AN OVERVIEW OF SUBSISTENCE SALMON AND OTHER SUBSISTENCE FISHERIES OF THE CHIGNIK MANAGEMENT AREA, ALASKA PENINSULA, SOUTHWEST ALASKA

by

Lisa Hutchinson-Scarbrough and James A. Fall

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ABSTRACT

This report provides an overview of subsistence harvests and uses of salmon in the 1980s and early 1990s in the Chignik Management Area of the Alaska Peninsula, southwest Alaska. A brief overview of subsistence uses of other finfish and marine invertebrates is also included. The report is based on research conducted by the Alaska Department of Fish and Game, including systematic household surveys, permit records, key respondent interviews, and participant observation. There are five year-round communities in the Chignik Area: Chignik (Chignik Bay), Chignik Lagoon, Chignik Lake, Ivanof Bay, and Perryville. A section of the first chapter of the report provides historic background for these communities, and describes the history of commercial salmon fishing and processing in the area as well.

Chapter Two of the report is an overview of the contemporary subsistence salmon fishery in terms of species used, harvest quantities, levels of participation, areas used, harvest timing, harvest methods, and processing techniques. Case examples are included to illustrate these subsistence fishing patterns. Most salmon taken for home use in the Chignik Area are harvested using subsistence seines and set nets; salmon are also retained from commercial catches and caught with rod and reel. Virtually every household in the five Chignik communities uses salmon for subsistence purposes, and most participate in the harvest and processing of subsistence salmon as well. Salmon harvests make a substantial contribution to the food supply of these communities, with annual harvests in usable weight ranging from about 100 pounds per person to about 265 pounds per person. Salmon contribute between 33 and 70 percent of the total annual subsistence harvests of all resources by Chignik Area residents.

Subsistence fishers in the Chignik Area must obtain an annual permit, issued free of charge by the Department of Fish and Game. Permit returns are used to estimate annual subsistence harvests. Estimated salmon harvests by subsistence permit holders in the Chignik Area were 20,503 fish in 1993 and 20,300 fish in 1994. These estimates include harvests of 16,847 salmon in 1993 by households living year-round in one of the five Chignik communities, and 16,359 salmon by these households in 1994. The balance of the harvest was by seasonal residents of the Chignik Area.

The subsistence harvests estimated for 1993 and 1994 were much higher than the average harvest estimate from permits for 1976 through 1992 of 9,152 salmon, but were consistent with estimates from earlier years based on systematic household surveys. The increase in estimated harvests based on permits is a result of improved participation by subsistence fishers in the permit system.

All five species of Alaska salmon are harvested for subsistence purposes in the Chignik Area. The composition of the long-term (1976-1994) average harvest was 82.7 percent sockeyes,

8.9 percent coho, 5.7 percent pink, 2.3 percent chum, and 0.4 percent chinook. It is likely that this long-term average underestimates the contribution of coho salmon to the subsistence harvest, because households from communities that harvest large numbers of cohos were not participating consistently in the permit system until recently. For 1993 and 1994 combined, the harvest composition was 70.3 percent sockeye, 19.2 percent coho, 7.3 percent pink, 2.5 percent chum, and 0.7 percent chinook. This is probably more representative of the area's subsistence harvest.

Residents of Chignik Area communities used at least 17 kinds of fish other than salmon for subsistence purposes in the 1980s and 1990s. Those taken in the largest quantities include halibut, gray cod, eulachon (candlefish), and Dolly Varden. About 19 kinds of marine invertebrates were used, including clams, cockles, crabs, octopus, chitons ("bidarkies"), and sea urchins.

The report concludes that into the 1990s, the way of life in the five communities of the Chignik Area continued to be based upon a combination of subsistence harvesting for local use and noncommercial exchange and upon commercial salmon harvesting. Subsistence harvests were relatively large and diverse, making an important contribution to the diet. Subsistence harvesting and processing were largely family activities, with traditional roles assigned by age and sex. Salmon were preserved in a variety of ways, including drying, smoking, canning, salting, and pickling. Subsistence uses of salmon, other fish, and marine invertebrates in the area bound extended families and communities together in networks of cooperative harvesting activities and exchanges of wild foods that had cultural, social, and economic importance for the people of these communities.

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ACKNOWLEDGMENTS

The authors wish to thank the village councils of Chignik Bay, Chignik Lake, Perryville, and Ivanof Bay and the village of Chignik Lagoon for permission to conduct research in their communities. Most of all, we thank all the people of these communities who have kindly allowed us to observe their subsistence activities and for the information they provided which appears in this report.

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PLATES

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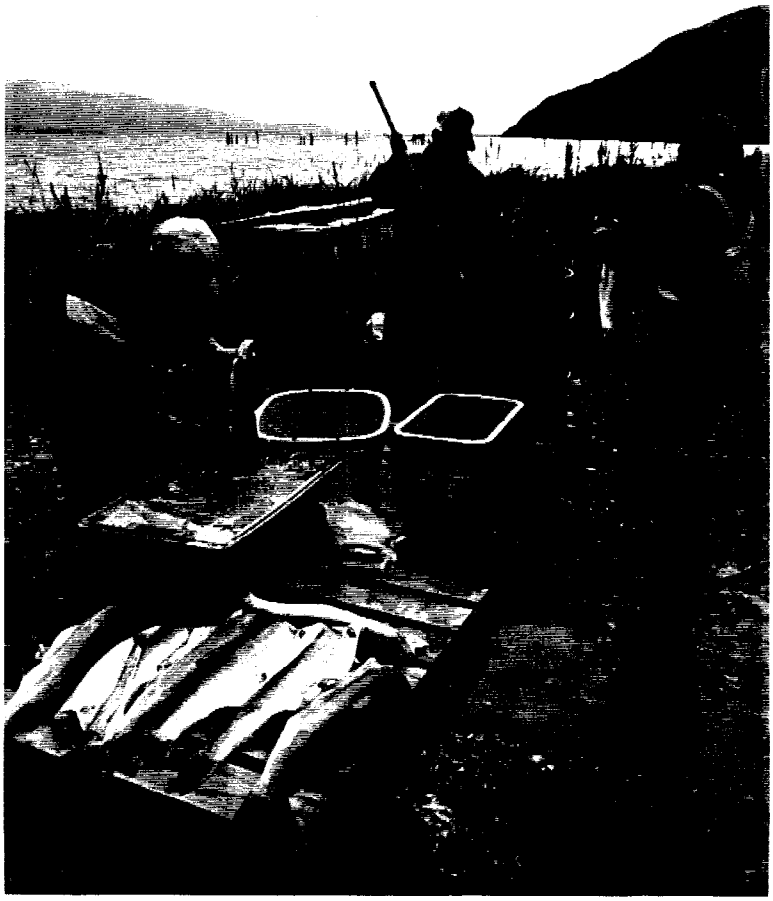

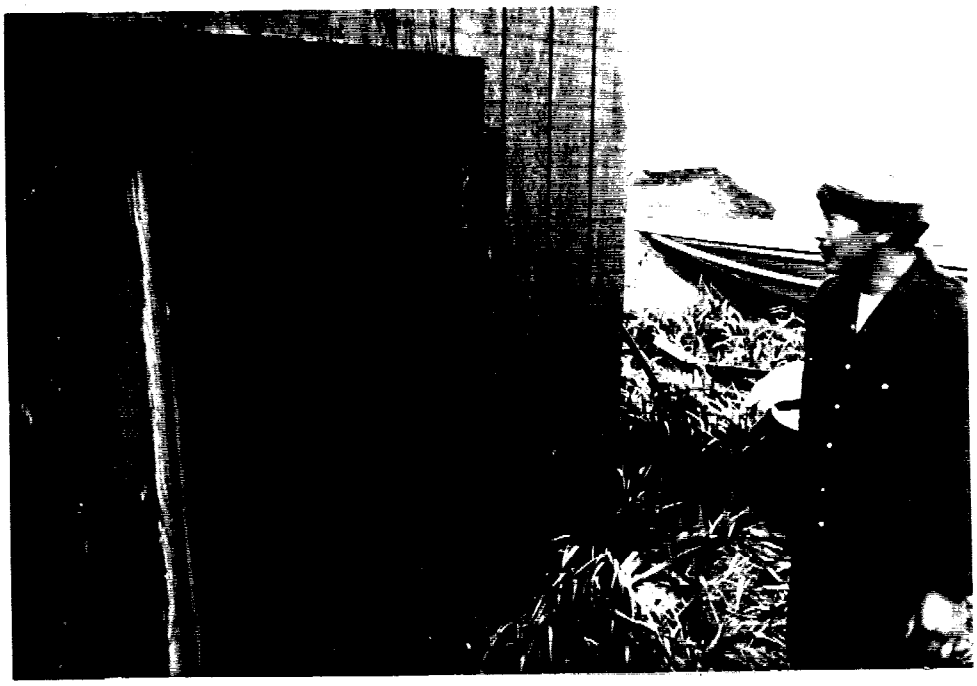

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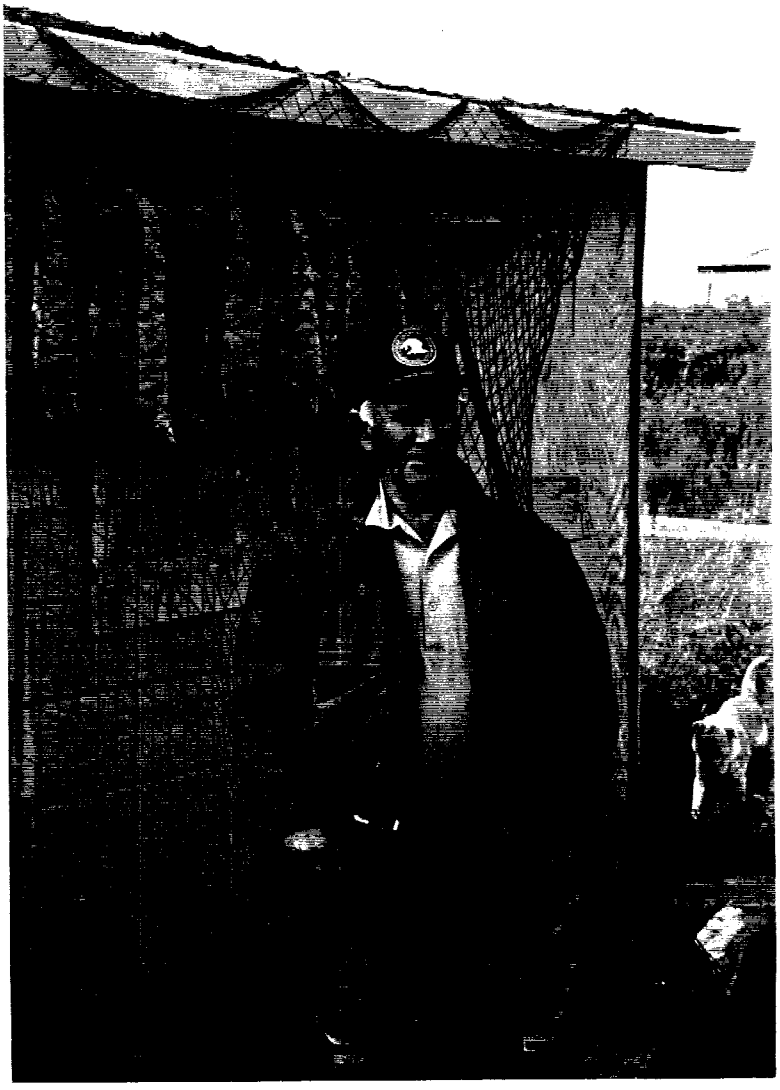

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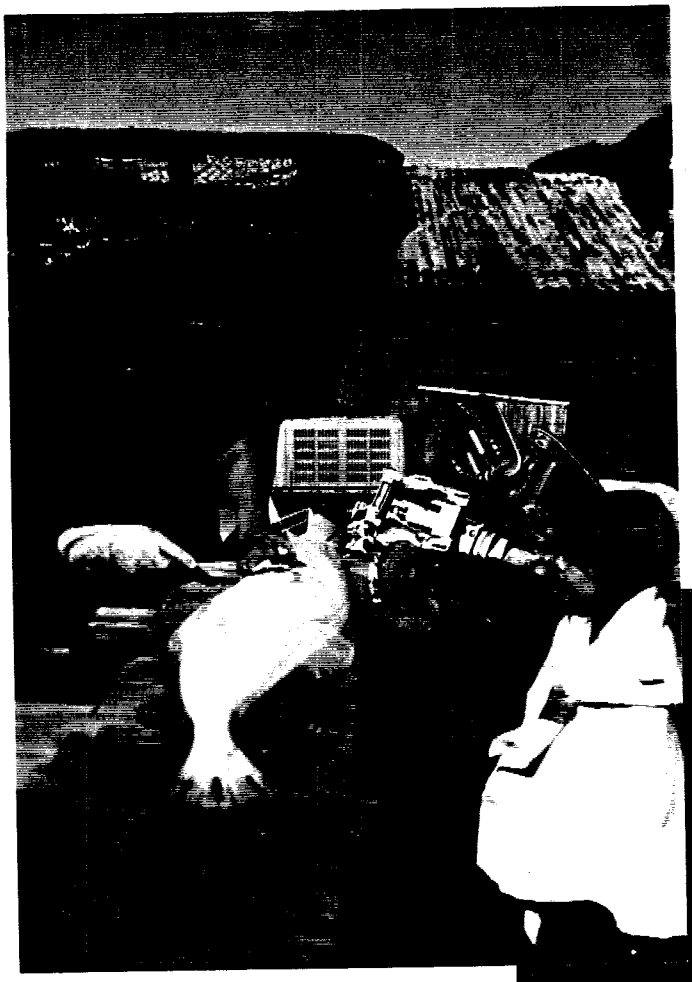

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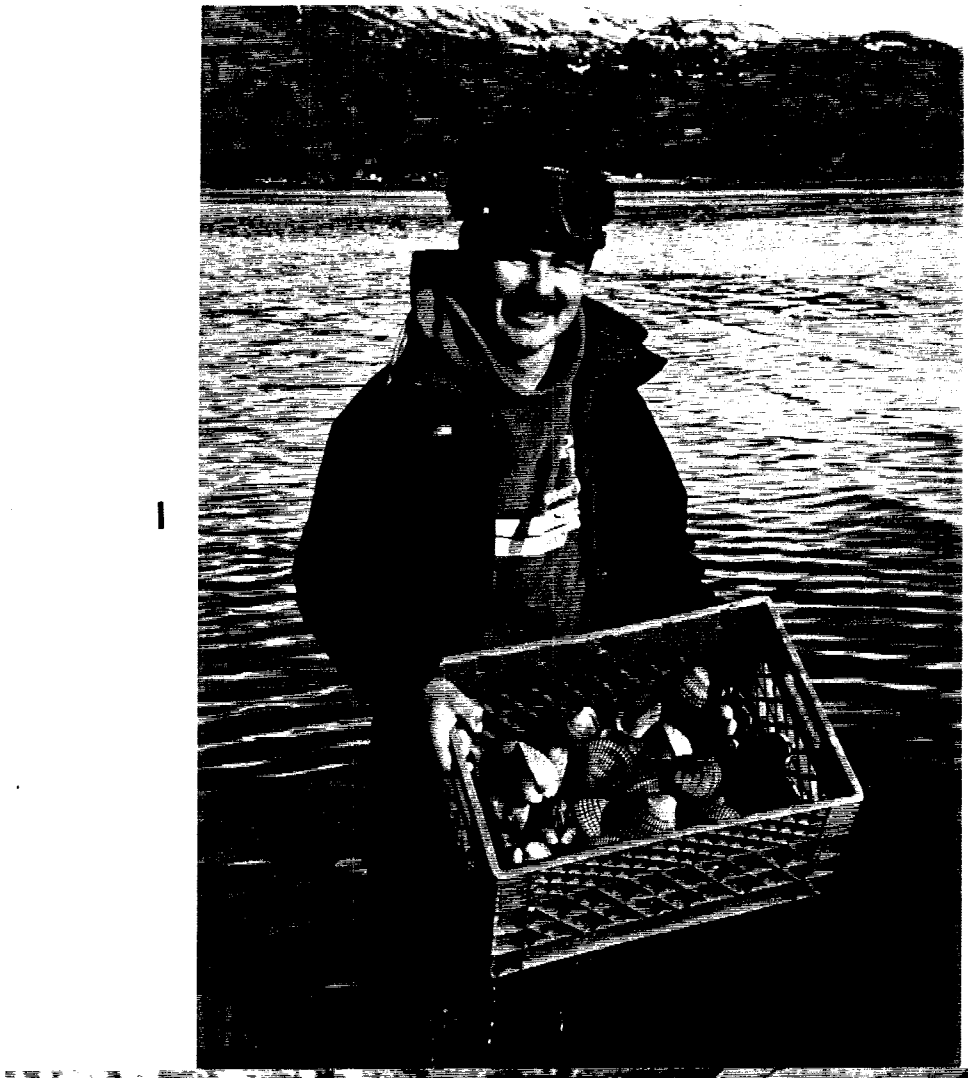

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

INTRODUCTION: PURPOSE, OBJECTIVES, AND METHODS

This report provides an overview of subsistence harvests and uses of salmon in the 1980s and early 1990s in the Chignik Management Area of the Alaska Peninsula, Southwest Alaska. A brief summary of subsistence uses of other finfish and marine invertebrates is also included in the report. Table 1 lists the 1990 population of the five communities of this area including Chignik Bay (also called "Chignik"), Chignik Lagoon, Chignik Lake, Perryville, and Ivanof Bay. Figure 1 shows the location of these and former communities in the area. In 1990, the total year-round population was 517 people. In the fall of 1995, the total number of year-round households in these communities was approximately 137, as in 1990, but changes had occurred in specific communities, as discussed below.

An earlier version of this report was prepared for presentation at a meeting of Alaska Board of Fisheries in Kodiak in January 1993. At that time, the Board of Fisheries, in a series of meetings, was reviewing background information on subsistence fisheries throughout the state in order to implement the provisions of the 1992 state subsistence law (ADF&G 1995). In January 1993, the Board determined that salmon and other finfish (except steelhead and rainbow trout) of the Chignik Area support customary and traditional (that is, subsistence) uses. The original board report has been updated at this time for inclusion in the Division of Subsistence *Technical Paper Series*.

The information in this technical paper is based largely on the findings of research conducted by the Division of Subsistence of the Alaska Department of Fish and Game (ADF&G). Several data gathering methods have been used in this research. In 1985, division researchers conducted comprehensive household interviews with members of 85 households in the five local Chignik Area communities. During these interviews, detailed information about subsistence harvests and uses of wild resources which occurred in 1984 was recorded (Morris 1987). In 1990, division staff conducted similar interviews with 105 Chignik Area households in order to update harvest and use data in the aftermath of the *Exxon Valdez* Oil Spill (Fall et al. 1995). The harvest year for those interviews was 1989. In 1992, the division conducted 54 interviews in Chignik Bay and Chignik Lake, pertaining to harvest and use activities from April 1991 through March 1992 (Hutchinson-Scarbrough 1995a, 1995b). Table 2 summarizes sample sizes for these three rounds of household interviews. Also, in 1982, 1983, and 1985, division researchers conducted map interviews with residents of the five Chignik Area communities which documented contemporary harvest areas for salmon fishing as well as a variety of other subsistence activities. Harvest area maps based on these interviews appear in ADF&G (1985), Morris(1987), and Fall et al. (1995). Finally, in May, June, and September 1990 field research was conducted on contemporary subsistence salmon fishing, primarily in Chignik Bay, Chignik Lagoon, Perryville, and Ivanof Bay.

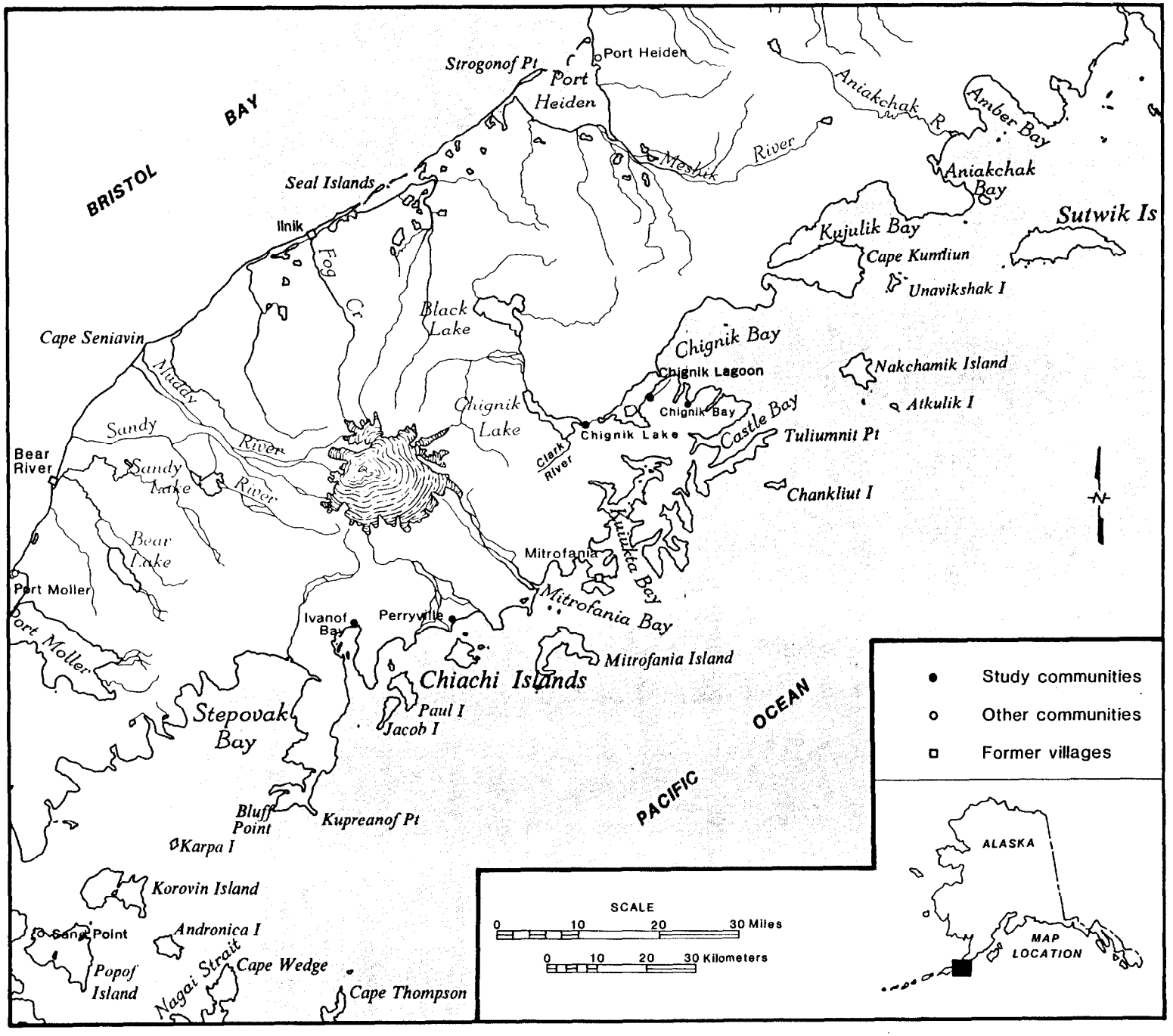

BRISTOL BAY
Strogonof Pt
Port Heiden
Port Heiden
Aniakchak R
Amber Bay
Meshik River
Aniakchak Bay
Seal Islands
Ilnik
Fog Cr
Sutwik Is
Kujulik Bay
Cape Kumliun
Unavikshak I
Black Lake
Cape Seniavin
Muddy River
Chignik Bay
Chignik Lagoon
Nakchamik Island
Atkulik I
Chignik Lake
Chignik Bay
Castle Bay
Tuliumnit Pt
Sandy River
Bear River
Sandy Lake
River
Clark River
Chankliut I
Bear Lake
Mitrofania
Kuiukta Bay
Port Moller
Mitrofania Bay
Ivanof Bay
Perryville
Port Moller
Mitrofania Island
Chiachi Islands
Stepovak Bay
Paul I
Jacob I
OCEAN
PACIFIC
Bluff Point
Kupreanof Pt
Karpa I
Korovin Island
Sanak Point
Andronica I
Popof Island
Nagai Strait
Cape Wedge
Cape Thompson
Study communities
Other communities
Former villages
SCALE
0 10 20 30 Miles
0 10 20 30 Kilometers
ALASKA
MAP LOCATION

Table 1. Population of the Communities of the Chignik Area, 1990

Community	Population	Number of Households
Chignik Bay	188[a]	46
Chignik Lagoon	53	17
Chignik Lake	133	34
Ivanof Bay	35	9
Perryville	108	31
TOTAL	517	137

[a] Includes total of 28 in group quarters.

Source: Alaska Department of Labor 1991:95-96.

Table 2. Sample Sizes, Division of Subsistence Household Surveys, Chignik Area Communities, 1984, 1989, and 1991/92

Community	Number of Households		Percentage of Households Interviewed
	Total	Interviewed	
Study Year 1984			
Chignik Bay	28	19	67.9%
Chignik Lagoon	22	17	77.3%
Chignik Lake	31	23	74.2%
Ivanof Bay	10	6	60.0%
Perryville	27	20	74.1%
Study Year 1989			
Chignik Bay	39	35	89.7%
Chignik Lagoon	15	15	100.0%
Chignik Lake	28	21	75.0%
Ivanof Bay	7	7	100.0%
Perryville	31	27	87.1%
Study Year 1991/92			
Chignik Bay	44	30	68.2%
Chignik Lake	33	24	72.7%

Participant observation and key respondent interviews were the data collection methods used during this phase of the research.

Additional data about contemporary subsistence salmon fisheries of the Chignik Management Area appear in the annual management reports (AMRs) prepared by the Division of Commercial Fisheries Management and Development (CFMD Division) of ADF&G. The harvest estimates in the AMRs are based upon harvests reported on returned subsistence salmon permits, which before 1993 were usually hand tabulated at the end of each fishing year. In 1993, the Division of Subsistence developed a database with the subsistence permit information then stored in the ADF&G archive in Kodiak. Also in 1993, the Subsistence Division began assisting the CFMD Division with issuing permits and began supplementing permit returns with post-season interviews conducted by division personnel and local research assistants. As a consequence, the number of permits issued and the rate of return of harvest data increased. The results of this effort are discussed in Chapter Two. Because this work with the permit archive and the supplemental post-season interviews occurred after the January 1993 Board of Fisheries meeting, these findings were not part of the original board report.

The report is divided into four chapters. The remainder of this first chapter provides historic background material, focusing on the development of the area's commercial salmon fishery, the development of a mixed subsistence/cash economy, and the establishment of each of the present-day Chignik Area communities. Chapter Two is an overview of the contemporary subsistence salmon fishery in terms of species used, harvest quantities, levels of participation, areas used, and harvest timing. The second chapter also provides several case examples of contemporary patterns of subsistence salmon fishing, illustrating harvest methods, processing methods, and the composition of harvest and processing groups. These case examples provide the information needed to understand the social, cultural, nutritional, and economic importance of subsistence salmon fishing for the Chignik Area's residents today. Chapter Three is a short overview of available information on other subsistence fisheries of the area, including fish other than salmon and marine invertebrates. The report concludes with Chapter Four, a summary of study findings. A series of appendix tables contains detailed information about the Chignik Area subsistence salmon fishery as reflected by the subsistence permit database.

HISTORIC BACKGROUND

The purpose of this section is to provide a broad overview the history of the Chignik Area, especially as it relates to the establishment of the commercial fishing and processing industries and the development of a mixed economy in the area's communities. The Alaska Native people living in Chignik Bay, Chignik Lagoon, Chignik Lake, Perryville, and Ivanof Bay today are descendants of the Alaska Peninsula Pacific Yup'ik Eskimo, generally designated today as "Alutiiq." Archaeological evidence shows the Pacific side of the Alaska Peninsula has been occupied for a minimum of 6,000 years (Clark 1984). At

least throughout the first millennium AD, people lived along the Chignik River and depended heavily on salmon (Dumond 1977).

