,000
1979	16	100	414,737	209.3	\$248,000
1980	21	78	189,000	95.0	\$95,000
1981	7	108	378,207	190.0	\$250,000
1982	8	214	234,924	117.0	\$176,000
1983	4	125	270,866	135.0	\$284,000
1984	6	330	407,587	203.0	\$203,000
1985	canceled	canceled	canceled	canceled	canceled
1986	3	143	374,396	187.2	\$187,000
1987	5	187	307,307	153.6	\$166,000
1988	10	259	489,320	244.6	\$346,000
1989	11	487	559,780	279.9	\$448,000
1990	7	481	413,844	206.9	\$360,000
1991	7	532	348,357	174.2	\$383,000
1992	5	386	363,600	181.8	\$254,000
1993	2	173	383,000	191.5	\$268,000
1994	3	204	308,400	154.2	\$212,000
1995	5	188	281,600	140.8	\$362,000
1996	3	200	455,800	227.9	\$510,000
86-95 Average	6	310	382,935	191.5	\$299,000

ADFG data; NDA = No data available

Total value of the herring sac roe, roe-on-kelp, and food bait fishery from the southern shore of the refuge was valued at more than 14.9 million dollars. Capelin, a member of the smelt family is also an important food source. In the past, this fish has been thought to be just abundant as the herring and has experienced some commercial interest in the Togiak District. No attempts were made to find or harvest capelin in 1996.

Table 20. Togiak Herring Fishery Ex-Vessel Value, 1996

Product	Value
Herring Sac Roe	\$14,395,000
Capelin ¹	NA
Roe-on-Kelp	\$510,000
Food/bait	\$5,000
Total Estimated Ex-vessel Value	\$14,910,000

ADFG data. ¹ There was no capelin fishery in 1996.

Kuskokwim Bay herring are harvested on the west coast of the refuge in the Goodnews Bay and Security Cove Districts (Table 21). Since 1978, after the first season, the use of purse seiners has been prohibited; no roe-on-kelp harvest is allowed.

Table 21. Goodnews/Security Cove District, 1986-1996
Estimated Biomass & Commercial Harvest of Pacific Herring

Year	District	Short ton Biomass	Harvest Catch	Waste	Total	%Roe	Value x 1000	Exploit
1986	GN	3,000	557	0	556	10.4	325	18.1
	SC	3,700	751	0	751	11.2	535	20.3
1987	GN	2,000	321	0	321	7.1	133	16.0
	SC	2,300	313	0	313	9.7	242	13.4
1988	GN	4,479	483	0	483	8.0	463	10.7
	SC	4,906	324	0	324	9.3	324	6.6
1989	GN	4,040	616	0	616	8.4	335	15.2
	SC	2,830	554	0	554	9.4	265	19.6
1990	GN	2,577	455	0	455	12.2	314	17.7
	SC	2,650	234	0	234	8.7	94	8.8
1991	GN	4,387	263	0	263	8.9	93	6.0
	SC	4,434	570	0	570	9.3	208	12.9
1992	GN	5,572	740	0	740	9.5	286	13.3
	SC	7,773	824	10	834	9.2	285	10.7
1993	GN	6,221	954	0	954	10.3	293	15.4
	SC	6,995	5	0	5	12.8	2	0.1
1994	GN	5,679	426	1	427	12.3	391	18.7
	SC	7,638	1,062	-	1,062	-	-	-
1995	GN	4,224	1,051	3	1,054	13.5	848	25.0
	SC	6,702	1,292	0	1,292	12.3	956	19.3
1996	GN	7,519	1,204	0	1,204	12.5	895	19.1
	SC	8,721	1,854	5	1,859	11.6	1,251	27.1

ADFG data GN = Goodnews SC = Security Cove

The herring fishery has been relatively unrestricted, and fishermen are allowed to transfer from the Togiak District to the Security Cove District in Kuskokwim Bay. On the other hand, the Goodnews Bay District was established for the exclusive use by local commercial fishermen from the villages of Quinhagak, Platinum, and Goodnews Bay; transfers are not allowed.

As noted from these tables, the biomass of harvested herring is very large and financial return great. No research has been done on what impacts this is having on the local seabird population as well as marine mammals. Impacts to salmon smolt and anadromous char populations that feed upon herring fry are also unknown. Another unknown impact is that of the lost herring nets. These continue to ghost-fish for a long time, inflicting mortality not only on fish but on marine birds and mammals.

12. Wildlife Propagation and Stocking

Nothing to report.

13. Marking and Banding

WB Aderman completed banding schedules and summarized passerine banding data collected at Cape Peirce. Results included 220 birds being banded representing 17 species. Mist nets were opportunistically set on 41 days between May 10 and September 29 for a total of 421 net hours. This equates to a capture rate of 52 birds/100 net hours. Kudos to BT's T. Burke, L. Burke, and Moran as all mist netting/banding was done on their own time in between rigorous seabird and marine mammal monitoring efforts. A summary of banded birds this year is listed in Table 22.

Table 22. Togiak Refuge Bird Species Banded List (Dillingham and Cape Peirce), 1996

Species	After Hatch Year	Hatch Year	Unknown	# Banded
Tree Swallow	17			17
Black-capped Chickadee		4	2	6
Ruby-crowned Kinglet	2	1		3
Gray-cheeked Thrush	1	2		3
Hermit Thrush	3	2		5
Varied Thrush	2			2
Yellow Wagtail	2			2
Orange-crowned Warbler	3			3
Yellow Warbler	10	1		11
Wilson's Warbler	48	2		50
Savannah Sparrow	33	9		42
Fox Sparrow	2	2		4
Golden-crowned Sparrow	22	14		36
White-crowned Sparrow	1	4		5
Lapland Longspur	1			1
Common Redpoll	23	2		25
Hoary Redpoll	4		1	5
TOTALS	174	43	3	220

* Type of Banding: Miscellaneous/Training; Number of Day Netting: 41
Range of Dates: May 10 - September 29; Number of Net Hours: 421

14. Scientific Collections

During the 1996 field season, fisheries samples were collected during refuge fisheries surveys on the Arolik, Matogak, Ongivinuck, Ongoke, and Osviak rivers and on Pungokepuk and Gechiak creeks. In addition refuge river rangers collected chinook salmon escapement samples on the Goodnews and Kanektok rivers. The following is a list of fisheries samples collected.

Table 23. Fisheries Samples Collected - 1996

River/Creek	Species	Fishery	Number
Arolik River	Rainbow trout	Survey	324
	Arctic grayling	Survey	59
	Char	Survey	50
	Chinook salmon	Escapement	15
Gechiak Creek	Rainbow trout	Survey	237
	Arctic grayling	Survey	5
	Char	Survey	17
Goodnews River	Chinook salmon	Escapement	100
Kanektok River	Chinook salmon	Escapement	150
Matogak River	Chinook salmon	Escapement	3
	Char	Survey	25
Ongivinuck River	Rainbow trout	Survey	2
	Arctic grayling	Survey	69
	Char	Survey	53
Ongoke River	Arctic grayling	Survey	152
	Char	Survey	16
Osviak River	Rainbow trout	Survey	5
	Arctic grayling	Survey	40
	Char	Survey	10
	Chinook salmon	Escapement	4
Pungokepuk Creek	Rainbow trout	Survey	102
	Arctic grayling	Survey	24
	Char	Survey	16
	Northern pike	Survey	34

All sampling efforts include collecting scales to determine age, length and weight measurements, and determining sex if possible. Escapement samples are collected from spawned out salmon carcasses. Fisheries survey samples are collected by hook and line. After sampling, these fish are then released. Most rainbow trout were tagged with individually numbered Floy™ spaghetti tags.

15. Animal Control

Nothing to report.

H. PUBLIC USE

1. General

There are seven villages located either within the refuge boundary or in close proximity. Quinhagak, Goodnews Bay, and Platinum border Kuskokwim Bay; Togiak, Twin Hills, Dillingham, and Manokotak are on the Bristol Bay side.

Kuskokwim Bay villages concentrate their commercial fishing and subsistence activities north of Cape Newenham, utilizing Bethel as their transportation, service, social, and political center. The Bristol Bay communities usually focus their subsistence and commercial fishing activities from east of Cape Newenham to the Nushagak River. These villages utilize Dillingham as a center for transportation, service, political, and social needs.

The majority of non-rural resident public use on the refuge, which occurs primarily from May through September, consists of either guided or non-guided sport fishing, big game hunting, and river rafting. A few visitors utilize coastal portions of the refuge for photography, wildlife observation, and waterfowl hunting.

In December, PR Miller and AT Andrew attended a meeting to help reestablish Boy Scout programs in the Dillingham Area. AT Andrew was instrumental in organizing the meeting, and both volunteered to be program leaders.

RI Dyasuk and RIT Sharp traveled to New Stuyahok to deliver a Career Day presentation regarding Fish and Wildlife Service careers. Nine students attended the presentation. RI Dyasuk delivered a similar presentation to 14 Koliganek students. The reception was good in both villages. The students seemed genuinely interested in the presentation.

2. Outdoor Classrooms - Students

A fly fishing clinic was held in the village of Quinhagak July 23. The village corporation staff organized the event and were the primary sponsor. Some of the sport fishing guides operating on the Kanektok River were the primary instructors. FB Lisac and River Rangers Malenfant and Stanley assisted with fly-tying instruction and presented fish biology, anatomy and life history. Participants received individual instruction on tying useful fly patterns which they then put to use the next day during a picnic held on a gravel bar up river. All participants appeared to thoroughly enjoy the activities. This is the second year that the corporation in conjunction with some of the commercial sport fishing guides have sponsored a fly fishing clinic. Previous sentiments between local village residents and the sport fishing industry have been somewhat adversarial. The new cooperative spirit and interest in fly fishing has grown dramatically. The village corporation has begun providing guide services and become more proactive in managing their lands and visitor education.

A Pathways to Fishing clinic was held in Dillingham on June 12 as part of National Fishing Week. The clinic took place at the Refuge aircraft hangar and was coordinated with the local Girl Scout Troop annual day camp and the Bristol Bay Area Health Corporation (BBAHC) Accident Prevention Program. The Girls Scout Troop accounted for approximately half of the 65 kids (ages 4 to 16) who attended the 3.5 hour clinic. The original 12-station format for the clinic was consolidated into 6 stations: 1)Fish Biology and Location; 2)Presentation - Tackle and equipment; 3)Knot tying; 4)Casting; 5)Hooking, Handling, Releasing Fish, and Angler Ethics; and 6)Angler Safety. National Fishing Week hats, pencils, glasses and activity books were provided by Togiak Refuge to all participants. Lures and spools of line were prizes for casting accuracy and provided by King Salmon FRO, and a youth float coat was provided by BBAHC Accident Prevention as a door prize drawing. It appeared that all the participants as well as the staff members enjoyed the activities. Letters were received (some hand delivered) and radio announcements were heard thanking the Fish and Wildlife Service.



Photo 17. PR Malenfant teaches a girl scout how to fish with a rod and reel.

From June 3 to the 6th, WB Aderman and EES Johnson (RO) conducted the marine science and Yup'ik culture camp at Cape Peirce. Six high school students and two adult aides from Rocky Mountain School in Goodnews Bay participated. Participants learned firsthand how staff monitor the rich and diverse wildlife resources present in the area. Topics and activities included counting walrus and seals at haulouts, seabird nest monitoring, bird and plant identification, weather measurement and monitoring, wetland ecology, predator-prey interactions, visiting historical sites and story telling, bird banding, beach cleanup and stewardship of the environment. Participants also learned some of the duties associated with daily field camp life including cooking, dishes, and packing their gear and food two miles with a 40 mph crosswind. This is the third consecutive year Togiak Refuge has run this camp with funding coming through Challenge Cost Share Agreement process. Everyone involved had a great time and we look forward to continuing this camp for a long time.

In May, Interpreter Dyasuk and RIT Sharp presented Wetlands and Wildlife presentations to nine classes of Dillingham elementary students (171 total). The video "The Wealth in Wetlands" was shown and a demonstration of how wetlands filters and purifies water was completed by using harbor clay, gravel, and plant material.



Photo 18. RIT Sharp during a school presentation.

During the month of February, 33 off-site presentations were given by INT Dyasuk and/or RIT Sharp and RIT Evans to almost 800 students located in Dillingham and surrounding villages. The presentations were about the goose calendar contest and the Federal Junior Duck Stamp contest. Weather prevented formal presentations at a couple of the villages, but all classrooms received the necessary information to compete.

BTF MacDonald and FB Lisac presented a pond ecology and aquatic insect program to the three classes of first grade students (46 total) at Dillingham Elementary School on May 15. Fish biology and dissection were presented to the first and third grades on May 29.

3. Classrooms - Teachers

In May, several staff members assisted Dillingham teachers and guided 46, fourth-grade students on a birdwalk. Each leader took a group of students and helped them locate and identify bird species.

