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Stock Status of Anadromous Dolly Varden in Waters of Alaska's North Slope

by

William D. Arvey

May 1991

Alaska Department of Fish and Game

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ABSTRACT

Life history features and stock status of anadromous Dolly Varden *Salvelinus malma* on the North Slope of Alaska are reviewed. Estimates of overwintering abundance in key streams of the North Slope are presented, along with estimates of the sport fishery harvest, the subsistence harvest, and mortality from research activities on the North Slope. Results of a voluntary catch and effort logbook study in 1990 are presented. Sport fishery harvests are estimated to range from about 1,000 to about 3,000 Dolly Varden annually, while subsistence harvests probably take from two to six times as many Dolly Varden. It is recommended that the Alaska Department of Fish and Game continue to monitor subsistence fisheries, and to estimate mortality due to sport harvests and research removals. There is no evidence that any North Slope stocks of Dolly Varden are severely depleted or jeopardized at this time, and intensive studies for management of the species by the Alaska Department of Fish and Game are not warranted at this date.

KEY WORDS: Dolly Varden *Salvelinus malma*, Arctic char *Salvelinus alpinus*, Sagavanirktok River, Kongakut River, Anaktuvuk River.

INTRODUCTION

Dolly Varden *Salvelinus malma*, and Arctic char *S. alpinus*, are both resident in waters of Alaska's North Slope. Arctic char occur only in lakes of the area, mainly in the coastal plain and foothills, but also in mountain lakes such as Galbraith, Chandler, Itkillik, and Elusive lakes among others. Both non-migratory and anadromous Dolly Varden are found in freshwater streams.

This report is written to address stock status of anadromous Dolly Varden occurring in fresh and marine waters of the North Slope area of Alaska. This report is also intended to serve as a contract report for the 1990 Federal Aid project F-10-6; R-3-3(b) sponsored by the U.S. Fish and Wildlife Service. The intent of that project was to conduct aerial surveys in 1990 of overwintering populations of anadromous Dolly Varden in several North Slope streams. For a variety of reasons, aerial surveys were not conducted and the deletion of this objective was appended to the contract. A secondary objective of the project was to estimate angler success and catch per-unit-effort of guided anglers at the Kongakut River fishery using a voluntary logbook program. Voluntary logbook returns were sparse. Although these data are reported, the emphasis of this report is a summary of existing information concerning overall stock status of anadromous Dolly Varden of the North Slope area.

The information provided and discussed in this report pertains to the anadromous Dolly Varden whose distribution includes all of the North Slope of Alaska and a large portion of the western Arctic coastal plain in Canada. The generic term, char, used extensively in this paper, will denote anadromous Dolly Varden unless specifically otherwise stated.

LIFE HISTORY OF NORTH SLOPE CHAR

Char occur as lake-resident, stream resident, and anadromous populations on Alaska's North Slope. Anadromous char are the most widespread and abundant, and it is the form most frequently harvested by North Slope sport fisheries. Anadromous char spawn in streams and, at age 2-5, their progeny smolt migrate to marine waters of the Beaufort Sea to feed during the summer period. Yoshihara (1973) reported that about 95% of the downstream migrant smolts in the Sagavanirktok River were age 3 and age 4. Furniss (1975) estimated that the sex ratio of anadromous char in the Sagavanirktok River was 3:1 females/male. Anadromous char populations with high female sex ratios were also reported by Armstrong (1974), DeCicco (1989), Glova and McCart (1974), McCart et al. (1972), and Yoshihara (1972). The preponderance of female fish in the anadromous population is probably a result of both differential mortality by sex (Armstrong 1974) and the tendency for males to remain in freshwater instead of undertaking seaward migrations. Stream resident "residual" char, except for those isolated by impassable barriers, have been reported in almost every case to be male fish (McCart 1980). Char of the Beaufort Sea drainages seek freshwater during the winter months and thereby avoid the sub-zero (C°) water temperatures of the nearshore marine environment. Migration to stream environments occurs in August and September. All char, including those that will spawn, and those that will overwinter without spawning, re-enter freshwater during early fall. Char face a rigorous

survival challenge during winter in North Slope waters since ice-free water is scarce and occurs mainly where there is spring upwelling. During the period of freshwater migration there is a small time window when most of the stream populations can be counted using aerial surveys. At this time stream populations are composed of both non-anadromous and anadromous char of mixed stocks. Anadromous char may not necessarily overwinter as non-spawners in their natal streams, and tagging studies summarized by Furniss (1975) confirm that while non-fidelity to overwintering areas occurs on the North Slope, there is no evidence to suggest that homing for reproduction is not precise. Tag recoveries (Furniss 1975) also suggest that char seldom spawn in consecutive years.