The Alutiiq people were maritime hunters who relied on the sea as well as the rivers and tundra for survival. These areas provided them with food, oil, and raw materials to manufacture clothing, shelters, and boats. They were extremely skillful at hunting and adept at using ocean-going crafts (bidarkas and umiats) in their subsistence activities. These skills were quickly noted by Russian explorers in the 1700s and early 1800s who gradually expanded their interests in Russia America in search of reliable supplies of furs. The hunting skills of the Native people made it possible for the Russians to establish themselves at the cost of exploiting the Native people and the fur bearing mammals and whales.

This tradition continued after 1867 when the American government assumed control of Alaska. American interests concentrated on whaling, trapping, and the development of commercial fishing. In the 1880s, salmon fishing became the most important commercial resource harvesting industry in the Chignik Area and has continued as such to the present.

In 1888, the community of Chignik was established as a fishing village when the Fisherman's Packing Company of Oregon set up a salmon saltery there. The following year, the first three canneries in the area were built at Chignik Lagoon. These were the Chignik Bay Company cannery, the Shumagin Packing Company, and the Chignik Bay Packing Company. In 1892, the Chignik Lagoon canneries consolidated to form the Chignik Bay Packing Company. In 1889 and 1890, a cannery called Western Alaska Packing Company operated near Ivanof Bay. In 1896, Chignik itself received its first two canneries, owned by Pacific Steam Whaling Co. and Hume Bros & Hume. In 1901, they joined with Pacific Packing and Navigation Co., and in 1904, Northwestern Fisheries bought the two canneries (Davis 1986). In 1911, two canneries were in existence in Chignik Bay: Alaska Packers Association and Northwest Fisheries.

In 1911, Columbia River Packing Company was operating a cannery on the north side of the Lagoon that in later years became Columbia Ward Fisheries. Columbia Ward remained in operation at Chignik Lagoon as a shore based operation until approximately 1989. This firm operated a couple of tenders in the Lagoon in 1990.

In 1953, another cannery was built in Ivanof Bay called the Ivanof Bay Packing Company. Also in 1953, Alaska Packers Association and Chignik Fisheries Inc. operated canneries in Chignik Bay (Davis 1986). In 1978, the Alaska Packers Cannery burned, and the following year, it was rebuilt and leased to SEA Alaska. In 1985, Aleutian Dragon Fisheries (ADF) subleased the facility from SEA Alaska and has controlled it since that time. In 1987, the Chignik Property Partnership became owners of the ADF facility, which is still leased to ADF (Fulker 1992). In 1979, Peter Pan and one of the local Alaska Native village corporations built a cannery near the old Northwest Fisheries cannery. The Peter Pan facility was purchased in 1984 and became Chignik Pride Fisheries (Resoff 1992).

In 1992, Aleutian Dragon Fisheries and Chignik Pride Fisheries were the only processing plants that remained in the area. Both were located in the community of Chignik Bay. With the advent of freezers, canning salmon was replaced in the early 1980s with cold storage and salting (Resoff 1992). Salmon, cod and halibut were the primary resources processed in these two facilities; however, they also processed limited quantities of octopus, black cod, red snapper, pollock, and herring (Murphy 1992; Resoff 1992). In addition to salmon, in the 1970s Chignik canneries also processed shrimp from the Chignik Area, king crab in the early 1980s, and Tanner crab around 1987.

In the commercial fishery, fish traps were first used to harvest salmon. These traps were most heavily used throughout the Chignik Lagoon. In 1911, there were approximately 30 traps in the lagoon alone, and more operated from Chignik Bay northeast to Aniakchak Bay. By the 1940s, however, only three were in operation in the lagoon (Stepanoff 1990). The traps were very efficient, to the extent that local people feared that no salmon could escape to their spawning grounds, but traps continued to operate until 1959 when they were prohibited by the newly formed State of Alaska (Sam 1990).

In addition to fish traps that were owned by the companies, beach seines owned by individuals were used to catch fish along the shoreline of the Chignik Area for commercial sale. In 1932, a man named Harry Crosby arrived at Chignik Lagoon and brought with him the first moving seine that could be set off the back of a moving boat. This allowed people to catch fish off shore and provided them with a more efficient means of catching fish (Tuten 1977). The early nets were made of cotton soaked in tar, but were later replaced with nylon, a more durable material (Pedersen 1990). These early seine boats had a large roller on the back of the boat, and the nets loaded with fish had to be pulled by hand. In the early 1990s, a few of these boats still operated in the lagoon, but most of the boats were operated with hydraulics (Fulker 1992). The first power block was brought to Chignik by Raymond Anderson in approximately the 1960s (Pedersen 1990). By 1959, seining dominated all commercial salmon fishing activities in the Chignik Area. In the 1980s and 1990s, seines were the only legal gear for commercial salmon fishing in the Chignik Management Area.

With the development of the fur trade and commercial fishing and processing, some aspects of the traditional subsistence patterns were altered as the Alutiiq people began to use money and the imported goods they could obtain through selling furs and working in the canneries. In the early years of the commercial fishery, salmon canneries did not offer much employment for the regional Alutiiq people. These jobs were filled primarily by numerous seasonal immigrants, such as Chinese, Filipinos, and Hawaiians. Scandinavians and Italians also worked in the fishery, but primarily as fishermen. Many of these newcomers married into local Alutiiq families and stayed in the region. Descendants of these people continue to live in the Chignik area today (Tuten 1977).

Starting around 1900, Alutiiq people worked for the Chignik canneries and Alaska Commercial Company on a part-time basis. By 1920, more Alaska Native people coming from villages such as Kanatak, Mitrofania, Perryville, and the Chigniks were employed in the canneries. Those that worked the

fish traps or in the canneries could obtain fish in cans or fresh from the company whenever they wanted, but many of the local families preferred to use beach seines in local streams or along the beach in order to catch enough fish for smoking or drying (Stepanoff 1990).

To supplement cannery work, some local residents ran fox farms established by Alaska Commercial Company on various islands and others trapped along mainland coastlines throughout the region. Living in remote trapping cabins they had built, these trapping families spent winters using wild resources such as salmon, caribou, ptarmigan, hares, marine mammals, and waterfowl. By 1940, however, trapping had declined greatly because the price of furs had dropped, making commercial fishing at Chignik Lagoon a more reliable source of cash (Tuten 1977). Consequently, commercial fishing became the primary source of cash income for local families. In addition, subsistence harvests remained the primary source of food for almost all local households, a pattern which continues today.

CONTEMPORARY COMMUNITY HISTORIES AND OVERVIEW[1]

Chignik Bay

The Pacific Yup'ik (Alutiiq) village of Kaluiak, located at the present site of Chignik Bay village, was destroyed by Russians in the late 1700s (Tuten 1977). As noted above, in 1888 Chignik, which is Alutiiq for "windy place," was established as a fishing village when the Fisherman's Packing Company of Oregon set up a salmon saltery there. Chignik has been the center of commercial fish processing for the Chignik area ever since, and this remained the community's most vital industry into the 1990s. Descendants of Alutiiq people originally from Katmai, Douglas, and Mitrofania settled at Chignik, as well as descendants of early non-Alaska Native immigrants to the area. According to the U.S. Census, the population of Chignik Bay was 188 in 1990. Of these, 28 were resident in "group quarters" (the fish processing facility) and the remaining 160 lived in 46 households (Table 1); however, its population swells in the summer to over 1,000 people. Many of these seasonal residents are originally from the Chignik area. Although they live outside the area in the winter, many of these former residents still consider the Chignik area "home" and engage in subsistence activities locally (Morris 1987:210-212; see also the discussion of the permit data base, below). The approximate number of year-round households in Chignik Bay in the fall of 1995 was 29. The decline from 1990 may be due to the lack of year-round commercial fish processing in the community.

[1] For more detail on the history of these communities and contemporary facilities, see Davis (1986), Morris (1987), Fall et al. (1995) and Partnow (1993).

Chignik Lagoon

The community of Chignik Lagoon (on the south or "the flat side" of the lagoon) developed as a fishing village because of the large sockeye salmon runs in the lagoon. Two canneries were built here in 1889 by Fisherman's Packing Company of Astoria, Oregon (Tuten 1977). The community's past is traced to European and Russian-Alutiiq ancestors, many of whom immigrated to the area in the early 1900s (Davis 1986). An earlier Alaska Native settlement, referred to as "Old Village," was located on the northeastern shore of the lagoon and was occupied when the commercial salmon industry began. This village was abandoned as a year-round settlement when the school and church were built at Chignik Lake village around 1960, but the site continued to be used as a summer fish camp by some families into recent times. At the time of this study, in addition to the year-round community on the south side of the lagoon, scattered along the entire northern shoreline of Chignik Lagoon were a series of fish camps that are occupied in the summer primarily by residents of Chignik Lake and Perryville. Permanent houses, cabins, wall tents, fish racks, and smokehouses made up these camps. The year-round population of Chignik Lagoon was 53 persons in 17 households in 1990 (Table 1), but as in Chignik Bay, this population grows in the late spring and summer months with the advent of commercial salmon fishing. By 1995, the number of year-round households in Chignik Lagoon had swelled to 30. This increase was largely due to former residents deciding to remain in the village year-round instead of living there only during the commercial salmon season.

Chignik Lake

The community of Chignik Lake started as a trapping cabin in the 1920s that was used by an Alutiiq family from Bear River (near Port Moller). Many of their descendants continued to reside at Chignik Lake into the 1990s. This family overwintered at the site of the present village because subsistence resources were easy to obtain there. The area was also used as a fishing and hunting camp by other families prior to the establishment of the village, which occurred around 1960 after a school and church were built. Alutiiq people living in Kanatak (near Ugashik Lake), Ilnik, and Port Moller (on the Bristol Bay side of Alaska Peninsula), and some Perryville, Chignik Bay, and Chignik Lagoon residents moved to Chignik Lake primarily so their children could attend school and worship at the Russian Orthodox church. The year-round availability of wild foods was an attraction for these families also. As noted above, many Chignik Lake families maintained summer fish camps along Chignik Lagoon. Chignik Lake's population in 1990 was 133 persons in 34 households (Table 1). In 1995, the number of year-round households living in Chignik Lake was about 39.

Perryville

Many of the residents of Perryville and Ivanof Bay are descendants of the Alutiiq people who previously resided along Shelikof Strait at Katmai and Kaguyak (Douglas) villages. They moved to their present location in 1912 after their villages were destroyed during the Novarupta eruption. At the time of the eruption, these people were salting, smoking, and drying fish for home use at fish camps. They were rescued by the U.S. Coast Guard and taken to the present site of Ivanof Bay, then to the present site of Perryville where they established their present homes (Kosbruk 1992). Many Perryville families maintained fish camps along the north side of Chignik Lagoon, which they occupied in summer. The 1990 population of Perryville was 108 in 31 households (Table 1). There were also about 31 year-round households living there in 1995.

Ivanof Bay

Ivanof Bay was the site of a cannery in the late 19th century and again from 1930 to the early 1950s. In 1965, some residents of Perryville established Ivanof Bay as their home. Today, these people are closely tied with Chignik Lake and Perryville people in kinship relations and subsistence exchanges. Ivanof Bay families also maintained households in the community of Chignik, which they occupied in the summer during the commercial fishing season. The population of Ivanof Bay in 1990 was 35 in 9 households (Table 1). Ivanof Bay had about eight year-round households in 1995.

CHAPTER TWO: CONTEMPORARY SUBSISTENCE HARVESTS AND USES OF SALMON IN THE CHIGNIK MANAGEMENT AREA

SUBSISTENCE SALMON FISHING REGULATIONS

Regulations governing subsistence salmon fishing in the Chignik Area which were in effect when this research took place allowed fishing with seine and gill net gear and required that an individual permit be obtained with a seasonal limit of 250 salmon.[2] The permit had to be returned to the CFMD Division of ADF&G by October 31 of each year. Purse seines could be used to harvest subsistence salmon except in Chignik Lake. However, Chignik Area commercial salmon fishermen could not subsistence fish between June 10th and September 30th, although they were allowed to remove salmon caught during commercial openings for home use. Those individuals not holding commercial crew or skipper licenses could fish throughout the season. Subsistence salmon fishing was not allowed in the Chignik River upstream of the ADF&G weir site to Chignik Lake, in the tributaries to Chignik Lake, or in Black Lake (ADF&G 1991). Beginning in 1993, the restriction on commercial fishermen's participation in subsistence fishing was modified to allow them to participate in May and June up to 48 hours before the first commercial salmon fishing opening (ADF&G 1994). The Board of Fisheries made this change at the request of local residents who wanted more flexibility to harvest subsistence salmon in spring before the start of the commercial fishery.

In January 1993, the Alaska Board of Fisheries determined that the salmon stocks of the Chignik Area support customary and traditional subsistence uses. The Board further determined that approximately 19,000 salmon were necessary to provide a reasonable opportunity for subsistence uses (ADF&G 1995). This amount was based largely on household survey data collected by the Division of Subsistence and summarized in the earlier version of this report. It includes harvests with all gear types.[3]

HARVEST METHODS

In the Chignik Management Area in the 1980s and early 1990s, residents of the local communities took salmon for subsistence purposes primarily with purse seines, beach seines, and gill nets. They also removed salmon from their commercial catches for home use and harvested salmon with rod and reel gear under sport fishing regulations. As shown in Figures 2 and 3, in the 1980s, most salmon harvested for home use by the five Chignik Area communities were taken with subsistence methods, with removal

[2] Note that this differs from many other areas of the state, where subsistence salmon fishing permits are issued to households, not individuals.

[3] The 1992 Alaska subsistence statute requires the Board of Fisheries to determine the amount of the harvestable portion of a fish stock with customary and traditional uses that is "reasonably necessary for subsistence uses." If the harvestable portion is above this amount, other uses (such as sport, commercial, or personal use) may take place (AS16.05.258[b]).

Figure 2. Salmon Harvests by Gear Type, Chignik Area Communities, 1984

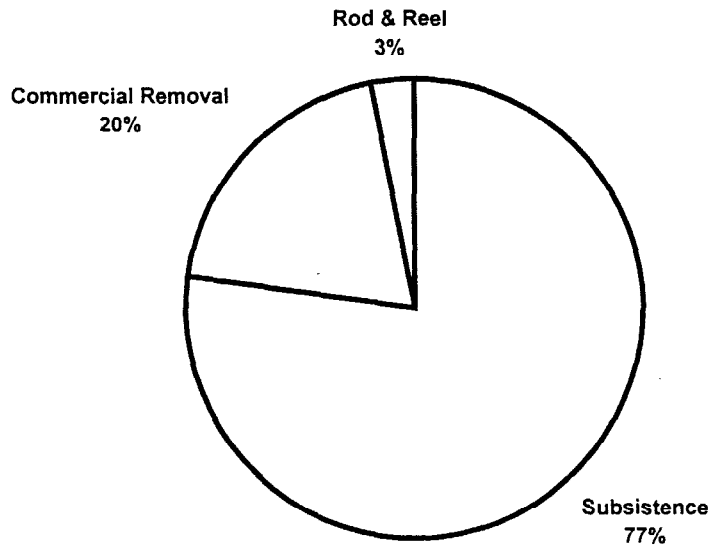
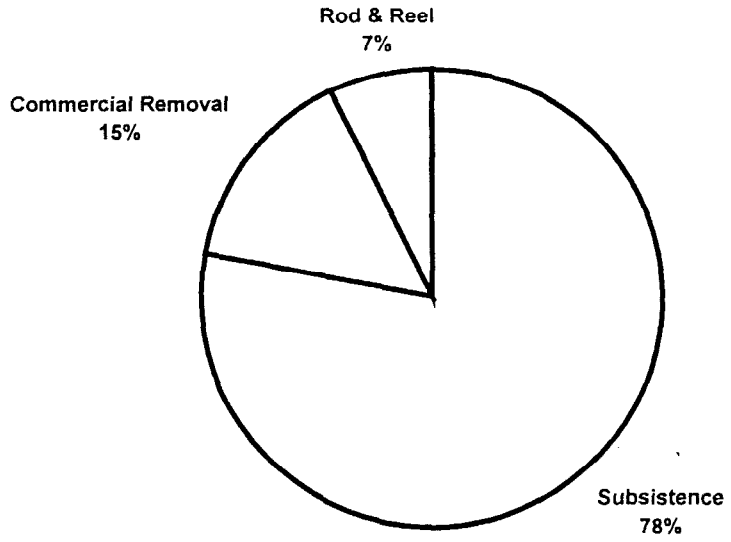


Figure 3. Salmon Harvests by Gear Type, Chignik Area Communities, 1989



from commercial catches ranking second and rod and reel third. For example, harvest survey findings for 1984 showed that 77 percent of the total salmon taken for home use by the five Chignik Area communities was harvested using subsistence methods, 20 percent was removed from commercial catches, and 3 percent was caught using rod and reel (Fig. 2). The pattern was very similar in 1989 (Fig. 3), when subsistence methods accounted for 78 percent of the salmon, removal from commercial catches produced 15 percent, and rod and reel produced 7 percent. In 1991, residents of Chignik Bay harvested 77.4 percent of their home use salmon with subsistence methods, 17.2 percent through commercial removal, and 5.4 percent with rod and reel. At Chignik Lake in 1991, 76.6 percent of the salmon were taken with subsistence methods, 17.9 percent by commercial removal, and 5.5 percent with rod and reel (Hutchinson-Scarbrough 1995a, 1995b).

Table 3 reports the percentage of sampled households in the Chignik Area communities that harvested salmon using the various gear types in 1984, 1989, and 1991. In most years, 25 to 50 percent of the households in each community removed salmon for home use from commercial catches, 30 to 70 percent used subsistence methods, and 10 to 50 percent used rod and reel. As noted above, however, subsistence methods produced most of the salmon for home use in each community.

LEVELS OF USE OF SALMON AND HARVEST QUANTITIES

Levels of Participation in Use of Salmon and Harvests in Pounds Usable Weight

In the 1980s and early 1990s, subsistence harvests of wild resources were relatively large and diverse in all five Chignik Area communities (Table 4). Total annual subsistence harvests (fish, land mammals, marine mammals, marine invertebrates, birds and eggs, and wild plants) averaged about 200 to 450 pounds usable weight per person, and the average household used about 12 to 25 kinds of subsistence foods each year. Salmon comprised the largest single subsistence resource category harvested by the five communities. With the exception of Ivanof Bay in 1989 and Chignik Lake in the same year, salmon made up about half or more of the subsistence foods harvested during each study year.

Table 5 and Figure 4 report data on annual harvests of salmon for subsistence use in each Chignik Area community in pounds usable weight per person based upon household survey results and including all gear types (subsistence methods, rod and reel, and removal from commercial catches). These harvests are substantial, and have ranged from about 100 to over 250 pounds per person per year.

As shown in Figure 5, virtually every household interviewed during Division of Subsistence research in Chignik Bay, Chignik Lagoon, Chignik Lake, Ivanof Bay, and Perryville in 1984, 1989, and 1991 used salmon for subsistence purposes. As shown in Table 5, most households also harvested

Table 3. Percentage of Households in Chignik Area Communities Harvesting Salmon by Gear Type, 1984, 1989, and 1991/92

Community	Percentage of Households							
		Subsistence Methods						
			Seines			Any		
	Commercial Removal	Gill Net	Purse Seine	Beach Seine	Any Seine	Subsistence Method	Rod & Reel	Any Method
Study Year 1984								
Chignik Bay	47.4	NA	NA	NA	NA	47.4	5.3	78.9
Chignik Lagoon	47.1	NA	NA	NA	NA	29.4	11.8	64.7
Chignik Lake	30.4	NA	NA	NA	NA	87.0	47.8	100.0
Ivanof Bay	33.3	NA	NA	NA	NA	50.0	33.3	83.3
Perryville	30.0	NA	NA	NA	NA	85.0	10.0	95.0
Study Year 1989								
Chignik Bay	34.3	22.9	NA	NA	25.7	42.9	31.4	77.1
Chignik Lagoon	40.0	13.3	NA	NA	33.3	33.3	33.3	60.0
Chignik Lake	57.1	14.3	NA	NA	57.1	71.4	52.4	85.7
Ivanof Bay	28.6	42.9	NA	NA	28.6	71.4	85.7	100.0
Perryville	25.9	55.6	NA	NA	25.9	63.0	37.0	88.9
Study Year 1991/92								
Chignik Bay	43.3	13.3	23.3	23.3		43.3	40.0	80.0
Chignik Lake	66.7	45.8	20.8	29.2		70.8	37.5	95.8

Sources: Scott et al. 1995; Fall et al. 1995; Hutchinson-Scarbrough 1995a, 1995b

Table 4. Subsistence Harvests in Pounds Usable Weight per Person, Range of Resources Used per Household, and Percentage of Total Harvest Composed of Salmon, Chignik Area Communities, 1984, 1989, and 1991/92

Community	Year	Pounds Per Person	Average Number of Resources Used per Household	Percentage of Total Harvest Composed of Salmon
Chignik Bay	1984	188	12.5	72.8%
Chignik Bay	1989	209	15.8	53.5%
Chignik Bay	1991/2	353	16.4	47.9%
Chignik Lagoon	1984	220	10.4	54.4%
Chignik Lagoon	1989	211	15.3	47.4%
Chignik Lake	1984	279	16.2	50.0%
Chignik Lake	1989	448	20.9	33.7%
Chignik Lake	1991/2	442	24.0	46.1%
Ivanof Bay	1984	456	18.5	58.2%
Ivanof Bay	1989	490	29.7	38.1%
Perryville	1984	391	21.2	55.2%
Perryville	1989	394	21.7	51.3%

Sources: Scott et al. 1993; Fall et al. 1995; Morris 1987; Hutchinson-Scarbrough 1995a, 1995b

Table 5. Harvests and Uses of Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	94.7	78.9	78.9	68.4	68.4	3,115	16,526	590.2	136.7
Chignik Bay	1989	97.1	80.0	77.1	71.4	48.6	2,563	13,460	345.1	111.8
Chignik Bay	1991	100.0	80.0	80.0	70.0	66.7	4,403	21,825	496.0	171.0
Chignik Lagoon	1984	88.2	70.6	64.7	52.9	47.1	1,637	8,833	401.4	119.7
Chignik Lagoon	1989	100.0	60.0	60.0	80.0	53.3	833	4,110	274.0	100.2
Chignik Lake	1984	100.0	100.0	100.0	52.2	47.8	4,080	21,805	703.3	139.4
Chignik Lake	1989	95.2	85.7	85.7	66.7	61.9	3,892	17,101	610.7	152.6
Chignik Lake	1991	100.0	95.8	95.8	70.8	91.7	6,599	26,614	806.4	203.7
Ivanof Bay	1984	83.3	83.3	83.3	33.3	66.7	1,823	9,729	972.9	265.3
Ivanof Bay	1989	100.0	100.0	100.0	100.0	71.4	1,437	5,971	852.9	186.5
Perryville	1984	100.0	95.0	95.0	60.0	60.0	5,249	24,764	917.1	215.8
Perryville	1989	100.0	88.9	88.9	81.5	63.0	5,206	23,451	756.4	202.2

Source: Scott et al. 1995

Table 6. Harvests and Uses of Chinook Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	47.4	31.6	31.6	15.8	5.3	35	588	21.0	4.8
Chignik Bay	1989	42.9	37.1	31.4	20.0	8.6	57	886	22.7	7.3
Chignik Bay	1991	53.3	46.7	43.3	16.7	30.0	198	3,021	68.6	23.6
Chignik Lagoon	1984	29.4	17.6	17.6	23.5	5.9	21	344	15.6	4.6
Chignik Lagoon	1989	80.0	46.7	46.7	46.7	26.7	38	592	39.4	14.4
Chignik Lake	1984	47.8	43.5	34.8	13.0	21.7	26	426	13.7	2.7
Chignik Lake	1989	42.9	38.1	33.3	23.8	14.3	32	499	17.8	4.4
Chignik Lake	1991	58.3	41.7	41.7	20.8	33.3	122	1,867	56.5	14.2
Ivanof Bay	1984	33.3	33.3	33.3	0.0	33.3	7	111	11.0	3.0
Ivanof Bay	1989	57.1	42.9	42.9	28.6	28.6	5	78	11.1	2.4
Perryville	1984	15.0	15.0	15.0	0.0	10.0	24	404	14.9	3.5
Perryville	1989	7.4	7.4	7.4	0.0	0.0	8	125	4.0	1.0

Source: Scott et al. 1995

Figure 4. Harvests of Salmon in Pounds Usable Weight per Person, Chignik Area Communities, 1984, 1989, and 1991

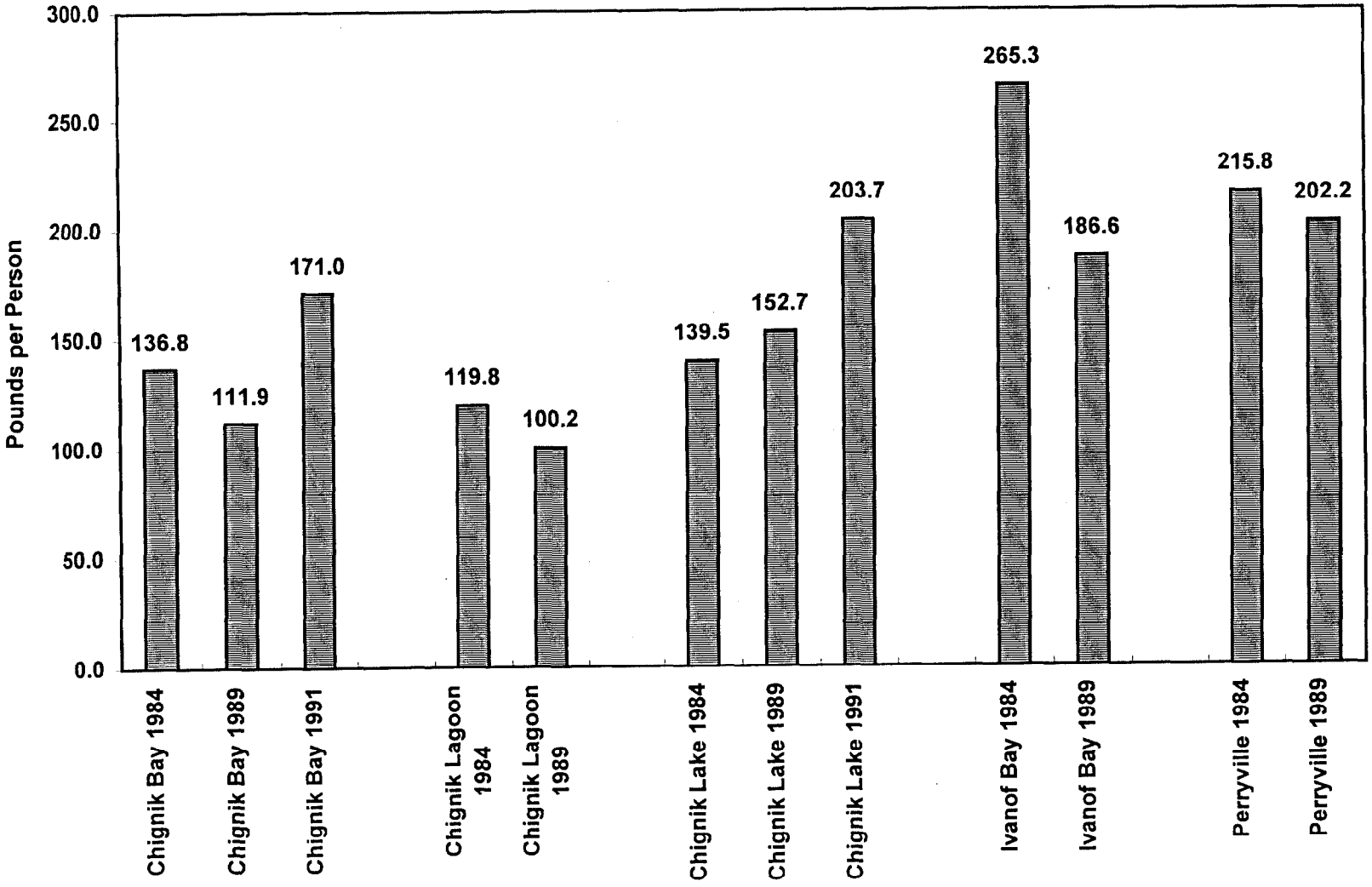
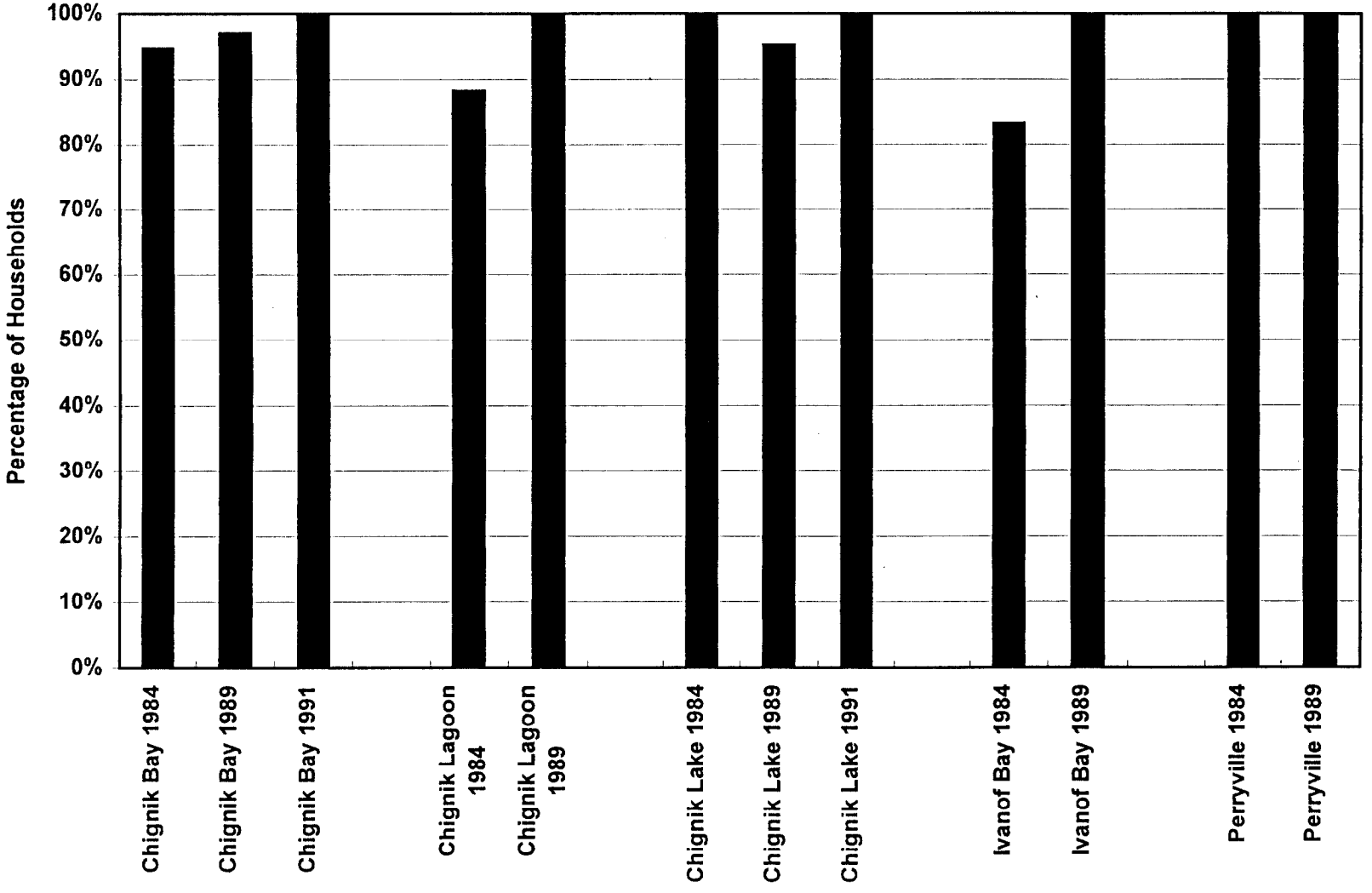


Figure 5. Percentage of Households Using Salmon, Chignik Area Communities, 1984, 1989, and 1991



salmon for subsistence (using any harvest method), received salmon as gifts from other households, and gave way portions of their catches to other households.