RIT's Sharp and Evans prepared necessary material to conduct school presentations regarding the Goose Calendar Contest. Thirteen teachers (Southwest Regional Schools and Dillingham School District) have signed up to participate. Sharp and Evans made presentations to students, kindergarten through fifth grade, in all surrounding villages. Approximately 250 students were involved. INT Dyasuk served as contest judge.

4. Interpretive Foot Trails

Nothing to report.

5. Interpretive Tour Routes

Nothing to report.

6. Interpretive Exhibits/Demonstrations

An interagency interpretive display was completed in 1990 and has proven to be a popular attraction with travelers. The project was a cooperative venture between Togiak Refuge, City of Dillingham, Bristol Bay Coastal Resource Service Area Board, local Native Corporations, Alaska Department of Natural Resources, and Alaska Department of Fish and Game.

The displays are located in major terminals at the Anchorage and Dillingham airports. They help to orient visitors to southwest Alaska by delineating land ownership patterns. Two displays are in each airport. Displays in Dillingham have tearsheets stocked on the following subjects: Togiak Refuge; Alaska Department of Fish and Game; Wood-Tikchik State Park; Nushagak and Mulchatna Rivers; and Dillingham. The displays in Anchorage have the tearsheets under clear Plexi-glas™ and are not stocked.

7. Other Interpretive Programs

Celebration activities for National Wildlife Refuge Week consisted of multiple presentations at local schools including Goodnews (7), Quinhagak (4), Togiak (9), Manokotak (8), Aleknagik (1), and Dillingham (13). Also, one-gallon berry buckets with NWR logo stickers attached were made available, newspaper articles were printed and radio releases were broadcasted, and an announcement was viewed the entire week on the local cable advertising channel.



Photo 19. PR Miller conducts National Wildlife Refuge Week presentations.

FB Lisac and BTF MacDonald assisted in conducting a Steel Shot information workshop in Dillingham on October 9-11. Tom Rothe (ADF&G), Dave Crowley (ADF&G), Bruce Batten (EA), and Janey Fadely (Spectacle Eider Project) all participated in the cooperative effort with the Bristol Bay Native Association to inform key village people on the poisonous nature of lead and the ballistics of steel shot shells. Sixteen individuals from ten villages attended the three hour classroom seminar and the seven-hour patterning and clay bird shooting at the Dillingham gun range. Everyone spoke highly of the information and skills they learned. By the end of program many of the participants had been converted to advocate status. A regional education program will be the next step.

During the summer, as identified by the Public Use Management Plan (1991), river rangers are placed on the Kanektok, Goodnews, and Togiak rivers. Two rangers on each river patrolled in small power boats to contact visitors, provide information, collect use data and obtain resource data. The emphasis on the river ranger program is educational; they do not have enforcement authority.

Rangers are the main source of environmental education and/or interpretation for sport fishermen and local residents. Information distributed to the public includes Service policies, regulations, resource management practices, State sport fish regulations, bear safety, wilderness ethics, low impact camping, and information about private Native lands to prevent trespass. Information rangers document include the level of sport fishing and subsistence use occurring on the river along with the location and timing of activities, conflicts between recreational and subsistence users, conflicts between different recreational users, sport fish catch/harvest per unit effort, neotropical bird sightings and other wildlife sightings. In addition they patrol campsites for litter, dispose of abandoned set nets, monitor compliance of commercial sport fishing operators, collect water samples, and offer assistance as needed (See Section E. 8b).

8. Hunting

Three big-game guides Chris Goll, John Peterson, and Nelson Hautanen are permitted via Special Use Permit to operate commercial brown bear hunts within the refuge. Hunters, however, are not required to use guided services.

Effort expended by local subsistence hunters varies each year depending on weather, traveling conditions, availability of game, and the success of commercial fishing. On refuge lands, there is no open season for moose by sport or subsistence hunters.

Throughout the year, Native residents of coastal villages within or adjacent to the refuge harvest marine mammals which is a significant subsistence activity. This activity is primarily directed toward harbor seals near coastal fish-spawning grounds with an occasional walrus. This is partly due to the traditional maritime orientation of the village residents and partly to the extremely low moose and caribou populations in the vicinity of these villages. Village residents often travel to areas off the refuge to hunt caribou.

Hunters shot two walruses on Maggy Beach on August 31, taking the animals quickly and causing a moderate level of disturbance to walruses hauled out. They took flippers, blubber, a large amount of meat and the tusks.

A second harvest by another group of hunters occurred on September 23, after they attempted for two days to take a walrus. On the first day of their arrival, some young people in the hunting party were seen throwing rocks at the herd on Maggy Beach; the entire herd, except an old, emaciated animal left the beach. This animal was found dead later in the day, with its ivory removed. The hunters then drove their skiff into South Firebaugh cove to investigate hunting possibilities; all animals left the beach. On the following day, the hunters tried to herd a walrus from Maggy Beach to their boat in Nanvak Bay, a distance of about 0.5-0.8 km. After taking more than three hours to move the animal 100m and causing a moderate level disturbance to the walruses hauled out, they gave up. On the third day, the hunters killed a walrus on Maggy Beach after firing 20 shots to its head. Only the chest meat, flippers and tusks were harvested. Refuge staff notified village council representatives in the hunters' village, who spoke to the hunters about the incident.

9. Fishing

Sport fishing for resident and anadromous fish in rivers and lakes on the refuge is considered excellent and draws the majority of use by visitors from outside the refuge. Fishing opportunities include all five species of Pacific salmon, rainbow trout, pike, grayling, lake trout, Dolly Varden, Arctic char, and others. These fish are sought at different times of the year, with the majority of use occurring during the summer. Of the available species, king and coho salmon, rainbow trout, and char (spp.) are the most avidly pursued by anglers.

Subsistence users from local villages, using various fishing methods, rely heavily on fish harvested from refuge rivers and lakes. The subsistence users catch the majority of their fish using nets during the ice-free season. Other subsistence methods include ice-fishing, rod and reel and spears.

Both subsistence and sport fishing efforts are concentrated on the Togiak, Goodnews, and Kanektok rivers. Due to the remoteness of the refuge, access is primarily by plane or boat during ice-free months and by snowmachine during frozen periods.

Refuge sport fishing guides offer fishing packages of various types to people from all over the world. These sport fishing packages range in price from \$2,000 to \$5,000 for a 6-10 day fishing excursion. Packages include float trips, tent base-camps on rivers, or full accommodations at lodges located off the refuge with daily fly-in fishing to refuge rivers and lakes. It is estimated that sport anglers spend more than \$3,000,000 to fish within the refuge. This cost does not include airfare to Alaska or fishing tackle and licenses. Costs of all gear and transportation will probably increase the total to more than \$6,000,000.

In 1996, non-guided anglers constitute approximately 49% of the angling visitors (9% increase over 1995). They are primarily river rafters, hiring an air taxi to fly into one of the headwater lakes of a major river system. Some non-guided anglers may also fly private aircraft into the refuge to fish. During the chinook and coho salmon sport fisheries, flying scheduled seat fare to Quinhagak and fishing the Kanektok River has become very popular. In the village it is possible to rent a boat and motor or hire someone to give you a ride to a prime fishing spot and fish for the day. The village corporation in Quinhagak expanded these services by operating their own guide service, Kanektok River Safaris. This is a motorboat operation located in the lower river using tents for base camp.

Estimating use levels for the refuge has always been difficult. Refuge programs such as the river ranger program and creel censuses conducted by the refuge, the King Salmon Fishery Resources Office, and the Alaska Department of Fish and Game provide a better picture of the use pattern. Most of these studies represent minimums and often do not provide complete coverage of an entire river system, nor of all user groups. It has been necessary to use figures reported by the individual permit holders and staff estimates of non-guided users to acquire a full range of user estimates.

Table 24. 1996 Estimates of Sport Fishing Use Days on Togiak National Wildlife Refuge¹

Type of Use	Kanektok River	Goodnews River	Togiak River	Other Rivers ²	Total
Guided Use	8,561	3,269	1,397	382	13,609
Non-guided Use	6,779	5,504	447	278	13,008
TOTALS	15,340	8,773	1,844	660	26,617

¹ From refuge river ranger surveys, air taxi trip reports and sport fish guide reports.

² Includes Pungokebuk Creek and Lake, Gechiak Creek and Lake, Ongivinuck River and Lake, Negukthlik River, Ungalikthluk River, Kulukak River, Arolik River, Canyon Lake, Nenevok Lake, Jondik Creek, Heart Lake, and High Lake.

Other information pertaining to the sport fishing opportunities and levels of use can be found in Sections D.5. and G.11.



Photo 20. Float fishing groups fish the outlet of Kanektok River's headwater lake.

10. Trapping

Trapping is an important part of the culture and economy in northern Bristol Bay. Trapping was one of the main sources of cash income before the prices paid for commercially caught salmon increased during the early 1980s. Furs still provide an important source of income for many residents. During late February, trappers come to Dillingham from around the region to seal and sell pelts at the annual "Beaver Round-up." Fur buyers purchase thousands of pelts during the week-long rendezvous and celebration.

Beavers have historically been the most important furbearer in northern Bristol Bay. They are abundant throughout most areas of the refuge. Although beaver dams create inundated areas which enhance waterfowl production, they occasionally impede the movement of migrating salmon and cause siltation in traditional spawning areas. Pelt prices and local travel conditions are significant factors in the size of the annual beaver harvest. Commercial salmon prices also affect beaver trapping effort in the Bristol Bay area; as salmon prices rise, fur trapping effort declines. However, the importance of beaver as a food item for local residents assures a base level of harvest regardless of other factors.

River otters are common throughout the refuge, and many of those caught are taken in conjunction with beaver trapping activities. Mink and muskrat also occur within the refuge; however, little trapping effort is specifically directed toward them.

Red foxes are the second most commonly trapped furbearer on the refuge. Fox populations fluctuate widely, apparently as a result of periodic rabies outbreaks. Arctic foxes are uncommon, probably dispersing from the Yukon-Kuskokwim delta during peaks in their population cycles.

Lynx and marten occur on the refuge but are uncommon. Both species reside in boreal forest, an uncommon habitat type on the refuge. Any effort directed toward these furbearers is probably opportunistic.

Wolves and wolverines occur in limited numbers, due to the low density of moose and caribou. Interest in these valuable furbearers is high, from both a domestic and commercial standpoint. Most wolves and some wolverines are taken in this area by shooting, a legal method of take under trapping regulations. In addition, both are classified as big game and can be taken under hunting regulations.

Other furbearers on or near the refuge include coyote and short-tailed weasel. Coyotes are recent immigrants to this area as they continue to expand west from the Alaska Range. Weasels are common, but little effort is expended in trapping them.

In Alaska, five species of furbearers must be sealed by ADFG personnel or an authorized representative if taken anywhere in the State regardless of their intended use. These furbearers include lynx, river otter, wolf, and wolverine. Beaver hides do not need to be saved so long as the meat is salvaged.

In addition to sealing, ADFG collects harvest information through fur acquisition reports from fur buyers. The regulatory year begins July 1 and ends June 30; thus, calendar year 1996 encompasses the second and first halves of regulatory years 1995-96 and 1996-97, respectively. Furbearer sealing data for the villages in closest proximity to the refuge is presented in the following table. With the exception of wolves, all other furbearers were assumed to have been taken near or on refuge lands. Airplanes are often used to access areas off the refuge containing wolves. Trapping seasons generally reflect the period of pelt primeness and begin in early November and finish at the end of February or March. Most trappers access their trapping areas via snowmachines. Open water or lack of adequate snow may prohibit access and thus reduce trapping effort.

11. Wildlife Observation

This activity is usually associated with sport fishing or hunting within the refuge. Expense and troublesome logistics have prevented Cape Peirce from being a popular wildlife viewing attraction. High winds and low ceilings commonly postpone Cape Peirce arrival and/or departure schedules. Round trip costs for air charters are close to \$2000.

12. Other Wildlife Oriented Recreation

This activity consists primarily of wildlife photography. Every year a few outdoor writers and/or photographers visit the refuge. They are usually associated with a sport fish guiding operation and are getting pictures and information to complete articles for outdoor or fishing magazines.

13. Camping

Camping, as related to subsistence activities conducted by local village residents, occurs primarily on the refuge during the fall and winter months. Villagers camp while trapping, hunting, fishing (fall fishing for spawned-out salmon), berry picking, and firewood gathering. Most of the camps are located on Native land allotments within the refuge wilderness area.

Camping by non-rural residents is usually related to sport fishing, hunting, or river rafting. The refuge does not provide any camping facilities. In association with guiding services, several sport fish guides provide semi-permanent camps on major river drainages. All other camping is primitive tent camping.

14. Picnicking

Nothing to report.

