

When the fish come, we go fishing:
Local Ecological Knowledge
of Non-Salmon Fish Used for Subsistence
in the Bering Strait Region



Kawerak, Inc.
Social Science Program
Natural Resources Division
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2013

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Used for Subsistence in the Bering Strait Region

Final Report for Study 10-151

Submitted to the U.S. Fish and Wildlife Service, Office of Subsistence
Management, Fisheries Resource Monitoring Program

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ABSTRACT

When the fish come, we go fishing: Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region

This report documents work completed by Kawerak, Inc., the regional Alaska Native non-profit corporation serving the people and villages of the Bering Strait region of Alaska, for Study 10-151. The study goal was to investigate the subsistence harvest and use of non-salmon fish species in five Bering Strait region communities: Shishmaref, Wales, Brevig Mission, Teller, and Stebbins.

The study included a non-salmon subsistence harvest survey in each community, followed by semi-structured ethnographic interviews with local experts. Spatial information was documented during interviews and a map was produced for each community. This report documents local knowledge regarding when, where and how residents harvest non-salmon fish; information about fish abundance and biology; the cultural values associated with fish; climate change observations; community concerns related to fishing; and other topics.

This study determined that subsistence harvested non-salmon fish remain important to the cultural, nutritional, physical and mental well-being of individuals and communities in the Bering Strait region. It recommends that agencies which regulate non-salmon fish harvest work closely with communities prior to changing any related regulations or policy and that similar research be conducted in other region communities.

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the community maps included in this report as Maps 1-5. All photographs are by the author unless otherwise noted.

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INTRODUCTION

The goal of this project was to document current levels of subsistence use of non-salmon fish resources by five communities in the Bering Strait region: Shishmaref, Wales, Brevig Mission, Teller, and Stebbins, and to document local knowledge regarding these resources. Alaska Native residents of the Bering Strait region have depended on the resources of the land and water for millennia. This dependence, and the unique cultures and lifestyles associated with it, continue to this day. The ability to pursue subsistence activities, including fishing for non-salmon fish, is vital to the health of communities and individuals. Because of the longstanding cultural, nutritional, and economic importance of non-salmon fish, this project was developed in collaboration with five tribes in the region. The project documents various ways in which non-salmon fish are important to these communities, including local knowledge regarding when, where and how residents harvest non-salmon fish; information about fish abundance and biology; the cultural values associated with fish; climate change observations; community concerns related to fishing; and other topics. This work provides a local perspective on non-salmon fisheries resources for the Bering Strait region.

The interview portion of the project documented local ecological knowledge about non-salmon fish in each community. The phrase “local ecological knowledge” has no standard definition. For the purposes of this study, it is taken to mean knowledge about local ecosystems and how they operate and the ways that humans interact with them. It is gained through long-term, intimate experience with the environment, is not necessarily distributed evenly throughout a community, and is connected to culture. For this study, local ecological knowledge includes knowledge about non-salmon fish habitat preferences, spawning areas and seasonal movements, changes in species health and distribution over time, harvest methods, storage and preparation methods, as well as beliefs and practices related to non-salmon fish.

The interviews also addressed the effects of ongoing environmental changes on subsistence fisheries. Because some of the species that are included in this study (e.g., tomcod, smelt and others) are harvested primarily during winter months, the thickness and durability of shore and river ice is vital for accessing these fisheries. The report documents environmental changes that may have the potential to impact parts of non-salmon fish lifecycles such as seasonal movement patterns and timing of runs.

The report documents information about a large number of species: whitefish (*Coregonus* spp.), sheefish (*Stenodus leucichthys*), tomcod (*Microgadus proximus*), herring (*Clupea pallasii*), grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), lingcod (*Ophiodon elongatus*), flounder (*Platichthys stellatus*), halibut (*Hippoglossus stenolepis*), sculpin (*Scorpaeniformes*), smelt (*Osmerus mordax*), saffron cod (*Eleginus gracilis*), blue cod (*Parapercis colias*), capelin (*Mallotus villosus*), burbot (*Lota lota*), blackfish (*Dallia pectoralis*), Dolly Varden trout (*Salvelinus malma*) and other non-salmon species identified by community residents as being utilized for subsistence purposes.

Local ecological knowledge, baseline harvest estimates, and species-specific biological information are crucial to management and policy making. This report is relevant to federal subsistence fisheries management because the Bering Strait region contains significant federal

lands and waters from which these species are harvested. An understanding of the role of fish resources in the lives of Alaska Native region residents is important for appropriate fisheries management. As such, harvest data that quantifies the significance of various species, and biological data on species distribution, as well as information about the uses and importance of non-salmon fish, is some of the most basic data needed by fisheries managers. Additionally, local ecological knowledge will provide managers and policy makers with the additional details they need to understand subsistence practices that fall under the definition of “customary and traditional.”

