

SUBSISTENCE USE OF HERRING
IN THE NELSON ISLAND REGION OF ALASKA

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ABSTRACT

This report summarizes information on the subsistence use of herring by nine villages in the Nelson Island region of Western Alaska. Herring is the major food source of Nelson Island villages, especially as a dried food product important in the winter diet. Each village catches and dries herring from traditional areas near the community or near spring camps. Technology is relatively small scale and adapted to local conditions: primarily set gill nets less than 50 fathoms in length picked from skiffs about 22 feet or less.

No complete survey of subsistence harvest levels ever has been made for the nine villages in this region. A 1980 survey of only four villages showed a harvest of 100.9 metric tons; a 1983 survey for Tununak showed a harvest of 85.0 metric tons for that village alone.

In the past, proposals to open Nelson Island herring stocks to commercial fishing have met strong opposition by Nelson Island area residents, in part because residents observed decreases in abundance and size of stocks when Japanese and Soviet commercial trawl fleets harvested herring in Eastern Bering Sea in the 1960s and 1970s. These recent historic depletions created difficulties for the subsistence fishery, and residents view local stocks are still recovering. While still concerned about the adverse effects of commercialization, the United Villages of Nelson Island support a conservatively-managed local commercial herring fishery if commercialization is inevitable in the Nelson Island region. It is probable that the number of local fishermen

(estimated at least at about 127 people from halibut permits) could harvest the 850 metric-ton harvest proposed by the Division of Commercial Fisheries, based on the performance of local fishermen at the Cape Romanzoff herring fishery which present similar local conditions. The villages of the Nelson Island region currently rank among the lowest in the State in per capita income, and are supported by local economies combining subsistence fishing and hunting with intermittent cash employment.

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INTRODUCTION

The importance of the subsistence use of herring to residents of Nelson Island and vicinity has been reported in many sources (cf., Lantis 1946; Barton 1978; Hemming, Harrison, and Braund 1978; Lenz 1980; Skrade 1980; Fienup-Riordan 1983). In the past, proposals to open Nelson Island herring stocks to commercial fishing have been met with intense opposition by Nelson Island and area residents, in part because of their experience with the effects of previous offshore commercial harvests by foreign fisheries (Hemming et al. 1978). This year, there are proposals to open the Nelson Island herring stocks to commercial harvest. This report presents existing information on the subsistence use of herring in the Nelson Island region that could be employed in the consideration of current proposals.

PURPOSE

This report summarizes available information on the subsistence use of herring by communities of Nelson Island and vicinity, including Tununak, Newtok, Toksook Bay, Nightmute, Chefornak, the northern Kuskokwim Bay villages of Kipnuk, Kongiganak, and Kwigillingok, and Mekoryuk on Nunivak Island (Fig. 1). Information on times of harvest, methods of harvesting and processing, areas used, and harvest levels for each community is presented. Additionally, this report discusses the local concern about the potential impact of commercialization of herring in this region.

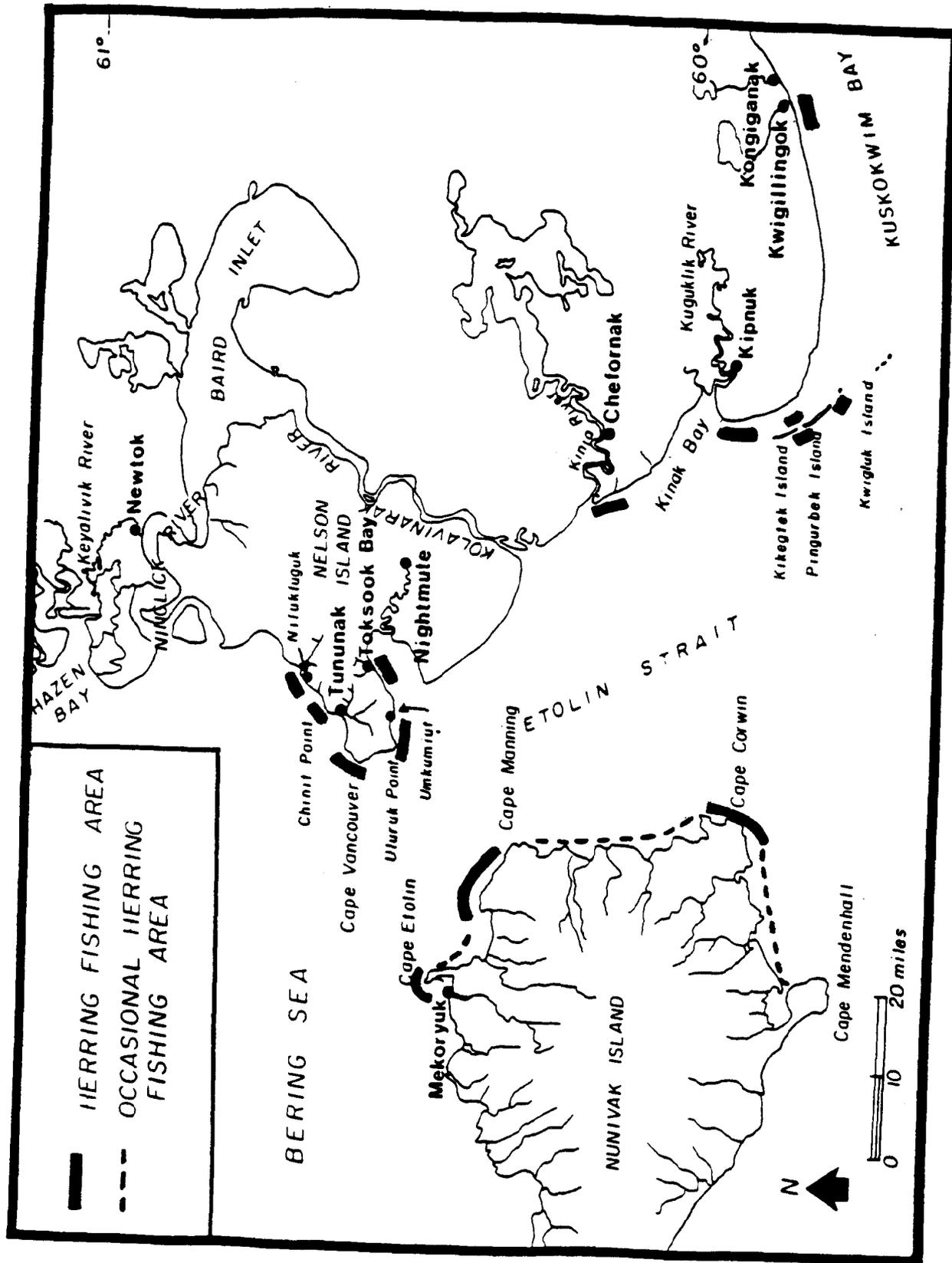


Fig. 1. Locations of communities and subsistence herring fishing areas.