15. Off-Road Vehicling

Snowmachines are the only off-road vehicles authorized for use on the refuge and are for use only during periods of adequate snow cover. Their use on the refuge during the winter is quite extensive and is usually associated with travel from one village to another, trapping, firewood gathering, ice fishing, or hunting.

16. Other Non-Wildlife Oriented Recreation

These are subsistence activities conducted by village residents. These activities consist primarily of firewood gathering and berry picking.

17. Law Enforcement

DRM Stovall assisted by State Fish and Wildlife Protection Officers, questioned a "non-guided" group coming off a float trip on the Kanektok River. It was determined one of the party members was serving as a guide for the party and that he received compensation for the trip beyond expenses. He did not have a State of Alaska sport fish guiding license which is a requirement. He was issued a State violation notice.

I. EQUIPMENT AND FACILITIES

1. New Construction

Engineers Tom Eagan and John Harris were on site, June 22 and 23, to inspect the new government quarters. Problems included: design problems, tile floors that need to be replaced due to nail heads popping out, drainage problems, one of the water filter systems had to be repaired, various cosmetic problems such as nails coming out of the sheet rock, and other miscellaneous deficiencies. We have been working with the regional engineer office to correct these problems and to accomplish some landscaping this summer to eliminate erosion problems.

2. Rehabilitation

A tree fell over the power line which serviced the bunkhouse and warehouse. This caused a severe electrical overload to both facilities. All of the electrical components were damaged including the boiler, ballasts for fluorescent lighting, the bunkhouse T.V. and VCR, plus other appliances and electrical items. The items damaged were or will be fixed if possible or replaced.

3. Major Maintenance

Sheds were constructed at each of the new government quarters. They are large enough to house snow machines plus lots of other miscellaneous items.



Photo 21. RITs Sharp, Abraham, and Evans help to complete the sheds.

4. Equipment Utilization and Replacement

Three new 50 hp Honda Four-Stroke jet units arrived on December 11 to be used in the river ranger program. The engines minimize environmental impacts in relation to noise and pollution than the 50 hp Yamaha jet units previously used.

The Refuge received a new Dodge 4X4 Pickup Extended Cab with a V10 engine.

All non-Fish and Wildlife Service individuals will now be charged a rate of \$20 per night to stay in the refuge bunkhouse. Fees will be collected through a bill of collection of which the refuge will get back approximately 80%. These funds will assist in providing periodic cleaning services and help to maintain cooking and bedding provisions.

A new Polaris ATV arrived on August 22. It will be used at the hangar to help move Service aircraft over snow covered aprons going in/out of the hangar.

On January 9, RM Archibeque and DRM Stovall met with the owner of one of the residential houses that will be released. It was agreed that the government will continue to lease the house until April, all floor coverings would be replaced, and several miscellaneous items fixed. This was in accordance to the contract agreement that states the government will "restore the premises to the same condition as at the time of entering upon the same. . . ." It cost the government approximately \$11,000 to close out the lease. The refuge had leased the house for six years.

5. Communication System

A voice mail system was installed on October 17. Fine tuning had to be accomplished once we discovered the best method of being as user friendly as possible. Every staff member has his/her own extension and the individual can be reached without going through the front desk by calling 842-1966 plus the extension (a directory is listed on voice mail). This eliminated the time it takes to answer and route calls by the front desk. Our goal, however, is for a real person to answer all other incoming calls.

During the summer of 1996, the refuge took advantage of a trial satellite phone service offer by Skycell/Black Canyon Radio. Two fixed satellite dishes were installed and a transportable unit was taken on float trips. After a few kinks were ironed out, it all worked pretty slick even in real remote sites. At the end of season, two fixed-site phones were purchased with the intention of buying three more to replace the VHF system.

6. Computer Systems

Three Gateway Pentium desktops and two notebook computers were purchased this year. All staff members now have a relatively current system to use. An older model computer was placed in the bunkhouse for miscellaneous use.

7. Energy Conservation

Staff at Togiak Refuge actively recycles paper, cardboard, magazines, and aluminum. Recycle bins are located in a large hallway of the office.



Photo 22. Cape Peirce field camp was one of the locations the satellite phone was put to test.

J. OTHER ITEMS

1. Cooperative Programs

Wildlife programs on the refuge have been cooperative efforts with the Alaska Department of Fish and Game. The working relationship between the two agencies has been excellent, insuring the success of these programs.

DRM Stovall and PR Miller attended the Southwest Alaska Municipal Conference (SWAMC) in Dillingham, September 11-13. This was the first Togiak Refuge staff participated in SWAMC and their attendance proved beneficial. Contacts were made to revive the cooperative efforts to print the informative tear sheets provided in displays at the terminals of Alaska Airlines and Freshwater Adventures. The need for an airport visitor contact station was stressed. The possibility for a cooperative venture was discussed and is listed as a high priority goal. It was identified that over 60,000 people go through the Dillingham airport of which very few leave the airport area prior to going to a lodge or a field location.

2. Other Economic Uses

Nothing to report.

3. Items of Interest

In October, National Geographic Explorer television program aired a five-minute segment on Cape Peirce walruses. Footage was taken during August 1995 in conjunction with National Geographic Magazine story on America's National Wildlife Refuges that was also featured in October. Both BT's Wilson and Haggblom got their proverbial 10 seconds in the "lime light" on national T.V.

August 19-20, Assistant Director - Refuges and Wildlife Bob Streeter flew into Pungokebuk Lake with RM Reardon and met RM Archibeque, WB/P Hinkes, and RO ARW Corin for an over nighter and then flew into Dillingham. Upon their arrival in Dillingham, DRM Stovall gave them a tour of refuge facilities and introduced them to the staff. These informal meetings are ideal to discuss projects, programs, and issues in a much more enjoyable manner.

RI Dyasuk served as a panel judge for the Junior Duck Stamp Contest and the goose calendar contest in Anchorage on April 2.

RI Dyasuk was presented an "On the Spot Award" this year. Due to his efforts, a large number of students located in Dillingham and surrounding villages participated in the goose calendar contest and the Federal Junior Duck Stamp contest. During the month of February, 33 off-site presentations were given and/or coordinated by Interpreter Dyasuk to almost 800 students. This is the first time contest information was so widely distributed. It took a major effort to include all eligible students and to coordinate presentations with school superintendents and teachers.



Photo 23. RI Dyasuk is happy to receive his "On The Spot Award".

4. Credits

Preparing this report was a combined effort of refuge staff.



Photo 24. Taking off to achieve new highlights.

3 nautical miles of Steller sea lion rookeries west of the Kenai Peninsula. Restricted people on land from approaching within half a nautical mile.

- Prohibited commercial trawl vessels from fishing within 10-20 miles of certain rookeries at certain times.

- Placed observers on fishing vessels to monitor the accidental capture of sea lions in fishing gear and reduced the allowable take from 1,350 to 675 animals annually west of 141°W longitude.

- Initiated numerous studies to determine the cause of the decline and the key to reversing it.

The Solution

Finding a solution to the mystery of the sea lion decline will require continued public commitment. You can help by learning more about sea lions and supporting programs to protect and rebuild their population.

For more information contact:

National Marine Fisheries Service, P.O. Box 21668, Juneau, AK 99802-1668. Phone: (907) 586-7235.

The Alaska Department of Fish and Game conducts all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood, or disability. For information on alternative formats available for this publication, please call (TDD) 1-800-478-3648. Any person who believes s/he has been discriminated against should contact: ADF&G, Box 25526, Juneau, AK 99802; or O. E. O., U. S. Dept. of the Interior, Washington, D. C. 20240.

Text by Michelle Sydeman and photos by John Hyde.



Steller Sea Lions in Alaska: A Threatened Species

Effect of Commercial Fisheries

Over the past 30 to 40 years, commercial fisheries have grown dramatically in the North Pacific. Estimates place their current value at several billion dollars each year, employing tens of thousands of people in harvesting and processing.

Such massive increases in human activity have undoubtedly had some effect on sea lions.

Entanglement in fishing nets and shooting in defense of fishing gear and harvests have resulted in some sea lion mortality.

The estimated mortality from these causes, however, is not enough by itself to account for the magnitude of the decline.

Scientists are investigating whether the main potential impact of commercial

fisheries could be a reduction in the abundance and availability of sea lion prey, such as pollock.

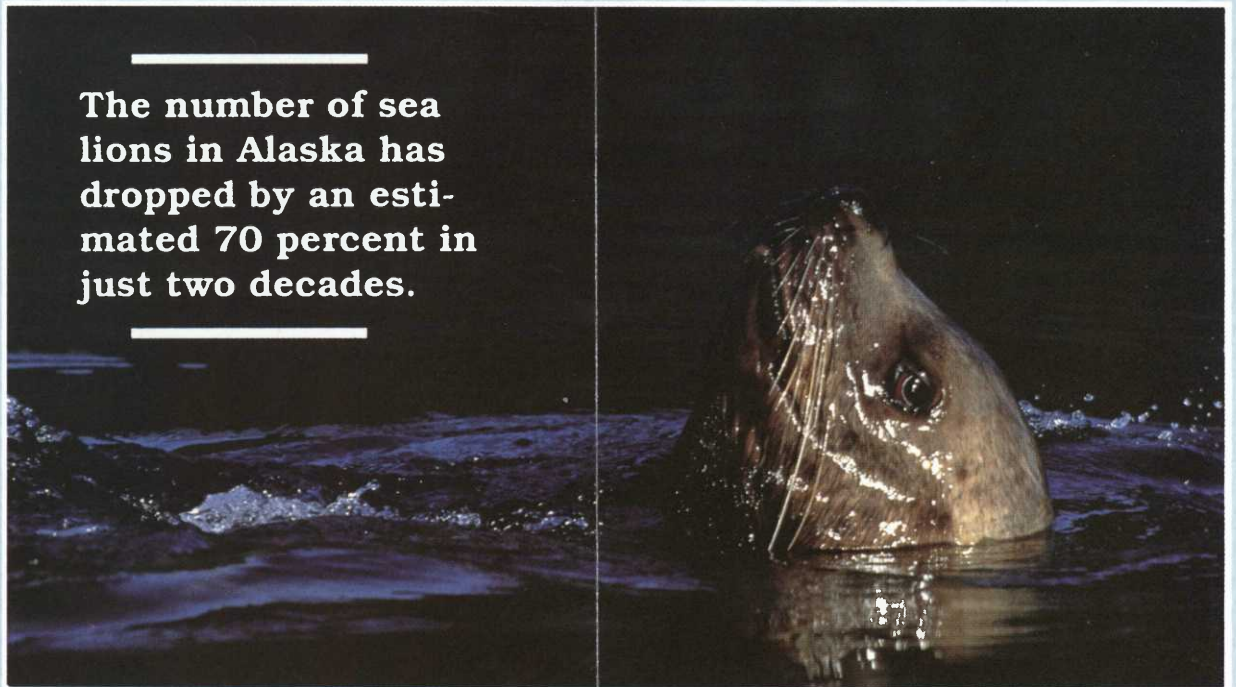
The Response

Although it isn't entirely clear what has caused the crash in sea lion numbers, wildlife managers are trying to come up with ways to halt the decline and allow the population to recover.

The state and federal governments have already taken the following actions to protect sea lions in Alaska:

- Prohibited shooting at or near sea lions, with the exception that Alaska Natives can harvest them for subsistence purposes.
- Restricted vessels from approaching within

The number of sea lions in Alaska has dropped by an estimated 70 percent in just two decades.



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Text by Michelle Sydeman and photos by John Hyde.



Steller Sea Lions in Alaska: A Threatened Species



The number of sea lions in Alaska has dropped by an estimated 70 percent in just two decades.

Removing the Hook

Always try to remove the hook quickly and gently, keeping the fish underwater. Firmly grasp the hook with your fingers, or better yet with long-nosed pliers or hemostat, and roll or back the hook out of the fish's mouth. Most of the time it will not be necessary to touch the fish.

When a fish is hooked deeply, never attempt to force or pull out the fly or lure. Cut the leader as close to the eye of the hook as possible and revive the fish as described. The hook will eventually dissolve or rust away.



Reviving and Releasing Your Fish

Never throw, drop, or kick a fish back into the water. Cradle it gently, well behind the gills, and lower it back into the water.

Revive a stream fish by pointing its head into the current until its gills are working and it maintains an upright position. In slow or still water some fish might need to be revived by "walking" them for a few minutes. To walk a fish, move upstream from other anglers, cradle the fish in the water, and gently move it back and forth. As the fish recuperates, its gills will begin to work strongly.