Spawning has been observed in many streams of the North Slope, from the Colville River drainage eastward. Spawning west of the Colville River is poorly known. Lake-resident, non-anadromous char are believed to spawn in lakes exclusively, and anadromous char are thought to always spawn in streams, never in lakes (McCart 1980). Known stream spawning areas are mostly in the mountains near groundwater or spring sources. Many of the actual springs remain ice-free during winter, and form large fields of aufeis (icing that forms during winter downstream of springs). Spring water sources are closely associated with spawning of anadromous char and are probably essential to spawning success as well as overwinter survival. Dates of spawning for anadromous char in streams range from late July to December or later, possibly as a function of water temperature. Spawning dates of resident char in some of the warmer springs such as Sadlerochit Springs on the Sadlerochit River apparently does not commence until after December (Craig 1977), but typically the months of August through October accommodate the majority of spawning in streams of the North Slope for anadromous char.

North Slope sport fisheries attract little effort and harvest in comparison to fisheries elsewhere in Alaska. The total sport harvest of char for the entire North Slope in 1989 was an estimated 1,031 fish (Mills 1990). Monitoring of char populations on the North Slope has been sporadic, but is important because of the potential impact of industrial development on both freshwater and marine habitat. Roads, culverts, offshore gravel causeways, water removal during the winter, streambed disturbances, and various kinds of pollution would potentially affect fish populations in different ways. In addition, recreational activity on parts of the North Slope is increasing annually, and fisheries are developing on streams that, until recently, were in remote wilderness.

Only scanty information is available describing the range and distribution of char stocks in Beaufort Sea drainages. Tagging studies conducted during the 1970's provide the best information on movements at sea. This work is summarized by McCart (1980). Char tagged in upstream locations on the Firth River in Canada, the Canning River, and the Sagavanirktok River were recaptured along the Beaufort Sea coast as well as at upstream locations in drainages other than those of original tagging. Movements greater than 300 km along the coast were documented, including movement of fish from the Firth River in Canada to the Canning River in Alaska. Movement and distribution of char west of the Colville River are not well documented. Three fish that were tagged in the Sagavanirktok River were subsequently recaptured west of the

Colville River, one as far west as Elson Lagoon, near Barrow. However, there have been no known recoveries that indicate interchange between char stocks of the Beaufort Sea and Chukchi Sea drainages. Since 1982, 8,695 char have been tagged in Chukchi Sea drainages in the Kotzebue area, to study movements and distribution of those stocks (DeCicco 1985, 1989). No tag recoveries of fish tagged in the Kotzebue Area have been reported from north of Point Hope, even though recoveries have been reported from as far south as Norton Sound, and from as far west as the Anadyr River in the Soviet Union (DeCicco 1990). The possible recovery of tagged char moving along the coast north of Point Hope is enhanced by the existence of subsistence gill net fisheries at Point Lay, Wainwright, and Barrow. Those same fisheries should also intercept tagged char moving south from the Beaufort Sea coast. No such recoveries have been reported from these villages, in spite of rewards offered for returned tags in some of the programs, and the seemingly large number of tags at large both north as well as south of the area. The hypothesis that there is no interchange between char stocks of the Beaufort Sea drainages with those of the Chukchi Sea cannot be refuted with the evidence available.

Most biologists agree that char remain close to shore (within 500 m of shore) during the marine phase of their life history. While this belief may be, in part, an artifact of sampling distribution, observations by Griffiths et. al. (1975, 1977), Furniss (1975), Bendock (1977) and Craig and Haldorson (1980) all support the hypothesis that char typically move and feed in near proximity to shore in the Beaufort Sea. Workers such as Craig and Haldorson (1980), Bendock (1977) and others suggest that char, and perhaps other species as well, seek less saline and warmer water by staying near shore, and avoid colder, deeper, and more saline waters found offshore. DeCicco (1990), reports recent tag recoveries from the Soviet Union of char tagged near Kotzebue. His findings indicate that char are capable of, and may routinely undertake, extensive offshore oceanic migrations. However, there is no evidence that Beaufort Sea stocks move or migrate far offshore.