METHODOLOGY

Information on the subsistence use of herring in Nelson Island and vicinity was derived from a review of the literature, including Alaska Department of Fish and Game, Division of Commercial Fisheries herring reports (Barton 1978; Skrade 1980; Regnart and Kingsbury 1980; Fried, Whitmore, and Bergstrom 1982, 1984), other reports focusing on herring (Hemming, Harrison, Braund 1978; North Pacific Fishery Management Council 1981; Lenz 1980), as well as ethnographic sources (e.g. Nelson 1979; Lantis 1946; Fienup-Riordan 1983). Findings from Division of Subsistence studies in Kwigillingok (Stickney 1984) and Mekoryuk and Nelson Island (field notes) are also compiled here, as well as information from informal interviews by Division of Subsistence staff with area residents during meetings and visits.

COMMUNITIES USING HERRING

Geographic Locations

The nine communities discussed in this report are located between Hazen Bay on the north to Kuskokwim Bay on the south (Fig. 1). Three of the communities are located directly on the Bering Sea coast and six are along rivers. All have access to and use herring for subsistence purposes. Tununak, Toksook Bay, and Nightmute are on Nelson Island proper. Tununak is on the north shore and about 6 miles northeast of Cape Vancouver and Toksook Bay is roughly 6.5 miles southeast of Tununak on the south shore of the peninsula that is formed by Cape Vancouver. The present locations of Tununak and Toksook Bay have been noted as being influential in their current levels of herring use (Hemming et al. 1978). Earlier in the

century, Tununak was a spring and summer camp for harvesting sea mammals, herring, salmon, and other marine resources. In winter, Tununak residents moved near Chakchak, which is on the eastern (inland) side of Nelson Island, or moved to many small extended-family based settlements around the vicinity of Keyalivik, which is north of Nelson Island and east of Newtok. From these settlements, they harvested pike, burbot, whitefish, blackfish, and other resources throughout the winter (Hemming et al. 1978). The establishment of Tununak as a permanent settlement occurred to facilitate participation and use of the school, church, and stores.

Toksook Bay, another customary summer camp, was established as a permanent settlement in 1964 by some residents of Nightmute, because erosion threatened their houses and they wanted to establish a school that would get more reliable barge service (Hemming et al. 1978; Fienup-Riordan 1982, 1983). The present locations of Tununak and Toksook Bay may make trips to traditional winter harvesting areas more prohibitive because of the costs in fuel, time, and equipment, thereby contributing to an increased dependence on herring (Hemming et al. 1978).

Mekoryuk is located on the northeast coast of Nunivak Island, which is approximately 23 miles from the mainland across Etolin Strait. The other six villages which harvest herring are situated along rivers (Fig. 1). Nightmute is about 22 river miles or 8 miles overland from the coast at the base of a hill along the Toksook River. Newtok is situated along the Keyalivik River, across the Ninglick River, which separates Nelson Island from the mainland. It is approximately 12 to 19 river miles inland from the coast and 36 miles north east of Cape Vancouver. Chefornak is located south of Nelson Island about 15 river or 7

miles inland along the Kinak River. Kipnuk is about 15 miles southwest of Chefornak, approximately 5 miles inland on the banks of the Kuguklik River. About 25 miles eastward from Kipnuk, Kwigillingok is situated on the north shore of Kuskokwim Bay, less than a mile from the coast on the west bank of the Kwigillingok River (Stickney 1984). Kongiganak is about 9 miles northeast of Kwigillingok, roughly 6 river miles inland on the east bank of the Kongnignanohk River.

Community Characteristics

The nine communities range in size from 119 persons in 23 households (Newtok) to 371 persons in 81 households (Kipnuk) (Table 1). All are primarily Alaska Native (Yup'ik Eskimo), with the overall average being about 96 percent Alaska Native (Table 1) (U.S. Bureau of Census 1980). None of the communities are road-connected and they all receive services and supplies by barge and air from Seattle or other points, primarily through the regional center of Bethel. Each has comparable educational, medical and commercial services.

The local economy of these communities is characterized as a "mixed subsistence-based economy" referring to their use of local wild resources obtained by hunting, trapping, fishing, and gathering with some income secured by primarily seasonal, though intermittent, wage employment, commercial sale of halibut, salmon, herring, and furs and cottage industries (cf. Wolfe 1981, 1983). The numbers of people in eight villages holding commercial fishing permits in 1984 is summarized in Table 2. This information shows that most Nelson Island area permit holders have only commercial halibut permits, with some holding a combination of halibut, salmon, and herring permits. All commercial (and subsistence)