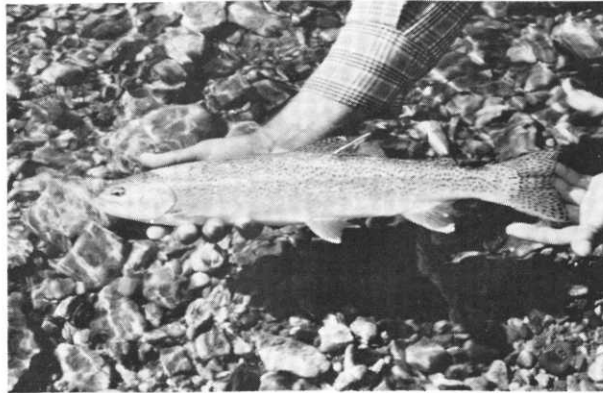


Photo courtesy USFWS

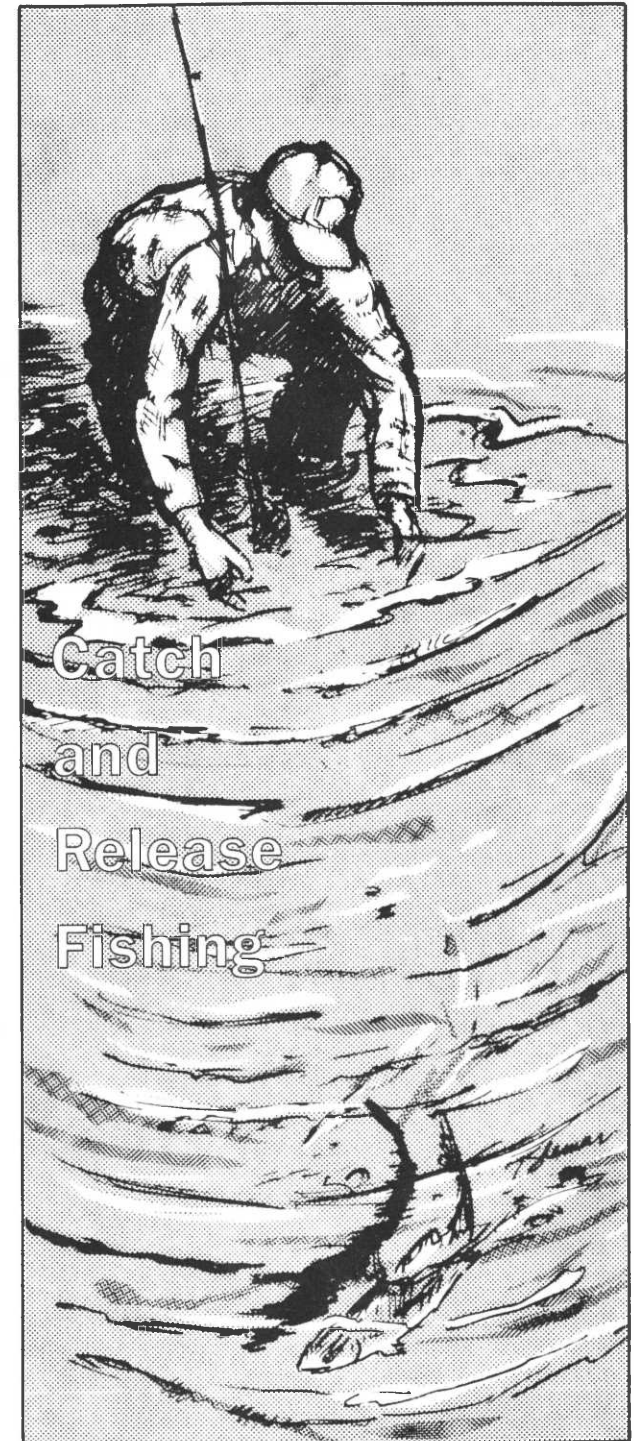
It may take some time to revive a fish. Large fish often require more time since their struggle to escape may have left them exhausted and in shock. When the fish pulls against your hand, release it. Don't be alarmed if the fish swims off slowly. If the fish takes off quickly, so much the better.

Do everything you can to help a fish swim away before you leave it.



Produced by the University of Alaska Sea Grant College Program, the Alaska Department of Fish and Game, the National Park Service, and the U.S. Fish and Wildlife Service.

Illustration and design by Todd Sherman.
Sea Gram #29.



Catch and Release Fishing

Fish are one of Alaska's greatest renewable resources. The popularity of catch and release sport fishing, which helps protect that resource, is growing along with the size of Alaska's angler population. A fish that is handled gently and released quickly by a skilled angler has a good chance of surviving. By practicing proper catch and release fishing, today's anglers preserve quality fishing for the anglers of tomorrow.

Your Gear

Use artificial flies and lures to catch fish that you plan to release. Hooking mortality in fish is much lower if caught with flies and lures instead of bait.

Take care to select a hook size appropriate for the size of fish you will be catching. Use barbless hooks when you plan to release fish. Pliers can be used to pinch down barbs on conventional hooks. Overly large hooks can cause excessive damage to mouth parts or eyes. Small hooks may be taken more deeply by fish.



Playing Your Fish

Play and release your fish as quickly as possible. A fish that is played to the point of exhaustion may not survive. Use a rod, line, and leader of sufficient strength to easily land a fish.

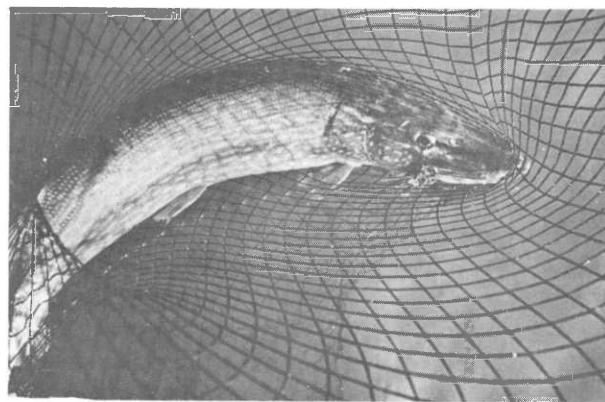


Photo by Silvio Calabi

Landing a Fish

When you are about to land the fish, try to avoid removing it from the water. Keep it in water deep enough to protect it. Do not let a fish flop in shallow water over rocks and never on dry land.

When fishing from a boat or raft, using a net can reduce landing time. Nets made of knotless nylon are the least abrasive to fish.

Handling Your Fish

Keep the fish in the water as long as possible while handling. The longer a fish is out of water, the greater the probability that it will



Photo courtesy USFWS

Hold the fish in the water and have someone else take your photograph.

die. Cradle a fish gently with two hands, one supporting the belly and the other hand just ahead of and underneath the tail section. Holding it up side down by its tail may break its back.

Keep your fingers out of and away from the gills of any fish. Gills are delicate and full of blood vessels. Once a fish begins bleeding from the gills, it is likely to die.

Never squeeze a fish. Pressure against a vital organ will often prove fatal. Use soft, wet gloves or at least wet your hands before handling a fish.



Photo by Grant Sims

Do not remove fish from the water to take photographs if you plan to release it.

It's better to release the fish at the boat without ever attempting to lift it out of the water. A fish can be severely injured when being lifted out of the water or when flopping in the boat. If necessary, it is better to break your line than to needlessly wrestle with a fish.

If you wish to photograph a fish, have a camera ready and do it quickly. Get someone else to take the picture or to hold the fish. If possible, keep the fish in the water by cradling it or by keeping it in a net.

Close Encounters: What to do

If you see a bear, avoid it if you can. Give the bear every opportunity to avoid you. If you do encounter a bear at close distance, remain calm. Attacks are rare. Chances are, you are not in danger. Most bears are interested only in protecting food, cubs or their "personal space." Once the threat is removed, they will move on. Remember the following:

Identify Yourself Let the bear know you are *human*. Talk to the bear in a normal voice. Wave your arms. Help the bear recognize you. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening. You may try to back away slowly diagonally, but if the bear follows, *stop* and hold your ground.

Don't Run You can't outrun a bear. They have been clocked at speeds up to 35 mph, and like dogs, they will chase fleeing animals. Bears often make bluff charges, sometimes to within 10 feet of their adversary, without making contact. Continue waving your arms and talking to the bear. If the bear gets too close, raise your voice and be more aggressive. Bang pots and pans. Use noisemakers. Never imitate bear sounds or make a high-pitched squeal.

If Attacked If a bear actually makes contact, surrender! Fall to the ground and play dead. Lie flat on your stomach, or curl up in a ball with your hands behind your neck. Typically, a bear will break off its attack once it feels the threat has been eliminated. Remain motionless for as long as possible. If you move, and the bear sees or hears you, it may return and renew its attack. In rare instances, particularly with black bears, an attacking bear may perceive a person as food. If the bear continues biting you long after you assume a defensive posture, it likely is a predatory attack. Fight back vigorously.

Protection

Firearms should *never* be used as an alternative to common-sense approaches to bear encounters. If you are inexperienced with a firearm in emergency situations, you are more likely to be injured by a gun than a bear. It is illegal to carry firearms in some of Alaska's national parks, so check before you go.

A .300-Magnum rifle or a 12-gauge shotgun with rifled slugs are appropriate weapons if you have to shoot a bear. Heavy handguns such as a .44-Magnum may be inadequate in emergency situations, especially in untrained hands.

State law allows a bear to be shot in self-defense if you did not provoke the attack and if there is no alternative, but the hide and skull must be salvaged and turned over to the authorities.

Defensive aerosol sprays which contain capsaicin (red pepper extract) have been used with some success for protection against bears. These sprays may be effective at a range of 6-8 yards. If discharged upwind or in a vehicle, they can disable the user. Take appropriate precautions. If you carry a spray can, keep it handy and know how to use it.

In Summary

- Avoid surprising bears at close distance; look for signs of bears and make plenty of noise.
- Avoid crowding bears; respect their "personal space."
- Avoid attracting bears through improper handling of food or garbage.
- Plan ahead, stay calm, identify yourself, don't run.

In most cases, bears are not a threat, but they do deserve your respect and attention. When traveling in bear country, keep alert and enjoy the opportunity to see these magnificent animals in their natural habitat.

For additional information about traveling in bear country, please contact one of the following agencies which participated in publication of this brochure:

Alaska Department of Fish & Game
Alaska Department of Natural Resources, Divisions of
Forestry and Parks and Outdoor Recreation
Alaska Department of Public Safety, Division of Fish &
Wildlife Protection
Alaska Natural History Association
U.S. Bureau of Land Management
National Park Service
U.S. Fish & Wildlife Service
U.S.D.A. Forest Service

Revised 1/92

Female bears can be fierce defenders of their young. Getting between a female and her cubs is a serious mistake. A female bear may respond aggressively to any threat she perceives to her cubs.

Larry Aumiller

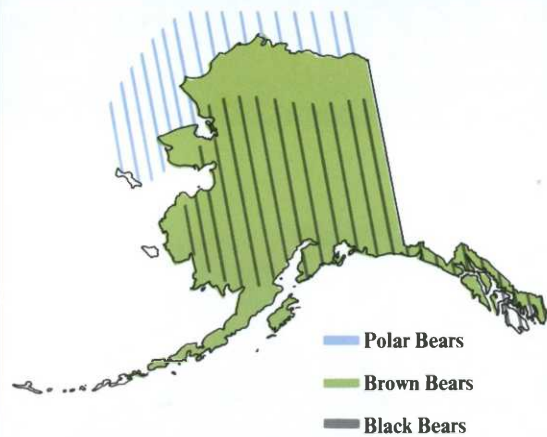
BEAR FACTS

The Essentials for Traveling in Bear Country



Larry Aumiller

Bear Behavior



One of the things that makes Alaska so special is that all three species of North American bears flourish here. There is a chance that you may be lucky enough to see a bear. But even if you don't, you will never be far from one, because Alaska is bear country.

Brown/grizzly bears are found from the islands of southeastern Alaska to the arctic. Black bears inhabit most of Alaska's forests. Polar bears frequent the pack ice and tundra of extreme northern and western Alaska.

Bears are curious, intelligent and potentially dangerous animals, but undue fear of bears can endanger both bears and people. Many bears are killed each year by people who are afraid of them. Respecting bears and learning proper behavior in their territory will help so that if you encounter a bear, neither of you will suffer needlessly from the experience.

Most bears tend to avoid people. In most cases, if you give a bear the opportunity to do the right thing, it will. Many bears live in Alaska and many people enjoy the outdoors, but surprisingly few people even see bears. Only a tiny percentage of those few are ever threatened by a bear. A study by the state epidemiologist showed that during the first 85 years of this century, only 20 people died in bear attacks in Alaska. In the 10 years 1975-85, 19 people in Alaska were killed by dogs.