Since 1970, research on North Slope char has been fairly extensive, spurred primarily by the industrial development of Prudhoe Bay and construction of the Trans-Alaska Pipeline and Dalton Highway (North Slope Haul Road) in the late 1970's. The Alaska Department of Fish and Game (ADFG), as well as other agencies and environmental consulting firms undertook studies to identify major stock groupings, to estimate relative abundance, and describe food habits, age and size distribution, migration, and critical habitat needs of char and other species. After participating fully in these early studies, the Sport Fish Division (ADFG) has not conducted any research on the North Slope since 1985. A limited data base of char population abundance indices based upon aerial surveys is available starting in 1971 for selected streams. In recent years however, the focus of fisheries research has shifted from freshwater to the marine environment to study the environmental impacts of solid-fill gravel causeways in Prudhoe Bay, and potentially off the coast of the Arctic National Wildlife Refuge (ANWR). Opening of the ANWR coastal plain for exploratory oil drilling is currently being evaluated in part by how the nearshore marine habitat and fisheries resources would be affected by shipping operations and offshore causeways should oil development proceed in ANWR.

CHAR ABUNDANCE IN BEAUFORT SEA DRAINAGES

Estimation of char abundance on the North Slope is a challenge because of the flexible life history of char, and the harsh climate of the area. Populations are composed of spawners and non-spawners and they include some non-spawners of different stocks than the stream spawners. Thus, abundance estimates made in the fall, even if only for large mature fish, usually are not germane to a single stream stock. Multiple year classes are generally present, from pre-smolt juveniles to sub-adult fish, of which all groups may not be equally susceptible to capture gear used to conduct mark-recapture experiments, or equally detectable by whatever direct counting method is used. Small fish, less than about 300 mm long, are usually not detectable in aerial surveys unless they are present in large dense schools. Mark-recapture experiments to estimate char abundance have been utilized only on a small scale in North Slope studies. ADFG operated a weir in 1971 for part of the open water season to estimate char abundance in the Lupine River (Figure 1), a tributary to the Sagavanirktok River (Yoshihara 1972). The weir was operational for a total of 53 days during the period from July 9 to September 16, 1971. The weir did not function for 16 days due to high water. The number of char that passed through the weir during the operational period totalled 628 fish, of which the majority (> 90%) were judged to be spawners. No char passed the weir site after September 8.

Aerial surveys using helicopters or fixed-wing aircraft have been used most often to estimate or index abundance of stream-dwelling char in past years. The most comparable estimates of stream-dwelling char are from the Ivishak River, a tributary to the Sagavanirktok River (Figure 1), where aerial survey results are available for 12 different years during the 1971 to 1989 period (Table 1). The Ivishak River has been used as an index of char abundance in the Sagavanirktok River because it not only has a spawning population of char, but because the stream also supports the largest concentration of non-spawning, overwintering fish in this drainage. Aerial survey abundance estimates of char do not accurately distinguish spawning from non-spawning char, nor is there an accepted minimum observable fish size. Fish of juvenile or sub-adult size (200 mm to 350 mm total length approximately) may or may not be visible during aerial surveys depending upon conditions and observer skill. Small fish are much more visible to observers when concentrated in dense schools. Estimates of char abundance in the Ivishak River have ranged from slightly over 8,000 char in 1975 to more than 36,000 in 1982 (Table 1). Survey dates (Table 1) have ranged from September 10 to September 22. Timing of surveys is important, since fish tend to migrate upstream over an extended period to the overwintering and spawning areas of the stream. Early survey dates would miss later arriving fish, while late surveys risk loss of stream visibility due to freezing and lack of good light conditions. The importance of timing was illustrated in 1975 when early surveys, conducted from September 7 to 10, indicated very reduced numbers of char in the Ivishak River compared to previous years. However, subsequent surveys on September 22 and 23 observed many thousands more char, indicating that fish were still in transit to the survey area during the early surveys.