TABLE 1. 1980 POPULATION SIZE AND COMPOSITION OF NELSON ISLAND,
KUSKOKWIM BAY COMMUNITIES AND MEKORYUK^a

Village	Population Size	Number of Households	Alaska Native Number (Percent)
Nightmute	119	23	116 (97.5)
Tununak	298	63	283 (95.0)
Toksook Bay	333	60	312 (93.7)
Newtok	131	28	124 (94.7)
Chefornak	230	44	221 (96.1)
Kongiganak	239	52	231 (96.7)
Kwigillingok	354	65	343 (96.9)
Kipnuk	371	81	358 (96.5)
Mekoryuk	<u>160</u>	<u>49</u>	<u>153 (95.6)</u>
Total	2,235	464	2,141 (95.8)

a. Source: U.S. Bureau of Census 1980

TABLE 2. NUMBERS OF PERSONS WITH COMMERCIAL FISHING PERMITS BY PERMIT TYPE AND VILLAGE IN 1984^a

	Halibut ^b Only	Halibut ^b and Herring K / BB ^c	Halibut ^b and Salmon K / BB ^c	Herring Only K / BB ^c	Herring and Salmon K / BB ^c	Salmon Only K / BB ^c	Total
Tununak	61	3				6	70
Toksook Bay	39	1	2	2	3	8	55
Newtok	7			1	1	3	12
Nightmute	14					4	18
Chefornak	6		1	1		3 / 4	15
Kwigillingok						15 / 5	20
Kongiganak				4 ^d		19 / 2	25
Kipnuk			1	2 / 2	2 / 1	11 / 8	27
Total	127	3 / 1	4	2 / 6	6 / 5	48 / 40	242

a. Source: Commercial Fisheries Entry Commission

b. All halibut permits are for Statewide waters, however, most of the residents of these villages fish off Nelson Island.

c. K refers to Kuskokwim Management Area and BB refers to Bristol Bay; these are for herring and salmon permits.

d. Three permit holders for Kuskokwim commercial salmon fishing also have Bristol Bay commercial herring permits.

TABLE 3. 1979 PER CAPITA AND MEDIAN HOUSEHOLD
INCOME BY COMMUNITY^a

Community	Per Capita Income	Median Household Income
Bethel	\$8,217	\$22,468
Chefornak	3,381	11,667
Mekoryuk	3,473	9,479
Newtok	1,691	2,500
Nightmute	2,955	8,750
Toksook Bay	2,859	13,636
Tununak	2,925	9,667
Kongiganak	b	10,500
Kipnuk	b	15,536
Kwigillingok	b	15,938

a. Source: U.S. Bureau of Census 1980

b. Not available because the U.S. Bureau of Census computed this figure for incorporated communities only; these communities are unincorporated.

halibut fishing occurs in the vicinity of Nelson Island, while fishing commercially for herring and/or salmon takes place in Bristol Bay or Kuskokwim Bay. Most permit holders from Kipnuk, Kongiganak, and Kwigillingok have only commercial salmon permits (83 percent) with a few holding multiple permits for salmon and herring and one holding both halibut and salmon permits (Table 2). No one from Mekoryuk was listed as a permit holder. In 1979, per capita incomes ranged from \$1,691 to \$3,473 compared to \$8,217 at Bethel (Table 3) (U.S. Census Bureau 1980). The reported incomes of these communities are among the lowest in the state (Alaska Department of Labor 1981:22)

GEOGRAPHIC AREAS USED FOR HARVESTING HERRING

Harvesting herring for subsistence has a long, historic time depth on Nelson Island and Nunivak Island (Hemming et al. 1978). Harvesting areas near Nelson Island include Niliklugak, Chinit Point, Cape Vancouver, Uluruk to Umkumiut, and west of Toksook Bay village (Fig. 1). Nunivak Island also has been used for a long, but unspecified, period for harvesting herring. By contrast, the harvesting areas near Chefornak, Kipnuk, Kwigillingok, and Kongiganak are relatively new. These areas are reported as initially being used as recently as the late 1960s and early 1970s (Hemming et al. 1978; Stickney 1984). Residents of these latter communities formerly went up to the Nelson Island area to harvest herring or obtained dried herring through trade with Nelson Island residents (Stickney 1984). Residents of Kipnuk, Kwigillingok, and Kongiganak stated that the herring that pass near their villages do not spawn (Hemming et al. 1978; Stickney 1984). It seems possible that herring are relatively recent arrivals in the areas around Kipnuk, Kwigillingok,

and Kongiganak; but the reconstruction of this natural history is yet to be done.

The geographic areas depicted in Figure 1 correspond to use areas of specific villages. The extent of use of particular areas by local residents is influenced by the size and movement of the herring runs and weather each year. For example, in 1980 residents of Tununak and Toksook Bay reported herring fishing almost exclusively off Cape Vancouver rather than off Chinit Point (which is a Tununak set net area) or off the coast west of Toksook Bay. Reasons given for this shift were that herring at Chinit Point and around Toksook Bay were smaller in size and fewer in number than usual, and inclement weather had prohibited harvesting herring at the peak times of productivity at Chinit Point and near Toksook Bay (Alaska Department of Fish and Game 1980).

The villages of Tununak and Toksook Bay are the most advantageously located to harvest herring. Herring are abundant near the villages, and people do not have to set up camps at remote locations during the herring season to harvest, process, and dry their catches. In most years, Tununak residents prefer to set their nets off Chinit Point because of its closeness to the village, but also use Cape Vancouver, if herring are not abundant at Chinit Point (Fig. 1). Toksook Bay residents set their nets off the coast west of the village or at the shallow waters at the mouth of the Toksook River (Fig. 1). Some Toksook Bay residents may join relatives from Nightmute during herring season at Umkumiut.

Some residents of Newtok go to Tununak, Toksook Bay, or Umkumiut to help relatives in those villages harvest and process herring, returning to Newtok after the herring season with some dried herring to use them-

selves throughout the year (cf. Fienup-Riordan 1982, 1983). Newtok residents have traditionally travelled about 30 miles to set up spring camp at Niliklugak, which is about 8 miles northeast of Tununak (Fig. 1). They reported that 1978 was the first year in about ten years that they had gone to Niliklugak to harvest herring due to ice and weather conditions, which prevented travel by boat (Hemming et al. 1978). At this time, it is not known whether they have continued to establish herring camp at Niliklugak since 1978.

Nightmute residents commonly catch herring in two different locations. Some Nightmute residents move for spring camp at Umkumiut. Their nets are set from the point just west of Umkumiut along the coast to Uluruk (Fig. 1). Another option for some Nightmute people is to stay with relatives at Toksook Bay during herring season to harvest herring from areas used by Toksook Bay residents (Fienup-Riordan 1983).