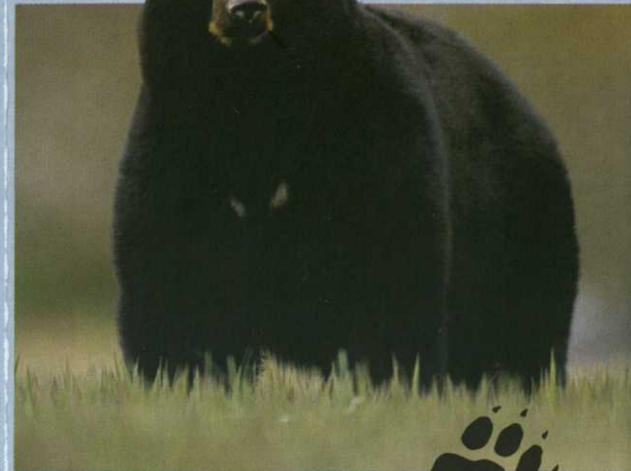
Most people who see a bear in the wild consider it the highlight of their trip. The presence of these majestic creatures is a reminder of how privileged we are to share some of the country's dwindling wilderness.

Alaska's Three Bears



Polar Bear
Length: 8-10 feet
Weight: Males 600-1,200 lbs.; Females 400-700 lbs.
Color: All white
Alaska Population Estimate: 4,000-6,000

K. Whitten



Black Bear
Length: 5 feet
Weight: Males 150-400 lbs.; Females 125-250 lbs.
Color: Brown to Black, white patch on front of chest
Alaska Population Estimate: More than 50,000

John Hyde



Larry Aumiller

Brown Bear
Length: 7-9 feet
Weight: Males 400-1,100 lbs.; Females 200-600 lbs.
Color: Dark brown to blonde
Alaska Population Estimate: 35,000-45,000

Bears and People

Bears Don't Like Surprises! If you are hiking through bear country, make your presence known—especially where the terrain or vegetation makes it hard to see. Make noise, sing, talk loudly or tie a bell to your pack. If possible, travel with a group. Groups are noisier and easier for bears to detect. Avoid thick brush. If you can't, try to walk with the wind at your back so your scent will warn bears of your presence. Contrary to popular belief, bears can see almost as well as people, but trust their noses much more than their eyes or ears. Always let bears know you are there.

Bears, like humans, use trails and roads. Don't set up camp close to a trail they might use. Detour around areas where you see or smell carcasses of fish or animals, or see scavengers congregated. A bear's food may be there and if the bear is nearby, it may defend the cache aggressively.

Don't Crowd Bears! Give bears plenty of room. Some bears are more tolerant than others, but every bear has a "personal space"—the distance within which a bear feels threatened. If you stray within that zone, a bear may react aggressively. When photographing bears, use long lenses; getting close for a great shot could put you inside the danger zone.

Bears Are Always Looking for Something to Eat! Bears have only about six months to build up fat reserves for their long winter hibernation. Don't let them learn human food or garbage is an easy meal. It is both foolish and illegal to feed bears, either on purpose or by leaving food or garbage that attracts them.

Cook away from your tent. Store all food away from your campsite. Hang food out of reach of bears if possible. If no trees are available, store your food in airtight or specially designed bear-proof containers. Remember, pets and their food may also attract bears.

Keep a clean camp. Wash your dishes. Avoid smelly food like bacon and smoked fish. Keep food smells off your clothing. Burn garbage completely in a hot fire and pack out the remains. Food and garbage are equally attractive to a bear so treat them with equal care. Burying garbage is a waste of time. Bears have keen noses and are great diggers.

If a bear approaches while you are fishing, stop fishing. If you have a fish on your line, don't let it splash. If that's not possible, cut your line. If a bear learns it can obtain fish just by approaching fishermen, it will return for more.

FISHERIES

WHAT'S SO SPECIAL ABOUT ALASKA'S FISHERIES?

Commercial and Recreational Importance

- Alaska's fisheries employ more people than any other state industry.
- Alaska's fisheries annually produce more revenue than the entire state operating budget.
- In 1995, over 63 million salmon returned to Bristol Bay 97% of which were sockeye salmon.
- Sport anglers spend more than \$38 million dollars annually to fish in the Kenai River.
- The largest chinook salmon ever documented was a 126 pound fish caught in a fish trap near Petersburg in 1949. A 97 pound chinook has been caught on sport tackle.
- The chum salmon is locally known as dog salmon because of its importance as food for dog teams once critical for transportation in remote areas.

Cultural Importance

- Rich fishery resources are probably what allowed the first Athabaskan people to settle and survive in the interior's extremely harsh climate.
- Alaska's fisheries continue to support a traditional subsistence lifestyle for many Native people. Salmon makes up 77% of the subsistence harvest in some Yukon River villages.

Ecological Importance

- Alaska contains 63% of the total wetland acreage in the United States. Over half of the state is covered by wetlands and fish are critical to the productivity of these ecosystems.
- Salmon that spawn and die in Alaska's streams replace the nitrates and phosphates that rainwater dissolves from the soil along the stream corridor.
- Late runs of chum salmon in southeast Alaska's Chilkat River support concentrations of up to 3,500 wintering bald eagles.



Togiak National Wildlife Refuge

Established in 1980 by Congress, the Togiak National Wildlife Refuge encompasses about 4.2 million acres of land, 2.3 million of which are designated as a National Wilderness Area. The refuge is about the same size as the states of Connecticut and Rhode Island combined.

The purposes of the refuge are to protect the diverse fish and wildlife resources, provide for subsistence use by local residents, protect the quality of streams,

and lakes, and protect and manage migratory birds.

The Togiak Refuge includes coastal areas in Bristol Bay and the Kuskokwim Bay. Mountainous upland areas define watersheds for several major river systems. The diversity and abundance of the fish and wildlife resources within Togiak Refuge make this area unique and a valuable component of the National Wildlife Refuge System.



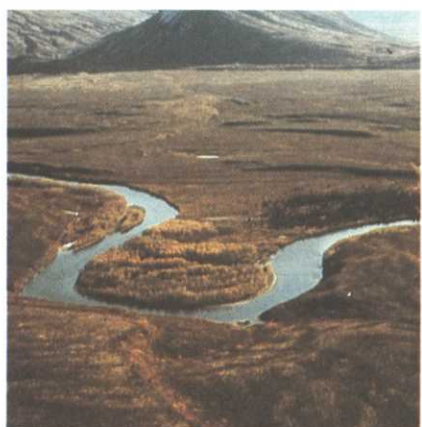
Refuge Habitats

Rivers, Lakes, and Streams

Each year more than one million salmon return to rivers, lakes, and streams within the refuge. The Kanektok, Togiak, and Goodnews Rivers and other river systems have clear water and contain essential fisheries habitat. Five different species -- king, silver, chum, sockeye, and pink -- are found in refuge rivers.

As spawning approaches, the salmon prepare spawning beds (redds), mate, and deposit their eggs. Less than half of the 6,000 eggs in each redd will survive the winter to emerge as fry the following spring. Most of the fry will spend up to two years in the river environment before they migrate out to the ocean as smolts. Only 1 to 3 fish may survive to return and spawn.

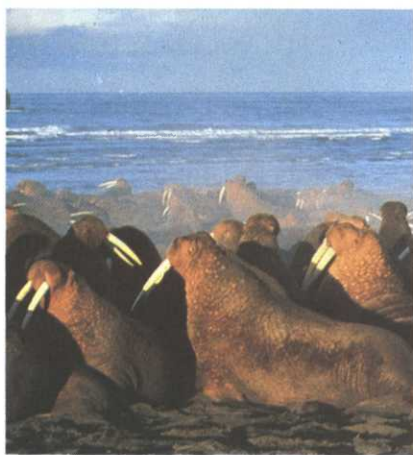
After spawning, the adult salmon die. Salmon carcasses provide food reserves for predators such as brown bears, foxes, gulls and resident fish. The decomposition process releases nutrients, feeding tiny plankton at the base of the food chain.



Coastal Bays and Shoreline

Rocky coastal headlands support several hundred thousand cliff nesting marine birds. The birds nest and roost on the ledges and in cracks of the cliff faces, reducing the chances of predation. Nesting species include common murrelets, black legged kittiwakes, puffins, cormorants, guillemots, and auklets.

The refuge coastline includes numerous saltwater lagoons and bays. These areas provide protected rest and feeding areas for migrating waterfowl.



Rocky beaches and dune areas along Cape Newenham and Cape Peirce serve as haul out and resting areas for Pacific walrus, Northern sea lions, and harbor seals. Since 1980, walrus have begun to recolonize traditional haul out areas largely as a result of the increased protection afforded by the refuge.

Endangered grey whales, beluga whales, minke whales and killer whales may be viewed from the coast during spring and fall migrations.

Protecting Resources for the Future

Goose banding projects on Togiak Refuge provide valuable information related to waterfowl populations and migration patterns. Declining waterfowl populations throughout North America has become a serious national wildlife concern.



In 1988, 150 caribou were transplanted from the Alaska Peninsula to the Togiak Refuge. Overharvest around the turn of the century had resulted in the loss of early caribou herds. With local cooperation and proper management, caribou herds may be restored to harvestable levels.



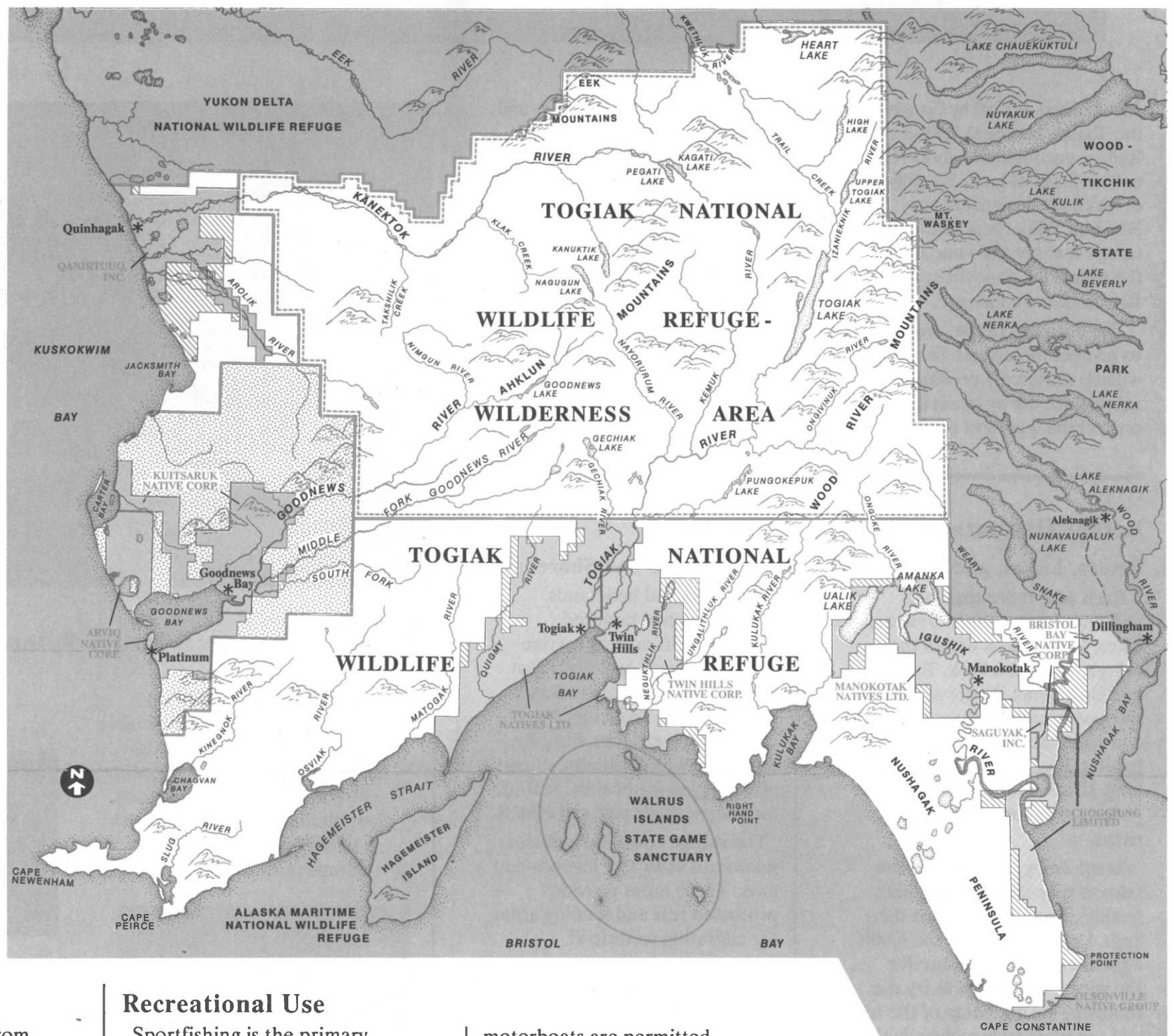
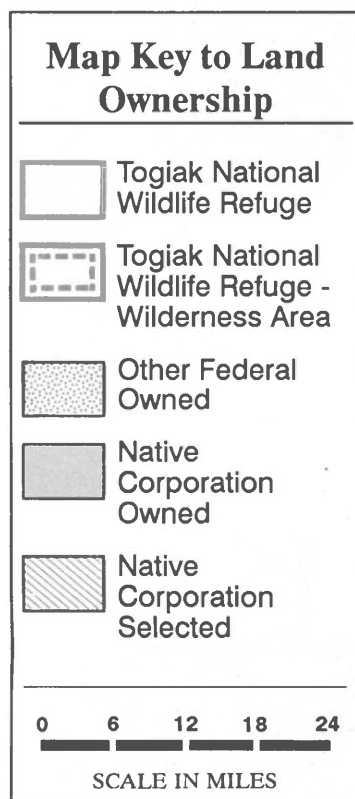
Between 1981 and 1984, recreational use of Togiak Refuge increased from about 3,000 to more than 12,000 visitor use days. Despite such increasing visitor pressure, refuge managers work to protect wilderness values and maintain high quality recreational opportunities.