Harvest Levels in Numbers of Fish and Composition of Harvest by Species

Based upon the results of household surveys, of the five species of Alaska salmon, sockeyes made the largest contribution to the subsistence harvest, over 50 percent of the combined harvest of the five villages' subsistence harvests in 1984 and 1989 (Figures 6 and 7). Sockeyes were primarily taken by the communities of Chignik Bay, Chignik Lake, and Chignik Lagoon because of the ready availability of the species in the Chignik bay, lagoon, and river system, as well as residents' preference for sockeyes. On the other hand, residents of Perryville and Ivanof Bay harvested mostly cohos, pinks, and chums because sockeyes are rarely found in local rivers near these villages. Those sockeyes harvested by Perryville and Ivanof Bay were almost all caught by village residents who traveled to Chignik Bay and Chignik Lagoon in the summer to fish commercially and for subsistence.

Tables 6 to 12 report estimated harvests of each type of salmon in 1984 and 1989 by each Chignik Area community, and for Chignik Lake and Chignik Bay for 1991, based on household harvest surveys.[4] Harvests are reported in estimated total number of salmon, estimated total usable pounds, average pounds harvested per household, and average pounds harvested per person. Again, these estimates include harvests by all gear types for home use. Also reported is the percentage of sampled households using, fishing for, harvesting, receiving, and giving away each species. It is estimated that residents of the five Chignik Area communities harvested about 15,900 salmon for home use in 1984, with about 12,300 of these (77 percent) taken with subsistence methods, and the rest removed from commercial catches or caught with rod and reel (see above). Combining harvests by all gear types, 31.6 salmon per person were taken by Chignik Area communities in 1984. For 1989, the estimate for the total salmon harvest by the five communities for home use is about 13,900 fish, with about 10,900 of these caught with subsistence gear (78 percent). The catch by all methods per person was 32.9 salmon in 1989.

Subsistence Salmon Permit Data and Comparisons with Survey Data

As noted above, during the study period, subsistence salmon fishermen in the Chignik Management Area were required to obtain a permit from ADF&G and return it with a harvest report by October 31 of each year. These permit returns are the basis of the total subsistence harvest estimates

[4] Data were collected separately for "spawned/spawning sockeyes" and "spawned/spawning cohos," as opposed to "fresh" sockeyes and cohos. Because of the different timing, harvest methods, and preservation methods, Chignik Area residents distinguish between "fresh" and "red" or "spawned" salmon. Failure to inquire about each type could lead to an underestimate of harvests.

Figure 6. Composition of Salmon Harvest by Species, Chignik Area Communities, 1984

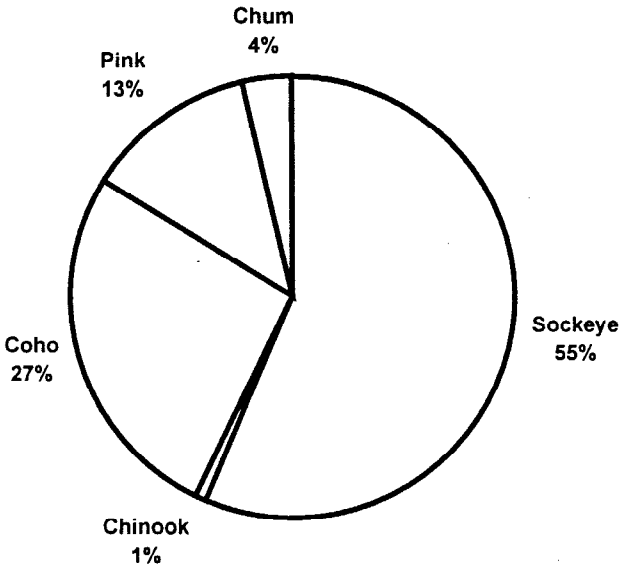


Figure 7. Composition of Salmon Harvest by Species, Chignik Area Communities, 1989

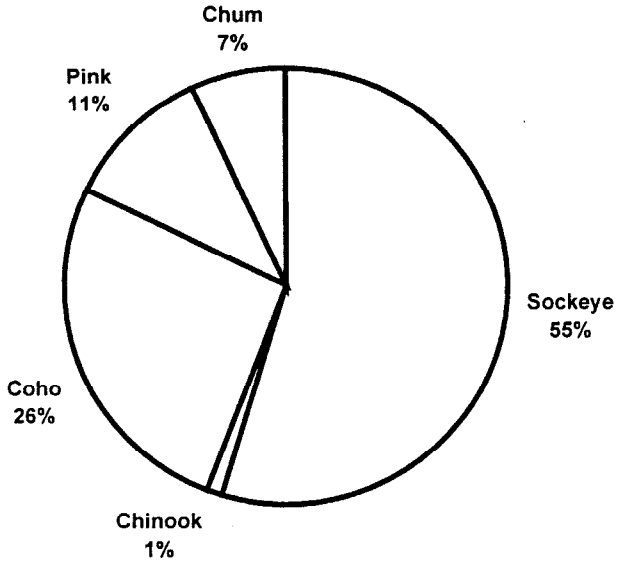


Table 7. Harvests and Uses of Sockeye Salmon, Chignik Area Communities[1]

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	94.7	73.7	73.7	63.2	63.2	2,633	13,641	487.1	112.8
Chignik Bay	1989	85.7	65.7	65.7	62.9	42.9	1,374	6,979	178.9	57.9
Chignik Bay	1991	86.7	63.3	60.0	53.3	46.7	2,398	12,110	275.2	94.9
Chignik Lagoon	1984	82.4	64.7	58.8	41.2	47.1	1,424	7,374	335.1	99.9
Chignik Lagoon	1989	93.3	33.3	33.3	73.3	26.7	463	2,352	156.8	57.3
Chignik Lake	1984	100.0	100.0	100.0	47.8	47.8	3,212	16,637	536.6	106.4
Chignik Lake	1989	95.2	81.0	76.2	42.9	52.4	2,488	12,639	451.3	112.8
Chignik Lake	1991	79.2	70.8	70.8	41.7	54.2	2,923	14,762	447.3	113.0
Ivanof Bay	1984	83.3	83.3	83.3	16.7	50.0	817	4,230	423.0	115.3
Ivanof Bay	1989	85.7	42.9	42.9	71.4	28.6	60	305	43.5	9.5
Perryville	1984	75.0	35.0	35.0	50.0	15.0	898	4,650	172.2	40.5
Perryville	1989	74.1	44.4	44.4	51.9	40.7	1,401	7,116	229.5	61.3

[1] Excludes spawning sockeye salmon ("red fish"); see Table 10.

Source: Scott et al. 1995

Table 8. Harvests and Uses of Coho Salmon, Chignik Area Communities[1]

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	63.2	47.4	47.4	31.6	31.6	343	1,985	70.8	16.4
Chignik Bay	1989	71.4	54.3	54.3	37.1	28.6	692	4,249	108.9	35.3
Chignik Bay	1991	63.3	50.0	50.0	33.3	40.0	804	4,308	97.9	33.7
Chignik Lagoon	1984	52.9	47.1	47.1	17.6	17.6	193	1,115	50.6	15.1
Chignik Lagoon	1989	60.0	40.0	40.0	33.3	33.3	101	620	41.3	15.1
Chignik Lake	1984	78.3	65.2	65.2	26.1	26.1	759	4,386	141.4	28.0
Chignik Lake	1989	61.9	66.7	61.9	19.0	38.1	189	1,163	41.5	10.3
Chignik Lake	1991	62.5	45.8	45.8	41.7	33.3	491	2,631	79.7	20.1
Ivanof Bay	1984	83.3	83.3	83.3	16.7	50.0	542	3,131	313.0	85.3
Ivanof Bay	1989	85.7	71.4	71.4	71.4	57.1	273	1,676	239.4	52.3
Perryville	1984	95.0	85.0	85.0	40.0	45.0	2,404	13,897	514.7	121.1
Perryville	1989	81.5	63.0	63.0	59.3	44.4	1,451	8,911	287.4	76.8

1 Excludes spawning coho salmon; see Table 11.

Source: Scott et al. 1995

Table 9. Harvests and Uses of Pink Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	42.1	26.3	26.3	26.3	15.8	93	251	8.9	2.0
Chignik Bay	1989	48.6	37.1	37.1	11.4	17.1	204	506	12.9	4.2
Chignik Bay	1991	23.3	23.3	23.3	0.0	6.7	67	142	3.2	1.1
Chignik Lagoon	1984	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Chignik Lagoon	1989	26.7	20.0	20.0	6.7	0.0	6	15	0.9	0.3
Chignik Lake	1984	30.4	26.1	26.1	13.0	13.0	43	117	3.7	0.7
Chignik Lake	1989	28.6	23.8	23.8	4.8	4.8	47	116	4.1	1.0
Chignik Lake	1991	37.5	25.0	25.0	25.0	25.0	287	603	18.2	4.6
Ivanof Bay	1984	50.0	50.0	50.0	16.7	50.0	142	383	38.2	10.4
Ivanof Bay	1989	85.7	71.4	71.4	71.4	42.9	205	508	72.6	15.8
Perryville	1984	80.0	65.0	65.0	35.0	45.0	1,729	4,669	172.9	40.6
Perryville	1989	77.8	66.7	66.7	37.0	37.0	1,056	2,620	84.5	22.5

Source: Scott et al. 1995

Table 10. Harvests and Uses of Chum Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1984	26.3	10.5	10.5	21.1	5.3	10	61	2.1	0.5
Chignik Bay	1989	28.6	22.9	22.9	5.7	5.7	91	495	12.6	4.1
Chignik Bay	1991	23.3	6.7	6.7	16.7	6.7	18	84	1.9	0.6
Chignik Lagoon	1984	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Chignik Lagoon	1989	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Chignik Lake	1984	17.4	17.4	17.4	8.7	4.3	40	239	7.7	1.5
Chignik Lake	1989	9.5	4.8	4.8	4.8	0.0	1	7	0.2	0.0
Chignik Lake	1991	12.5	4.2	4.2	12.5	4.2	45	216	6.5	1.6
Ivanof Bay	1984	50.0	50.0	50.0	33.3	50.0	317	1,875	187.4	51.1
Ivanof Bay	1989	71.4	71.4	71.4	57.1	42.9	396	2,146	306.6	67.0
Perryville	1984	60.0	50.0	50.0	15.0	25.0	193	1,143	42.3	9.9
Perryville	1989	51.9	44.4	44.4	29.6	22.2	454	2,458	79.2	21.2

Source: Scott et al. 1995

Table 11. Harvests and Uses of Spawning Sockeye Salmon ("Red Fish"), Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1989	25.7	11.4	11.4	14.3	2.9	139	329	8.4	2.7
Chignik Bay	1991	40.0	26.7	26.7	23.3	16.7	896	2,106	47.8	16.5
Chignik Lagoon	1989	66.7	33.3	33.3	33.3	26.7	225	531	35.4	12.9
Chignik Lake	1989	66.7	66.7	66.7	38.1	42.9	1,135	2,678	95.6	23.9
Chignik Lake	1991	87.5	79.2	79.2	50.0	79.2	2,610	6,135	185.8	46.9
Ivanof Bay	1989	28.6	0.0	0.0	28.6	0.0	0	0	0.0	0.0
Perryville	1989	48.1	25.9	25.9	37.0	18.5	276	650	20.9	5.6

Source: Scott et al. 1995

Table 12. Harvests and Uses of Spawning Coho Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Number Harvested	Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away			per Household	per Capita
Chignik Bay	1989	11.4	2.9	2.9	8.6	0.0	6	16	0.4	0.1
Chignik Bay	1991	6.7	6.7	3.3	3.3	3.3	22	55	1.2	0.4
Chignik Lagoon	1989	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Chignik Lake	1989	0.0	0.0	0.0	0.0	0.0	0	0	0.0	0.0
Chignik Lake	1991	16.7	12.5	12.5	8.3	12.5	78	195	5.9	1.4
Ivanof Bay	1989	85.7	71.4	71.4	71.4	57.1	375	1,072	153.2	33.5
Perryville	1989	48.1	40.7	37.0	25.9	22.2	537	1,537	49.5	13.2

Source: Scott et al. 1995

that are summarized each year in the AMR prepared by the CFMD Division (e.g. Quimby and Owen 1994).

Table 13 reports estimated subsistence harvests of salmon in the Chignik Management Area for 1976 - 1994 based upon returned permits. The estimated totals include harvests by local community residents as well as residents of other Alaska communities. In 1993, the Division of Subsistence obtained copies of all available subsistence permits for the Chignik Management Area from the CFMD Division's archive in Kodiak. All permit data were entered into a computer database. Except for years prior to 1980 and for 1987 (permits for which could not be located in the archive), the data in Table 13 are based upon this subsistence permit database.

The estimated subsistence harvests reported in Table 13 differ slightly in most years from those reported in AMRs (e.g. Quimby and Owen 1994:90) for several reasons. First, there are small discrepancies in some years concerning the number of permits issued or returned.[5] Second, estimated harvests reported in the AMRs for years prior to 1993 are based on a simple expansion from harvests reported on returned permits to the total number of permits issued. Harvest estimates in Table 13 (and in AMRs beginning for 1993) are based on the sum of expanded community harvest estimates, similar to the method used in the Bristol Bay and Alaska Peninsula Management areas. Appendix Tables 1 through 14 report estimated subsistence harvests based upon permit returns using this community expansion method. (Because the permits for 1987 and years prior to 1980 are missing, no revised estimates can be made for those years.) Appendix Tables 15 through 19 report harvest estimates from 1980 through 1994 (except 1987) for each local community. Appendix Table 20 reports the average salmon harvest per permit fished for each local community and for all local communities combined.

The 19-year average total subsistence harvest of salmon in the Chignik Area for the period 1976 through 1994 was 10,336 fish (Table 13). The composition of this 19-year average harvest was 82.7 percent sockeye salmon, 8.9 percent coho, 5.7 percent pink, 2.3 percent chum, and 0.4 percent chinook salmon (Table 14). This differs from the composition of the 1984 and 1989 harvests as reported during household surveys (Fig. 2, Fig. 3), for reasons that are discussed below.

For 1993 and 1994, the Division of Subsistence assisted in issuing permits and helped supply local vendors with permits to issue. Also, the Subsistence Division employed local research assistants to collect permits at the end of the year and interview households which did not obtain or had lost their permit or who had fished for "red fish" after returning their permit by the October 31 due date.[6] There was a large increase in the number of permits issued. Also, estimated harvests increased substantially in 1993 and 1994, to 20,503 salmon and 20,300 salmon, respectively, compared to recent previous years and the long-term average. As is discussed below, this was largely a result of increased participation by local

[5] Data on the number of permits issued and returned are not reported in all of the annual management reports.

[6] As discussed below, residents of Chignik Lake and to a lesser extent the other communities fish for spawned sockeye or other salmon, locally called "red fish" well into December or even later. Because subsistence permits are due by October 31, permit reports rarely included any of these "red fish" harvests.

Table 13. Estimated Subsistence Harvests of Salmon, Chignik Management Area, 1976 - 1994[1]

Year	Number of Permits Issued	Number of Permits Returned	Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests Chinook	Sockeye	Silver	Pink	Chum	Total
1976						100	6,000	1,500	500	150	8,250
1977						50	9,700	2,400	1,800	600	14,550
1978						50	6,000	500	2,100	600	9,250
1979						14	7,750	34	262	0	8,060
1980	82	37	45.1%	70	85.4%	6	12,475	32	478	169	13,160
1981	29	7	24.1%	18	62.1%	0	2,049	0	0	0	2,049
1982	59	15	25.4%	56	94.9%	3	8,532	12	2	0	8,548
1983	32	21	65.6%	27	82.8%	0	3,078	1,319	1,250	850	6,497
1984	77	64	83.1%	58	74.9%	23	8,747	464	330	204	9,768
1985	59	48	81.4%	49	83.1%	1	7,177	50	26	25	7,279
1986	74	38	51.4%	70	94.6%	4	10,347	205	98	77	10,730
1987	NA	NA	NA	NA	NA	10	7,021	278	204	261	7,774
1988	80	34	42.5%	77	96.3%	9	9,073	1,455	54	142	10,733
1989	68	23	33.8%	47	68.8%	24	7,552	384	81	147	8,187
1990	72	23	31.9%	62	86.1%	103	8,099	210	470	115	8,996
1991	95	58	61.1%	83	87.4%	42	11,483	13	275	81	11,893
1992	98	19	19.4%	86	87.5%	55	8,648	709	305	145	9,862
1993	201	141	70.1%	163	81.0%	122	14,710	3,765	1,265	642	20,503
1994	219	122	55.7%	160	73.0%	165	13,978	4,055	1,720	382	20,300
Aver.	89	46	52.2%	73	82.4%	41	8,548	915	590	242	10,336
Aver. w/o 93&94	69	32	46.9%	59	85.2%	29	7,866	563	484	210	9,152

[1] In 1993, the Division of Subsistence, ADF&G, obtained copies of all available subsistence permits for the Chignik Management Area from the Division of Commercial Fisheries archive in Kodiak. Permits issued prior to 1980 and for 1987 could not be located. All permit data were entered into a data base. The estimated harvests reported in this table differ slightly from that reported in earlier annual management reports for several reasons. There are small discrepancies in some years for the number of permits issued or returned. Estimated harvests in earlier annual management reports were based on a simple expansion from harvests reported on returned permits to the total number of permits issued. Harvest estimates in this table are based on the sum of expanded community harvest estimates, similar to the method used in the Bristol Bay and Alaska Peninsula Management Areas.

Since 1993, the Division of Subsistence has been responsible for permit data entry and harvest estimates for the Chignik Management Area. Increases in permits issued beginning in 1993, and consequently higher harvest estimates, reflect the use of local vendors to issue permits and post-season surveys by department staff and local research assistants.

Sources: Quimby and Owen 1994:90, for 1976 - 1979 and 1987; Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database, Anchorage, for the remaining years.

Table 14. Composition of Subsistence Salmon Harvests by Specicies in the Chignik Management Area as Estimated by Permit Returns and Household Surveys

	Percentage of Total Harvest				
	Chinook	Sockeye	Coho	Pink	Chum
Permit Data					
All Years (1976 - 1994)	0.4%	82.7%	8.9%	5.7%	2.3%
All Years Except 1993 & 1994	0.3%	85.9%	6.2%	5.3%	2.3%
1993 & 1994 Only (Combined)	0.7%	70.3%	19.2%	7.3%	2.5%
Household Survey Data					
Subsistence Methods Only					
1984	0.1%	52.7%	27.6%	15.4%	4.1%
1989	0.0%	56.1%	25.9%	10.2%	7.7%
1984 & 1989 Combined	0.1%	54.3%	26.8%	13.0%	5.8%
All Harvest Methods					
1984	0.7%	56.5%	26.7%	12.6%	3.5%
1989	1.0%	54.8%	26.3%	11.0%	6.8%
1984 & 1989 Combined	0.9%	55.7%	26.5%	11.9%	5.1%

subsistence fishermen in the permitting system. The harvest composition for these two years also changed in comparison with the long-term average, with a lower percentage of sockeyes (70.3 percent) and a higher percentage of cohos (19.2 percent) (Table 14) (see below for additional discussion).

As shown in Table 15, permittees with "local addresses" (Chignik, Chignik Lagoon, Chignik Lake, Perryville, or Ivanof Bay) have accounted for 84.7 percent of the total estimated subsistence harvest of salmon in the Chignik Area for the period 1980 through 1994. They held 78.5 percent of the permits. In the three most recent years (1992, 1993, and 1994), local permittees caught well over 90 percent of the salmon and held about 90 percent of the permits. These permit data overestimate the proportion of the Chignik Area subsistence salmon catch taken by residents of local communities because seasonal residents of Chignik Bay and Chignik Lagoon use local mailing addressees when obtaining permits. Many of these people are originally from the area and are linked by kinship to permanent, year-round residents, with whom they share equipment and subsistence harvests (see Case A, below; cf. Morris 1987:204-212). (See discussion of Tables 19 and 20, below.)

It is likely that for most years prior to 1993, harvest estimates based upon returned permits underestimated the total number of salmon taken with subsistence methods in the Chignik Management Area. This was due to lack of participation in the permit system by some area households, especially in the more remote communities of Chignik Lake, Perryville, and Ivanof Bay, and a consequent underestimate of the number of subsistence fishers. This can be shown by comparing permit and survey data for 1984 and 1989 (Table 16; Fig. 8). Based on permit data, an estimated 36 subsistence fishers lived in local communities in 1984. However, household surveys resulted in an estimate of 75 households which caught salmon with subsistence gear in the same year. The two methods estimated a similar average harvest per permit (189.1 salmon) or household (164.3 salmon). However, because of the higher estimated level of participation, the survey method resulted in an estimate of 12,269 salmon harvested, compared to just 6,751 salmon using the permit data. Comparisons of data for 1989 also result in a difference in harvest estimates. Permit records yield an estimate of 41 local subsistence salmon fishermen, with an estimated harvest of 6,999 fish. In contrast, household surveys identified 66 subsistence fishing households, with an estimated harvest of 10,868 salmon. Again, average catches per fishing permit or household were similar, 170.7 salmon per permit and 164.1 salmon per household.

As noted above, the number of permits issued in the Chignik Area subsistence salmon fishery increased notably in 1993, with 176 issued to people with local addresses. The number of permits issued to people with local mailing addresses increased again in 1994 to 199. For the two years combined, an average of 146 permittees with local mailing addresses fished. This compares to an average of 46 permittees with local mailing addresses who fished from 1980 through 1992 (Table 17). Household surveys estimated 75 subsistence fishing household in the five communities in 1984, and 66 in 1989. The 176 permits issued in 1993 represent 141 households, approximately 101 of which were year-round residents of a Chignik Area village who subsistence fished in 1993 (Table 18). For 1994, the 199 permits

Table 15. Participation in Chignik Area Subsistence Salmon Fishery and Estimated Total Salmon Harvest by Place of Residence, 1980 - 1994[1]

	Local Community Residents				Other Permit Holders			
	Subsistence Permits		Harvest of Salmon		Subsistence Permits		Harvest of Salmon	
Year	Number Issued	Percentage of Total	Estimated Harvest	Percentage of Total	Number Issued	Percentage of Total	Estimated Harvest	Percentage of Total
1980	51	62.2%	9,013	68.5%	31	37.8%	4,148	31.5%
1981	24	82.8%	2,049	100.0%	5	17.2%	0	0.0%
1982	52	88.1%	8,059	94.3%	7	11.9%	489	5.7%
1983	21	65.6%	5,585	86.0%	11	34.4%	912	14.0%
1984	46	59.7%	6,751	69.1%	31	40.3%	3,018	30.9%
1985	43	72.9%	6,072	83.4%	16	27.1%	1,207	16.6%
1986	53	71.6%	8,977	83.7%	21	28.4%	1,753	16.3%
1987	Data unavailable							
1988	61	76.3%	8,768	81.7%	19	23.8%	1,965	18.3%
1989	41	61.2%	6,999	85.5%	26	38.8%	1,188	14.5%
1990	50	69.4%	7,258	80.7%	22	30.6%	1,738	19.3%
1991	69	72.6%	8,815	74.1%	26	27.4%	3,078	25.9%
1992	91	92.9%	9,612	97.5%	7	7.1%	250	2.5%
1993	176	87.6%	19,070	93.0%	25	12.4%	1,433	7.0%
1994	199	90.9%	18,760	92.4%	20	9.1%	1,540	7.6%
Average	70	78.5%	8,985	84.7%	19	21.5%	1,623	15.3%
Average 1980 - 1992	50	73.1%	7,330	81.7%	19	26.9%	1,646	18.3%

[1] Based upon address on permit. Some seasonal residents of local communities give local community addresses on their permit.