Mekoryuk residents commonly take herring from areas between Shoal Bay and Cape Corwin (Stickney 1982: field notes). Harvesting areas of Mekoryuk residents vary from year to year depending upon several factors and Mekoryuk residents are not noted as harvesting as much herring as Tununak and Toksook Bay residents (Lantis 1946). Perhaps this is due in part to the higher unpredictability of finding harvestable numbers of herring near Mekoryuk since most spawning takes place along the southeast shore of Nunivak Island (Lantis 1946; Stickney 1982: field notes; Alaska Department of Fish and Game Proposal 83, see appendix), with sporadic spawning around the rest of the island (Stickney 1982: field notes). Additionally, Mekoryuk residents are known to hunt and harvest more walrus in the spring than Tununak and Toksook Bay residents, and the spring walrus hunt most

often occurs concurrently with the time when herring are passing through the area. In some years, the presence of ice on the north shore of Nunivak Island hampers harvesting herring in Shoal Bay and off Cape Etolin, so residents of Mekoryuk may go to the east side of the island (Fig. 1) (Stickney 1982: field notes). Herring harvesting off the east and south sides of the island sometimes occur in conjunction with spring sea mammal hunting and cod and halibut jigging trips (Stickney 1982: field notes).

As mentioned above, residents of the communities of Chefornak, Kipnuk, Kwigillingok, and Kongiganak began harvesting herring from areas near their villages fairly recently (Hemming et al. 1978; Stickney 1984). These areas maybe undergoing recent shifts or expansion with increased familiarity and knowledge of herring movements in these areas. According to the last published account in 1978, Chefornak residents set nets for herring just south of the mouth of the Kinia River (Fig. 1) (Hemming et al. 1978). Residents of Kipnuk place their nets south of the mouth of the Kuguklik River between Kigegtek and Pingurbek Islands and at the south end of Pingurbek Island (Hemming et al. 1978; Stickney 1984). Some Kwigillingok residents also drift for herring in the waters on either end of Pingurbek Island, but the mouth of the Kwigillingok River is more commonly used by Kwigillingok residents because of its proximity to the settlement (Stickney 1984). As no herring appeared near Kongiganak in 1978, residents of that community reported moving to Kwigillingok during herring season to harvest herring from areas used by Kwigillingok people, with nets borrowed from relatives and friends at Kwigillingok (Hemming et al. 1978). However, herring are described as

moving south along the coast and have appeared near Kongiganak (Stickney 1984), and that community may have since started harvesting herring from the mouth of the Kongignanohk River.

Herring Roe-On-Kelp

Harvesting of herring roe-on-kelp (Fucus sp.) occurs only around Nelson Island proper (Hemming et al. 1978) and around Nunivak Island. Areas from Chefnak to Kongiganak do not have kelp and herring spawn on eel grass, if at all, in these areas. Usually roe-on-kelp is gathered for subsistence in conjunction with setting or checking of herring set nets. Roe-on-kelp is gathered from kelp beds on adjacent shores, or by walking to these areas during low tide.

METHODS OF HARVESTING AND PROCESSING

Herring are caught using gill nets with stretched mesh sizes ranging between 2 1/4 to 2 1/2 inches, and with depths of 6 to 8 feet. Most herring fishermen use nets between 18 to 75 feet long (Hemming et al. 1978), though nets up to 300 feet are used in Chefnak and Kipnuk (Hemming et al. 1978). Nets are set perpendicular to the shore with one end anchored to the shore. They are "picked" by shaking the herring off the net while the net is pulled over and across the boat. Drifting with gill nets for herring is another method used by Kwigillingok residents (Stickney 1984). Most vessels are locally made wooden skiffs, although some use aluminum boats. Both types range between 16 to 22 feet in length (cf. Hemming et al. 1978). The few fishermen with commercial salmon permits leave their large commercial fishing boats (30 to 32 feet in length) in Bristol Bay for the winter.

Duration of harvesting activity varies from year to year ranging from a few days to several weeks. Ice presence and weather conditions affect timing and length of harvesting, as well as success in drying of the herring caught. When offshore winds prevail during the herring run, herring stay away from the rough coastal waters and are difficult to catch (Hemming et al. 1978; Fienup-Riordan 1983). Although onshore winds drive herring to the shore, if much ice is present, these winds can drive the ice to the shore, hampering harvesting activities. Consequently, when optimum conditions exist people work around the clock to get all the herring they need, or all that the women can process in a reasonable amount of time without wasting herring through spoilage. Nets are emptied, usually by men, several times during high tide.

On Nelson Island, the first run is composed of "fatty" herring, which require more processing because a high oil content makes them more difficult to dry. Less fatty herring from later runs are more desirable because they are easier to dry.

Once the herring are caught, they are deposited in grass-lined pits near drying racks to age overnight or a few days, preferably until they are easier to gut and the sac-roë has hardened enough to come out clean and whole from the rest of the entrails. Most of the processing is done by women.

Fat herring are filleted and opened along the backbone, the sac-roë is set aside, entrails removed and discarded, and each one is laid out on rocks, cardboard, or logs to allow some of the fat to seep out until they are braided (see below). Herring processed in this manner are called ullipngayat (from ulligte-: to cut fish for drying, making cuts so that

air can reach all parts of the flesh). Other herring are gutted by running the right thumb from under the gills down to the stomach, and again, eggs are separated and guts discarded. All sac-roes from processed herring is laid out on flat dry surfaces (rocks, logs, cardboard, or plywood) to dry.

For air drying, herring are braided with grass (taperrnat) tightened under the gills, into strings containing between 60 to 100 herring. The strings are hung on drying racks. Most drying racks consist of two posts about 6 to 7 feet high with a 12 to 15 foot log across the top, however, a few people have the older teepee style racks (Hemming et al. 1978). Each string of herring is turned every few days to facilitate drying, and the racks are covered with grass mats or visqueen during rainy weather.

When dry, each herring is twisted and pulled from its head and stored in large loosely woven grass baskets, which allow air to circulate. The strings of grass with the dried heads still attached are burned on the beach on a calm day. Some of the "fatty" or large herring are preserved in seal skin pokes with seal oil. Dried herring and sac-roes are eaten immediately and throughout the winter, dipped into seal oil.