For More Information, Contact:

- Refuge Manager
Togiak National Wildlife Refuge
P. O. Box 270
Dillingham Alaska 99576
(907) 842-1063

Togiak National Wildlife Refuge



Subsistence Use

More than 2,000 people from six villages live within the refuge. While local residents now enjoy some benefits of a cash economy as a result of the commercial fishing industry, most local people also rely economically and culturally on fish and wildlife resources through subsistence activities.

Residents fish and hunt mainly along the river drainages near communities and on traditionally used coastal sites. In the summer, many families move to camps at commercial salmon set net sites. In the fall, families go upriver to lakes to fish, and to hunt land otter, caribou, moose, and brown bear.

Fish are the mainstay of the subsistence lifestyle. All five salmon species, whitefish, char, smelt, pike, rainbow trout, herring and other fish are harvested.

Recreational Use

Sportfishing is the primary recreational activity by visitors to Togiak Refuge rivers. The predominant fish species sought include king and silver salmon, rainbow trout, dolly varden, and arctic grayling.

Most sportfishing use occurs on the Kanektok, Goodnews, and Togiak Rivers. Opportunities such as wilderness float trips and base camp accommodations are offered by various guide services. Non-guided visitors generally choose to float refuge rivers in rafts, canoes, or kayaks.

Waterfowl and bear hunting occur during various seasons. Sightseeing, camping, wildlife observation, and photography attract many visitors.

The primary means of access to refuge rivers is by boat or air. Commercial air services are available from Bethel or Dillingham. Private aircraft and

motorboats are permitted throughout the refuge but helicopters are not permitted for recreational purposes. Food and basic supplies may be

purchased in the villages of Quinhagak, Goodnews Bay, and Togiak.

Please Avoid Trespass on Private Lands

Land ownership patterns on the refuge are complicated. Hiking, camping and other recreational activities are permitted on publicly owned refuge lands. Exposed, non-vegetated sand and gravel bars are open to public use.

Permission to use privately owned uplands is required from the appropriate local village corporations:

- Arviq Native Corporation
General Delivery
Platinum, Alaska 99651
- Bristol Bay Native Corporation
800 Cordova St.
P. O. Box 100220
Anchorage, Alaska 99510

- Choggiung Limited
P. O. Box 330
Dillingham, Alaska 99576
- Kuitsaruk Native Corporation
Goodnews Bay, Alaska 99589
- Manokotak Natives Limited
Manokotak, Alaska 99628
- Olsonville Native Group
Contact Choggiung Ltd.
- Qanirtuug, Inc.
General Delivery
Quinhagak, Alaska 99655
- Saguyak, Inc.
P. O. Box 4
Clarks Point, Alaska 99569
- Togiak Natives Limited
P. O. Box 169
Togiak, Alaska 99678
- Twin Hills Native Corporation
Twin Hills, Alaska 99576

**UNGUIDED
GREAT TRIPS**

Togiak

National Wildlife Refuge
U.S. Fish and Wildlife Service
Department of Interior



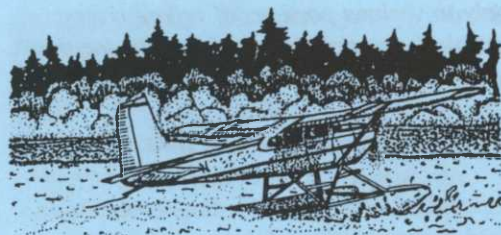
FLOAT BOAT FISHING TRIPS IN THE TOGIAK NATIONAL WILDLIFE REFUGE

Togiak National Wildlife Refuge encompasses about 4.7 million acres (2.3 million acres is designated wilderness) between Kuskokwim Bay and Bristol Bay in southwestern Alaska. The refuge is an area about the size of Connecticut and Rhode Island combined.

Sport fishing is the primary recreational activity in the Togiak Refuge. One of the best ways to experience refuge wilderness fishing is to float a river. Although there are many small rivers and tributaries within the Togiak Refuge, float fishing is concentrated on the Goodnews, Kanektok and Togiak rivers.

Each river is fed by a pristine wilderness lake, which is where most float trips begin. These rivers offer a variety of sport fishing opportunities. The rivers range from 60 to 93 miles in length and require five to ten days to float. Although there is very little white water, the rivers are braided and may have many sweepers (overhanging and submerged trees) that are hazardous if you do not use proper gear and stay alert.

ACCESS



Primary access to Refuge rivers is by chartered aircraft. Charter air services are available in Dillingham and Bethel. Float trips begin within the Togiak Wilderness Area and end in Yupik Eskimo villages. Air

charter arrangements should be made to be picked-up at village airports.

The recommended craft to float these rivers is an inflatable raft. Canoes and kayaks can be used, but your boat will need to be flown into a wilderness lake. Canoes or kayaks that are not collapsible are not conducive to this method of transportation. A good sturdy raft is recommended. Do not try to get by with an inexpensive plastic inflatable boat; your life may depend on it! A rowing frame with oars fastened to the raft is also recommended. If you don't want the expense of purchasing equipment, outfitters in the area have all the necessary gear for rent.

WILDLIFE AND HABITAT

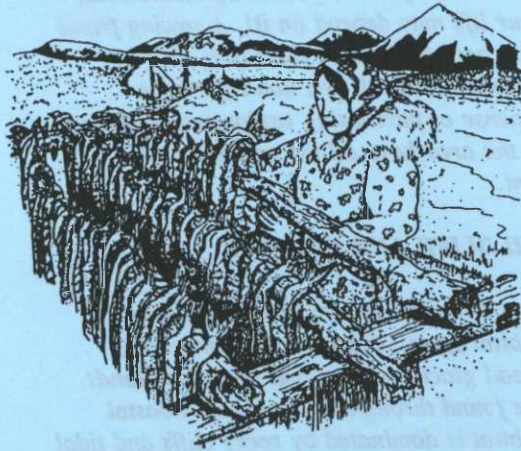
Togiak Refuge is comprised of diverse habitat types. Jagged mountain peaks, broad glacial valleys and tundra wetlands are found throughout the area. Coastal habitat is dominated by rocky cliffs and tidal marshes.

While in the wilderness portion of the refuge, there is an abundance of solitude. Your chances of seeing a variety of wildlife are good. Brown bear, caribou and moose may be seen during your trip. Smaller mammals which include the hoary marmot, beaver, wolverine, river otter, mink, red fox, wolf or coyote may also be seen by the keen observer. Birds of prey, songbirds, waterfowl and sea birds, also inhabit the Togiak Refuge.



SUBSISTENCE

The Togiak Refuge area has been occupied by Yupik Eskimos for at least 2,000 years. Eskimos enjoy some benefits of a cash economy but still live a traditional subsistence way of life, depending on fish and wildlife resources for much of their food. When floating Togiak Refuge rivers, you might observe local subsistence activities.



Private lands are located within Togiak Refuge, several of which have cabins, tents and fish racks. Please respect private property and do not trespass. Subsistence activities, and the style of life they support, are very important to the people in this region and should be respected. If shown consideration, local people are very friendly and may share many experiences with you.

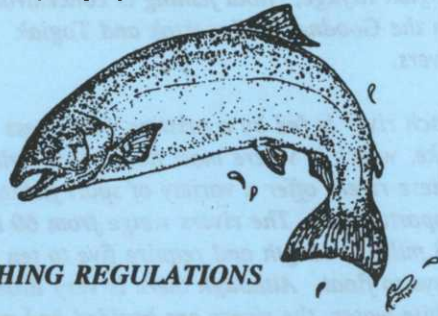
The most common subsistence method for obtaining fish is through the use of gill nets. Fish are preserved for consumption throughout the year. There are traditional fishing sites which have been used for many generations. It is important not to crowd someone who is subsistence fishing. On the Kanektok and Goodnews rivers, it is illegal to sport fish within 300 feet of a legally operating subsistence net.

Some recreational angling practices, such as "catch and release" fishing, may be offensive to

local residents. Releasing fish is viewed to be disrespectful to the fish. However, a fish that is handled gently and released quickly by a skilled angler has a good chance of surviving.

FISHERIES

The Togiak Refuge is known internationally for its sport fishing. Refuge rivers support world class sport fishing for coho, sockeye, chum, pink and chinook salmon; Dolly Varden/Arctic char; grayling; and rainbow trout. The length of your trip and the time you spend within the wilderness area will vary depending on the type of fishing and/or species you prefer to catch.



FISHING REGULATIONS

All State of Alaska fishing and hunting regulations apply to Togiak Refuge. Licenses and fishing regulations (resident and non-resident) are available from the Alaska Department of Fish and Game, sporting goods stores, and other stores in Dillingham, Bethel and Anchorage. Special regulations apply to various portions of refuge rivers. Consult the state fishing regulations for the particular area you plan to fish.

MINIMUM IMPACT CAMPING

Disposal of waste must be done carefully to avoid contamination of water and aquatic life. Rivers are used as the primary source of drinking water for local village residents. Water can become polluted from the run-off of soaps, food and human waste.

Toilet paper and other trash leave unsightly messes. You should pack out solid human waste or carry a camp shovel and bury it at least 150 feet from a water source.

Good wilderness ethics will help insure minimum impacts on the resource. The following is recommended:

- * Camp on gravel bars when possible
- * Camp in small groups
- * Avoid creating new trails
- * Leave no sign of your campfire
- * Pack out all trash
- * Bury or pack out all solid human waste
- * Burn toilet paper
- * Use biodegradable soap
- * Do not harass wildlife

By following these practices, all can enjoy the solitude and pristine beauty of the wilderness.

HELPFUL HINTS

Wood: Small sticks, gathered from the ground, are the best source of wood. Use only dead and down wood. Never cut green trees or branches, they won't burn. Standing dead trees are valuable for cavity nesting birds and aesthetics, and should not be removed. To avoid campfire hassles, bring a camp stove.

Leave No Trace: Make sure your fire is out. Pick out any non-burned trash and scatter the ashes, unburned logs and any rocks from the fire pit before you leave the site. A last minute check of cigarette butts, gum wrappers, etc., will help insure that you leave no trace.

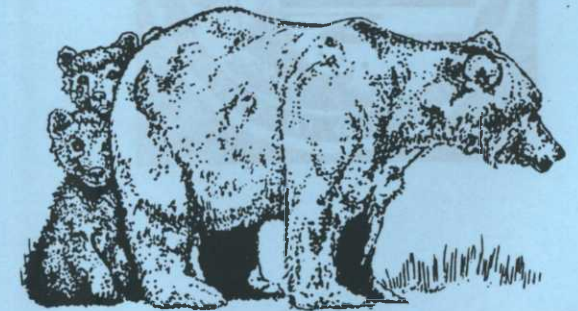
If burning food waste, make sure the fire is very hot to assure a complete burn. Partially burned food attracts bears. It is best to pack out your food waste in plastic sacks and store food and trash away from sleeping quarters.

Water: There are Giardia parasites and other contaminants in many streams, springs and other water sources, so filter or boil all drinking water.

Camp Sites: To avoid trespass on private lands along the river, camp on gravel bars, which are public lands owned by the State of Alaska. Gravel bars are durable sites and are less likely to show effects from camping, than fragile upland sites. By camping on gravel bars you may also escape thick bugs, usually located in tundra and brush. Camping is limited to three consecutive days at one location. After three consecutive days, camps must be moved a minimum of one river mile.

Bear Encounters: Most bears tend to avoid people but can be curious and potentially dangerous animals. By following camping tips listed below, your chances of an unpleasant bear encounter may be minimized.

- * Do not get between sow and cubs
- * Avoid surprising bears
- * Look for bear sign
- * Make noise when hiking
- * Avoid crowding bears
- * Leave pets at home
- * Maintain a clean camp
- * Be alert



GENERAL INFORMATION

Local villages are "dry" and importing alcohol is a violation and could result in prosecution.