Source: Division of Subsistence, ADF&G, Chignik Area Subsistence Salmon Permit Database

Table 16. Comparison of Subsistence Salmon Harvest Estimates and Participation Estimates as Derived from Permit Returns and Household Surveys, Chignik Area Communities, 1984, 1989, and 1991

	Subsistence Permits[1]			Household Surveys		
	Estimated Subsistence Salmon Harvest	Estimated Number of Permits Fished	Catch per Fished Permit	Estimated Subsistence Salmon Harvest	Estimated Number of Households Harvesting Salmon with Subsistence Methods	Catch per Fishing Household
Study Year 1984						
Chignik Bay	2,318	15	156.9	2,131	13	160.6
Chignik Lagoon	1,188	6	184.8	696	6	252.8
Chignik Lake	1,365	8	182.0	3,461	27	128.3
Ivanof Bay	800	4	200.0	1,275	5	255.0
Perryville	1,080	3	360.0	4,706	23	205.1
All Local Area Communities	6,751	36	189.1	12,269	75	164.3
Study Year 1989						
Chignik Bay	4,766	24	198.6	1,635	17	97.7
Chignik Lagoon	580	4	145.0	529	5	105.9
Chignik Lake	180	3	60.0	3,255	20	162.8
Ivanof Bay	473	2	236.5	1,056	5	211.3
Perryville	1,000	8	125.0	4,393	20	224.9
All Local Area Communities	6,999	41	170.7	10,868	66	164.1
Study Year 1991						
Chignik Bay	3,856	29	131.7	3,406	19	178.8
Chignik Lake	1,350	9	154.3	5,055	23	216.4

[1] Permit data include some seasonal residents of local communities who use their seasonal addresses on their permits. For example, although precise information is not available, as few as eight of the 24 people with Chignik Bay mailing addresses who obtained permits for 1989 were living in the community the following January.

Sources: Division of Subsistence, ADF&G, Chignik Area Subsistence Salmon Permit Database; Scott et al. 1995

Figure 8. Estimates of Subsistence Salmon Harvests by Local Community Residents, Chignik Management Area

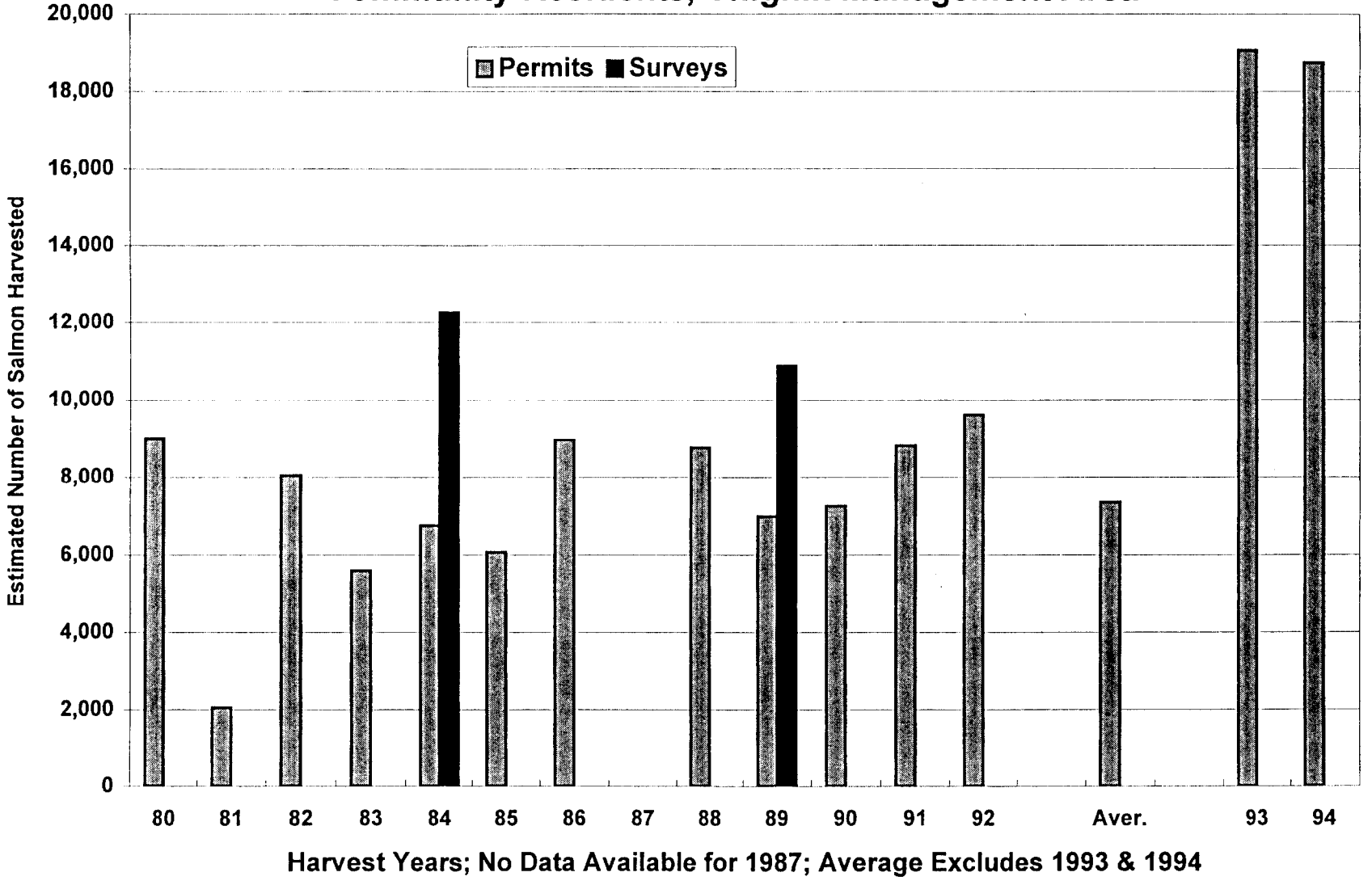


Table 17. Estimated Levels of Participation in the Chignik Area Subsistence Salmon Fishery by Local Community of Residence[1]

	Estimated Number of Permits Fished						Estimated Number of Subsistence Fishing Households, Based on Household Surveys			
	Average, 1980 - 1994		Average, 1980 - 1992		Average, 1993 & 1994		1984		1989	
Chignik Bay	20	32.4%	18	38.4%	31	21.0%	13	17.8%	17	25.3%
Chignik Lagoon	15	24.6%	12	26.0%	32	22.0%	6	8.7%	5	7.5%
Chignik Lake	11	18.6%	7	15.0%	37	25.4%	27	36.1%	20	30.2%
Ivanof Bay	4	6.3%	2	4.9%	13	8.9%	5	6.7%	5	7.5%
Perryville	11	18.1%	7	15.8%	33	22.7%	23	30.7%	20	29.5%
Totals	60		46		146		75		66	

[1] Permit data include some seasonal residents of local communities who give their seasonal addresses on their permits. Because of missing data, 1987 has been omitted from this analysis.

Table 18. Estimated Year-Round Household Participation in Chignik Area Subsistence Salmon Fishery, 1993 and 1994

Community	Number of Permits Issued[1]	Approximate Number of Households with Permits	Approximate Number of Year-Round Households with Permits	Estimated Number of Year-Round Households Who Fished
1993				
Chignik Bay	44	36	24	17
Chignik Lagoon	36	31	18	17
Chignik Lake	41	30	29	28
Ivanof Bay	13	9	8	8
Perryville	42	35	35	31
Area Total	176	141	114	101
1994				
Chignik Bay	49	43	24	18
Chignik Lagoon	52	34	23	20
Chignik Lake	42	33	31	31
Ivanof Bay	13	9	6	6
Perryville	43	32	31	27
Area Total	199	151	115	102

[1] Permits are issued to individuals.

represent 102 year-round local resident households who subsistence fished. Thus, the permit data for 1993 and 1994 provide a slightly higher estimate of subsistence fishing households in the Chignik area villages than do the survey data for 1984 or 1989. Probably accounting for this larger estimate for the later years is a real increase in the number of year-round households in the local communities by 1993, especially in Chignik Lagoon and Chignik Bay. In the latter community, this increase was related to more year-round jobs in fish processing (which had declined again by 1995). In Chignik Lagoon, former residents who had lived there seasonally decided to remain year-round again because they needed less cash in live in the village (Hutchinson-Scarbrough 1995a, 1995b).

With this increased participation in the permit system in 1993 and 1994, estimated harvests based upon returned permits have become a more accurate measure of the local subsistence take of salmon compared with the permit data prior to 1993. Consistent with the large increase in permits issued, the harvest estimate for subsistence fishermen with local community addresses increased to 19,070 salmon in 1993 and 18,760 for 1994, compared to an average of 7,330 for the period 1980 through 1992 (Table 15). These estimates for 1993 and 1994, as for previous estimates based upon permits, include harvests by non-year-round residents of the five local communities who gave local mailing addresses on their permits. This accounts in part for the higher harvest estimates in 1993 and 1994 than the harvests estimated for 1984 or 1989 derived from household surveys; the harvest surveys only included year-round residents. However, as noted above, there has also been an increase in the number of year-round households participating in the subsistence fishery, which is due, at least in part, to an increase in the number of year-round households in the five communities.

Table 19 and Table 20 show estimated subsistence salmon harvests in 1993 and 1994 by those permittees with local addresses who either spent the entire year in a local community and by those who are only seasonal residents.[7] This provides the harvest estimate for these years best suited to compare with those of 1984 and 1989 which used the household survey methodology. In 1993 and 1994, year-round residents accounted for 88.3 percent and 87.2 percent, respectively, of the harvest by those permittees with "local" addresses. These estimates of 16,847 salmon harvested in 1993 and 16,359 in 1994 are higher than those of 1984 (12,269) and 1989 (10,868). Again, the difference is largely a result of more year-round households participating in the fishery in 1993 (101) and 1994 (102) compared to 1984 (75) and 1989 (66) (Table 16, Table 18). The average subsistence salmon harvest for year-round households who subsistence fished has been remarkably constant: 164.3 salmon per household in 1984, 164.1 in 1989, 166.8 in 1993, and 160.4 in 1994 (Fig. 9)

The underestimate of subsistence harvests prior to 1993 especially affected coho, pink, and chum salmon because the majority of these species are harvested by residents of Perryville and Ivanof Bay.

[7] Because of the recency of these years and because the Division of Subsistence has compiled lists of year-round households for another project, we were able to make reliable classifications of permit holders by "year-round" and "seasonal." It is not possible to so classify permittees for earlier years, thus this comparison is limited in scope. Regarding 1989, of the 24 permits issued to people with Chignik Bay mailing addresses, as few as 8 (33.3 percent) were living in the community the following January.

Table 19. Estimated Subsistence Salmon Harvests by Year-Round Resident Households of Chignik Area Communities, 1993

Community	Percentage of Reported Harvest by		Total Estimated Harvest	Estimated Harvest by	
	Year-Round Households	Other Households		Year-Round Households	Other Households
Chignik Bay	58.0%	42.0%	2,595	1,506	1,089
Chignik Lagoon	72.5%	27.5%	4,125	2,991	1,134
Chignik Lake	100.0%	0.0%	6,259	6,259	0
Ivanof Bay	100.0%	0.0%	1,691	1,691	0
Perryville	100.0%	0.0%	4,400	4,400	0
Total	88.3%	11.7%	19,070	16,847	2,223

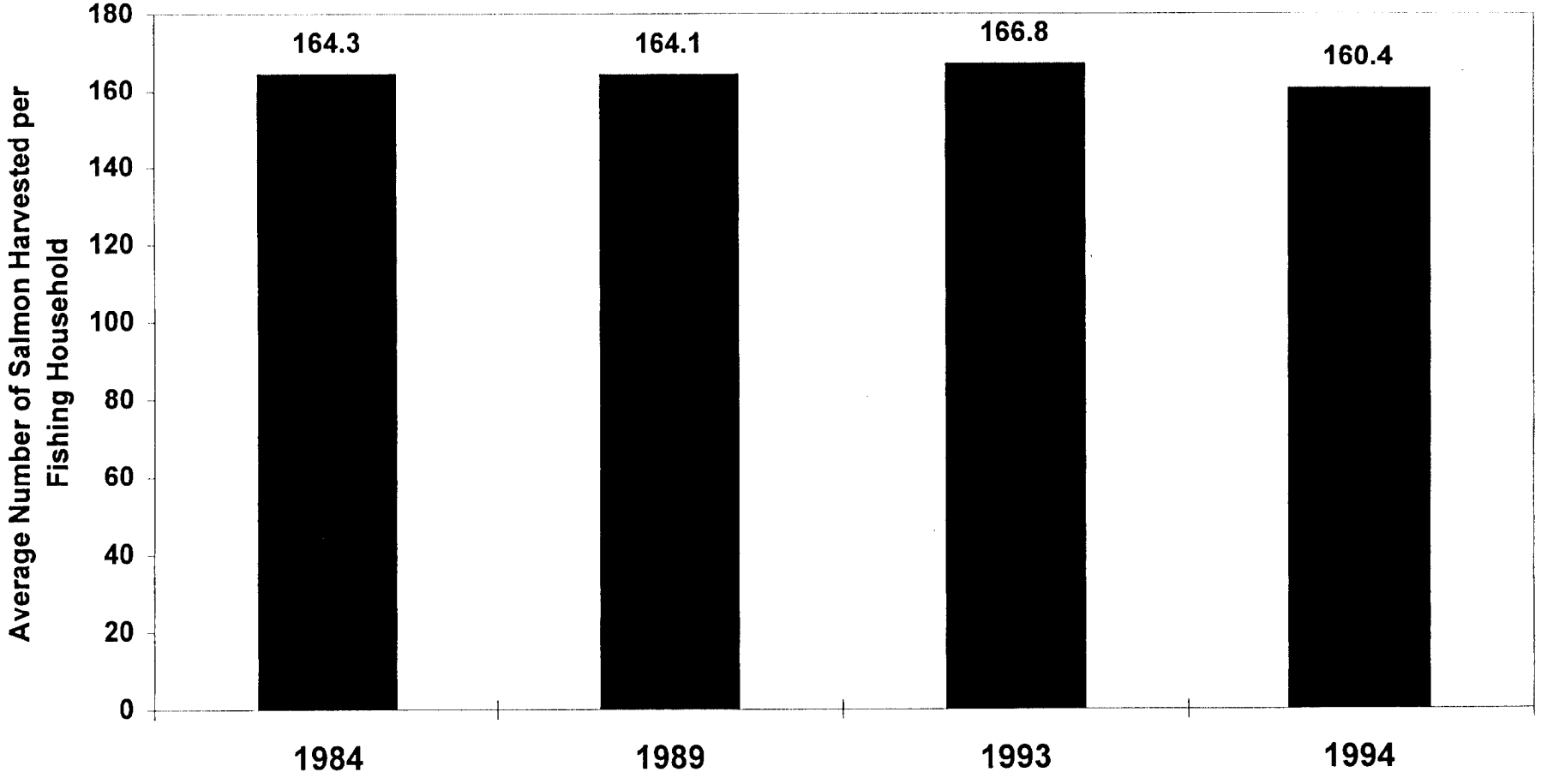
Source: Chignik Area Subsistence Permit Database

Table 20. Estimated Subsistence Salmon Harvests by Year-Round Resident Households of Chignik Area Communities, 1994

Community	Percentage of Reported Harvest by		Total Estimated Harvest	Estimated Harvest by	
	Year-Round Households	Other Households		Year-Round Households	Other Households
Chignik Bay	49.1%	50.9%	2,446	1,201	1,245
Chignik Lagoon	83.0%	17.0%	2,534	2,104	430
Chignik Lake	98.6%	1.4%	5,479	5,403	76
Ivanof Bay	70.9%	29.1%	2,234	1,584	650
Perryville	100.0%	0.0%	6,068	6,068	0
Total	87.2%	12.8%	18,761	16,359	2,402

Source: Chignik Area Subsistence Permit Database

Figure 9. Average Subsistence Harvest of Salmon by Subsistence-Fishing Households, Year-Round Resident Households of Chignik Area Communities



Data for 1984 and 1989 based on household surveys; data for 1993 and 1994 based upon permit returns.

Before 1993, residents of these villages were underrepresented in the permit data base. As shown in Table 14, cohos made up about 19.2 percent of the catch in 1993 and 1994, compared to just 6.2 percent from 1980 through 1992. Harvest data for 1984 and 1989 from household surveys suggested a higher proportion of cohos than shown by permit returns, even higher than that in the 1993 and 1994 permit harvests. Inclusion of seasonal residents of Chignik Lagoon and Chignik Bay, most of whom catch predominantly sockeyes, accounts for part of the difference between the permit data for 1993 and 1994 and the survey data for 1984 and 1989. Also, the portion of year-round households who fished in 1993 and 1994 who lived Chignik Lagoon was higher than in either 1984 or 1989, again accounting for the slightly different species composition of the harvest.

Subsistence harvests of sockeyes were likely also underestimated prior to 1993 by the permit system because harvests of spawned sockeyes occurred after the October 31 deadline for return of subsistence permits. For 1993 and 1994, post-season surveys conducted in January of the following year collected data on harvests of "red fish" which took place after October 31. Most of these harvests are by residents of Chignik Lake, but residents of the other local communities also participate in harvesting "red fish."

Figure 10 presents information on the number of salmon taken per permit for 1980 through 1994. Most permittees (66.5 percent) harvested over 100 salmon per year.[8] The largest percentage of permittees (37.3 percent) harvested between 151 and 200 fish.[9] (Appendix Table 21 reports the percentage of permittees harvesting salmon by 50 fish increments for 1980 through 1994.) The average reported catch for permittees who fished for the period 1980 through 1994 was 141.6 salmon. (See Appendix Table 20 for average catches per year by each local community and by all local permittees.) This average also corresponds well with household survey data for 1984 (164.3 salmon harvested per subsistence fishing household) and 1989 (164.1 salmon per household), especially considering that some households held more than one permit.

CONTEMPORARY HARVEST AREAS

In 1984 and 1985, Division of Subsistence researchers mapped community subsistence salmon fishing areas with representatives of the Chignik Bay, Chignik Lagoon, Chignik Bay, Perryville, and Ivanof Bay communities (ADF&G 1985; Morris 1987; Fall et al. 1995). These areas, depicted in Figures 11 through 15, had been used regularly during the 20-year period from the mid 1960s into the 1980s. Generally, the same areas were used into the 1990s. These include waters of Anchorage Bay, Chignik

[8] A proposal before the Board of Fisheries in 1993 would have restricted subsistence permittees in the Chignik Area to 100 salmon per year. The Board did not pass this proposal.

[9] Regulations limit annual subsistence harvests to 250 salmon in the Chignik Area, but ADF&G personnel have regularly placed a limit of 200 fish on the permits. This accounts for the large percentage of permittees who report a harvest of 200. This also explains why some households obtain two permits.

Figure 10. Reported Subsistence Salmon Harvests per Permit, Chignik Management Area, 1980 - 1994

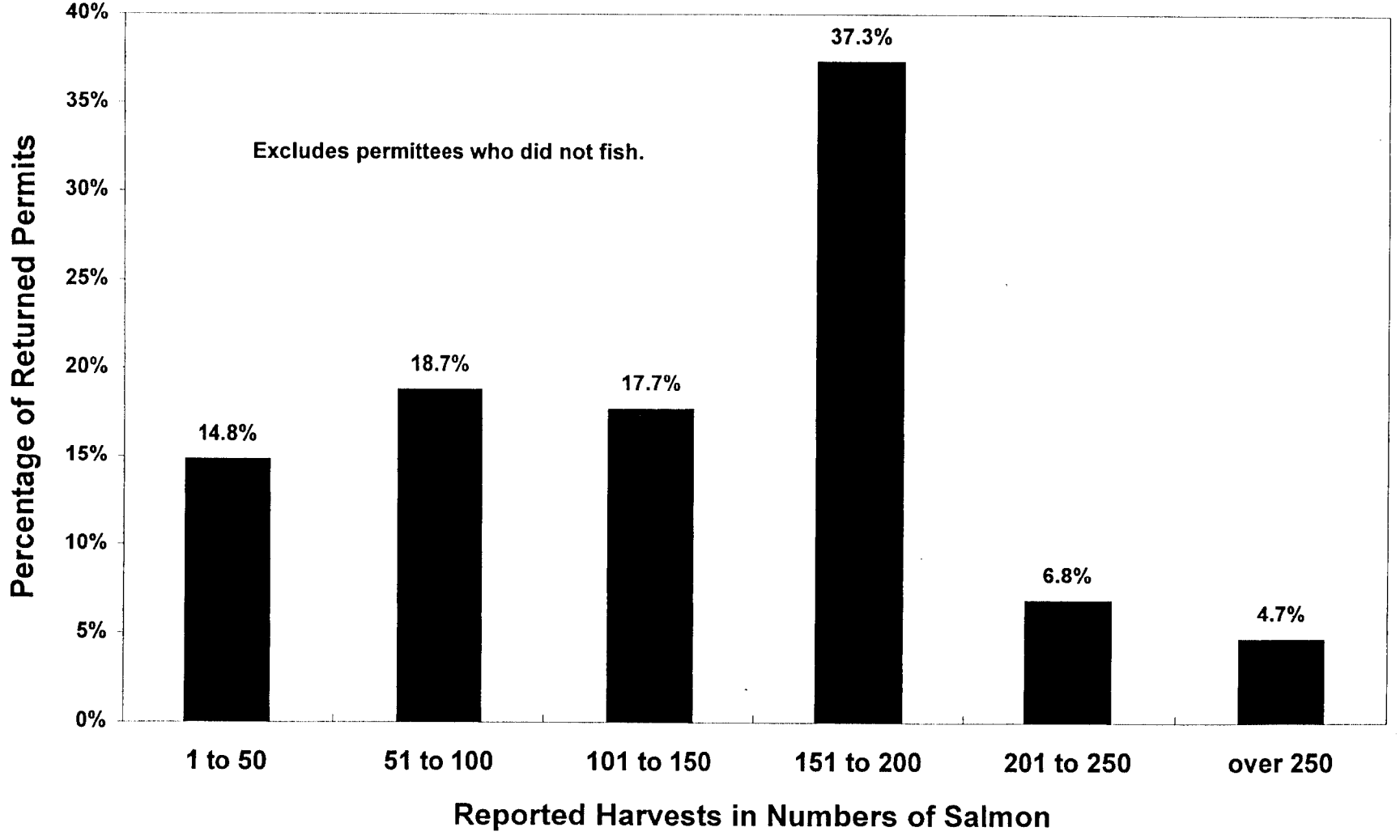
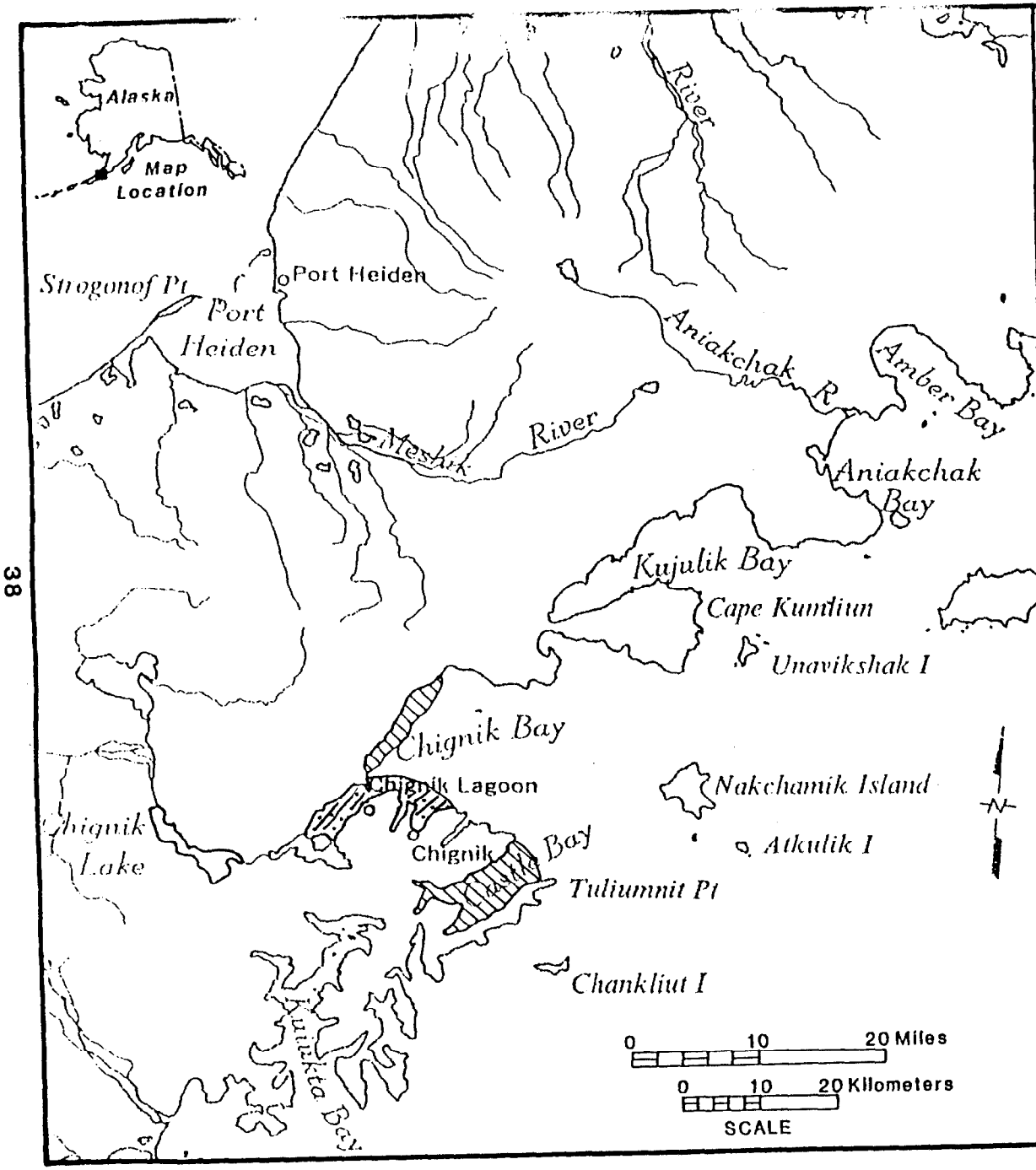


Figure 11



CHIGNIK
Subsistence Use Areas

MARINE MAMMALS

SALMON

SOURCES

Judith Morris, field research 1982 and 1983. See Division of Subsistence Technical Paper #114. "Bristol Bay Regional Subsistence Profile" (1985) for description of methodology and further information.

ADF&G 1986, Alaska Habitat Management Guides Reference Atlas, Southwest Region, Volume 4.

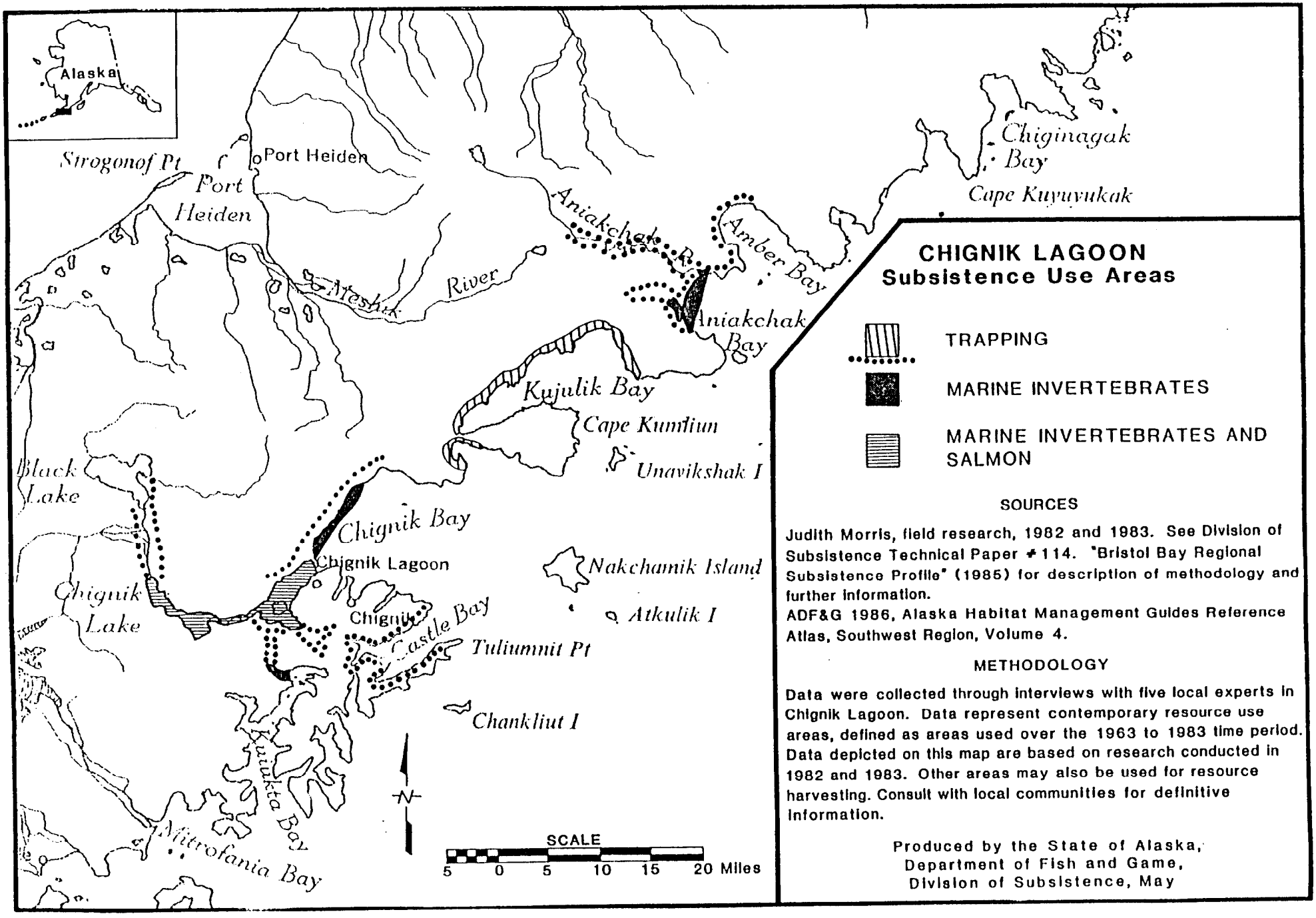
METHODOLOGY

Data were collected through interviews with four local resource experts in Chignik. Draft maps were reviewed and corrected at a public meeting prior to final drafting. Data represent contemporary resource use areas, defined as areas used over the 1963 to 1983 time period.