Background

Community Associations with Federal Lands

Three of the participating communities have significant associations with Federal public lands or waters. Shishmaref and Wales are both adjacent to the Bering Land Bridge National Monument, and the village of Stebbins is adjacent to the Yukon Delta National Wildlife Refuge. Shishmaref, Wales and Stebbins harvest non-salmon subsistence fish species in waters adjacent to the National Monument and National Wildlife Refuge. While Brevig Mission and Teller are not located directly adjacent to any Federal conservation units, these communities are representative of many others in the region in terms of size, Alaska Native population size, and dependence on subsistence foods, particularly fish. Additionally, the Kuzitrin River, the main river system in the vicinity of Brevig Mission and Teller, originates on Federal public lands within the watershed of the Bering Land Bridge National Preserve.

The Bering Strait Region

The Bering Strait region is located in northwest Alaska 60 miles south of the Arctic Circle (Figure 1). The region encompasses the Seward Peninsula, the islands of Big and Little Diomede, St. Lawrence Island, and several other small islands. The southern shores of Norton Sound are included in the Bering Strait region. The Seward Peninsula is approximately the size of West Virginia. Vegetation in the region is mostly tundra with the tree line starting about 50 miles south of Nome. Spruce forests are found in the southern part of the region. The region is home to three distinct linguistic and cultural groups of Eskimo people; the Iñupiaq, Central Yup'ik, and Saint Lawrence Island Yupik. There is evidence of human habitation in the area dating back at least 10,000 years (Hoffecker and Elias 2003). The population of the Bering Strait region (the Nome Census Area) is about 9,500 people. Alaska Native peoples make up approximately 75% of the population. There are 15 year-round villages outside of Nome that range in population from approximately 120 to 700. Nome is the largest community in the region with approximately 3,700 people. Nome is the transportation and service hub for the region (Ahmasuk et al. 2008; DCCED 2013).

Kawerak Incorporated

Kawerak, Inc. (Kawerak) is a regional nonprofit corporation authorized by tribal resolution to provide services throughout the Bering Strait region of Alaska. Kawerak's main offices are in Nome, Alaska. The Kawerak Board of Directors consists of the Presidents of the 20 federally recognized tribes in the region, two elder representatives, and the Chair of the Norton Sound Health Corporation. This project was completed by Kawerak's Social Science Program, which is

part of its Natural Resources Division. Kawerak also has a Community Services Division, an Education, Employment and Training Division, and a Children and Family Services Division. All of the programs within these divisions provide various services for the tribes and residents of the region. Kawerak’s vision statement reads, “*Building on the inherent strength of our cultural values, we shall assist our tribes and residents to create a positive future.*”