Permits for nonguided, noncommercial parties are not required at this time. It is recommended that you contact the Togiak Refuge headquarters in Dillingham to get more details on a particular trip or river. There are a variety of resources available to you, such as brochures and lists of guides permitted on the Refuge and air taxi operators in the area. Refuge River Rangers monitor the rivers during the summer months. They can answer your questions and provide assistance if necessary. If you would like more information, please contact the Refuge Manager at:

*Togiak National Wildlife Refuge
P.O. Box 270
Dillingham, Alaska 99576*

(907) 842-1063



Graphics by Carol Wilson

Division of Fishery Resources
U.S. Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503
(907) 786-3510
<http://www.fws.gov/fish/fishres.html>

The U.S. Fish and Wildlife Service was established to preserve, enhance and protect the nation's fish and wildlife resources. In carrying out this mission, the Service helps Americans enjoy the outdoors while helping to ensure a healthy environment that benefits fish, wildlife, and people.



Field Offices

1. Fish Genetics Laboratory
U.S. Fish and Wildlife Service
1011 E. Tudor Road • Anchorage, Alaska 99503 • (907) 786-3510
2. Fairbanks Fishery Resource Office
101 12th Avenue, Box 17, Room 222 • Fairbanks, Alaska 99701 • (907) 456-0219
3. Juneau Fishery Resource Office
3000 Vintage Park Blvd., Suite 201 • Juneau, Alaska 99801 • (907) 586-7240
4. Kenai Fishery Resource Office
P.O. Box 1670 • Kenai, Alaska 99611 • (907) 262-9863
5. King Salmon Fishery Resource Office
P.O. Box 277 • King Salmon, Alaska 99613 • (907) 246-3442
6. Fishery Biologist
Kodiak National Wildlife Refuge
1390 Buskin River Road • Kodiak, Alaska 99615 • (907) 487-2600
7. Fishery Biologist
Togiak National Wildlife Refuge
P.O. Box 270 • Dillingham, Alaska 99576 • (907) 842-1063

The Department of the Interior prohibits discrimination in programs on the basis of race, color, national origin, religion, sex, age, or disability. If you believe that you have been discriminated against in any program, activity, or facility operated by the U.S. Fish and Wildlife Service or if you desire further information please write to:

U.S. Department of the Interior
Office for Equal Opportunity
1846 C Street, N.W.
Washington, DC 20240

Questions regarding this requirement or the federally conducted program should be directed to the Office for Human Resources at (907) 786-3336.

Cover: Spawning sockeye salmon

U.S. Fish & Wildlife Service

Alaska Fisheries Program

*Conserving fish
populations for today
and the future*



▲ Biologist sets a gillnet.

◀ Fisheries technician samples and releases a chum salmon.



▲ top: Many animals, including bears and eagles, depend on salmon for food. When salmon die, nutrients from their bodies enrich the soil and water.

center: Biologists use sonar to count salmon returning to spawning grounds.

bottom: Conserving genetic diversity is essential in maintaining long-term health and survival.

Alaska's wild fish and pristine habitats are national treasures. The U.S. Fish and Wildlife Service is one of many organizations working together to conserve these spectacular resources for use and enjoyment in the future.

Alaska's Valuable Fisheries

Many Alaskans rely on fish for food, income, and recreation. Fisheries are a mainstay of the state's economy and culture.

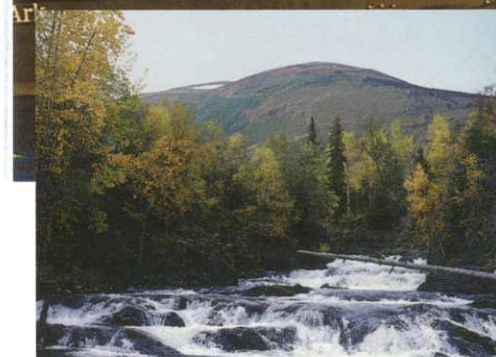
- Commercial fisheries are worth more than \$1 billion each year. The industry is the largest private sector employer in Alaska.
- Over 1.2 million salmon are harvested annually for subsistence uses. These fish are culturally significant in over 200 rural villages.
- Alaskan waters are renowned and revered for their world class sportfishing opportunities. Each year, anglers spend more than \$540 million to fish in Alaska.
- Sixty-three percent of all wetlands in the United States are found in Alaska. These aquatic habitats cover 43% of the state and are important rearing areas for fish.

Scientists at Work

The Service works to conserve fishery resources within the 83 million acre national wildlife refuge system in Alaska, and cooperates with others to manage wild fish populations throughout the state. Service scientists are located at four fishery field offices, a genetics laboratory, two national wildlife refuges, and an administrative office in Anchorage.

Service scientists specialize in the fields of ecology, population monitoring, statistics, and genetics. Biologists use state-of-the-art techniques to learn more about the health, size, and movement of fish populations. Scientists also measure genetic diversity among fish stocks.

Biologists capture coho salmon for a radio telemetry study.



◀ *National wildlife refuges make up nearly 25% of Alaskan lands.*

The information is used to identify population characteristics and to predict the effects of environmental change and human use.

In other areas of the country, wild fish populations have been devastated by habitat loss, overfishing, development, and the introduction of non-native species. In the hope of preventing similar losses in Alaska, scientists carefully monitor fish populations and habitats, and watch for troublesome trends.

A Common Goal

Alaska's fisheries cross many boundaries. Government agencies, tribal organizations, the academic community, and user groups have formed partnerships to cooperatively manage fish and their habitat. For example, the Service works with fishermen, Canadian officials, and Federal and State agencies to solve particularly complex and sensitive issues relating to salmon in the Yukon River.

The Service is a member agency of the North Pacific Fisheries Management Council and participates on many scientific committees. It is one of twenty-five organizations working together to prevent the introduction of exotic species into Prince William Sound.

Alaska is one of the last places where there is an opportunity to conserve fish populations and avoid expensive and disruptive recovery efforts. The U.S. Fish and Wildlife Service is committed to the sound management of these natural treasures.



▲ *top: Service scientists involve youth in National Fishing Week, Adopt-a-Stream, and other school and community programs.*

center: People living in rural Alaska continue to depend on salmon as they have for centuries. Salmon make up more than 75% of the subsistence harvest in some villages.

bottom: The Service monitors salmon at several sites within the Yukon River drainage. The river drains a vast area and flows through seven national wildlife refuges in Alaska.

Important information for visitors to the

KANEKTOK,

GOODNEWS, &

TOGIAK RIVERS,

& the

TOGIAK NATIONAL WILDLIFE REFUGE



Welcome

The rivers of the Togiak National Wildlife Refuge attract visitors from around the world. People come especially to catch the five species of salmon, rainbow trout, Arctic grayling, Dolly Varden, lake trout, white fish, burbot, and northern pike that are found in the refuge's lakes, streams, and rivers.

Public use of the Togiak Refuge rivers has increased rapidly since 1980. The purpose of this brochure is to provide you with suggestions to make your visit safe, enjoyable and compatible with the purposes of the refuge.

As mandated by Congress, the purposes of the refuge are to protect the diverse fish and wildlife resources, provide for subsistence use by local residents, and protect the quality and quantity of the water resources.

The entire length of the Togiak and Kanektok Rivers and most of the Goodnews River are within the boundaries of the 4.2 million acre Togiak National Wildlife Refuge established in 1980. The headwaters and upper portions of all three rivers are within the designated Togiak Wilderness Area. There are also private lands within the refuge. Ownership of most of the private land was established by the Alaska Native Claims Settlement Act in 1971. The State of Alaska owns the stream bed and water column of the major waterways, including the non-vegetated shorelands and gravel bars up to the ordinary high water line (usually considered to be where substantial vegetation begins). To avoid trespass problems, please refer to the map on the back of this brochure.

Subsistence Use on Togiak Refuge Rivers by Local Residents

The land within the Togiak Refuge has been continuously occupied by Alaska Natives for at least 2,000 years. These people have traditionally depended on fish, wildlife, and marine resources for survival. Years ago hunters and their families spent winters at villages near the mouths of the rivers and moved up river during the summer and fall months. Around the turn of the century, there were approximately 1,800 people living in seven villages along the Togiak River between Togiak Lake and Bristol Bay. Today the combined population of Togiak and Twin Hills villages is approximately 850 people. On the Kuskokwim Bay side of the Refuge approximately 500 people live in Quinhagak, 250 live in Goodnews Bay, and 50 live in Platinum.

Traditional seasonal subsistence movements and patterns are practiced today. As you travel the rivers, be aware that while these lands and rivers appear to be wild and undeveloped, they may be culturally significant to people in the region. Each physical characteristic of the landscape, whether it be a bend in the river, a bluff, or a hill, may have some historic importance. Through family and kinship ties, the cultural significance of these rivers is maintained.

While local residents now enjoy some benefits of a cash economy, most local people continue to be economically and culturally dependent on fish and wildlife resources. As you travel the rivers, you may notice dried fish hanging from racks and people using nets to catch fish. As with most coastal areas, fish are the mainstay of the subsistence way of life.

Please Respect Local Residents' Subsistence Culture

It is important that visitors understand the significance of a subsistence lifestyle to local people. Rapid increase in visitor use can be disruptive to traditional patterns. Crowding people for fishing sites is discourteous, and visitors are encouraged to be respectful of local people who may be using traditional fishing sites. Special regulations actually prohibit sport fishing within 300 feet of a legally operating subsistence set gillnet. If you are considerate, people will be friendly and may be more inclined to share their experiences with you.

Some common recreational practices may be unfamiliar or even offensive to local customs. "Catch and release" fishing is a popular method for visitors; however, to some Native cultures this practice is viewed as disrespectful and wasteful of the resource. Many village elders believe that the misuse of, or "playing" with, fish will affect the future availability of the resource and, therefore, the survival of their people. It is recommended that visitors take extra care to practice proper catch and release fishing to minimize mortality. Occasional reports of brightly fresh fish found dead in the water or the practice of releasing fish on gravel bars and "kicking fish" back into the water have contributed to the distrust of catch and release as a productive management philosophy along the rivers of rural Alaska. A catch and release fishing brochure is available through the Refuge Office in Dillingham which will provide you with important tips to successful catch and release fishing.

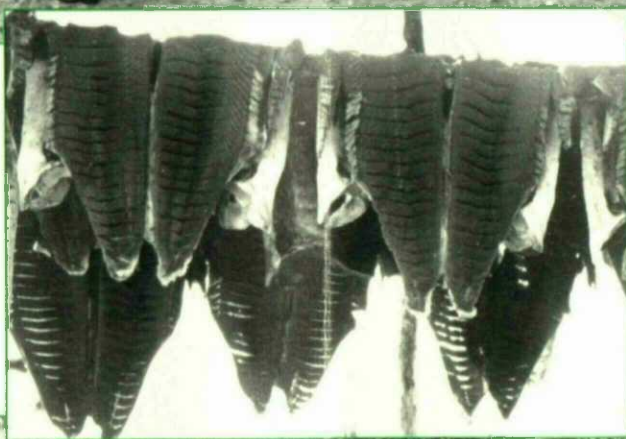
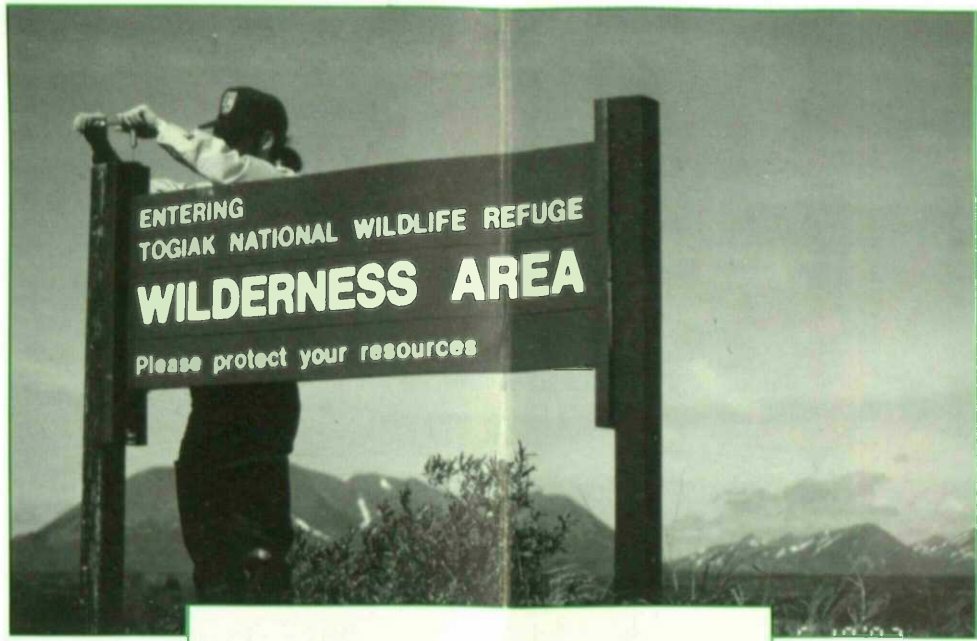
Visitor Use and Access

Sport fishing is the primary recreational activity occurring on rivers within the Togiak National Wildlife Refuge. Other popular activities include river rafting, sightseeing, camping, wildlife observation and photography.