HARVEST LEVELS

Herring is the major food source of Nelson Island villages. As one researcher stated:

"Of all the fish sought, herring are the most important in terms of quantity, ease of storage, and nutritional value. They are relatively easy to obtain and labor productivity is high. The size of the herring run means the difference between feast and famine in the late winter and early spring...it is the food that maintains the family when other stores are depleted" (Fienup-Riordan 1983:94).

TABLE 4. AVAILABLE ESTIMATED SUBSISTENCE HERRING HARVEST LEVELS
(IN METRIC TONS) BY COMMUNITY, 1975-1983^a

Community	1975	1976	1977	1978 ^b	1979	1980	1981	1982	1983
Tununak	19.8	13.9	51.9	34.6 (37)	31.0	59.2	36.0	43.8	85.0 (63) ^c
Toksook Bay	31.0	38.8 ^d	19.3	33.5 (31)	46.5	26.6	13.0	31.6	
Umkumiut (Nightmute)	30.0	8.5	2.8	10.4 (15)	7.5	3.1	9.0		
Newton	(109)	(42)	(90)		(54)	(70)	(93)	(65)	- e
				1.2 (9)					
Chefornak				2.8 (19)					
Kipnuk				6.1 (23)					
Kwigillingok		9.6	0.9		7.2	12.0		12.0	
Kongiganak			0.3						
Mekoryuk			0.5 ^b	0.5 ^b				0.3 ^f (4)	
Totals	80.8	70.8	75.7	89.1	92.2	100.9	58.	87.7	85.0

a. Unless otherwise noted, harvest levels are from Fried et al. 1984.

b. Figures and numbers of households contacted (in parentheses) are from Hemming et. al 1978.

c. Adjusted with total households in 1980 Census because this was a complete community survey.

d. Adjusted with number of pounds harvested from Hemming et. al. 1978:68.

e. This row of numbers in parentheses refers to total numbers of families contacted in Tununak, Toksook Bay, Umkumiut.

f. From Stickney 1982, field notes; the number in parentheses refers to numbers of boats rather than families.

Information on harvest levels is available from 1975 to 1983 for some of these villages (Table 4). All of these surveys (except the 1983 survey in Tununak) are reported to represent minimum estimates because not all villages or fishermen were contacted (Fried et al. 1984; Hemming et al. 1978). Comparability from year to year is virtually impossible because numbers of fishing families included each year is different and only one community (Tununak) is represented every year (Table 4).

One estimate places the average annual subsistence harvest in the eastern Bering Sea (from Pilot Point in Ugashik Bay to Golovin on Norton Sound) at about 100 metric tons, with the harvests by the villages of Tununak, Toksook Bay, and Nightmute believed to account for about 75 percent of the harvest (Hemming et al. 1978; Regnart and Kingsbury 1980; Fried et al. 1984). However, a survey done in 1980 showed that a sample of families in only four of the nine communities (Tununak, Toksook Bay, Nightmute, and Kwigillingok) took over 100 metric tons (Table 4) and that year was considered to be a "less than average year" for amounts of herring taken, due to weather (Regnart and Kingsbury 1980) and "small size of herring going through net mesh" (Alaska Department of Fish and Game 1980). Further, a survey in 1983 by this author showed that Tununak residents alone took about 85 metric tons of herring (Table 4); this was viewed as a "good" year by Tununak residents. The 1983 Tununak survey took place at the end of the herring season and was based on direct observation and complete count of 110 log and 2 teepee racks full of herring in the community. In addition, a factor not usually noted, is that most subsistence herring fishermen, especially Nelson Island residents, considered 1970 to about 1980 to be less productive than previous

years due to commercial high seas fisheries interception, so harvest estimates for this time period may underestimate subsistence need (Hemming et al. 1978; Lenz 1980).

Another estimate of harvest levels focused on the average amounts needed by households in the Nelson Island area. Some sources report that each household uses about 2,000 to 2,500 pounds of herring a year, especially on Nelson Island (Hemming et al. 1978; Lenz 1980). In the past, annual harvest levels were thought to be approximately 6,000 pounds per family, but that included amounts needed to feed dogs (Hemming et al. 1978).

Annual harvests are reported to be affected by weather, availability of herring, abundance of other subsistence resources, and availability of wage employment at the time of the herring season, among other things (Hemming et al. 1978). However, several Nelson Island families stated that they do attempt to get their racks filled every year, regardless of other factors, because "herring will always be eaten" (Tununak residents, pers. comm.)

In sum, a complete documentation of subsistence harvest levels by the communities around Nelson Island has never been made. Incomplete and sporadic surveys do suggest that the Nelson Island villages of Tununak, Toksook Bay, and Nightmute harvest the most herring of the nine villages on Table 4. Villages that have more recently begun to fish for herring near their communities may show an increasing subsistence harvest over the past five years.

DISCUSSION

Commercial fisheries can support or damage the local, subsistence-based economies of rural Alaska communities, depending on how the commercial fishery is structured and managed. Commercial fisheries can support a local, subsistence-based economy if: (1) the commercial fishery is designed to supply a source of income to local fishermen which can be invested in subsistence equipment; (2) the commercial fishery is structured to enable local people to successfully compete with external competitors for local resources which are utilized by the local communities; (3) the commercial fishery is managed to maintain the biological health of local fish and game populations; (4) the commercial fishery does not result in the creation and application of management regimes which unduly restrict customary and traditional patterns of fishing and hunting (cf., Wolfe 1981, 1983, 1984 in press; Wolfe et al. 1984; Olson 1984). Commercial fisheries can damage a local, subsistence-based economy if structured so that the opposite conditions result: that is, local fishermen receive no income from their local resources; external competitors draw away the value of the local resources; the biological health of fish and game populations are not maintained; and unduly restrictive management regimes are created. Residents of Nelson Island and vicinity expressed these kinds of concerns in relation to commercialization of herring in their region (United Villages 1984).