Data depicted on this map are based on research conducted in 1982 and 1983. Other areas may also be used for resource harvesting. Consult with local communities for definitive information.

Produced by the State of Alaska Dept. of Fish and Game, Division of Subsistence, May 1989

Figure 12



CHIGNIK LAGOON
Subsistence Use Areas

TRAPPING

MARINE INVERTEBRATES

MARINE INVERTEBRATES AND SALMON

SOURCES

Judith Morris, field research, 1982 and 1983. See Division of Subsistence Technical Paper # 114. "Bristol Bay Regional Subsistence Profile" (1985) for description of methodology and further information.

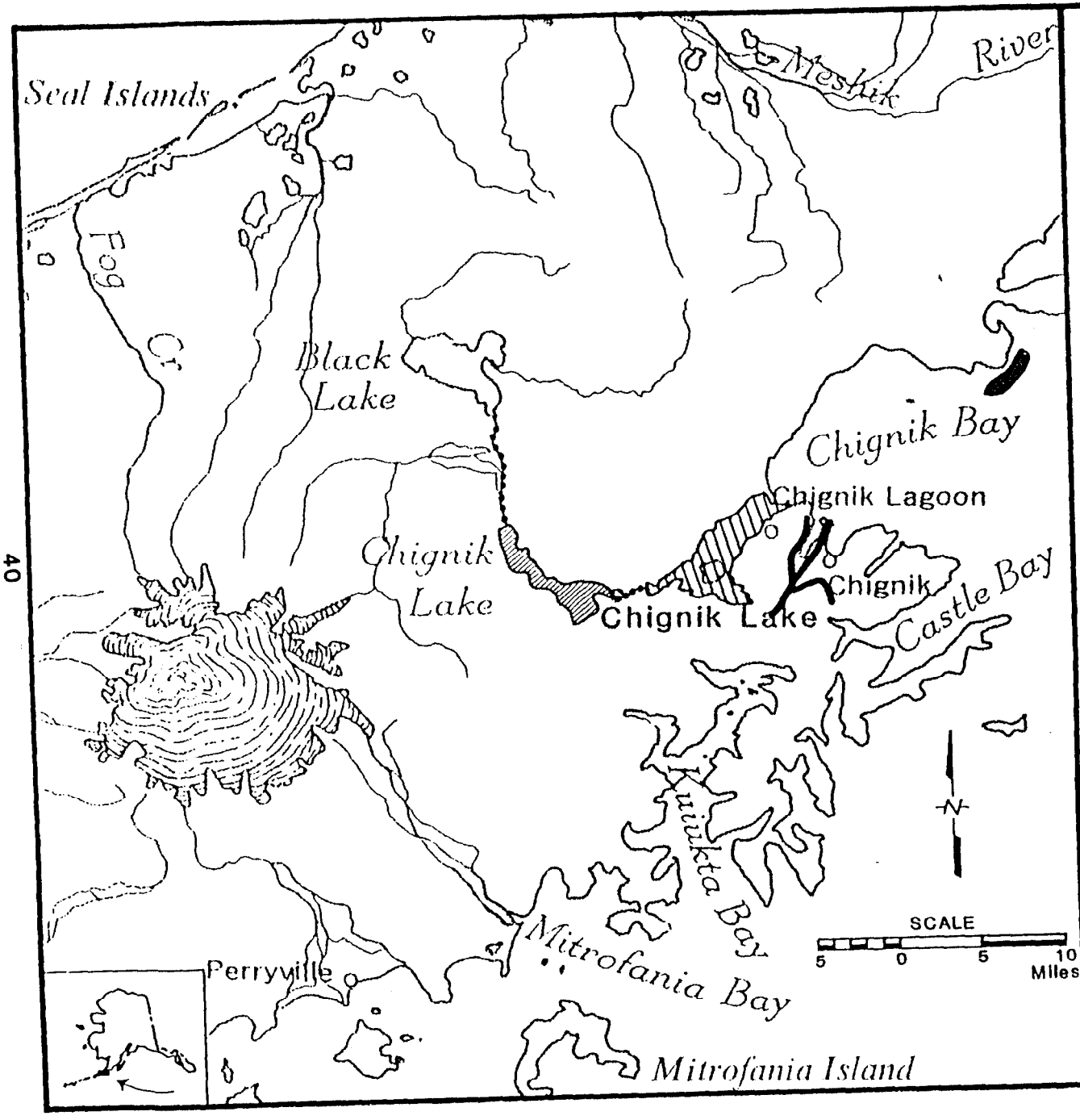
ADF&G 1986, Alaska Habitat Management Guides Reference Atlas, Southwest Region, Volume 4.

METHODOLOGY

Data were collected through interviews with five local experts in Chignik Lagoon. Data represent contemporary resource use areas, defined as areas used over the 1963 to 1983 time period. Data depicted on this map are based on research conducted in 1982 and 1983. Other areas may also be used for resource harvesting. Consult with local communities for definitive information.

Produced by the State of Alaska,
Department of Fish and Game,
Division of Subsistence, May

Figure 13



CHIGNIK LAKE
Subsistence Use Areas

TRAPPING

SALMON AND MARINE FISH

MARINE FISH ONLY

SALMON ONLY

SOURCES

Judith Morris, field research, 1982 and 1983. See Division of Subsistence Technical Paper #114. "Bristol Bay Regional Subsistence Profile" (1985) for description of methodology and further information.

ADF&G 1986, Alaska Habitat Mangement Guides Reference Atlas, Southwest Region, Volume 4.

METHODOLOGY

Data were collected at a public meeting held at Chignik Lake. Draft maps were reviewed and corrected at a public meeting prior to final drafting. Data represent contemporary resource use areas, defined as areas used over the 1963 to 1983 time period.

Data depicted on this map are based on research conducted in 1982 and 1983. Other areas may also be used for resource harvesting. Consult with local communities for definitive information.

Produced by the State of Alaska,
Department of Fish and Game,
Division of Subsistence, May 1989

Figure 14

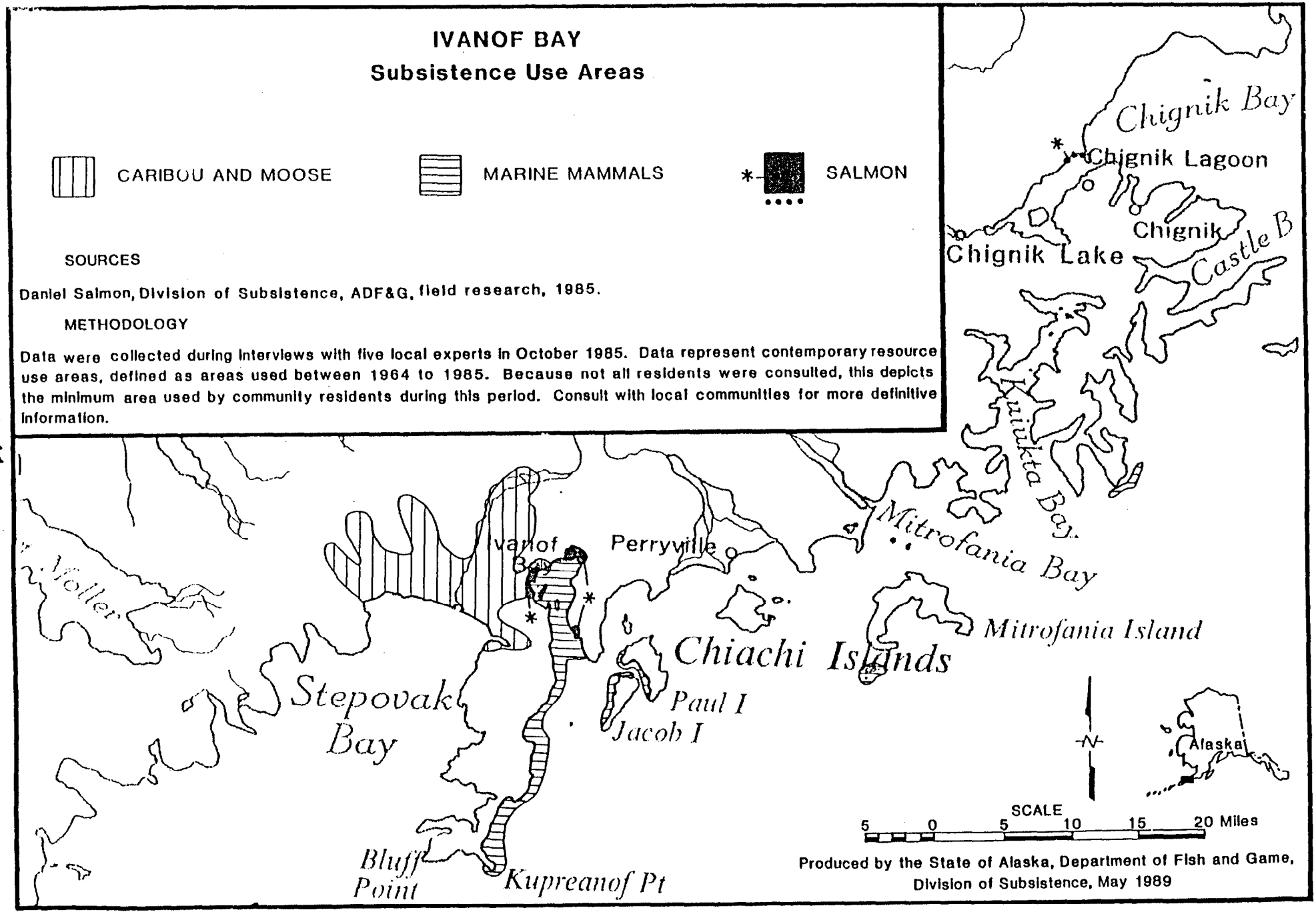
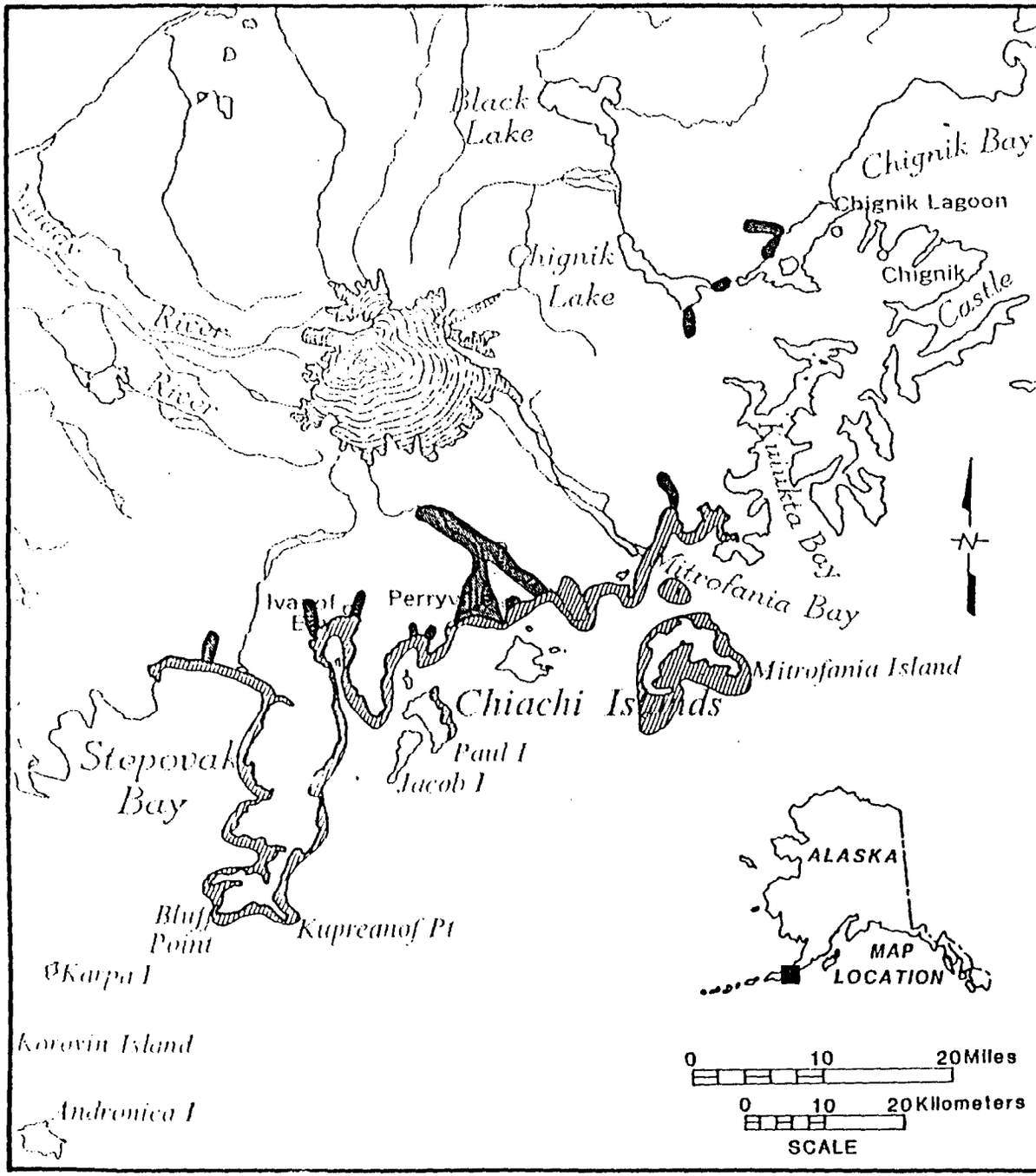

IVANOF BAY
Subsistence Use Areas
CARIBOU AND MOOSE
MARINE MAMMALS
SALMON
SOURCES
Daniel Salmon, Division of Subsistence, ADF&G, field research, 1985.
METHODOLOGY
Data were collected during interviews with five local experts in October 1985. Data represent contemporary resource use areas, defined as areas used between 1964 to 1985. Because not all residents were consulted, this depicts the minimum area used by community residents during this period. Consult with local communities for more definitive information.
Chignik Bay
Chignik Lagoon
Chignik
Chignik Lake
Castle B
Kuiukta Bay
Mitrofania Bay
Mitrofania Island
Chiachi Islands
Paul I
Jacob I
Perryville
Ivanof Bay
Stepovak Bay
Bluff Point
Kupreanof Pt
Alaska
SCALE
5 0 5 10 15 20 Miles
Produced by the State of Alaska, Department of Fish and Game, Division of Subsistence, May 1989

Figure 15



PERRYVILLE
Subsistence Use Areas

MARINE MAMMALS

SALMON

SOURCES

Judith M. Morris and Daniel Salmon, field research, 1985. See Division of Subsistence Technical Paper #151, "Fish and Wildlife Uses In Six Alaska Penninsula Communities" (1987) for description of methodology and further information.

METHODOLOGY

Data were collected during interviews with members of 16 households in October 1985. Data represent contemporary resource use areas, defined as areas used between 1964 and 1985. Because not all residents were consulted, this depicts the minimum area used by community residents during this period. Consult with local communities for more definitive information.

Produced by the State of Alaska
Department of Fish and Game, Subsistence Division
May 1989

Bay, Chignik Lagoon, Chignik River, Chignik Lake, and the bays along the Pacific Ocean shore from Mitrofania Bay west to Stepovak Bay.

GENERAL OVERVIEW OF TIMING OF HARVESTS AND PRESERVATION METHODS

In certain areas near Chignik Lake and Perryville, salmon can be taken almost year-round, from very early spring until mid-winter. For example, during the 1980s and early 1990s, starting in April, a few residents of Perryville and Ivanof Bay set out gill nets approximately four to five fathoms in length along beaches adjacent to their communities for the early run of chinook salmon and the occasional sockeye salmon passing through (Morris 1987:187). Residents of Chignik Lake reported that good quality sockeye salmon can be harvested in some years into January near certain Chignik Lake tributaries, such as the Clark ["Clarks"] River.

During the study period there were two primary harvest periods for subsistence salmon harvesting in the Chignik Management Area, spring and fall. In the springtime, fresh sockeyes were caught, smoked, kippered, salted, and frozen. In the fall, sockeyes were taken after they had turned red just before or after spawning. Sockeyes taken when red were a valued product because they have less fat, and therefore can be dried without spoilage. Also, the cooler fall weather allowed for less interference from blow flies. Similar patterns were true for Perryville, where in the summer fresh cohos, pinks, and chums were smoked, salted, or put away fresh, while in the fall the same species were dried. Sockeyes caught by Perryville families who spent the summers at Chignik Lagoon were either smoked at the camps or brought over by boat and smoked at Perryville. Almost the entire village of Ivanof Bay spent summers in Chignik Bay and smoked their sockeye salmon there. When they returned home in the fall, they also smoked fish caught in local streams.

Subsistence salmon production requires the joint effort of extended family groups. in the Chignik Area in the 1980s and early 1990s, groups of persons commonly related by ties of kinship cooperated during the summer in the harvesting, cutting, drying, smoking, and storing of salmon. Each family had its own system and recipes for processing and smoking salmon. Residents of Chignik Bay and Lagoon processed their salmon at their communities. About half the residents of Chignik Lake and residents of Perryville that had family ties to Chignik Lake residents moved to the north side of Chignik Lagoon where they spent the entire summer in fish camps. Here subsistence salmon were caught, cleaned, cut, salted, smoked, and canned.

CASE STUDIES OF SUBSISTENCE SALMON FISHING

The following case studies illustrate subsistence salmon fishing timing, methods of harvesting and processing, and other subsistence uses in more detail. The case studies are based on participant

observation at fish camps and in the communities in the spring and fall of 1990. Although the descriptions pertain to the specific year of 1990, these cases illustrate general patterns of harvest and use which occurred annually in the 1980s and early 1990s. This is "the study period" which is referred to in the descriptions which follow.

The Spring and Summer Subsistence Fishery

During the study period, spring and early summer subsistence fishing by residents of Chignik Lake, Chignik Bay, and Chignik Lagoon took place primarily in Chignik Lagoon. The majority of salmon were harvested for subsistence purposes prior to June 10th, because after that date individuals who commercial fished could no longer participate in subsistence fisheries. Salmon could still be taken from commercial catches for home use; however, this was rarely done with the exception of chinook salmon, which were occasionally kept and not sold so they could be smoked or eaten fresh.

The majority of salmon were caught during the end of May and through early June with purse seines and gill nets. Few gill nets were used during this early period, because most people were using purse seines used later in the season for commercial fishing to catch their subsistence salmon. Throughout the summer, however, gill nets and beach seines were more abundant.

CASE A

Case A illustrates an extended family from Chignik Lagoon with a commercial fisheries permit which harvested, cut, and prepared the fish for smoking just prior to the June 10th closure for subsistence fishing for commercial fishing license holders. This extended family of three generations included six households -- a mother and father from one household, and the families of five of their children from five other households. Three of the six households lived in Chignik Lagoon year-round while the other three lived there only in the spring and summer months and lived in other Alaska communities in the winter. Approximately twenty-five family members shared the subsistence salmon harvest, and about half of them participated in the harvesting and processing of the fish.

Before fishing, each household decided how much fresh, smoked, kippered, canned, salted, and dried salmon they needed for the year. This determined the total harvest goal for all the households in the extended family. They caught and prepared all of their salmon (with the exception of "red salmon" that they planned to harvest in the fall for drying) during a two or three day period, just prior to June 10th. In 1990, the total salmon needed for all six households was about 300 to 400 sockeyes with about 10 kings. If sufficient kings were not caught in the nets, a couple members of the extended family would fish for them with rod and reel along the Chignik River.

This family used a purse seine to catch their spring subsistence salmon. The responsibility of fishing for the salmon generally alternated between two brothers. One year, one brother used his boat and net to harvest the families' fish, and the next year the other brother would do the same. In 1990, the brother who fished was assisted by his commercial fishing crew, which included his nephew. If the crew members need salmon for home use, then salmon were harvested for them as well. They started fishing around 8:00 am in Chignik Lagoon. The run was slow that day, and it took them almost 12 hours and nine sets to catch the 300 salmon, most of which were sockeyes.

When approximately 80 salmon were on deck, they were loaded into a skiff inside a large plastic tub, and the nephew hauled the fish to the beach at the northeast end of Chignik Lagoon village. Here the other family members processed the fish, for salting, smoking, canning, and kippering.

The fish were unloaded and cleaned immediately. The mother and two sons split the fish on a handmade plywood portable table. The heads were first removed, then the fins. Then the fish were split down the belly and back, filleting the meat from the bone and leaving the two side portions attached at the tail. About two dozen fish were filleted by cutting out the belly; the belly was salted or canned, and the back portion was smoked with the rest of the fish.

After the fish were split, they were placed into a bucket of swirling, cold water. Wives and daughters of the sons would take the accumulating fish from the bucket and scrub each one with a brush to remove most of the blood, slime, and scales. The cleaned pieces were placed in another bucket and carried up the beach to a garage where the father brined the salmon for kippering, smoking, and salting the bellies.

When enough pieces were available to fill a large wooden barrel, the father added each fish one by one to the salt water brine of "100 percent solution," which means that the salt concentration is so thick that it can no longer dissolve in the water. Once the barrel was full, he left them in the brine for 45 minutes. Two barrels were used to speed up the process. The salmon to be kippered were prepared the same way, but were only left in the brine for 30 minutes. After the salmon soaked for the appropriate amount of time, each piece was removed and hung over poles with the meat side out to dry for one day. This allows the salmon to develop a glaze, which allows the meat to take the smoke better and prevents the salmon from falling apart. King salmon were cut into one inch strips and soaked in the brine solution for approximately 10 minutes.

The brined and partially air-dried salmon were loaded into the smokehouse belonging to the mother and father. Their smokehouse was one of 13 located on the Chignik Lagoon flat side, and was typical of most. It consisted of a small plywood building with long rectangular screened windows. The windows were covered with a hinged plywood board, that could be opened up whenever they wanted to dry the fish, or add oxygen to the fire. (See Plate C.)

The following day, a low, smoky fire of dried alder and cottonwood was built in a stove made of a 55-gallon drum cut lengthwise with four legs welded on the bottom. The stove was situated on the floor

inside the smokehouse. Both the fish to be smoked and those to be kippered were smoked together for the first three days after which those to be kippered were removed, canned, and pressure cooked at 15 pounds for 1.5 hours.

After the salmon had been in the smokehouse three or four days, several pieces were removed and baked in the oven. These were served with fresh homemade bread. The remainder of the salmon in the smokehouse was allowed to dry by lowering the heat in the fire and opening up screened windows around the smokehouse. If it was rainy, this drying stage was not possible because the fish would likely spoil, in which case they kept the fire hot. Then the fish were smoked for a few more days, then dried until approximately 10-14 days had passed, after which the fish were cured. The fish were removed, vacuum sealed in bags, and placed in the freezer until needed.

The salmon bellies were salted the day they were caught. They were spread open so they would lay flat, then one by one placed into a 10 gallon plastic bucket layered with rock salt. The salt and salmon juice made its own brine and will preserve the fish for years. To prepare salted fish for cooking, the piece must be soaked in water for approximately three days, changing the water to rid the fish of the salt. Then it can be baked and tastes almost as good as fresh salmon.

This family preferred fresh salmon above all other methods, so throughout the summer, whenever desired, salmon were removed from a commercial harvest or taken with subsistence net or rod and reel and baked or fried. This family believed that sockeye salmon do not taste good after being frozen; however, they did freeze kings.

About two dozen salmon heads were saved where the "tips" were removed. The tips are a piece of meat behind the gills. One family member prepared the tips by rolling them in flour and frying them. The head is said to be rich in fat. This family boiled about two dozen salmon heads for "fish nectar" which was canned. The nectar consists of the meat from the head. This can later be cooked with vegetables to make a salmon head chowder, or broth for soups and other dishes.

Unlike the fish smoking operation where the six households worked together, canning of salmon was done separately by each household. Each took to their local home (year-round or summer residence) the amount of fresh salmon they needed for canning. Salmon were canned by hand-operated canners, then pressure cooked. Most family members participated in the canning operation since it is very time consuming.

The entire spring subsistence salmon operation for this extended family took up to three weeks from start to finish, but the majority of work that involved the entire family occurred during the first two days. In the fall time around October, the three households of this extended family that lived year-round in the Lagoon usually traveled to Chignik Lake or the mouth of the lower Chignik River and put out a gill net to catch fall spawned-out sockeyes or "red" salmon as they are referred to locally because of the color they turn when they hit fresh water. They generally took about 40 to 50 fall salmon that they hung on drying racks for about five days. If the weather was cool, they dried the fish with smoke.

CASE B

This case study is another example of an extended family in Chignik Lagoon that harvested subsistence salmon in early June 1990. This family consisted of three households: a mother and father, son and daughter, and their spouses and children. The father, son, son-in law, and another Chignik Lagoon year-round resident harvested subsistence salmon using a purse seine. They fished all day and brought home 200 fish, which was less than their usual catch of around 300. They planned to get the rest in the fall time or remove them from their commercial catch.

After the fish were caught and brought to shore, the same family members who fished split, cleaned, and soaked the salmon in 100 percent salt brine solution for 45 minutes. It took 16 hours to harvest and prepare 200 salmon for smoking. Then the fish were hung overnight in the smokehouse before the fire was built.

The smokehouse consisted of a square plywood building with a roof and dirt floor. There were two levels of racks. Two walls had large windows on hinges that served as air vents to help dry the fish on hot and windy days. There was a fine wire net over the windows to keep out the flies.

The fire was built the next afternoon after the salmon had hung for about 11 hours. This family preferred to use cottonwood that was gathered as driftwood from the beaches. They did not use a stove, but rather a fire pit in the center floor of the smokehouse. The salmon were hung at two separate levels. In three days, they removed approximately 40 partially smoked salmon from the smokehouse to be kippered. They were cut into chunks, canned, and pressure cooked. The others remained in the smokehouse for another week to 10 days.

Inside the parents' home, the mother and daughter cut up whole sockeye salmon and stuffed these pieces into half-pound cans (Plate E). A teaspoon of rock salt was placed on top of the fish. Then the father, son, and son-in-law traded off hand cranking the canner, while the two-year-old grandson watched (Plate F). It took about a minute to seal each can. After 48 cans were ready, they were stacked inside a pressurized cooker, with hot water added. Then they were cooked for about 1.5 hours at 12-15 pounds of pressure. This family canned 15 sockeye salmon. Also, they saved about two dozen fish heads that they froze to use at later date for fish chowder.