Most sport anglers use one of nearly thirty commercial guides permitted to operate within the Refuge. Guided recreational opportunities include river rafting, river base camps with daily motorboat access, and daily fly-out fishing from a lodge located outside the Refuge. Most unguided visitors charter an aircraft to one of the many headwater lakes to begin a float trip lasting from four to ten days. Others may fly to the airstrip located at each village and access the river by walking or renting a boat.

Commercial air service is available from Anchorage to Dillingham or Bethel. Chartering a wheel, float or amphibious aircraft to the specific Refuge site you wish to fish is easily done from either community. Private aircraft, motorboats and rafts are permitted throughout the refuge, but helicopters are not permitted for recreational purposes within the refuge.

Most food, basic supplies, commercial lodging and emergency services can be found in Dillingham and Bethel. Each village has at least one grocery store, but food stocks are generally limited. Specialty items are best purchased before you leave home.



Camping and River Recreation

Camping and fishing are permitted on public lands throughout the refuge. There are no designated campsites so you are free to choose a site to meet your own needs as long as it is not on private land. Camping on Togiak Refuge lands or adjacent State-owned lands is limited to three days at one location. At the outlet of Kagati Lake, camping is limited to one day to provide equal access for float parties and anglers. Camping on State-owned lands may be permitted for more than three days by contacting the Alaska Department of Natural Resources at the address provided on the back cover of this brochure.

Campsites on sand or gravel bars provide well drained and durable sites, usually with fewer mosquitoes. Full-scale floods are unusual; however, water levels can rise rapidly if it is raining heavily either where you are or upriver. Water levels are usually high throughout the months of June, late August and September and less predictable the rest of the year. Choose your campsite with these factors in mind. A good idea is to mark the water's edge when you first stop and check it again for changes before retiring for the night.

Gravel bars also make the best place for campfires. Leave the area clean. Remove any unburnable items such as melted foil, plastic, and aluminum cans from the fire spot, scatter the ashes and remaining wood, and return rocks to a natural location with the black side down.

All human waste should be buried at least eighteen inches deep and located away from surface waters. Toilet paper should be burned or carried out, not buried. All members of your party should carry matches or a lighter.

Foxes and bears have a great sense of smell and will generally dig up anything that you try to bury. Litter and large craters filled with garbage left behind by campers not only detract from the beauty of these wilderness waterways, but are illegal.

Good equipment is essential for floating Refuge rivers. Inflatable rafts equipped with rowing frames are recommended. Canoes, kayaks and paddle rafts are also adequate for the experienced user. Although there is no whitewater on the Kanektok, Goodnews and Togiak Rivers, river channels can be braided, and sweepers (overhanging and submerged trees) can pose serious hazards — stay alert. All rivers are icy cold, and life jackets are recommended. Each boat should also carry a throw rope in case someone falls out or the boat needs to be pulled ashore by someone on the bank.

Resource and Public Use Management

Fish are a vital component of the Togiak Refuge ecosystem. Fish also support the local culture and economies of the people of Southwestern Alaska. For the last 100 years these resources have also become important commercially and are the basis for the region's cash economy. More recently (within the last 30 years), sport fishing has increased pressure on the fishery resources. The State of Alaska is responsible for the management and regulation of the commercial, sport and subsistence fisheries occurring within the Refuge. The U.S. Fish and Wildlife Service is responsible for management of public lands and public use occurring within the Togiak National Wildlife Refuge. The Refuge Headquarters are located in Dillingham.

Each river system is managed for the five species of salmon. Numbers of returning spawners (escapement) are controlled to produce the maximum number of fish for the various users. You may encounter biologists conducting research programs which monitor the health and strength of fish populations. Several programs have been established to monitor the escapement of salmon and insure that adequate numbers of each species reach the spawning grounds. Fish in excess of the necessary return are available for harvest by subsistence, sport and commercial fisheries.

Resident fish species are managed to maintain natural population structure and diversity. For most resident fish populations, primarily rainbow trout and grayling, this means managing them under a trophy fish population philosophy.

You may be contacted by Refuge River Rangers stationed on the Kanektok, Goodnews and Togiak Rivers. Purposes of the River Ranger program include: contacting visitors, collecting public use information and informing visitors of various refuge regulations. Throughout the season, River Rangers will also collect angler and fisheries information to aid in responsible resource management. Occasionally, more intensive angler creel surveys are conducted on river areas most heavily fished to assess angler effort, catch and harvest, and demographics. Your cooperation with these efforts is greatly appreciated.

Sport Fishing Licenses and Special Regulations

A State sport fishing license is required annually (each calendar year) and must be in the possession of all persons 16 years of age or older while sport fishing. All State of Alaska fishing regulations apply to Togiak Refuge. Any commercial use of the Refuge requires a Special Use Permit from the refuge office in Dillingham.

Several Refuge drainages have special regulations adopted to maintain or improve high quality sport fisheries. These regulations can change annually. Currently, the Wilderness portions of the Kanektok and Goodnews Rivers are restricted to fishing with single-hook artificial lures only. Consult the current Alaska Sport Fishing Regulation Summary or contact the Togiak Refuge office for updated information concerning the area you plan to fish.

Thank You

For visiting the Kanektok, Goodnews & Togiak Rivers
and the Togiak National Wildlife Refuge

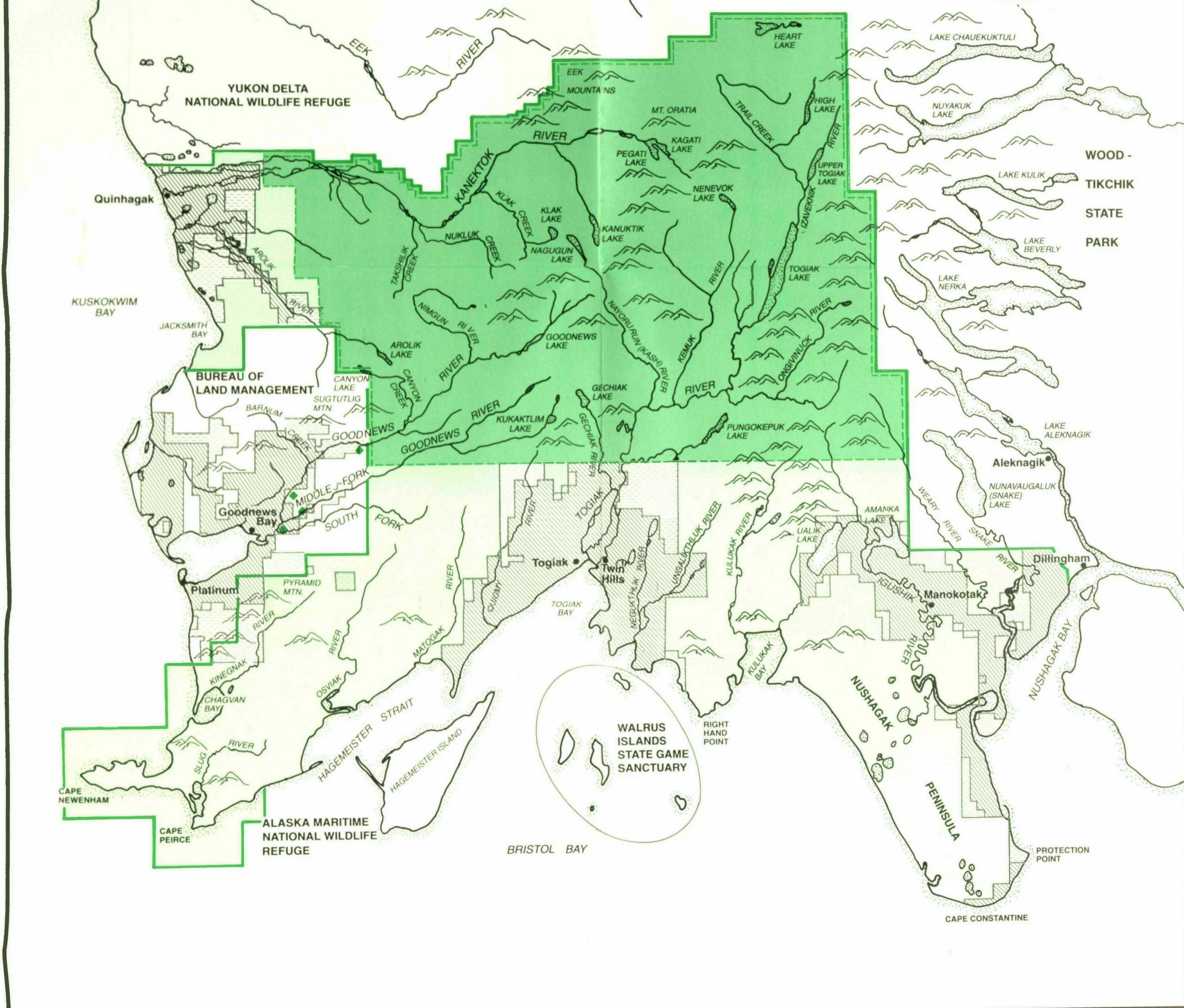


TOGIAK NATIONAL WILDLIFE REFUGE

LEGEND

- Refuge Boundary
- Wilderness Area
- Native Lands Selected
- Native Lands Conveyed
- BLM 1-acre public easement site available for camping limited to 24 hours.

0 6 12 18 24 30
SCALE



PLEASE AVOID TRESPASS ON PRIVATE LANDS

Land ownership patterns on the Refuge are complicated. Hiking and other recreational activities are permitted on public (refuge and state) lands; however, numerous small parcels of privately owned lands or allotments are scattered along the banks of major waterways. These allotments are generally not posted and may not be obvious. You may notice signs of old camps, mounds or other artifacts; any disturbances of these sites is a violation of federal law.

As you leave the Togiak Wilderness Area, you will notice a sign asking you to avoid trespass on private lands. Downstream of the Wilderness Area, most of the uplands above ordinary high water are owned by local village corporations. Trespass on these lands is prohibited. The exposed non-vegetated, sand and gravel bars, however, are publicly owned by the State of Alaska. Therefore, if you limit camp locations to sand and gravel bars, you will not be trespassing on private lands. Read the section above concerning Camping and River Recreation for more information on camp sites and length of stay limitations.

Permission to use privately owned lands is required from the appropriate local village corporation at the address below:

1. Choglung Limited, P.O. Box 330, Dillingham, AK 99576
2. Manokotak Native Limited, Manokotak, AK 99628
3. Togiak Native Limited, P.O. Box 169, Togiak, AK 99678
4. Twin Hills Native Corporation, Twin Hills, AK 99576
5. Kuitsaruk Native Corporation, Goodnews Bay, AK 99589
6. Aniq Native Corporation, Platinum, AK 99651
7. Qanirtuug, Inc., General Delivery, Quinhagak, AK 99655

FOR A SAFE AND ENJOYABLE TRIP, REMEMBER

- * Respect the cultural heritage and subsistence activities of local residents.
- * Avoid trespass on private lands.
- * Respect the rights of others to enjoy the beauty and resources of the refuge and pack out trash for proper disposal.
- * Camp on exposed sand and gravel bars.
- * Make sure you have safe equipment and are prepared for cold, windy and wet weather.
- * Leave only footprints on gravel bars; if you pack it in, pack it out; if you see trash others have left, please pack it out as well.
- * Bury human wastes away from surface waters, burn toilet paper.
- * Know how to properly catch and release fish to ensure their survival, prevent unnecessary fish mortality, and to avoid offending others. It is up to you to responsibly promote the catch and release practice.



This brochure was produced by the U.S. Fish and Wildlife Service. For further information, please write:

Togiak National Wildlife Refuge

P.O. Box 270
Dillingham, AK 99576
(907)842-1063

Alaska Department of Fish & Game

Sport Fisheries or Commercial Fisheries
P.O. Box 230
Dillingham, AK 99576
(907) 842-2427 or 842-5227

Alaska Department of Fish & Game

Commercial Fisheries
P.O. Box 90
Bethel, AK 99652

Dillingham Chamber of Commerce

P.O. Box 348
Dillingham, AK 99576

Bethel Chamber of Commerce

P.O. Box 329
Bethel, AK 99559

Alaska Department of Natural Resources

South Central Regional Office
P.O. Box 107005
Anchorage, AK 99510-7005

Bristol Bay Native Association

Natural Resource Program
P.O. Box 310
Dillingham, AK 99576

Association of Village Council Presidents

Natural Resource Program
P.O. Box 219
Bethel, AK 99559