Nelson Island and area residents have opposed commercialization of herring because they felt that abundance and size of herring decreased when the Japanese and Soviet commercial trawl fleets harvested herring in

the Eastern Bering Sea in the 1960s and 1970s (Hemming et al. 1978; Lenz 1980; North Pacific Fishery Management Council 1981; United Villages of Nelson Island 1984). Subsistence fishing was reported to be more difficult and less productive than prior to high seas commercial fishing.

This year, Nelson Island and area residents are still concerned about the adverse effects of commercialization on the important subsistence fishery. However, they support a small local commercial herring fishery, if commercialization is inevitable given the mandate of State and Federal law to utilize harvestable surpluses of herring observed near Nelson Island (United Villages 1984). An inshore fishery is preferred, because it is easier to monitor and manage to the benefit of local people and the herring resource (United Villages 1984; North Pacific Fisheries Management Council 1981). Also, it may prevent a mixed-stock offshore fishery.

The proposal from the United Villages of Nelson Island, which is composed of officials from Indian Reorganization Act (IRA) councils and/or city councils from the communities of Newtok, Tununak, Toksook Bay, Nightmute, and Chefornek calls for a small local fishery (see appendix). It asks for a conservative harvest (10% of biomass) with small equipment, currently in local use (50 fathoms or less in net length, 26 foot vessels), and exclusive registration (see appendix). These conditions were modeled after the commercial herring fishery at Cape Romanzoff which, because of its structure, supports the local, subsistence-based economies of Chevak, Hooper Bay, and Scammon Bay villages.

There is a strong belief by local residents that they can harvest the total commercial herring harvest. Several factors support their

belief. Currently, 127 persons from Newtok to Chefornek hold commercial halibut only permits (Table 2). Halibut fishing, both for commercial and subsistence purposes begins after herring fishing (about the second week of June). These halibut permit holders could comprise the bulk of the commercial herring fishermen, given that they do not hold any other permits and have no other competing interest (that is, they do not leave the area for commercial fishing).

Cape Romanzoff offers a reasonable comparison: in 1984, 63 local fishermen in 57 boats with gill nets, harvested 98% of the 740 metric tons allowed for commercial harvest (Fried et al. 1984). If a fishery did open in Nelson Island, an estimated 850 metric tons is proposed for commercial harvest. With more than double the number of potential fishermen (127 compared to 63; additionally, the labor force is higher than 127 persons), it seems probable that Nelson Island and area residents could harvest the commercial guideline limit.

SUMMARY

Present information and knowledge show that subsistence herring harvest and use occurs in all nine communities in the Nelson Island region. The highest uses are made by villages on Nelson Island (Tununak, Toksook Bay, and Nightmute), although existing data on harvest levels contain many gaps. Villages south of Nelson Island have recently begun to harvest herring near their communities. Each community has its own area for harvesting herring (Fig. 1). Herring and sac-roe from processed herring is dried for food and is especially important in the winter diet, as most of these villages do not have large salmon runs to harvest for winter food.

Most residents of these communities have opposed commercialization of herring because of its importance as a subsistence resource, and also because of previous experience with Japanese and Soviets trawl fisheries and their effects on herring abundance and size. Now, if commercialization is inevitable, residents of the Nelson Island region have proposed to open a small local herring fishery, to help prohibit offshore fisheries. Current community profiles suggest that there are enough local people with the interest, skills, and equipment in commercial fishing (Table 2) to support and harvest the allowed commercial guideline.

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APPENDIX

Proposal 78, 5 AAC 27.884, 5 AAC 27.8 xx pg. 29. Allow only small boat, exclusive registration gill net fisheries north of Cape Newenham.

Justification: To maximize conservation of the herring resource for the future, and economic return to the small village fishermen who has no other economy.

Proposed by: Central Bering Sea Advisory Committee

Justification: To reduce gear effort and protect herring stocks while biologists monitor health of stocks, and to maximize benefits to the village fishermen who do not have the equipment or time to wonder for herring.

Proposed by: Lower Kuskokwim Advisory Committee

Proposal 79, 5 AAC 27.875-897 pg. 29. Open a commercial herring gill net fishery in Kinak Bay near Kipnuk.

Justification: There are an abundance of herring fish that spawn each season. This commercial fish, if it opens, will not affect subsistence harvest.

Proposed by: Paul R. Kiunya, Sr.

Proposal 80, 5 AAC 27.8xx pg. 29-30. Let Nelson Island area herring fishery be an exclusive registration area and that any vessels registered in this area may not fish in any other statistical area. Limit the size of gear. Gill nets may be used and they must not exceed 50 fathoms in length. No trawlers or purse seiners. Limit the size of vessels in Nelson Island area to 26 feet. Allow subsistence fishing during open commercial fishing.

Justification: This would give local area residents a chance to engage and develop their fishery in this economically depressed area. It would also protect the over harvest of herring stocks by keeping down on influx of boats. Gear limits would protect the herring stock from over harvesting and more importantly majority of the area residents do not have enough capital to invest in greater amount of gear(s). Limiting vessel size would greatly help the area residents a better chance to engage and enter their fishery. This would also keep the competition on equal basis. Since herring is the main diet of Nelson Island residents it is very crucial that the department allow subsistence fishing to continue as it is during the commercial openings. Allow continuation of all traditional methods of catching herring for subsistence, not limited to set nets and drift gill nets. It is of the utmost importance that this subject matter is not overlooked and in a event where Department of Fish and Game finds that the stock of herrings are depleting in Nelson Island area, the subsistence fishing shall be protected by the subsistence law, whereas it

is the first priority of residents in this area.

Proposed by Peter Julius

Proposal 81, 5 AAC 27.875 pg. 30. Establish herring fishing districts near Nunivak Island and Etolin Strait, set season to open by emergency order, and allow 150 fathom gill nets to take herring from the proposed districts.

Justification: The Nunivak and Etolin Strait areas have been surveyed for several years indicating that a harvestable amount of herring are present in these areas. During the 1984 spring season an estimated 16,000 metric tons was observed by ADF&G. At the present management policy of 15-20% exploitation rate on inshore herring stocks, there appears to be approximately 3,200 metric tons of herring available to the domestic fleet. The previous 5 year average subsistence harvest in this area has been documented by ADF&G Commercial Fish Division at less than _____ metric tons. Therefore, a harvestable surplus of herring appear to be available for commercial purposes at this time.