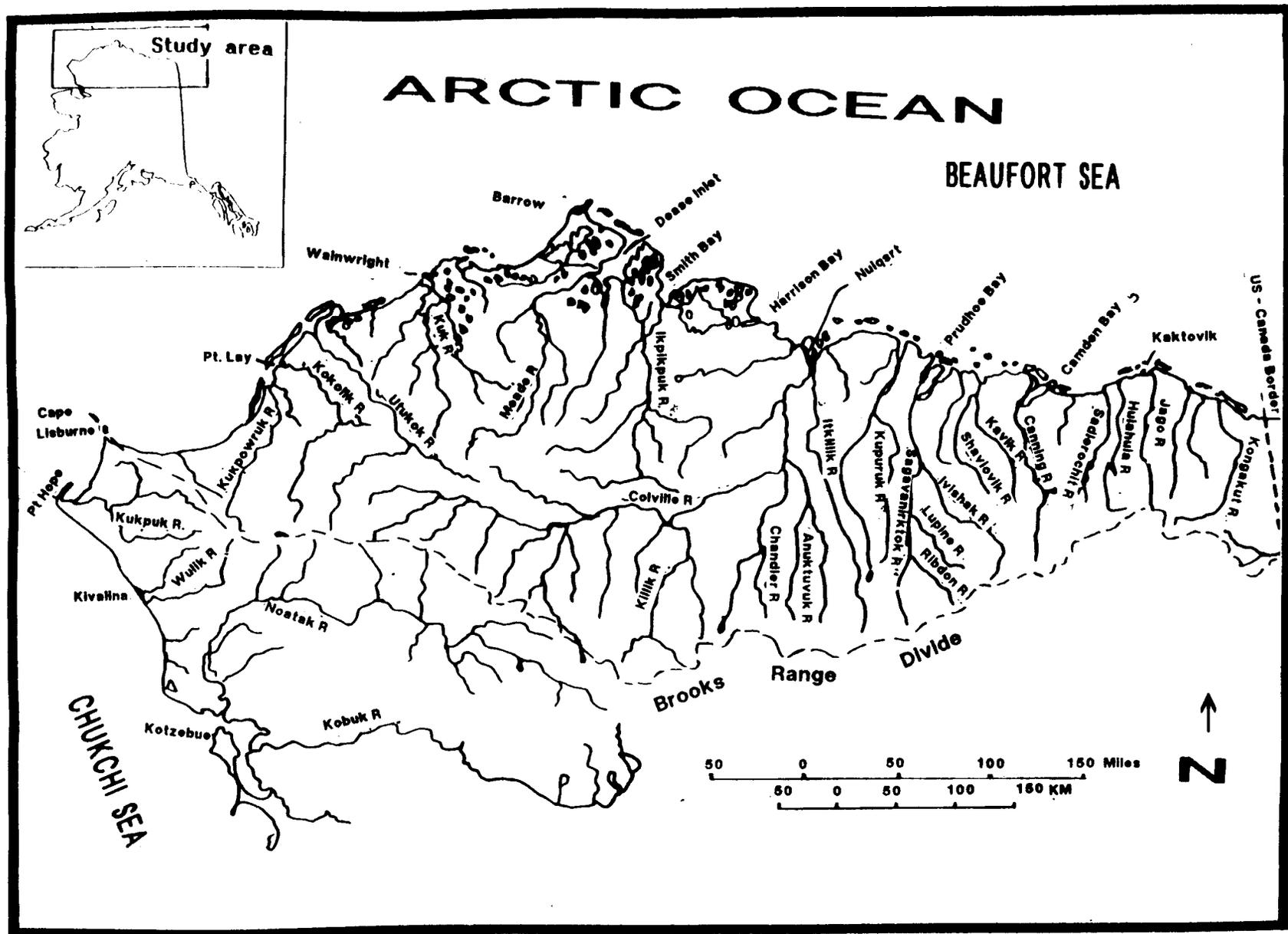


Figure 1. Principal drainages of the Beaufort Sea in Alaska and the northeastern Chukchi Sea.

Table 1. Abundance estimates of Dolly Varden in selected North Slope streams (1971-1989).