CASE C

The following case is a composite of several fish camps observed in 1990 that were situated along the northern shore of Chignik Lagoon, occupied by Chignik Lake and Perryville residents who lived in these camps throughout the summer. Approximately a dozen fish camps, consisting of houses, tents, smokehouses, and drying racks stretched along the entire northern shoreline of Chignik Lagoon. Both

purse seines as well as subsistence gill nets were commonly used at these camps to harvest subsistence salmon.

At one camp, a male head of household from Chignik Lake who did not commercial fish used a gill net to beach seine his family's salmon. He anchored one end of the net on the beach, then set the other end of the net out from the beach using his boat. He left it anchored for a few hours, then returned to seine the net back to the shore. Lead weights held the net down and trapped the fish in the net. He unloaded the salmon, reset his net, and returned to the camp to clean, split, brine, and add the salmon to his smokehouse that was currently smoking salmon. The rest of his family had not joined him at this early date, so he was doing the work alone.

Another extended family from Chignik Lake and several other villages all worked together to put up enough salmon for this large family, as well as for some elder friends in Perryville. They were using a gill net and a purse seine to catch fish, but said the process was slow going, with about 10 fish per haul. They cleaned all their salmon on the back of their commercial seine boat at the dock of the old Columbia Ward Fishery facility. They then took the salmon to their fish camp where it was smoked, kippered, canned, salted, boiled, and pickled.

Another camp was occupied by families from Chignik Lake and Perryville. Families using this camp were related through direct blood lines or through marriage. This camp was referred to as "little Perryville" because primarily residents of Perryville stayed there and had always used the area as a place to come and fish for sockeye salmon. One Perryville resident and his entire family helped with all phases of the subsistence operation. They started earlier in the month and did a little at a time; however, they said that the 1990 run was real slow and they had to work harder to get fish. They used a purse seine to get their fish, and cleaned and split the fish on the boat. This immediate family was large with about ten members, and their goal for spring sockeyes was to smoke 175, kipper 30, jar or can 9, and salt 60 sockeye salmon.

In addition, they saved several fish heads that they boiled for fish broth which they either canned or jarred. They pickled salmon eggs in jars and ate it with dry salmon or by itself. Before returning to Perryville at the end of September, they planned to fish for approximately 40 "red" salmon that they would take with them to Perryville where they dried them on racks. If the weather was too rainy at the time, they froze the fish, then thawed them out and dried them when the weather improved. In addition, they planned to fish the Kametolook River in September to get a few silvers.

CASE D

This case illustrates two separate families that lived in Chignik Bay year-round and shared a set gill net for subsistence. Family A, consisted of a husband and wife and young daughter. Family B, consisted of a husband and wife who shared fish with their daughter, her husband and their daughter who

lived in another community in Alaska. The two families were not related, but were friends. The two male heads of household traded-off checking the setnet on an almost daily schedule, usually taking along village children to help them pick the salmon from the net.

In 1990, the net was set along the northwest shoreline of Anchorage Bay, with the other end anchored away from the shoreline. One skiff was used to get to and to check the net. The net remained set in approximately the same place throughout the summer until both families got the salmon they needed. Daily harvests ranged from no fish to a dozen. If they accumulated enough salmon in a short period of time, then they smoked their fish together and split what remained. Otherwise the fish were dried, salted, or frozen.

Fall and Winter Subsistence Salmon Fishery

The following description and case studies illustrate several typical strategies followed by extended families for taking subsistence salmon during the fall in the Chignik Management Area. In the fall, families who stayed at Chignik Lagoon fish camps, as well as many other households from the three Chignik villages, Perryville, and Ivanof Bay put up "red" salmon that had spawned. They preferred to smoke the spring fish because of their high fat content, and dry the fall red salmon because they are less likely to spoil because of their low fat content.

Fall salmon, locally called "red salmon" because of the color sockeyes turn during spawning, were primarily taken out of Chignik Lake by residents of Chignik Lake; however, residents of the other two Chignik communities, and some Perryville and Ivanof Bay residents used the lake as well. Chignik Lagoon, just below the Alaska Department of Fish and Game weir, was also a common area used to get "red salmon."

Spawned-out salmon were preferred by most of the residents of Chignik Lake and made up a larger percentage of salmon harvested in that community than those taken in the spring and summer fish. Chignik Lake residents preferred to wait until October or later to put up "red" salmon, because the weather is cooler, there are less blow flies, and less interference from bears getting into their drying fish. They fished almost entirely along the beach of Chignik Lake from the village to the Clark River (or "Clarks" River as the local residents refer to it). Fall fishing was done by making day trips from the village with a shore gill net or beach seine. If a single person fished, he or she might set out a gill net and return at a later time. The most common method, however, was to have one person stand on the shore with one end of the net, with another person in a skiff with the other end of the net. Together they pulled the net up the shoreline, then seined the net around to the shore capturing salmon in the net. In the wintertime, salmon were occasionally taken with a hook by jigging near the mouth of the Clarks River as late as March.

The fish were then brought back to the village and hung to dry, cooked fresh into fish pie, baked, or fried. Often "red fish" were sent to residents of Chignik Bay, Perryville, and Ivanof Bay, where

sockeyes were not available. In exchange for the "red" salmon, Chignik Lake received shellfish such as chitons (bidarkies), sea urchins (uduks), and butter clams from Perryville and Ivanof Bay people, resources Chignik Lake people have to travel far to get.

Extended families had their own drying racks in all five of the Chignik Area villages. These generally were constructed with a solid plywood roof to keep the rain and snow off the fish and were supported by four corner-posts with walls of wire mesh or fish net to keep dogs out, but allow the fish to dry. It took anywhere from a few days to a couple of weeks to dry salmon taken in the fall. Dried fall salmon were commonly eaten with brown bear grease or seal oil and served with pickled salmon eggs.

Perryville residents primarily caught their salmon at the Kametolook River located about three miles northeast of Perryville. In the past, they more regularly harvested at two rivers southwest of the village, Three Star Point and Long Beach. After a volcanic eruption of Mt. Veniaminof several years ago, the river channel at Three Star Point changed, making it difficult for land travelers to cross the river to get to Long Beach to fish. Salmon were rare in the river at Three Star Point; however, candlefish are abundant, and Perryville people harvest them with dip nets when the fish come up the river in the spring to spawn. Coho, chum and pink salmon were most abundant in these Perryville and Ivanof Bay area rivers, and sockeyes were rare. But in 1992, sockeyes were reported to be more abundant there than in most other years.

Perryville residents who did not travel to Chignik to fish in the summer months harvested their subsistence salmon as a gradual process. They made day trips on their all-terrain vehicles to the Kametolook River. They fished with short gill nets, catching what they could. They returned until sufficient salmon were harvested for the family, and for others who could not fish for themselves.

Elders, single parent families, and those who worked full time jobs had more difficulty obtaining the salmon they needed because they did not have the time or ability to make frequent trips to the river. Sharing was common in Perryville as well as the other Chignik communities, and these families often received salmon and other subsistence foods from other families to help them out.

CASE E

In this case, a Perryville male head of household fished for salmon in the Kametolook River in September 1990. He had a large extended family including a wife and several children, grandchildren, and great-grandchildren. He contributed salmon to this extended family group. He and his wife also fed other people in the village on a daily basis.

In one trip, the household head drove his Honda to the Kametolook River and rode back a couple of miles to a side channel of the river. Here he used a gill net about five fathoms long. He said that he has a longer one but has never used it, because he does most of his fishing alone. He tied off one end of the net on a bush along one shore, then waded with the other end of the net and tied it off to the other side

of the channel. Lead weights held the net down in the water. He then walked along the edge of the bank upstream of the net approximately 50 feet. Next, using a willow branch, he plunged the water and banks, driving fish into his net. Then, he untied one end of the net and pulled it across to the other shore. He caught one red, one silver salmon, and two Dolly Varden trout. He was somewhat disappointed with his success, but said that the run of salmon in the river has been very poor over the last few years, and he was concerned about how Perryville people would be able to live without salmon. He cleaned his salmon at the river, wrapped them in a gunnysack, and returned to Perryville.

Meanwhile, closer to the mouth of the river, a husband and wife were fishing (Plate A). They were using a longer gill net than the first man. The woman held onto the net and walked downstream with it along the bank of the river, while the man held the other end and walked with waders down the river stretching the net as far as it would go. After they walked about 200 yards, the man brought his net toward her and when together on the shore they hauled the net and captured salmon. Their success was not much better than the first man, with three silver salmon. They tried several more times, catching a few more before returning to the village.

For the most part, salmon at Perryville were processed in the same way as has been described for Chignik. Those who harvested enough salmon at one time smoked their fish; however, drying of fish occurred throughout the summer at Perryville, and was not limited to the fall as in Chignik. Both alder and cottonwood were used for smoking, depending on the preference of the family.

In September 1990, fish drying racks in Perryville were full. Several families were half-drying their fish, then freezing them. This type of fish is called *kac'amaasaq* and, when eaten, it was boiled and served with brown bear fat (Kosbruk 1992).

CASE F

After Ivanof Bay residents returned from Chignik, they sometime brought with them smoked sockeye salmon that they had put up during the spring in Chignik. In 1990, however, they did not have the opportunity to put up sockeyes prior to the first commercial opening, so they did all of their subsistence fishing in September. In 1990, the entire village was one large extended family and groups worked together to process fish. Some extended family members also might fish and smoke their fish separately from the others. (See Plate B and Plate D.)

Ivanof Bay residents caught their fall salmon at the mouth of the Ivanof River, just one mile east of the village, primarily with rods and reels or with a subsistence gill net at one of the two rivers at Smoky Hollow, five miles southwest of the village. Ivanof Bay residents used all varieties of salmon. Silver salmon were the most abundant; chums and pinks were also common.

In September 1990, two Ivanof Bay families traveled to the river at the north end of Smoky Hollow and returned that evening with 150 salmon. During the same day, two other men traveled by three

wheeler, to the Ivanof Bay River and brought home about a dozen silvers that they caught with their rods and reels. All the fish were combined as a single catch.

Three of the brothers worked into the night, cleaning, splitting, and brining about half of the salmon. They used large plastic 55-gallon drums for brining the fish. Once they added enough salmon to fill the barrel, a wooden oar was used to plunge the pieces and to stir the fish and brine solution. After one hour, the salmon pieces which were still attached at the tail were carried to the smokehouse, draped over posts and left to dry for several hours before lighting the fire. The other half was saved for morning because a storm was blowing in heavy rain, and they feared their salmon would spoil. They covered the remaining salmon and retired to one of the homes for fresh boiled salmon heads.

The process continued the next morning until all the salmon were prepared for smoking. The salmon were smoked for approximately two weeks, then distributed to each household. The smokehouse was owned by an older couple related to most of the other families in the village and was used by almost everyone in the community. There was a second smokehouse too. Most households in the village generally harvested and smoked all their fish together to simplify the process and to conserve on time and fuel. Respondents stated that it took the same amount of wood to smoke 10 fish as it did 300.

After the smoking was complete, respondents estimated that the village needed about 150 additional salmon for smoking, salting, and freezing. A few days later, fishers returned to the Smoky Hollow River and harvested more fish. This continued until there was enough fish for the winter.

CHAPTER THREE: OTHER SUBSISTENCE FISHERIES OF THE CHIGNIK AREA

FINFISH OTHER THAN SALMON

As shown in Table 21 and Figure 16, fish other than salmon make a substantial contribution to the annual subsistence harvests of wild resources in Chignik Area communities. Annual per capita harvests of these resources (usable weight) have ranged from 16 pounds (Chignik Lake, 1984) to over 110 pounds (Chignik Bay, 1991). These harvests made up between 5 and 30 percent of the total subsistence take in the 1980s and early 1990s. As shown in Table 21 and Figure 17, virtually every household in the Chignik Area communities participated in the subsistence use of fish other than salmon in the 1984, 1989, and 1991/92 study years.

At least 17 kinds of fish other than salmon were used by sampled (Table 22, Table 23). Fish other than salmon taken in the largest quantities or used by the most households included halibut, gray cod, eulachon ("candlefish"), and Dolly Varden. Estimated harvest quantities for each community are reported in Table 24 (for 1984) and Table 25 (for 1989), and for Chignik Lake and Chignik Bay for the 1991/92 study year in Table 26.

Because of open marine water conditions through most of the year, marine fish such as halibut, cod, and greenling are taken year-round. Eulachon return to streams in the Perryville area in late April through June, when they are harvested in large quantities for local use and exchange with other communities (Plate H). Fishing through the ice in lakes occurs for Dolly Varden and rainbow trout.

Maps of areas used to harvest nonsalmon fish by the five Chignik Area communities appear in Fall et al. (1995) and ADF&G (1985). Most of the Chignik Management Area is used for harvesting these species, with more concentrated effort occurring near population centers and near fish camps. Harvests of eulachon are concentrated in a few streams near Perryville. Access to these fishing areas is by skiff, commercial fishing boat, ATV, or on foot.

In the study years, a variety of gear types was used to take fish other than salmon. Some fish were removed from commercial catches for home use (such as halibut, gray cod), but more were harvested with rod and reel (halibut, greenling, rainbow trout, Dolly Varden) and with other noncommercial methods (Table 27). Gear included hand line (halibut), longline (bottomfish), seines and set nets (Dolly Varden), and dip nets (eulachon; Dolly Varden in the Ivanof Bay area). Table 28 reports the percentage of sampled households in 1989 and 1991 that harvested fish other than salmon by gear type. (The percentage of households harvesting nonsalmon fish by gear type was not determined for 1984.)

Methods of preserving fish other than salmon for later use included freezing, salting (herring, cod), drying (halibut), and smoking (Dolly Varden, eulachon). At Perryville, large quantities of eulachon were dipnetted in a few local streams. These were smoked and shared widely with other communities. Dry and

Table 21. Harvests and Uses of Fish Other Than Salmon, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away		per Household	per Capita
Chignik Bay	1984	84.2	73.7	73.7	68.4	63.2	2,660	95.0	22.0
Chignik Bay	1989	88.6	80.0	77.1	60.0	51.4	6,594	169.0	54.7
Chignik Bay	1991	96.7	80.0	66.7	66.7	50.0	14,021	318.6	109.8
Chignik Lagoon	1984	76.5	52.9	52.9	47.1	29.4	1,421	64.5	19.2
Chignik Lagoon	1989	100.0	66.7	66.7	86.7	53.3	1,826	121.7	44.5
Chignik Lake	1984	95.7	73.9	69.6	69.6	52.2	2,539	81.8	16.2
Chignik Lake	1989	85.7	81.0	81.0	71.4	47.6	4,359	155.6	38.9
Chignik Lake	1991	100.0	79.2	79.2	87.5	70.8	5,428	164.4	41.5
Ivanof Bay	1984	66.7	66.7	66.7	66.7	33.3	660	66.0	18.0
Ivanof Bay	1989	100.0	100.0	100.0	100.0	85.7	2,086	298.0	65.2
Perryville	1984	100.0	95.0	95.0	85.0	90.0	5,130	190.0	44.7
Perryville	1989	96.3	77.8	74.1	88.9	63.0	8,053	259.7	69.4

Source: Scott et al. 1995

Figure 16. Harvests of Fish Other Than Salmon in Pounds Usable Weight per Person, Chignik Area Communities, 1984, 1989, and 1991

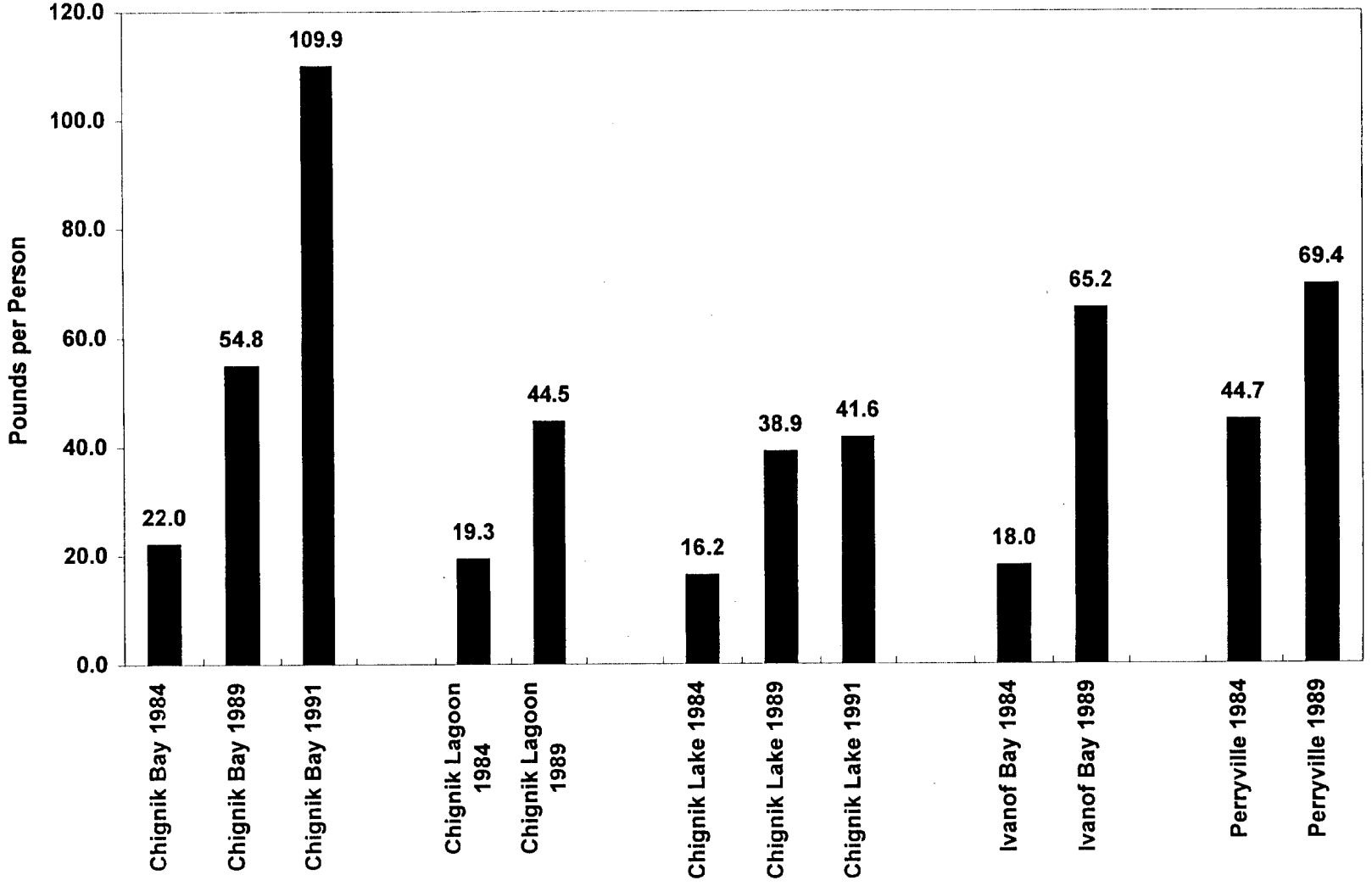


Figure 17. Percentage of Households Using Fish Other Than Salmon, Chignik Area Communities, 1984, 1989, and 1991

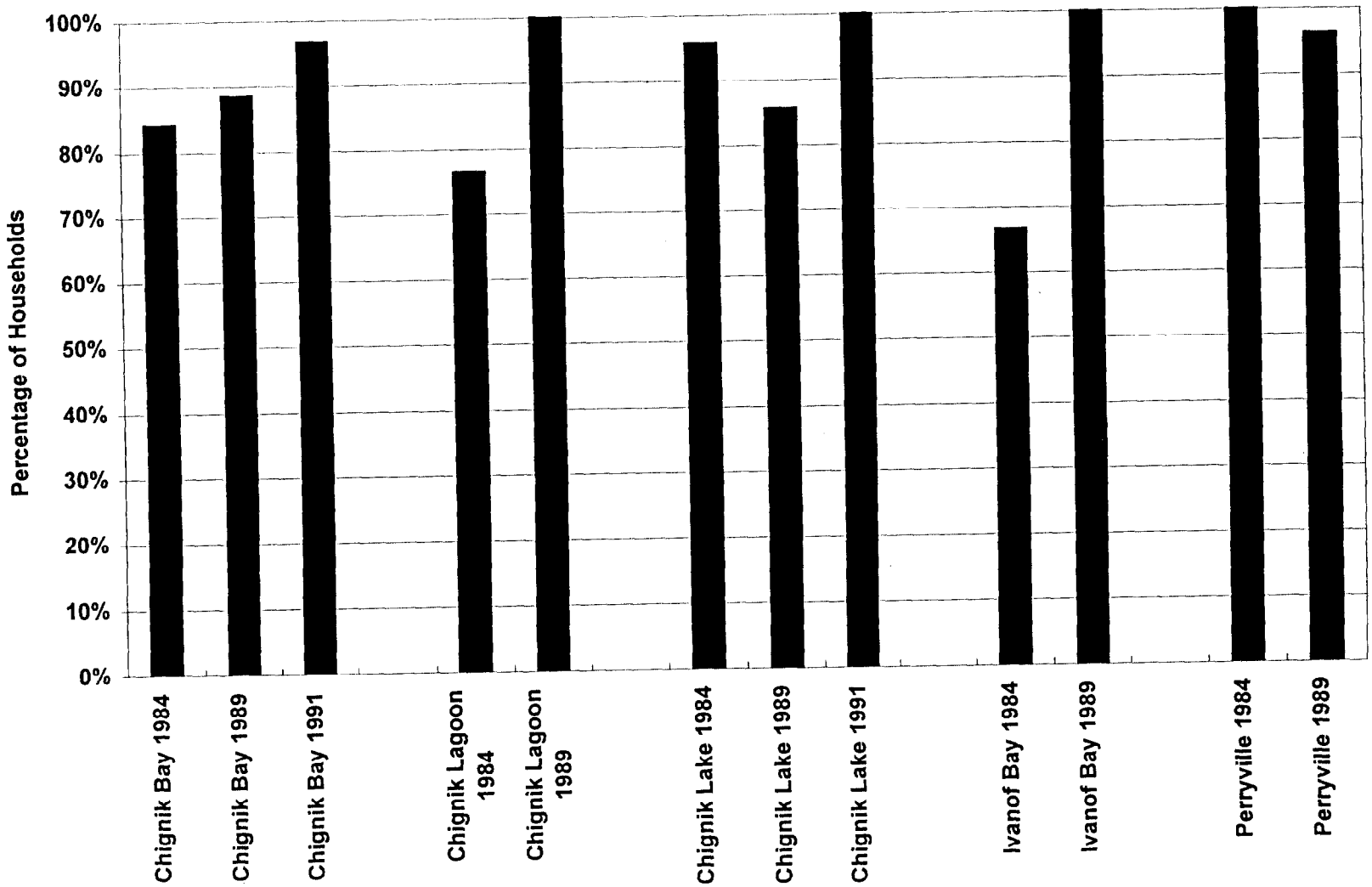


Table 22. Fish Other Than Salmon Used for Subsistence Purposes in Communities of the Chignik Management Area, 1984

Common English Name	Scientific Name	Percentage of Households Using in:				
		Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville
Herring	*Clupea harengus pallasi*	21.1	17.6	8.7	16.7	5.0
Herring Spawn on Kelp	---			Not asked		
Pollock	*Theragra chalcogramma*			Not asked		
* Rainbow Smelt	*Osmerus mordax*	0.0	11.8	34.8	0.0	0.0
Halibut	*Hippoglossus stenolepis*	84.2	76.5	95.7	66.7	80.0
Rainbow Trout	*Salmo gairdneri*	5.3	0.0	0.0	0.0	5.0
Dolly Varden	*Salvelinus malma*	5.3	5.9	21.7	66.7	75.0
Eulachon (Candlefish)	*Thaleichthys pacificus*	10.5	5.9	26.1	50.0	90.0
Pacific Cod (Gray)	*Gadus macrocephalus*	36.8	47.1	52.2	50.0	85.0
Sculpin	*Hemilepidotus sp.*			Not asked		
Starry Flounder	*Platichthys stellatus*	5.3	0.0	17.4	0.0	0.0
Greenling	*Hexagrammos decagrammus*			Not asked		
Grayling	*Thymallus arcticus*	5.3	0.0	0.0	0.0	0.0
Black Cod	*Anoplopoma fimbria*			Not asked		
Steelhead	*Salmo gairdneri*	0.0	5.9	0.0	0.0	5.0
"Lake Trout"	Unknown	0.0	0.0	0.0	0.0	10.0
Black Rockfish	*Sebastes melanops*			Not asked		
Red Rockfish	*Sebastes ruberrimus*			Not asked		
Any Fish Other Than Salmon		84.2	76.5	95.7	66.7	100.0

* Most likely harvested outside the Chignik Management Area; Chignik area households receive gifts of rainbow smelt from relatives and friends in Pilot Point, Ugashik, and Nanek, among other communities.

Source: Fall et al. 1995; Scott et al. 1995

Table 23. Fish Other Than Salmon Used for Subsistence Purposes in Communities of the Chignik Management Area, 1989

Common English Name	Scientific Name	Percentage of Households Using in:				
		Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville
Herring	*Clupea harengus pallasi*	22.9	46.7	28.6	28.6	14.8
Herring Spawn on Kelp	---	14.3	0.0	4.8	0.0	3.7
Pollock	*Theragra chalcogramma*	2.9	0.0	0.0	0.0	0.0
* Rainbow Smelt	*Osmerus mordax*	11.4	0.0	47.6	0.0	0.0
Halibut	*Hippoglossus stenolepis*	88.6	100.0	66.7	100.0	96.3
Rainbow Trout	*Salmo gairdneri*	2.9	0.0	23.8	57.1	7.4
Dolly Varden	*Salvelinus malma*	22.9	6.7	38.1	85.7	55.6
Eulachon (Candlefish)	*Thaleichthys pacificus*	22.9	40.0	33.3	100.0	77.8
Pacific Cod (Gray)	*Gadus macrocephalus*	28.6	60.0	47.6	85.7	63.0
Sculpin	*Hemilepidotus sp.*	11.4	0.0	4.8	0.0	29.6
Starry Flounder	*Platichthys stellatus*	5.7	0.0	19.0	14.3	0.0
Greenling	*Hexagrammos decagrammus*	11.4	0.0	9.5	0.0	29.6
Grayling	*Thymallus arcticus*	0.0	0.0	0.0	14.3	0.0
Black Cod	*Anoplopoma fimbria*	0.0	6.7	4.8	0.0	0.0
Steelhead	*Salmo gairdneri*	0.0	13.3	4.8	0.0	0.0
Black Rockfish	*Sebastes melanops*	0.0	6.7	0.0	0.0	22.2
Red Rockfish	*Sebastes ruberrimus*	2.9	0.0	0.0	0.0	3.7
Any Fish Other Than Salmon		89.0	100.0	86.0	100.0	96.0

* Most likely harvested outside the Chignik Management Area; Chignik area households receive gifts of rainbow smelt from relatives and friends in Pilot Point, Ugashik, and Nanek, among other communities.

Source: Fall et al. 1995; Scott et al. 1995

Table 24. Harvests of Fish Other Than Salmon for Home Use, Chignik Area Communities, 1984

	Estimated Number of Fish Harvested					
	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	Total
Grayling	9	0	0	0	0	9
Gray Cod	97	26	129	50	166	468
Black Cod			Data not collected.			
Flounder	4	0	8	0	0	12
Halibut	69	40	58	10	68	245
Herring	111	129	47	0	0	287
Black rockfish			Data not collected.			
Red Rockfish			Data not collected.			
Sculpin			Data not collected.			
Candlefish	0	0	0	0	9,612	9,612
Rainbow smelt[1]	0	0	1,522	0	0	1,522
Greenling			Data not collected.			
Pollock			Data not collected.			
Dolly Varden	4	0	20	128	880	1,032
Rainbow trout	44	0	0	0	4	48
Steelhead	0	1	0	0	4	5
Lake Trout	0	0	0	0	14	14
Unknown	0	0	0	0	0	0
Spawn-on-kelp			Data not collected.			

[1] Probably not harvested in the Chignik Area.