Proposed by DeeDee Jonrowe

Proposal 82, 5 AAC 27.870 pg. 30. Allow a commercial herring fishery in the Etolin Strait area. In order to ensure the orderly development of this new fishery and give adequate protection to the subsistence fishery, the following specific amendments are offered:

The Nelson Island district consists of all waters of Alaska between the latitudes of the southeastern tip of Kigigak Island (60°50' N., 165°00' W.) and Chinigyak Cape (60°27' N., 165°08' W.).

The Nunivak Island district consists of all waters of Alaska east of the longitude of Cape Algonquin (60°13'33" n., 166°56'30" W.) and north to the latitude of Twin Mountain (60°02' N., 165°43' W.).

In the Security Cove, Goodnews Bay, Nelson Island and Nunivak Island districts, herring may be taken only from May 1 through June 30.

In the Security Cove, Goodnews Bay, Nelson island, and Nunivak Island districts, herring may be taken only during periods established by emergency order.

Gill net specifications and operation: In the Nelson Island and Nunivak Island districts, the aggregate length of herring gill net in use by a herring interim use permit holder may not exceed 50 fathoms in length. No more than 50 fathoms of herring gill net may be operated from any commercially licensed herring fishing vessel.

Vessel specifications and operations: No commercially licensed herring fishing vessel in the Nelson Island and Nunivak districts may be more than 26 feet in overall length. For the purposes of this regulation, "overall length" means the straight line measurement between

the extremities of the vessel.

Waters closed to Herring Fishing: Cape Vancouver: All waters are closed to the commercial taking of herring from a point one and one-half miles to a point one and one-half miles south of Cape Vancouver (60°33' N., 165°25' W.).

Chinit Point: all waters are closed to the commercial taking of herring from a point three-quarters of a mile north and east to a point three-quarters of a mile south and west of Chinit Point (60°37' N., 165°15' W.).

Nilikluguk: all waters are closed to the commercial taking of herring from Nilikluguk (60°37' N., 165°09' W.) to a point one mile south and west of Nilikluguk.

Guideline harvest levels: In the Nelson Island and Nunivak Island districts, the guideline harvest level is 10% of the available biomass.

Exclusive Use Area: The Nelson Island and Nunivak Island districts are a combined exclusive use area. Any person who participates in the commercial taking of herring, either as a herring entry, interim use permit holder, or as a crew member license holder, in an exclusive use area and any vessel used in the commercial taking of herring in an exclusive use area from February 1 through June 30 may not participate or be used in the commercial taking of herring in another exclusive or nonexclusive use area from February 1 through June 30. Any person who participates in the commercial taking of herring either as a herring entry, interim use permit holder, or as a crew member license holder, in a nonexclusive use area and any vessel used in the commercial taking of herring in a nonexclusive use area from February 1 through June 30 may not participate or be used in the commercial taking of herring in an exclusive use area from February 1 through June 30.

Justification: The large biomass of Eastern Bering Sea herring presently spawning in the Nelson Island is greater than in recent years, but is far less than the optimum populations that spawned in this region prior to the onset of foreign interception of these stocks in the mid 1960's. This biomass if un-utilized could allow the opening of a mixed stock trawl fishery in the winter. The United Villages of Nelson Island and vicinity request that the following conditions be set if a commercial fishery is to start on these stocks. (1) That the Eastern Bering Sea herring population is still below optimum numbers and should be considered as a damaged stock still recovering. (2) That reproduction of these spawning herring, and the take from that population by people of Nelson Island for subsistence is the highest priority for use of these stocks. (3) That conservation on any commercial opening must be practiced to avoid commercial versus subsistence/spawn conflicts to protect recovery of this stock. (4) That any commercial fishery in the future must be halted if adequate spawn does not appear necessary for reproduction and subsistence take. (5) That to conserve the recovery of this damaged stock, any commercial fishery must be managed to limit harvest to 10% of

the biomass, and to prevent overutilization prior to complete recovery, must be further managed as a small boat, exclusive registration fishery until stock recovery.

Justification for closed waters: The area one and one-half miles to the north of Cape Vancouver is an important harvesting area for herring roe-on-kelp for subsistence uses. The area one and one-half miles south of Cape Vancouver is a dangerous area for harvesting herring. It is exposed, rocky, and has strong surf. The Chinit Point area is the main subsistence herring fishing area for Tununak residents and keeping this area closed to commercial fishing would reduce conflicts with subsistence fishing. The Nilikluguk area is an important subsistence herring fishing and herring roe-on-kelp gathering area.

Proposed by: Charlie Kairaiuk, United Villages of Nelson Island

Proposal 83, pg. 32-33. Open a new herring fishery in the Nunivak area. In order to ensure the orderly development of this new fishery, give adequate protection to the subsistence fishery, and stimulate additional public and agency discussion, the following amendments to existing regulations are offered:

1. 5 AAC 27.875. The Nunivak Island District consists of all waters of Alaska south of the latitude of Cape Manning (60° 16' 30" N. lat.) and east of the latitude of the Binajoaksmiut River (59° 51' N. lat.).
2. 5 AAC 27.880. Provide for a fishing season of May 1 through June 30 and weekly fishing periods established by emergency order.
3. 5 AAC 27.888. The aggregate length of herring gillnet in use by a herring interim-use or entry permit holder may not exceed 50 fathoms. Not more than 50 fathoms of gillnet may be operated from any commercially licensed herring fishing vessel.
4. 5 AAC 27.890. Consider additional closures of sensitive areas (e.g. major subsistence fishing grounds, bird rookeries) based on further public and agency input.
5. 5 AAC 27.895. Provide a guideline harvest level of 750 metric tons or 10-15 percent exploitation rate if a current season biomass estimate is available.
6. 5 AAC 27.896. Provide for buyer reporting requirement.