Stream or section	Year	Date	Number of char	Survey Method ^a	Survey Rating	Data Source
Ivishak River	1971	9-22	12,808	H	Good	Yoshihara (1973)
	1972	9-24	12,292	H	Good	Yoshihara (1972)
	1973	9-11	10,000	H	Excellent	Furniss (1975)
	1974	9-(10-23)	11,000	H	Not Rated	Furniss (1975)
	1975	9-(22)	8,306	H	Not Rated	Bendock (pers. comm.) ^b
	1976	9-22	8,570	H	Fair	Bendock (pers. comm.) ^c
	1977	No Survey				
	1978	No Survey				
	1979	9-22	24,403	S	Excellent	Bendock (1980)
	1980	No Survey				
	1981	9-14	24,873	S	Excellent	Bendock (1982)
	1982	9-19	36,432	S	Excellent	Bendock (1983)
	1983	9-18	27,820	S	Excellent	Bendock & Burr (1984)
1984	9-18	24,818	S	Excellent	Bendock & Burr (1985)	
1989	9-22	12,650	H	Good	DeCicco (pers. comm.) ^d	
Anaktuvuk River	1979	9-22	15,717	S	Excellent	Bendock (1980)
	1980	No Survey				
	1981	9-14	10,536	S	Excellent	Bendock (1982)
	1982	9-19	6,222	S	Excellent	Bendock (1983)
	1983	9-18	8,743	S	Excellent	Bendock & Burr(1984)
	1984	9-18	5,462	S	Excellent	Bendock & Burr(1985)
Kongakut River	1986	9-20	8,900	S	Good	USFWS (pers. comm) ^e
	1989	9-22	6,355	S	Good	DeCicco (pers. comm) ^d

^a H = helicopter and S = supercub.

^b Internal memorandum. T. Bendock, Fishery Biologist, Division of Sport Fish ADFG, Fairbanks, AK. September 1975. To: George Van Whye. Title: Arctic char counts, North Slope, 1975.

^c Internal memorandum. T. Bendock, Fishery Biologist, Division of Sport Fish ADFG, Fairbanks, AK. Sept. 27, 1976. To: George Van Whye. Title: Arctic char counts, North Slope, 1976.

^d Internal memorandum. F. DeCicco, Fishery Biologist, Division of Sport Fish ADFG, Fairbanks, AK. Sept. 31, 1989. To: Bill Arvey. Title: Kaktovik trip report.

^e Internal memorandum. Tanya Stevens and Robin West, Fisheries Biologists FWE, Fairbanks AK. December 16, 1987. Title: Trip report: Aerial surveys of Arctic char in five coastal streams, Arctic National Wildlife Refuge, 1986.

The Anaktuvuk River, a tributary to the Colville River (Figure 1), has been surveyed to estimate char abundance from 1979 to 1984 (excluding 1980). The stream has not been surveyed since 1984. A concentration of spawning and non-spawning char has been observed consistently in the Rooftop Ridge area, a 20 km section approximately 65-85 km upstream from the confluence with the Colville River. Bendock (1982) surveyed other sections of the Anaktuvuk River and its tributaries, including the Nanushuk River, and reported the Rooftop Ridge concentration to be the largest in the Anaktuvuk River drainage. He reported that large mature char typically composed the aggregation. Estimates of char abundance in the Rooftop Ridge section of the Anaktuvuk River range from about 5,500 in 1984 to more than 15,000 fish in 1979 (Table 1). Anecdotal reports were received by ADFG in 1987 and 1988 that numbers of char in the Anaktuvuk River were greatly reduced from prior years (Winters pers. comm.)¹. Additional anecdotal reports from a local hunting guide based at Umiat indicated that char were present in the fall of 1989 in numbers similar to those he had observed in past years. ADFG estimates of char abundance in the Rooftop Ridge section of the Anaktuvuk River range from about 5,500 in 1984 to more than 15,000 fish in 1979 (Table 1).