Source: Scott et al. 1995

Table 25. Harvest of Fish Other Than Salmon for Home Use, Chignik Area Communities, 1989

	Estimated Number of Fish Harvested[1]					
	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	Total
Grayling	0	0	0	17	0	17
Gray Cod	95	62	140	56	153	506
Black Cod	0	0	59	0	0	59
Flounder	7	0	79	10	0	96
Halibut	176	60	132	41	123	532
Herring	10g	1g	23g	5g	45g	84g
Black rockfish	0	89	0	0	28	117
Red Rockfish	0	0	0	0	7	7
Sculpin	80	0	13	0	117	210
Candlefish	400	0	0	1,150	8,975	10,525
Rainbow smelt	0	0	0	0	0	0
Greenling	59	0	13	0	123	195
Pollock	1	0	0	0	0	1
Dolly Varden	106	2	518	523	783	1,932
Rainbow trout	22	0	284	5	23	334
Steelhead	0	1	7	0	0	8
Unknown	111	0	0	0	0	111
Spawn-on-kelp	0	0	0	0	1g	1g

[1] g = gallons

Source: Scott et al. 1995; Fall et al. 1995

Table 26. Harvests and Uses of Fish Other Than Salmon for Home Use, Chignik Bay and Chignik Lake, 1991

Resource[2]	Chignik Bay		Chignik Lake	
	Percentage of Households Using	Total Harvests[1]	Percentage of Households Using	Total Harvests[1]
Grayling	6.7%	4	0.0%	0
Black cod	16.7%	16	8.3%	0
Gray cod	43.3%	190	45.8%	186
Lingcod	0.0%	0	0.0%	0
Greenling	10.0%	98	8.3%	44
Flounder	0.0%	0	12.5%	41
Halibut	90.0%	401	91.7%	126
Herring	3.3%	0	8.3%	69g
Spawn-on-kelp	0.0%	0	0.0%	0
Black rockfish	16.7%	69	4.2%	28
Red rockfish	16.7%	13	4.2%	0
Sculpin	10.0%	76	20.8%	63
Rainbow smelt	0.0%	0	33.3%	0
Candlefish	13.3%	0	62.5%	0
Pollock	0.0%	0	8.3%	3
Dolly Varden	23.3%	85	33.3%	56
Rainbow trout	16.7%	70	16.7%	48
Steelhead	6.7%	4	16.7%	7

[1] g = gallons

[2] Uses of three other fish with tentative identifications were reported as follows. For Chignik Bay: prowfish, 3.3% using, harvest of 3; giant wrymouth, 3.3% using, harvest of 4. For Chignik Lake: silver hake, 4.2 percent using, no harvest (received only).

Source: Hutchinson-Scarbrough 1995a, 1995b; Scott et al. 1995

Table 27. Harvests of Fish Other Than Salmon by Gear Type, Chignik Area Communities, 1984, 1989, and 1991/92

Community	Year	Percentage of Total Harvest (Pounds)		
		Removed from Commercial Catch	Rod and Reel	Subsistence Methods[1]
Chignik Bay	1984	58.6%	39.6%	1.8%
Chignik Bay	1989	20.3%	7.4%	72.3%
Chignik Bay	1991/92	65.0%	14.3%	20.7%
Chignik Lagoon	1984	91.2%	8.8%	0.0%
Chignik Lagoon	1989	63.0%	5.3%	31.7%
Chignik Lake	1984	79.2%	11.9%	8.9%
Chignik Lake	1989	56.4%	6.1%	37.5%
Chignik Lake	1991/92	61.2%	2.1%	36.8%
Ivanof Bay	1984	24.3%	43.4%	32.3%
Ivanof Bay	1989	2.9%	36.6%	60.5%
Perryville	1984	10.6%	55.5%	33.9%
Perryville	1989	8.6%	18.8%	72.6%

[1] "Subsistence methods" include hook and line, beach seines, set gillnets, longlines, and dipnets.

Sources: Scott et al. 1995; Fall et al. 1995; Hutchinson-Scarbrough 1995a, 1995b

Table 28. Percentage of Households Harvesting Fish Other Than Salmon by Gear Type, Chignik Area Communities, 1989 and 1991/92

Community	Percentage of Sampled Households Harvesting Fish Other Than Salmon by			
	Commercial Removal	Subsistence Methods[1]	Rod & Reel	Any Method
Study Year 1989				
Chignik Bay	34.3	54.3	20.0	77.1
Chignik Lagoon	53.3	46.7	6.7	66.7
Chignik Lake	47.6	52.4	14.3	81.0
Ivanof Bay	14.3	100.0	71.4	100.0
Perryville	11.1	74.1	48.1	74.1
Study Year 1991/92				
Chignik Bay	43.3	33.3	26.7	66.7
Chignik Lake	58.3	41.7	16.7	79.2

[1] Subsistence methods include hook and line, beach seines, longlines, set gillnets, and dip nets.

Sources: Fall et al. 1995; Hutchinson-Scarbrough 1995a, 1995b

smoked fish was eaten with seal oil or brown bear fat. Most types of nonsalmon fish were also eaten fresh. (See Plate G for a photograph of halibut processing at Chignik Lagoon.)

During the study period, regulations for the Chignik Management Area placed few restrictions on the subsistence harvesting of fish other than salmon. A permit was required for taking "trout and char," but there were no provisions for issuing these permits; no households obtained them and it is very likely none were aware of the requirement. Subsistence halibut regulations allowed for a single hand-held line with no more than to hooks attached, with a daily bag limit of two halibut and a possession limit of two daily bags.[10] In January 1993, the Alaska Board of Fisheries determined that fish other than salmon in the Chignik Area, except rainbow trout and steelhead, support customary and traditional subsistence uses. No finding was made for rainbow trout and steelhead. The Board further determined that 18,000 usable pounds of these fish were required annually to provide a reasonable subsistence opportunity (ADF&G 1995).

MARINE INVERTEBRATES

Marine invertebrates are another important category of marine resource used for subsistence in all five communities of the Chignik Area. Table 29 reports the number of sampled households using, harvesting, receiving, and giving away marine invertebrate resources in 1984, 1989, and 1991, along with estimated harvest quantities in pounds useable weight per household and per person. These resources made up about 4 to 10 percent of the annual subsistence harvests in these communities for the survey years. They added important variety to the diet, especially during the early spring when other resources were not readily abundant. As shown in Table 29 and Figure 18, harvests of marine invertebrates have ranged from about 3 pounds per person to about 46 pounds per person per year. Virtually every household in the Chignik Area used at least one kind of marine invertebrate in each of the harvest survey periods (Table 29, Fig. 19; Plate I, Plate J).

Table 30 lists the kinds of marine invertebrates used for subsistence in 1984 in the five communities based upon systematic household interviews. Data for the 1989 for the five communities are reported in Table 31, and information for Chignik Lake and Chignik Bay for 1991/92 appears in Table 32. Overall, about 19 kinds of marine invertebrates were used by members of the study communities. Marine invertebrates used in the largest quantities or by the largest number of households included various types of clams, cockles, chitons, sea urchins, octopus, and crab (Table 32, Table 33, Table 34).

In the 1980s and early 1990s, Chignik Area residents used a variety of gear types to harvest marine invertebrates, such as shovels and rakes for clams and cockles, and pots for crab. Other resources, such as chitons and sea urchins, were picked by hand during low tides. Some resources were

[10] The framework rules for state halibut regulations are set by the International Halibut Commission and the North Pacific Fisheries Management Council.

Table 29. Subsistence Harvests and Uses of Marine Invertebrates, Chignik Area Communities

Community	Year	Percentage of Households					Estimated Total Pounds Harvested	Pounds Harvested	
		Used	Attempt	Harvested	Received	Gave Away		per Household	per Capita
Chignik Bay	1984	94.7	78.9	78.9	73.7	52.6	892	31.8	7.3
Chignik Bay	1989	88.6	80.0	77.1	74.3	42.9	1,874	48.0	15.5
Chignik Bay	1991	100.0	76.7	70.0	93.3	46.7	4,958	112.6	38.8
Chignik Lagoon	1984	88.2	64.7	64.7	52.9	35.3	1,120	50.8	15.1
Chignik Lagoon	1989	86.7	53.3	53.3	80.0	46.7	851	56.7	20.7
Chignik Lake	1984	91.3	56.5	52.2	65.2	39.1	517	16.6	3.3
Chignik Lake	1989	81.0	47.6	47.6	81.0	47.6	1,776	63.4	15.8
Chignik Lake	1991	100.0	79.2	75.0	91.7	66.7	2,711	82.1	20.7
Ivanof Bay	1984	83.3	83.3	83.3	83.3	83.3	966	96.6	26.4
Ivnoaf Bay	1989	100.0	100.0	100.0	100.0	100.0	1,486	212.2	46.4
Perryville	1984	100.0	90.0	90.0	95.0	75.0	1,242	46.0	10.8
Perryville	1989	96.3	88.9	85.2	74.1	63.0	2,373	76.5	20.4

Source: Scott et al. 1995

Figure 18. Subsistence Harvests of Marine Invertebrates in Pounds Usable Weight per Person, Chignik Area Communities, 1984, 1989, and 1991

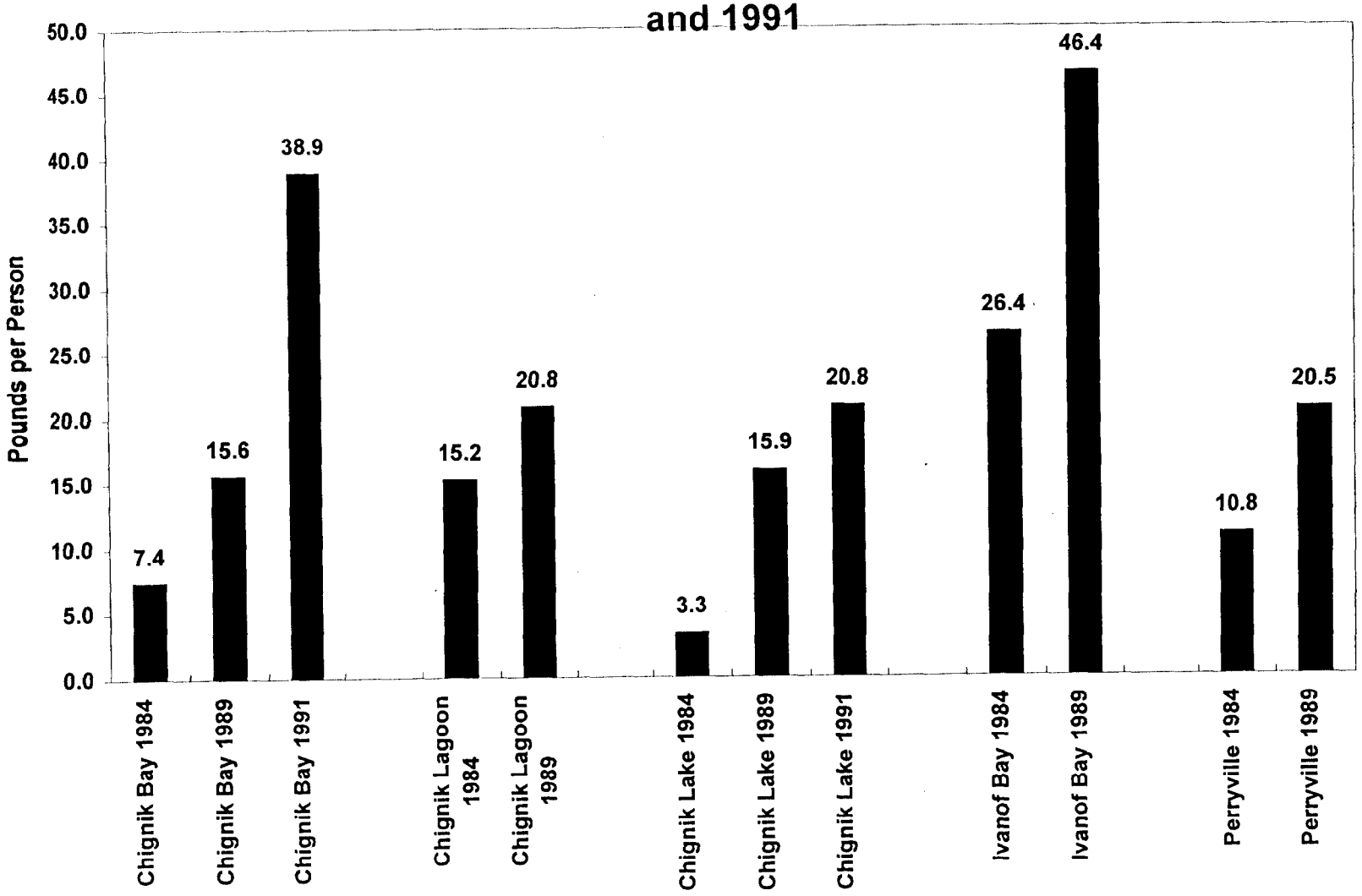


Figure 19. Percentage of Households Using Marine Invertebrates, Chignik Area Communities, 1984, 1989, and 1991

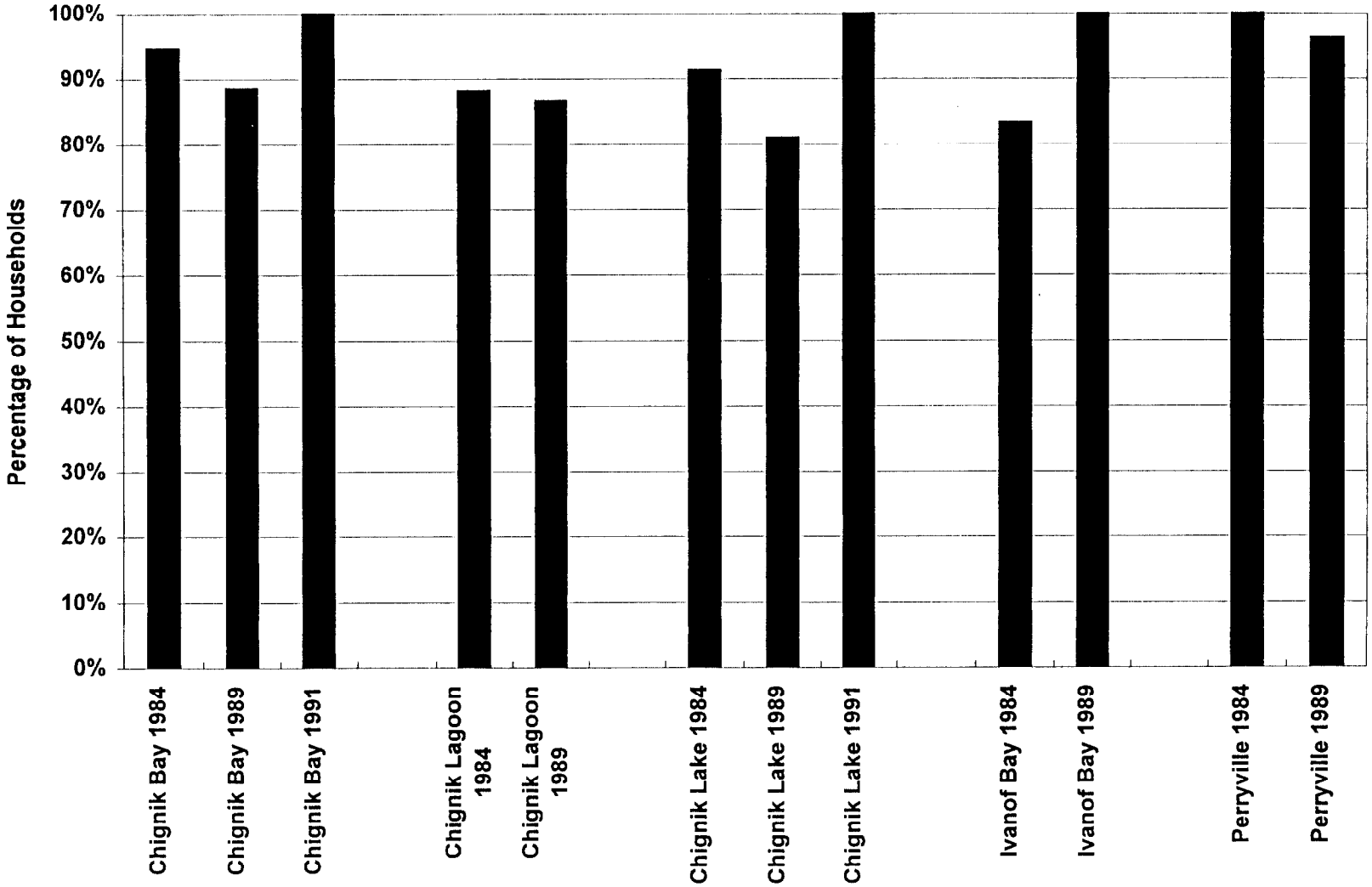


Table 30. Marine Invertebrates Used for Subsistence Purposes in Communities of the Chignik Area, 1984

Common English Name[1]	Scientific Name	Percentage of Households Using in:				
		Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville
Razor Clams	*Siliqua patula*	10.5	11.8	26.1	16.7	55.0
Butter Clams	*Saxidomus giganteus*	89.5	88.2	78.3	83.3	25.0
*Horse Clams	*Tresus capax*					
Cockles	*Clinocardium sp.*	31.6	0.0	52.2	83.3	85.0
*Pinkneck Clams (redneck)	*Spicula polynuma*					
*Littleneck (Steamer) Clams	*Protothaca staminea***					
Chitons, Black	*Katharina tunicata*	42.1	11.8	39.1	83.3	100.0
*Chitons, Red	*Cryptochiton stelleri*					
Mussels (blue)	*Mytilus edulis*	10.5	0.0	4.3	0.0	5.0
Octopus	*Octopus dolfleini*	68.4	5.9	47.8	50.0	55.0
Sea Urchins	*Stronglyocentrotus sp.*	10.5	0.0	21.7	66.7	95.0
*Sea Cucumbers	Unidentified					
Shrimp	*Pandalus sp.*	0.0	0.0	4.3	0.0	0.0
*Scallops	*Pecten caurinus*					
King Crab	*Paralithades camtschatica*	42.1	41.2	21.7	33.3	15.0
Dungeness Crab	*Cancer magister*	63.2	58.8	47.8	50.0	70.0
Tanner Crab	*Chionoecetes bairdi*	42.1	64.7	43.5	66.7	15.0
*Snails	*Neptunea sp.*					
*Limpets	*Acmaeidae sp.*					
Any Marine Invertebrate		94.7	88.2	91.3	83.3	100.0

* Probably used in some communities but data not systematically gathered for 1984; see Table 31 for 1989.
** May also include smaller-sized individuals of other species and softshell clams of the genus *Mya*.

Source: Scott et al. 1995; Fall et al. 1995

Table 31. Marine Invertebrates Used for Subsistence Purposes in Communities of the Chignik Area, 1989

Common English Name	Scientific Name	Percentage of Households Using in:				
		Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville
Razor Clams	*Siliqua patula*	14.3	33.3	23.8	42.9	37.0
Butter Clams	*Saxidomus giganteus*	71.4	66.7	52.4	71.4	40.7
Horse Clams	*Tresus capax*	11.4	0.0	0.0	0.0	3.7
Cockles	*Clinocardium sp.*	37.1	6.7	47.6	100.0	70.4
Pinkneck Clams (redneck)	*Spicula polynuma*	0.0	0.0	0.0	71.4	3.7
Littleneck (Steamer) Clams	*Protothaca staminea**	11.4	0.0	0.0	28.6	11.1
Chitons, Black	*Katharina tunicata*	48.6	26.7	57.1	100.0	92.6
Chitons, Red	*Cryptochiton stelleri*	0.0	0.0	0.0	85.7	11.1
Mussels (blue)	*Mytilus edulis*	8.6	6.7	0.0	14.3	14.8
Octopus	*Octopus dolfleini*	42.9	20.0	47.6	71.4	51.9
Sea Urchins	*Stronglyocentrotus sp.*	28.6	0.0	47.6	100.0	88.9
Sea Cucumber	Unidentified	0.0	0.0	0.0	0.0	3.7
Shrimp	*Pandalus sp.*	8.6	0.0	4.8	0.0	0.0
Scallops	*Pecten caurinus*	2.9	0.0	0.0	0.0	0.0
King Crab	*Paralithades camtschatica*	40.0	20.0	33.3	42.9	0.0
Dungeness Crab	*Cancer magister*	37.1	40.0	47.6	100.0	51.9
Tanner Crab	*Chionoecetes bairdi*	62.9	66.7	14.3	0.0	3.7
Snails	*Neptunea sp.*	2.9	0.0	0.0	0.0	3.7
Limpets	*Acmaeidae sp.*	2.9	0.0	0.0	0.0	3.7
Any Marine Invertebrate		89.0	87.0	81.0	100.0	96.0

* May also include smaller-sized individuals of other species and softshell clams of the genus *Mya*.

Source: Scott et al. 1995; Fall et al. 1995

Table 32. Subsistence Harvests of Marine Invertebrates Chignik Bay and Chignik Lake, 1991

Common English Name[1]	Chignik Bay		Chignik Lake	
	Percentage of Households Using	Total Harvests[1]	Percentage of Households Using	Total Harvests[1]
Razor Clams	26.7%	25g	37.5%	80g
Butter Clams	50.0%	363g	83.3%	249g
Horse Clams	0.0%	0	4.2%	0
Cockles	10.0%	7g	70.8%	197g
Pinkneck Clams (redneck)	3.3%	1g	0.0%	0
Littleneck (Steamer) Clams	36.7%	116g	83.3%	153g
Chitons, Black	33.3%	41g	75.0%	37g
Chitons, Red	3.3%	2g	4.2%	0
Mussels (blue)	6.7%	3g	4.2%	0
Octopus	60.0%	258	79.2%	40
Sea Urchins	30.0%	366g	70.8%	93g
Sea Cucumbers	3.3%	7g	0.0%	0
Shrimp	0.0%	0	0.0%	0
Scallops	0.0%	0	0.0%	0
King Crab	26.7%	7	16.7%	0
Dungeness Crab	76.7%	741	62.5%	204
Tanner Crab	80.0%	917	66.7%	113
Snails	6.7%	9g	0.0%	0
Limpets	3.3%	<1g	0.0%	0

[1] g = gallons; lb = pounds; otherwise, data expressed in number of individuals

Source: Scott et al. 1995; Fall et al. 1995

Table 33. Subsistence Harvests of Marine Invertebrates in Communities of the Chignik Area, 1984

Common English Name[1]	Total Harvests in Numbers[1]					
	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	Total
Razor Clams	47	78	101	125	860	1,211
Butter Clams	2,442	2,082	1,667	1,842	455	8,488
*Horse Clams						
Cockles	382	0	656	3,125	1,211	5,374
*Pinkneck Clams (redneck)						
*Littleneck (Steamer) Clams						
Chitons, Black	18 lb	1 lb	7 lb	78 lb	343 lb	447 lb
*Chitons, Red						
Mussels (blue)	1	0	0	0	0	1
Octopus	41	3	38	17	18	117
Sea Urchins	1 lb	0	0	50 lb	383 lb	434 lb
*Sea Cucumbers						
Shrimp	0	0	0	0	0	0
*Scallops						
King Crab	9	23	0	0	3	35
Dungeness Crab	74	107	28	67	74	350
Tanner Crab	22	302	0	33	0	357
*Snails						
*Limpets						

* Probably used in some communities but data not systematically gathered for 1984; see Table 33 for 1989.

[1] g = gallons; lb = pounds; otherwise, data expressed in number of individuals

Source: Scott et al. 1995; Fall et al. 1995

Table 34. Subsistence Harvests of Marine Invertebrates in Communities of the Chignik Area, 1989

Common English Name[1]	Total Harvests in Numbers[1]					
	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	Total
Razor Clams	33g	12g	5g	8g	55g	113g
Butter Clams	219g	100g	255g	14g	112g	700g
Horse Clams	9g	0	0	0	<1g	9g
Cockles	46g	2g	174g	267g	160g	649g
Pinkneck Clams (redneck)	0	0	0	23g	6g	29g
Littleneck (Steamer) Clams	5g	0	0	10g	8g	23g
Chitons, Black	43g	2g	43g	34g	166g	288g
Chitons, Red	0	0	0	14g	3g	17g
Mussels (blue)	10g	2g	0	2g	6g	20g
Octopus	65	10	19	3	53	150
Sea Urchins	33g	0	61g	22g	173g	289g
Sea Cucumbers	0	0	0	0	<1g	<1g
Shrimp	11 lb	0	11 lb	0	0	22 lb
Scallops	0	0	0	0	0	0
King Crab	3	1	13	43	0	60
Dungeness Crab	389	271	148	310	425	1,543
Tanner Crab	116	165	32	0	44	357
Snails	<1g	0	0	0	<1g	<1g
Limpets	0	0	0	0	<1g	>1g

[1] g = gallons; lb = pounds; otherwise, data expressed in number of individuals

Source: Scott et al. 1995; Fall et al. 1995

also removed from commercial harvests (especially crab) and others were caught as by-catch in other commercial fisheries and retained for home use (such as octopus). As estimated in pounds usable weight, about 7.5 percent of the harvest for home use of all marine invertebrates by the five Chignik communities in 1984 was removed from commercial harvests, as was 12.9 percent in 1989 (Scott et al. 1995; Fall et al. 1995:92-95). Harvests of marine invertebrates occurred year-round.

Maps of areas that the residents of Chignik Area communities used in the 1960s, 1970s, and 1980s to harvest marine invertebrates for subsistence use appear in Fall et al. (1995) and ADF&G (1985). For the most part, harvests occurred near the four coastal communities, with residents of Chignik Lake traveling to Chignik Bay, Castle Bay, or Kuiukta Bay to harvest marine invertebrates.

For shellfish regulatory purposes, the Chignik area is within the Alaska Peninsula - Aleutian Islands Management Area. Until 1993, regulations required that subsistence fishermen in this area to obtain a subsistence shellfish fishing permit. However, very few such permits were ever issued in any of the Chignik communities, and there were no provisions for issuing such permits in any of these communities. The Board of Fisheries repealed this permit requirement in 1993. During the study period, subsistence regulation placed daily bag and possession limits and size restrictions on Dungeness, king, and Tanner crab. As of 1995, the Board of Fisheries had made no customary and traditional use determinations for marine invertebrates in this management area.

CHAPTER FOUR: CONCLUSIONS

This report has provided an overview of the contemporary subsistence fisheries of the Chignik Management Area of southwest Alaska. These fisheries have a long history that predates by thousands of years the arrival of Europeans and Americans to Alaska. Most of the residents of the five year-round communities of the region are descendants of the indigenous Alutiiq people. Many are also descended from Europeans and Americans who arrived in the area in the late 19th and early 20th centuries to participate in the developing commercial fisheries and who married into local families. During the 19th and early 20th centuries, a mixed economy based upon subsistence hunting and fishing, fur harvests, and commercial fishing evolved in this area.

Estimated salmon harvests by subsistence permits holders in the Chignik Area were 20,503 fish in 1993 and 20,300 in 1994. These estimates include harvests of 16,847 salmon in 1993 by households living year-round in one of the five Chignik communities, and 16,359 salmon by these households in 1994. The balance of the harvest was by seasonal residents of the Chignik Area.

The subsistence harvest estimates for 1993 and 1994 for the Chignik Area were substantially higher than the average harvest for 1976 through 1992 of 9,152 salmon. The 1993 and 1994 estimates were also much high than those of other recent years, such as 11,893 salmon for 1991 and 9,862 salmon for 1992. For the most part, these recent higher estimates are the result of improved administration of the permitting process by the department. Over 200 permits were issued in both 1993 and 1994, compared to an average of 59 over the previous 13 years. This represented 101 local year-round households who fished in 1993 and 102 in 1994. Comparisons of permit data with household survey data for 1984 and 1989 demonstrated that the less than half the subsistence fishing households in the five local communities obtained permits in 1984, and less than two-thirds in 1989. By 1993, however, virtually every fishing household received a permit, resulting in a vastly improved harvest estimates for the subsistence salmon fishery.

It is likely that most subsistence salmon harvest estimates based upon the permit data base prior for 1992 and before are substantially low. For example, harvest estimates for 1984 and 1989 based upon household surveys were almost twice as high as the permit data base estimates. With the almost universal participation by local subsistence fishers in the permit system by 1993, the harvest estimate for year-round households for 1993 (16,847 salmon) and 1994 (16,359 salmon) were higher than that survey estimates for 1984 (12,269 salmon) and 1989 (10,868 salmon). This is largely a consequence of an increase in the number of year-round households in the five Chignik Area communities. Chignik Area households in 1993 and 1994 harvested on average about the same number of salmon with subsistence methods (166.8 salmon and 160.4 salmon, respectively) as they had reported harvesting during household surveys in 1984 (164.3 salmon per fishing household) and 1989 (164.1 salmon). This suggests that fishing households provide reliable estimates of their subsistence harvests.