Justification:

1. Aerial surveys conducted in 1983 and 1984 indicate that a harvestable surplus of spawning herring is available in the Nunivak Island area. The proposed boundaries include a majority of the known herring staging and spawning areas and exclude areas having important bird rookeries and possible subsistence fishing effort. Since the proposed boundaries include wilderness designated waters of the Nunivak Island National Wildlife Refuge, there may be a conflict with commercial fishing. Another option is to reduce the size of the proposed fishing area to include waters north of the latitude of Ingrimiut (near Twin Mt.) and east of Ikookstakswak Cove (near Cape Mohican) that do not include any wilderness designated waters. This smaller area contains a relatively small portion of the island's herring resource and the

- available harvest will be considerably smaller.
2. The proposed fishing season dates encompass the known occurrence of mature or spawning herring in inshore waters of the area. The proposed fishing season and provision of weekly fishing periods by emergency order are identical to that provided for existing fisheries in the Security Cove and Goodnews Bay Districts.
 3. The amendment of this section to reduce the length of gillnets used in Nunivak Island District provides for a slower paced and more orderly fishery and in addition may enhance participation of local residents who initially may not have the skills to operate or the funds to purchase greater amounts of gear.
 4. Department studies in this area have been limited to aerial surveys to determine the distribution and abundance of spawning herring. Very little information is known about subsistence fishing in the area except subsistence dependence and utilization of herring is probably not as great as the Nelson Island area. Local residents can be expected to provide additional information about subsistence fishing activities, herring stocks and means to protect subsistence fishing.
 5. Based on biomass estimates made from aerial surveys in 1983 and 1984 and taking into account natural mortality, it is estimated that the minimum spawning population in 1985 will approximate 5,000 m.t. In recognition of the limited biological data base and the presence of a subsistence fishery in the area, the department's proposed management strategy will be to harvest 10-15 percent of the available spawning stock instead of up to 20 percent in most other commercial fisheries.
 6. Standard buyer reporting requirements are necessary to obtain timely and accurate harvest data.

Note: If the proposal to allow commercial fishing in the Nunivak Island District is adopted, existing regulations will provide for: 1) gillnets as legal gear (5 AAC 27.885), 2) gillnet identification requirements (5 AAC 27.888), 3) herring spawn-on-kelp or on other substrates may not be taken for commercial purposes (5 AAC 27.890), 4) waters not described in 5 AAC 27.875 are closed to commercial fishing (5 AAC 27.890), and 5) salmon taken incidentally in conjunction with commercial herring fishing must be returned to the water (5 AAC 27.897).

Proposed by: Department of Fish and Game

Proposal 84, pg. 33-34. Open a new herring fishery in the Nelson Island area. In order to ensure the orderly development of this new fishery, give adequate protection to the subsistence fishery and stimulate additional public and agency discussion the following specific amendments are offered:

1. 5 AAC 27.875. The Nelson Island District consists of all waters of Alaska between the latitudes of the southeastern tip of Kigigak Island (60° 50' N. lat.) and Chinigyak Cape (60° 27' N. lat.).
2. 5 AAC 27.880. Provide for a fishing season of May 1 through June 30 and weekly fishing periods established by emergency order to minimize interference with the subsistence fishery.

3. 5 AAC 27.888. The aggregate length of herring gillnet in use by a herring interim-use or entry permit holder may not exceed 50 fathoms. Not more than 50 fathoms of gillnet may be operated from any commercially licensed herring fishing vessel.
4. 5 AAC 27.890. Consider additional closures of sensitive areas (e.g. major subsistence fishing grounds) based on further public and agency input.
5. 5 AAC 27.895. Provide a guideline harvest level of 850 m.t. or 10 percent exploitation rate if a current season biomass estimate is available.
6. 5 AAC 27.896. Provide for buyer reporting requirements.

Justification.

1. Aerial surveys conducted in 1983 and 1984 indicate that a harvestable surplus of spawning herring is available in the Nelson Island area. The proposed boundaries include the majority of known herring staging and spawning areas.
2. The proposed fishing season dates encompass known occurrence of mature or spawning herring in inshore waters of the area. The proposed fishing season and provision of weekly fishing periods by emergency order are identical to that provided for existing fisheries in the Security Cove and Goodnews Bay Districts. It appears that subsistence fishing effort occurs throughout most spawning areas so that the best method for reducing gear conflicts and competition between commercial and subsistence fishermen is through time restrictions instead of space restrictions. Commercial fishing times can be scheduled so that only subsistence fishing can occur for periods of time each week. There will be no restrictions on subsistence fishing time.
3. The amendment of this section to reduce the length of gillnets used in this district provides for a slower paced and more orderly fishery and in addition may enhance participation of local residents who initially may not have the skills to operate or the funds to purchase greater amounts of gear.
4. Local residents can be expected to provide additional information about subsistence fishing activities, herring stocks and means to protect subsistence fishing.
5. Based on biomass estimates made from aerial surveys in 1984 and taking into account natural mortality, it is estimated that the minimum spawning population in 1985 will approximate 8,500 m.t. In recognition of the limited biological data base and the presence of an important subsistence fishery in the area, the department's proposed management strategy will be to harvest only 10 percent of the available spawning stock instead of up to 20 percent in most other commercial fisheries.
6. Standard buyer reporting requirements are necessary to obtain timely and accurate harvest data.

Note: If the proposal to allow commercial fishing in the Nelson Island District is adopted, existing regulations will provide for 1) gillnets as legal gear (5 AAC 27.885), 2) gillnet identification requirements (5 AAC 27.888), 3) herring spawn-on-kelp or on other substrates may not be taken for commercial purposes (5 AAC 27.890), 4) waters not described in 5 AAC 27.875 are closed to commercial fishing (5 AAC 27.890), and 5) salmon

taken incidentally in conjunction with commercial fishing must be returned to the water (5 AAC 27.897).

Proposed by: Department of Fish and Game

Proposal 85, 5 AAC 27.9xx, pg. 34. Create an exclusive registration area for the Nelson Island and the Nunivak Island areas, and include crewmembers under the exclusive use.

Justification: To create a commercial herring fishery that can be well managed and be of value to the local residents.

Proposed by: Bering Sea Fishermen's Association