The Kongakut River flows into the Beaufort Sea east of Barter Island and drains the north side of the Brooks Range in the extreme northeast corner of Alaska (Figure 1). The stream supports spawning and non-spawning char and is one of the most important streams for that species in ANWR. The Kongakut River is receiving increased attention by recreational users including anglers. Statistics compiled by the ANWR staff indicate that in the years 1986-1989, the number of use-days by commercially guided recreational floaters on the Kongakut River increased from 330 in 1986 to 1,794 in 1989, an increase of over 500%. ADFG closed the Kongakut River to the taking of char in July, 1989 for the remainder of the season, in response to low abundance of char. ADFG aerial surveys in late September of 1989 verified that char were present in numbers comparable to those seen by the United States Fish and Wildlife Service in 1986. Char abundance has been estimated by aerial survey only in two years, 1986 and 1989 (Table 1). The reasons for low summer abundance of char in the Kongakut River in 1989 are not known but may include high winter mortality, population movement to the Beaufort Sea, or movement to lower sections of the Kongakut River during the summer of 1989.

SPORT HARVEST OF CHAR IN DRAINAGES OF THE NORTH SLOPE

The estimated recreational harvest of char is available from annual statewide harvest surveys from 1977 to 1989. These data combine the number of Dolly Varden (anadromous and non-anadromous) harvested with the number of Arctic char harvested. It is thought that the majority of fish harvested by sport anglers are anadromous Dolly Varden and harvest estimates in these surveys reflect this assumption. Harvest survey questionnaires were mailed to a random sample of sport fish licence holders and responses were compiled and expanded into estimates of annual harvest. Sport fishing effort was

¹ ADFG internal memorandum Sept. 21, 1989, J.F. Winters to A. G. Ott, Habitat Division, Fairbanks.

comparatively light on the North Slope. Mills (1990) estimated 4,118 angler-days of fishing for all species in the area in 1989, the least amount of any sub-area in the Arctic, Yukon and Kuskokwim Region. Mean annual recreational harvest of char from 1980 to 1989 is 1,772 fish and ranged from 181 (1978), to 3,489 (1985) fish (Table 2). In 1988 and 1989, the most recent survey years, the annual harvest was estimated to be about 1,000 char each year. From 1977 until 1983, the sport harvest from North Slope waters was estimated as the number of fish taken in the entire reporting area without further quantifying by smaller units such as streams versus lakes. Separate estimates are available after 1983 for saltwater versus freshwater streams and lakes, and since 1984 the harvest in streams and lakes along the Haul Road is estimated separately from other lakes and streams. Total sport harvest of char from North Slope waters is composed of significant numbers of fish taken in saltwater as well as from stream and lake components in freshwater (Table 2). In most years of record, the majority of fish are taken in fresh- as opposed to saltwater. An attempt was made in 1988 to assess the recreational char harvest near the West Dock Causeway in the Prudhoe Bay industrial area (Baker 1989). An estimated total of 185 char were caught, with 116 fish harvested.

To assess effort and catch-per-unit-effort (CPUE) of guided anglers on the Kongakut River, river guides and air-charter operators were requested to complete logbook forms summarizing angling activity for parties that they either guided or transported. A total of 29 letters requesting cooperation and data forms (Appendix A) were mailed to individuals registered with ANWR as either recreational river guides, outfitters, or air charter operators, with 20 addressed to guides or outfitters, and nine addressed to air charter operators. No responses were received from air charter operators or their clients. Five responses were received from guides or outfitters, and of those, three actually took clients on the Kongakut River in 1990. The respondents indicated that their clients had fished a total of 30.25 hours on the Kongakut River and had caught 16 char, for a CPUE of 0.53 char/hour. A total of 14 of the 16 total char were retained by anglers.

Two U.S. Fish and Wildlife Service volunteers were stationed on the Kongakut River from mid-June until late July 1990 to interview parties completing trips. They contacted 11 groups totalling 77 persons all of whom had spent several days floating the river. Interviews of river parties were conducted informally, and no quantitative information on the char fishery was obtained. The volunteers kept accurate records of their personal fishing activities. The summary that they provided indicated that a combined total of 216 hours was spent fishing by two persons, and they caught and released 90 char. The CPUE was 0.42 char/hour; the average total length of char caught was 559 mm; and the maximum length and weight of the char was 686 mm and 1.6 kg (Elison, pers. comm.)².

² US Fish and Wildlife Service, letter from G. W. Elison (ANWR Manager) to W. D. Arvey, December 1990, containing river user interview information for June and July, 1990.