The improved subsistence permit data for 1993 and 1994 also indicted a different composition of the harvest by species compared to the previous 17-year average. The previous average suggested a subsistence harvest dominated by sockeye salmon (85.9 percent), and a relatively low proportion of coho salmon (6.2 percent). The average of the estimated harvests for 1993 and 1994 was 70.3 percent sockeyes and 19.2 percent cohos. This reflects the greater participation by Perryville and Ivanof Bay subsistence fishers in the permitting process, since these communities are responsible for most of the harvests of cohos, chums, and pinks in the Chignik Area. Household survey results for 1984 and 1989 also indicted a larger proportion of cohos in the Chignik Area subsistence harvest, about 27 percent, and a correspondingly lower proportion of sockeyes, about 54 percent. That the 1993 and 1994 average had a lower percentage of cohos than the survey data for 1984 and 1989 is likely due to an increase in year-round households at Chignik Lagoon, who harvest mostly sockeyes, and the inclusion of "red fish" (spawning sockeyes) in the 1993 and 1994 permit data.

In conclusion, into the 1990s, the way of life in the five communities of the Chignik Area continued to be based upon a combination of subsistence harvesting for local use and noncommercial exchange and upon commercial salmon harvesting. Subsistence harvests were relatively large and very diverse. Salmon made up a large portion of these subsistence harvests, with other fish and marine invertebrates also making important contributions to the diet. Most salmon taken for home use were harvested with subsistence methods such as seines and nets (about 75 percent), with harvest activities based from the communities themselves or from fish camps. Subsistence harvesting and processing were largely family activities, with traditional roles assigned by age and sex. Salmon were preserved in a variety of ways, including drying, smoking, canning, salting, and pickling. In the early 1990s, subsistence uses of salmon, other fish, and marine invertebrates in the Chignik Area bound extended families and communities together in networks of cooperative harvesting activities and noncommercial exchanges of wild foods that had cultural, social, and economic importance for the people of these communities.

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APPENDIX TABLES

APPENDIX TABLE 1. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1980

COMMUNTY	Number of Permits Issued	Number of Permits Returned	Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	2	1	50.0%	2	100.0%	0	400	0	0	0	400
CHIGNIK BAY	21	14	66.7%	20	92.9%	0	3,222	0	2	0	3,224
CHIGNIK LAGOON	17	7	41.2%	15	85.7%	0	3,509	0	0	0	3,509
CHIGNIK LAKE	4	1	25.0%	4	100.0%	0	720	0	0	0	720
CORDOVA	6	1	16.7%	6	100.0%	0	1,200	0	0	0	1,200
IVANOF BAY	3	0	0.0%	0	0.0%	0	0	0	0	0	0
JUNEAU	1	1	100.0%	0	0.0%	0	0	0	0	0	0
KASILOF	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KENAI	2	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	11	3	27.3%	11	100.0%	0	1,584	0	0	0	1,584
PERRYVILLE	6	5	83.3%	6	100.0%	4	880	32	475	169	1,560
PORT ANGELES	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SEATTLE	1	0	0.0%	0	0.0%	0	0	0	0	0	0
SELDOVIA	2	1	50.0%	2	100.0%	2	400	0	0	0	402
SEWARD	3	2	66.7%	3	100.0%	0	360	0	2	0	362
UNKNOWN	1	0	0.0%	0	0.0%	0	0	0	0	0	0
TOTAL	82	37	45.1%	70	85.4%	6	12,475	32	478	169	13,160

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 2. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1981

COMMUNTY	Number of Permits Issued	Number of Permits Returned	Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	2	0	0.0%	0	0.0%	0	0	0	0	0	0
CHIGNIK BAY	3	1	33.3%	3	100.0%	0	168	0	0	0	168
CHIGNIK LAGOON	12	4	33.3%	12	100.0%	0	1,401	0	0	0	1,401
CHIGNIK LAKE	6	0	0.0%	0	0.0%	0	0	0	0	0	0
CORDOVA	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KASILOF	1	0	0.0%	0	0.0%	0	0	0	0	0	0
PERRYVILLE	3	2	66.7%	3	100.0%	0	480	0	0	0	480
SELDOVIA	1	0	0.0%	0	0.0%	0	0	0	0	0	0
TOTAL	29	7	24.1%	18	62.1%	0	2,049	0	0	0	2,049

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 3. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1982

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
CHIGNIK BAY	8	3	37.5%	8	100.0%	0	1,632	0	0	0	1,632
CHIGNIK LAGOON	27	3	11.1%	27	100.0%	0	4,500	0	0	0	4,500
CHIGNIK LAKE	9	1	11.1%	9	100.0%	0	684	0	0	0	684
KARLUK	2	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	3	2	66.7%	3	100.0%	3	356	11	0	0	369
OUZINKIE	1	0	0.0%	0	0.0%	0	0	0	0	0	0
PERRYVILLE	8	5	62.5%	8	100.0%	0	1,240	2	2	0	1,243
SELDOVIA	1	1	100.0%	1	100.0%	0	120	0	0	0	120
TOTAL	59	15	25.4%	56	94.9%	3	8,532	12	2	0	8,548

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 4. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1983

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	2	2	100.0%	1	50.0%	0	175	0	0	0	175
CHIGNIK BAY	3	2	66.7%	3	100.0%	0	299	0	0	0	299
CHIGNIK LAGOON	6	4	66.7%	5	75.0%	0	383	0	0	0	383
CHIGNIK LAKE	6	2	33.3%	6	100.0%	0	1,050	0	0	0	1,050
IVANOF BAY	1	1	100.0%	1	100.0%	0	50	600	250	150	1,050
KASILOF	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	2	2	100.0%	2	100.0%	0	362	0	0	0	362
OUZINKIE	1	0	0.0%	0	0.0%	0	0	0	0	0	0
PERRYVILLE	5	4	80.0%	5	100.0%	0	385	719	1,000	700	2,804
SEWARD	3	3	100.0%	3	100.0%	0	210	0	0	0	210
UNALASKA	1	0	0.0%	0	0.0%	0	0	0	0	0	0
UNKNOWN	1	1	100.0%	1	100.0%	0	165	0	0	0	165
TOTAL	32	21	65.6%	27	82.8%	0	3,078	1,319	1,250	850	6,497

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 5. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1984

COMMUNTY	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	5	5	100.0%	3	60.0%	2	480	0	0	0	482
CHIGNIK BAY	16	13	81.3%	15	92.3%	1	2,252	62	0	2	2,318
CHIGNIK LAGOON	9	7	77.8%	6	71.4%	6	1,182	0	0	0	1,188
CHIGNIK LAKE	12	8	66.7%	8	62.5%	0	1,365	0	0	0	1,365
IVANOF BAY	4	1	25.0%	4	100.0%	0	800	0	0	0	800
KODIAK	11	11	100.0%	9	81.8%	11	1,235	0	12	0	1,258
PERRYVILLE	5	5	100.0%	3	60.0%	0	180	400	300	200	1,080
SELDOVIA	4	4	100.0%	1	25.0%	0	150	0	0	0	150
SEWARD	7	7	100.0%	5	71.4%	2	740	2	12	2	758
UNALASKA	1	1	100.0%	1	100.0%	0	200	0	0	0	200
UNKNOWN	3	2	66.7%	3	100.0%	0	164	0	6	0	170
TOTAL	77	64	83.1%	58	74.9%	23	8,747	464	330	204	9,768

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 6. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1985

COMMUNTY	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	5	5	100.0%	4	80.0%	0	475	0	0	0	475
CHIGNIK BAY	11	9	81.8%	10	88.9%	0	1,638	0	0	0	1,638
CHIGNIK LAGOON	13	9	69.2%	10	77.8%	0	1,174	0	0	0	1,174
CHIGNIK LAKE	9	6	66.7%	9	100.0%	0	1,658	0	0	0	1,658
HONOLULU HAWA	1	0	0.0%	0	0.0%	0	0	0	0	0	0
IVANOF BAY	3	3	100.0%	3	100.0%	0	490	50	25	25	590
JUNEAU	1	1	100.0%	1	100.0%	0	15	0	0	0	15
KENAI	1	1	100.0%	0	0.0%	0	0	0	0	0	0
KODIAK	5	4	80.0%	3	50.0%	0	300	0	0	0	300
PERRYVILLE	7	7	100.0%	6	85.7%	0	1,012	0	0	0	1,012
SELDOVIA	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SEWARD	2	2	100.0%	2	100.0%	1	215	0	1	0	217
TOTAL	59	48	81.4%	49	83.1%	1	7,177	50	26	25	7,279

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 7. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1986

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	9	7	77.8%	9	100.0%	4	861	39	0	0	904
CHIGNIK BAY	15	10	66.7%	15	100.0%	0	1,881	17	23	2	1,922
CHIGNIK LAGOON	20	5	25.0%	20	100.0%	0	3,500	0	0	0	3,500
CHIGNIK LAKE	4	2	50.0%	4	100.0%	0	800	0	0	0	800
HOMER	2	0	0.0%	0	0.0%	0	0	0	0	0	0
IVANOF BAY	9	6	66.7%	9	100.0%	0	1,500	150	75	75	1,800
JUNEAU	2	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	5	3	60.0%	5	100.0%	0	483	0	0	0	483
PERRYVILLE	5	2	40.0%	5	100.0%	0	955	0	0	0	955
SELDOVIA	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SEWARD	2	2	100.0%	2	100.0%	0	166	0	0	0	166
TOTAL	74	38	51.4%	70	94.6%	4	10,347	205	98	77	10,730

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

[Note: data for 1987 are unavailable.]

APPENDIX TABLE 8. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1988

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	8	6	75.0%	8	100.0%	0	1,059	0	0	1	1,060
CHIGNIK BAY	26	10	38.5%	26	100.0%	5	2,912	42	42	91	3,091
CHIGNIK LAGOON	12	3	25.0%	12	100.0%	4	1,820	468	12	0	2,304
CHIGNIK LAKE	8	2	25.0%	8	100.0%	0	1,360	0	0	0	1,360
CORDOVA	1	0	0.0%	0	0.0%	0	0	0	0	0	0
CRAIG	1	1	100.0%	1	100.0%	0	200	0	0	0	200
HALIBUT COVE	1	0	0.0%	0	0.0%	0	0	0	0	0	0
HOMER	1	0	0.0%	0	0.0%	0	0	0	0	0	0
IVANOF BAY	5	3	60.0%	5	100.0%	0	0	508	0	50	558
KODIAK	3	1	33.3%	3	100.0%	0	120	210	0	0	330
PERRYVILLE	10	5	50.0%	10	100.0%	0	1,254	200	0	0	1,454
SELDOVIA	2	2	100.0%	2	100.0%	0	248	27	0	0	275
SEWARD	2	1	50.0%	2	100.0%	0	100	0	0	0	100
TOTAL	80	34	42.5%	77	96.3%	9	9,073	1,455	54	142	10,733

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 9. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1989

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	1	1	100.0%	1	100.0%	0	63	0	0	0	63
CHIGNIK BAY	24	7	29.2%	24	100.0%	24	4,605	103	31	3	4,766
CHIGNIK LAGOON	5	4	80.0%	4	75.0%	0	579	0	0	1	580
CHIGNIK LAKE	3	1	33.3%	3	100.0%	0	180	0	0	0	180
HOMER	4	0	0.0%	0	0.0%						
IVANOF BAY	2	2	100.0%	2	100.0%	0	0	281	50	142	473
KODIAK	10	2	20.0%	5	50.0%	0	1,125	0	0	0	1,125
PALMER	1	0	0.0%	0	0.0%						
PERRYVILLE	8	6	75.0%	8	100.0%	0	1,000	0	0	0	1,000
SEWARD	1	0	0.0%	0	0.0%						
UNKNOWN	9	0	0.0%	0	0.0%	0	0	0	0	0	0
TOTAL	68	23	33.8%	47	68.8%	24	7,552	384	81	146	8,187

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 10. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1990

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	5	2	40.0%	5	100.0%	0	700	0	0	0	700
BIG LAKE	1	1	100.0%	1	100.0%	0	8	0	0	0	8
CHIGNIK BAY	29	6	20.7%	29	100.0%	92	4,273	10	0	15	4,389
CHIGNIK LAGOON	12	1	8.3%	12	100.0%	0	1,488	0	0	0	1,488
CHIGNIK LAKE	2	2	100.0%	2	100.0%	10	208	0	3	0	221
FAIRBANKS	1	1	100.0%	1	100.0%	0	8	0	0	0	8
HOMER	1	1	100.0%	1	100.0%	0	10	0	0	0	10
IVANOF BAY	3	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	6	3	50.0%	4	66.7%	0	496	0	0	0	496
PERRYVILLE	4	3	75.0%	4	100.0%	0	393	200	467	100	1,160
SEATTLE WA.	1	0	0.0%	0	0.0%	0	0	0	0	0	0
SELDOVIA	3	3	100.0%	3	100.0%	1	515	0	0	0	516
UNKNOWN	4	0	0.0%	0	0.0%	0	0	0	0	0	0
TOTAL	72	23	31.9%	62	86.1%	103	8,099	210	470	115	8,996

APPENDIX TABLE 11. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1991

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	10	6	60.0%	10	100.0%	0	1,183	0	0	0	1,183
CHIGNIK BAY	31	18	58.1%	29	94.4%	3	3,792	10	29	21	3,856
CHIGNIK LAGOON	14	8	57.1%	12	87.5%	18	1,757	0	0	0	1,775
CHIGNIK LAKE	10	8	80.0%	9	87.5%	6	1,341	3	0	0	1,350
IVANOF BAY	3	2	66.7%	3	100.0%	0	600	0	0	0	600
KODIAK	12	5	41.7%	7	60.0%	14	1,080	0	0	0	1,094
PERRYVILLE	11	9	81.8%	9	77.8%	0	929	0	246	60	1,234
SELDOVIA	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SEWARD	3	1	33.3%	3	100.0%	0	600	0	0	0	600
TOTAL	95	58	61.1%	83	87.4%	42	11,483	13	275	81	11,893

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 12. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1992

COMMUNTY	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	2	0	0.0%	0	0.0%	0	0	0	0	0	0
CHIGNIK BAY	32	6	18.8%	32	100.0%	48	3,797	16	0	5	3,867
CHIGNIK LAGOON	13	4	30.8%	10	75.0%	3	1,619	0	0	0	1,622
CHIGNIK LAKE	22	1	4.5%	22	100.0%	0	1,320	0	0	0	1,320
IVANOF BAY	3	1	33.3%	0	0.0%	0	0	0	0	0	0
KING COVE	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	3	0	0.0%	0	0.0%	0	0	0	0	0	0
PERRYVILLE	21	6	28.6%	21	100.0%	4	1,663	693	305	140	2,804
SELDOVIA	1	1	100.0%	1	100.0%	0	250	0	0	0	250
TOTAL	98	19	19.4%	86	87.5%	55	8,648	709	305	145	9,862

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 13. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1993

COMMUNTY	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	6	3	50.0%	6	100.00%	0	640	0	0	0	640
CHIGNIK BAY	44	31	70.5%	30	67.74%	53	2233	234	7	68	2595
CHIGNIK LAGOON	36	24	66.7%	33	91.67%	33	3569	441	80	3	4125
CHIGNIK LAKE	41	33	80.5%	36	87.88%	6	5698	328	153	75	6259
CORDOVA	1	0	0.0%	0	0.00%	0	0	0	0	0	0
HALIBUT COVE	1	1	100.0%	0	0.00%	0	0	0	0	0	0
HOMER	2	1	50.0%	0	0.00%	0	0	0	0	0	0
IVANOF BAY	13	11	84.6%	13	100.00%	4	301	762	279	345	1691
KODIAK	8	4	50.0%	6	75.00%	0	404	0	0	0	404
PALMER	1	1	100.0%	1	100.00%	0	18	0	0	0	18
PERRYVILLE	42	30	71.4%	35	83.33%	25	1478	1999	746	151	4400
SELDOVIA	1	1	100.0%	1	100.00%	0	225	0	0	0	225
SEWARD	2	1	50.0%	2	100.00%	2	144	0	0	0	146
UNKNOWN	3	0	0.0%	0	0.00%	0	0	0	0	0	0
TOTAL	201	141	70.1%	163	81.0%	122	14,710	3,765	1,265	642	20,503

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

APPENDIX TABLE 14. ESTIMATED CHIGNIK AREA SUBSISTENCE SALMON HARVESTS, 1994

COMMUNTY	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Coho	Pink	Chum	Total
ANCHORAGE	4	2	50.0%	2	50.0%	0	92	0	0	0	92
CHIGNIK BAY	49	22	44.9%	31	63.6%	31	2,096	285	27	7	2,446
CHIGNIK LAGOON	52	22	42.3%	31	59.1%	24	2,314	189	0	7	2,534
CHIGNIK LAKE	42	33	78.6%	38	90.9%	38	5,422	19	0	0	5,479
HOMER	4	1	25.0%	4	100.0%	0	600	0	0	0	600
IVANOF BAY	13	8	61.5%	13	100.0%	23	681	978	333	219	2,234
JUNEAU	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KARLUK	1	0	0.0%	0	0.0%	0	0	0	0	0	0
KODIAK	4	1	25.0%	4	100.0%	0	168	0	0	0	168
PALMER	1	1	100.0%	1	100.0%	0	24	0	0	0	24
PERRYVILLE	43	28	65.1%	31	71.4%	48	1,935	2,583	1,361	141	6,068
PORT GRAHAM	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SELDOVIA	1	1	100.0%	1	100.0%	0	200	0	0	0	200
SEWARD	2	1	50.0%	2	100.0%	0	230	0	0	8	238
SUTTON	1	1	100.0%	1	100.0%	2	16	0	0	0	18
TOTAL	219	122	55.7%	160	73.0%	165	13,978	4,055	1,720	382	20,300

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 15. Estimated Subsistence Harvests of Salmon, Chignik Bay, 1980 - 1994, Based upon Returned Permits

Year	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvest					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Silver	Pink	Chum	Total
1980	21	14	66.7%	20	92.9%	0	3,222	0	2	0	3,224
1981	3	1	33.3%	3	100.0%	0	168	0	0	0	168
1982	8	3	37.5%	8	100.0%	0	1,632	0	0	0	1,632
1983	3	2	66.7%	3	100.0%	0	299	0	0	0	299
1984	16	13	81.3%	15	92.3%	1	2,252	62	0	2	2,318
1985	11	9	81.8%	10	88.9%	0	1,638	0	0	0	1,638
1986	15	10	66.7%	15	100.0%	0	1,881	17	23	2	1,922
1987	No Data Available										
1988	26	10	38.5%	26	100.0%	5	2,912	42	42	91	3,091
1989	24	7	29.2%	24	100.0%	24	4,605	103	31	3	4,766
1990	29	6	20.7%	29	100.0%	92	4,273	10	0	15	4,389
1991	31	18	58.1%	29	94.4%	3	3,792	10	29	21	3,856
1992	32	6	18.8%	32	100.0%	48	3,797	16	0	5	3,867
1993	44	31	70.5%	30	67.7%	53	2,233	234	7	68	2,595
1994	49	22	44.9%	31	63.6%	31	2,096	285	27	7	2,446

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 16. Estimated Subsistence Harvests of Salmon, Chignik Lagoon, 1980 - 1994, Based upon Return Permits

Year	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvest					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Silver	Pink	Chum	Total
1980	17	7	41.2%	15	85.7%	0	3,509	0	0	0	3,509
1981	12	4	33.3%	12	100.0%	0	1,401	0	0	0	1,401
1982	27	3	11.1%	27	100.0%	0	4,500	0	0	0	4,500
1983	6	4	66.7%	5	75.0%	0	383	0	0	0	383
1984	9	7	77.8%	6	71.4%	6	1,182	0	0	0	1,188
1985	13	9	69.2%	10	77.8%	0	1,174	0	0	0	1,174
1986	20	5	25.0%	20	100.0%	0	3,500	0	0	0	3,500
1987	No Data Available										
1988	12	3	25.0%	12	100.0%	4	1,820	468	12	0	2,304
1989	5	4	80.0%	4	75.0%	0	579	0	0	1	580
1990	12	1	8.3%	12	100.0%	0	1,488	0	0	0	1,488
1991	14	8	57.1%	12	87.5%	18	1,757	0	0	0	1,775
1992	13	4	30.8%	10	75.0%	3	1,619	0	0	0	1,622
1993	36	24	66.7%	33	91.7%	33	3,569	441	80	3	4,125
1994	52	22	42.3%	31	59.1%	24	2,314	189	0	7	2,534

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 17. Estimated Subsistence Harvests of Salmon, Chignik Lake, 1980-1994, Based upon Returned Permits

Year	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Silver	Pink	Chum	Total
1980	4	1	25.0%	4	100.0%	0	720	0	0	0	720
1981	6	0	0.0%	0	0.0%	0	0	0	0	0	0
1982	9	1	11.1%	9	100.0%	0	684	0	0	0	684
1983	6	2	33.3%	6	100.0%	0	1,050	0	0	0	1,050
1984	12	8	66.7%	8	62.5%	0	1,365	0	0	0	1,365
1985	9	6	66.7%	9	100.0%	0	1,658	0	0	0	1,658
1986	4	2	50.0%	4	100.0%	0	800	0	0	0	800
1987	No data Available										
1988	8	2	25.0%	8	100.0%	0	1,360	0	0	0	1,360
1989	3	1	33.3%	3	100.0%	0	180	0	0	0	180
1990	2	2	100.0%	2	100.0%	10	208	0	3	0	221
1991	10	8	80.0%	9	87.5%	6	1,341	3	0	0	1,350
1992	22	1	4.5%	22	100.0%	0	1,320	0	0	0	1,320
1993	41	33	80.5%	36	87.9%	6	5,698	328	153	75	6,259
1994	42	33	78.6%	38	90.9%	38	5,422	19	0	0	5,479

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 18. Estimated Subsistence Harvests of Salmon, Ivanof Bay, 1980 - 1994, Based upon Returned Permits

Year	Number of Permits		Percentage Returned	Estimated Number Fished	Percentage Fished	Estimated Harvests					
	Issued	Returned				Chinook	Sockeye	Silver	Pink	Chum	Total
1980	3	0	0.0%	0	0.0%	0	0	0	0	0	0
1981	0			0							
1982	0			0							
1983	1	1	100.0%	1	100.0%	0	50	600	250	150	1,050
1984	4	1	25.0%	4	100.0%	0	800	0	0	0	800
1985	3	3	100.0%	3	100.0%	0	490	50	25	25	590
1986	9	6	66.7%	9	100.0%	0	1,500	150	75	75	1,800
1987	No Data Available										
1988	5	3	60.0%	5	100.0%	0	0	508	0	50	558
1989	2	2	100.0%	2	100.0%	0	0	281	50	142	473
1990	3	0	0.0%	0	0.0%	0	0	0	0	0	0
1991	3	2	66.7%	3	100.0%	0	600	0	0	0	600
1992	3	1	33.3%	0	0.0%	0	0	0	0	0	0
1993	13	11	84.6%	13	100.0%	4	301	762	279	345	1,691
1994	13	8	61.5%	13	100.0%	23	681	978	333	219	2,234

Source: Division of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 19. Estimated Subsistence Harvests of Salmon, Perryville, 1980 - 1994, Based upon Returned Permits

Year	Number of Permits		Percentage	Estimated Number	Percentage	Estimated Harvests					
	Issued	Returned	Returned	Fished	Fished	Chinook	Sockeye	Silver	Pink	Chum	Total
1980	6	5	83.3%	6	100.0%	4	880	32	475	169	1,560
1981	3	2	66.7%	3	100.0%	0	480	0	0	0	480
1982	8	5	62.5%	8	100.0%	0	1,240	2	2	0	1,243
1983	5	4	80.0%	5	100.0%	0	385	719	1,000	700	2,804
1984	5	5	100.0%	3	60.0%	0	180	400	300	200	1,080
1985	7	7	100.0%	6	85.7%	0	1,012	0	0	0	1,012
1986	5	2	40.0%	5	100.0%	0	955	0	0	0	955
1987	No Data Available										
1988	10	5	50.0%	10	100.0%	0	1,254	200	0	0	1,454
1989	8	6	75.0%	8	100.0%	0	1,000	0	0	0	1,000
1990	4	3	75.0%	4	100.0%	0	393	200	467	100	1,160
1991	11	9	81.8%	9	77.8%	0	929	0	246	60	1,234
1992	21	6	28.6%	21	100.0%	4	1,663	693	305	140	2,804
1993	42	30	71.4%	35	83.3%	25	1,478	1,999	746	151	4,400
1994	43	28	65.1%	31	71.4%	48	1,935	2,583	1,361	141	6,068

Source: Divison of Subsistence, ADF&G, Chignik Subsistence Salmon Permit Database

Appendix Table 20. Average Subsistence Salmon Harvest per Permit Fished, Chignik Area Communities, 1980 - 1994 [1]

	Average Number of Salmon Harvested per Permit Fished					
	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	All Local Communities
1980	165.3	240.8	180.0		260.0	204.5
1981	56.0	116.8			160.0	113.8
1982	204.0	166.7	76.0		155.4	155.0
1983	99.5	85.0	175.0	1050.0	560.8	286.4
1984	156.9	184.8	182.0	200.0	360.0	189.1
1985	167.5	116.1	184.2	196.7	168.7	160.2
1986	128.1	175.0	200.0	200.0	191.0	169.4
1987						
1988	118.9	192.0	170.0	111.7	145.4	143.7
1989	198.6	145.0	60.0	236.5	125.0	170.7
1990	151.3	124.0	110.5		290.0	154.4
1991	131.7	144.9	154.3	200.0	144.3	142.6
1992	120.8	166.3	60.0		133.5	113.4
1993	86.5	125.0	173.9	130.1	125.7	129.7
1994	78.4	82.5	143.5	171.9	197.6	130.5
Average	130.3	144.4	142.6	184.8	177.8	148.6

[1] No community-level data available for 1987. For other years, blank cells indicate that no permits were returned with reported harvests. 1983 includes "community permits" issued to Ivanof Bay and Perryville.

See Appendix Tables 15 - 19 for estimated harvests and estimated number of permits fished.

Source: Division of Subsistence, ADF&G, Chignik Area Subsistence Salmon Database

Appendix Table 21. Reported Subsistence Harvests per Permit, Chignik Area, 1980 - 1994[1]

Year	Reported Harvests, Number of Salmon						Permits Returned that Fished
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250	over 250	
1980	0.0%	5.9%	23.5%	55.9%	5.9%	8.8%	34
1981	14.3%	28.6%	14.3%	28.6%	14.3%	0.0%	7
1982	6.7%	13.3%	33.3%	33.3%	13.3%	0.0%	15
1983	10.5%	26.3%	10.5%	36.8%	0.0%	15.8%	19
1984	2.1%	17.0%	27.7%	42.6%	6.4%	4.3%	47
1985	7.5%	12.5%	22.5%	57.5%	0.0%	0.0%	40
1986	13.2%	18.4%	13.2%	55.3%	0.0%	0.0%	38
1987	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	1
1988	14.7%	17.6%	20.6%	47.1%	0.0%	0.0%	34
1989	9.5%	14.3%	19.0%	28.6%	28.6%	0.0%	21
1990	13.6%	27.3%	22.7%	22.7%	9.1%	4.5%	22
1991	12.0%	24.0%	12.0%	36.0%	14.0%	2.0%	50
1992	11.8%	35.3%	11.8%	11.8%	29.4%	0.0%	17
1993	22.2%	20.5%	17.1%	27.4%	5.1%	7.7%	117
1994	26.9%	17.2%	11.8%	32.3%	4.3%	7.5%	93
Average[2]	14.8%	18.7%	17.7%	37.3%	6.8%	4.7%	40

[1] "Permits Returned" means the number of that can be accounted for in the database.

[2] Average of permits returned does not include 1987.

Source: Division of Subsistence, ADF&G, Chignik Subsistence Permit Database