Table 2. Sport fishery harvest estimates of Dolly Varden/Arctic char from North Slope waters, 1977-1989^a.

Year	Number of char harvested from:			Total char harvest in freshwater	Total char harvest
	Salt-water	Streams	Lakes		
1977 ^b					241
1978 ^b					181
1979 ^b					364
1980 ^b					801
1981 ^b					1,188
1982 ^b					2,065
1983	911	2,013	42	2,055	2,966
1984	805	624	78	702	1,507
1985	966	852	1,671	2,523	3,489
1986	435	397	151	548	983
1987	347	2,155	174	2,329	2,676
1988	0	982	36	1,018	1,018
1989	34	436	561	997	1,031

^a Mills 1990.

^b Harvest estimates by environmental category not available

OTHER SOURCES OF HUMAN-INDUCED MORTALITY TO CHAR

Char are also taken for subsistence use with the largest North Slope harvests taken at Kaktovik on Barter Island than from any other village (Table 3). This is because char are more abundant along the eastern portion of the Beaufort Sea coastline than they are west of the Colville River where other settlements are located. Craig (1987) reports that char and Arctic cisco *Coregonus autumnalis* are the principal anadromous species harvested in the section of the Beaufort Sea coast from the Colville River to the Canadian border, whereas pink and chum salmon (*Oncorhynchus gorbuscha*, and *Oncorhynchus keta*); broad, humpback and round whitefish (*Coregonus nasus*, *Coregonus pidschian*, and *Prosopium cylindraceum*) and least cisco *Coregonus sardinella* are principal species harvested west of the Colville River. Spawning streams used by char west of the Colville River drainage have not been identified to date. Char are usually harvested near Kaktovik in coastal waters from late June to September, but also in the Hulahula River in the fall and winter (Craig 1987). Annual subsistence harvests of char in coastal waters may be 5,000 fish, with the majority taken in Kaktovik, followed by Nuiqsut. Only in Kaktovik can char be considered a major target species of the subsistence fishery.

Incidental char mortality included the killing of fish for scientific purposes and the incidental mortality associated with capture gear set for other species. In recent years, this has occurred mostly in nearshore marine waters of the North Slope. The ADFG has authority and responsibility to issue permits for collection of fish for scientific and educational purposes. Permits require collectors to report the number of fish taken and the number of incidentally killed fish following each year's work. Other conditions may be stipulated with the permits, including sharing of specimens, upper limits for specimens collected, or requirements to share tagging data. Reports from permit holders in 1989 and 1990 are not complete. The number of char deliberately sacrificed or killed incidentally during research activities in these years is believed to be light (100-300 fish) from incomplete reports that are available. In 1988, the number killed was approximately 800 char. Since 1988, the number of char needed for research has declined. In 1985, 1986 and 1987, larger sample sizes of char were required for a study of genetic stock structure of char from the Beaufort Sea drainages (Everett and Wilmot 1990). For this purpose, 111 char were collected in 1985 from various streams throughout the area, 446 were collected in 1986, and 743 were collected in 1987. An additional 535 char of mixed stocks were collected in marine waters near the Endicott Causeway in 1987.

SUMMARY AND RECOMMENDATIONS FOR FURTHER RESEARCH OF NORTH SLOPE CHAR

North Slope char stocks are not intensively harvested by sport fisheries. The number of char taken by subsistence fisheries combined with scientific research is roughly estimated to range from 4,000 to 9,000 char, with the subsistence fishery taking the majority of the harvest. Presumably, fishery and research mortality occurs across a wide range of age classes of char, though most are age 3+.

Table 3. Estimates of subsistence harvests of Dolly Varden/Arctic char by residents of villages located on the North Slope of Alaska.

Village	Year	Number of char harvested	Data Source
Point Lay	1983	<100	Craig and Schmidt (1985)
Wainwright	1969-1973 ^a	200	Patterson (1974)
Atqusuk	1983	0	Sekerak et al. (1985)
Nuiqsit	1985-1986 ^b	1,053	Walker et al. (1988)
Barrow	1969-1973 ^a	150	Patterson (1974)
Kaktovik	1985-1986 ^b	3,075	Walker et al. (1988)
Kaktovik	1988-1989 ^c	2,342	Pedersen (1990)

^a Harvest for one year only

^b July 1985 to June 1986

^c July 1988 to June 1989.

Abundance of char in Beaufort Sea drainages is poorly known except that abundance is much greater east of the Colville River than to the west. The largest char stock identified in the Alaska portion of the Beaufort Sea drainage overwinters in the Sagavanirktok River. Overwintering and spawning char in the Ivishak River, tributary to the Sagavanirktok River, were surveyed and counted annually for several years by ADFG as an index to char abundance of the North Slope. The Ivishak River supports the greatest number of overwintering char in the Sagavanirktok River drainage. Char spawn and overwinter in several other streams on the North Slope, including the Hulahula, Anaktuvuk, Canning and Kongakut river drainages. Approximately 40,000 char were counted in two index streams in 1979. It is reasonable to expect that more char were present in streams of the North Slope in that year. Because of the severe and variable climate of the Beaufort Sea drainages, char probably undergo highly variable annual survival and natural mortality rates. Aerial survey estimates of the number of overwintering and spawning char in the Ivishak River between 1975 and 1982 indicate over a four-fold fluctuation in abundance.

Given the low level of harvest by the recreational fishery in Beaufort Sea drainages and that normal natural abundance variation in these drainages likely exceeds fishing mortality, it would be imprudent for the Sport Fish Division to continue monitoring of these char populations. Future involvement of Sport Fish Division staff should be limited to monitoring the recreational harvest through the statewide harvest survey, the subsistence char harvests through the ADFG Division of Subsistence, and evaluation of research mortality via monitoring of Scientific and Educational collection permit reports.

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APPENDIX A

VOLUNTARY LOGBOOK FORM AND SAMPLE OF LETTER
SENT TO GUIDES, OUTFITTERS, AND AIR CHARTER
OPERATORS IN THE KONGAKUT RIVER AREA OF ANWR

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

STEVE COWPER, GOVERNOR

1300 COLLEGE ROAD
FAIRBANKS, ALASKA 99701-1599

May 25, 1990

Dear

The Alaska Department of Fish and Game is attempting to contact authorized recreational guides and air charter services that operate on the Kongakut River in the Arctic National Wildlife Refuge. As those of you who took fishing parties on this river in 1989 are aware, char (Dolly Varden) fishing was poor during the 1989 summer season. As a result, the Department of Fish and Game enacted an Emergency Order closing the river to the harvest of char in mid-July for the remainder of the year. Reasons for poor char fishing in 1989 are poorly understood, but may be related to winter mortality or to the failure of spawning fish to remain in the river, as they customarily do. Aerial surveys conducted in late September verified a near normal number of char, indicating that char had entered the stream for spawning and overwintering.

During 1990, the Department of Fish and Game intends to monitor char abundance, fishing effort, and catch. Aerial surveys for char abundance and distribution will be conducted in the fall, and a voluntary fishing reporting program among river guides and air charter services is being initiated. One purpose of the latter program is to determine whether the pattern of low summer char abundance observed in 1989 again occurs in 1990. We are enlisting your support and cooperation in this effort.

We are asking that you fill out and return a Fishing Record Form (enclosed) if you guide a party on the Kongakut River. In addition, we request that the air charter operators who transport unguided float parties to the Kongakut River make the forms available to the parties before departure. Full confidentiality will be strictly maintained concerning all aspects of the guiding and transporting operations. The only information to be made public would consist of that which is obtained from the actual fishing record forms.

The form is fairly simple and self explanatory. To ensure information quality and completeness, we would prefer that the river guide fill out and maintain the form for his or her party of river runners for a given trip, and return them to us via the enclosed self-addressed/postage-paid envelope. In addition to the information requested on the form, we would also appreciate and make use of any data that can be provided on fish size, e.g. average length, maximum

and minimum length, etc. Extra blanks in the fishing success column could be used for that purpose.

Thank you for your cooperation. Please contact me for further questions you may have or to impart any information that you feel may be useful for fisheries management. Have a good summer season.

Sincerely,



Bill Arvey, Area Biologist
Division of Sport Fish
Phone (907) 456-8819
Fax (907) 456-2259

Enclosures: Fishing Record Form
Self-addressed/postage paid envelope