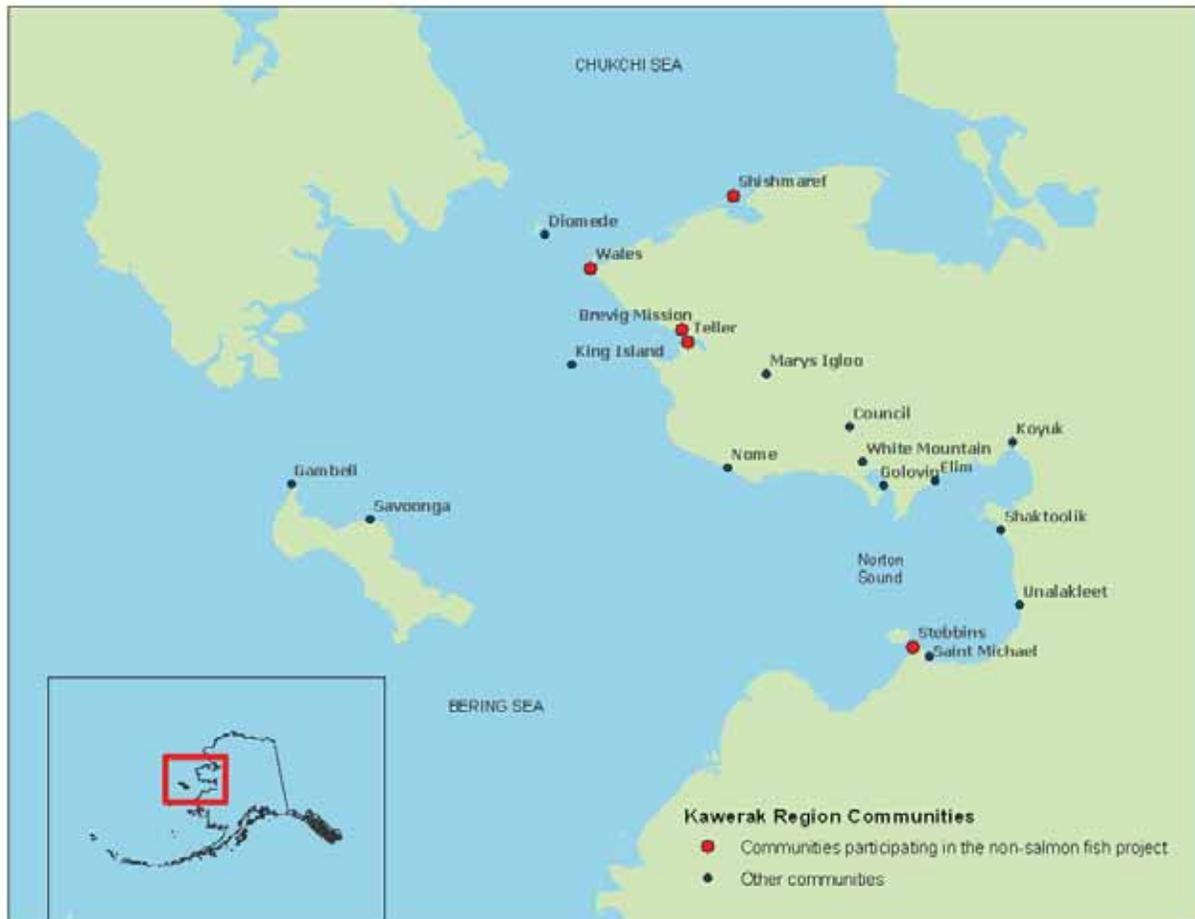


Figure 1: Communities of the Bering Strait region.

Shishmaref

The community of Shishmaref is located on Sarichef Island, a barrier island off the northwestern coast of the Seward Peninsula in the Chukchi Sea (Figure 1). The current population of Shishmaref is 605 and approximately 95% of village residents are Alaska Native (DCCED 2013), most of who are Iñupiat. Sarichef Island has been experiencing rapid and severe erosion, and as a result the community would like to relocate to a more stable location on the mainland (U.S. Army Corps of Engineers 2004). There is no road access to the mainland or any other community; all travel is by small plane, boat, or snowmachine during the winter months. There are a limited number of wage-based employment opportunities and many are seasonal. Subsistence hunting, fishing, and gathering remain very important to Shishmaref residents. The most recent research on the subsistence harvest by Shishmaref residents estimated a total of over 630,000 pounds of subsistence foods harvested for the period of July 2005 to June 2006 (Ahmasuk et al. 2008:289).



Figure 2: View towards Shishmaref Inlet in the fall.



Figure 3: Main street in Wales in the spring.

Wales

The community of Wales is located at Cape Prince of Wales, which is the westernmost point of the Seward Peninsula and directly adjacent to the Bering Strait (Figure 1). The current population of Wales is 152 and approximately 85% of village residents are Alaska Native (DCCED 2013), most of who are Iñupiat. Wales is approximately 110 miles northwest of Nome. There is no road access to any other community; all travel is by small plane, boat, or snowmachine during the winter months. There are a limited number of wage-based employment opportunities and many are seasonal. For Wales residents, subsistence hunting, fishing, and gathering continue to be highly valued activities. The most recent research on the subsistence

harvest by residents of Wales estimated a total of over 53,500 pounds of subsistence foods harvested for the period of July 2005 to June 2006 (Ahmasuk et al. 2008:289).



Figure 4: View of Brevig Mission in the spring.

Brevig Mission

The community of Brevig Mission is located on the north shore of Port Clarence, approximately 75 miles northwest of Nome (Figure 1). The current population of Brevig Mission is 417, and approximately 92% of the residents are Alaska Native (DCCED 2013), most of who are Iñupiat. Brevig Mission does not have road access to any other communities; all travel is by small plane, boat, or snowmachine during the winter months. There are a limited number of wage-based employment opportunities and many are seasonal. Subsistence hunting, fishing, and gathering remain very important to Brevig Mission residents. The most recent research on the subsistence harvest by Brevig Mission residents estimated a total of over 53,200 pounds of subsistence foods harvested for the period of July 2005 to June 2006 (Ahmasuk et al. 2008:289).

Teller

The community of Teller is located on the southern shores of Port Clarence and Grantley Harbor, approximately 72 road miles northwest of Nome (Figure 1). The current population of Teller is 250, and approximately 96% of the residents are Alaska Native (DCCED 2013), most of who are Iñupiat. Teller has road access to Nome and the surrounding road system during snow-free months. Travel to other communities is primarily by small plane, boat, or snowmachine during the winter months. There are a limited number of wage-based employment opportunities in Teller and many are seasonal. Subsistence hunting, fishing, and gathering are highly valued by residents of Teller. The most recent research on the subsistence harvest by Teller residents estimated a total of over 94,800 pounds of subsistence foods harvested for the period of July 2005 to June 2006 (Ahmasuk et al. 2008:289).



Figure 5: Teller "New Site" in the winter. The foreground is frozen Grantly Harbor.



Figure 6: Main street in Stebbins in the spring.

Stebbins

The community of Stebbins is located on St. Michael Island off the southern shore of Norton Sound, approximately 120 miles southeast of Nome (see Figure 1). The current population of Stebbins is 566, and approximately 95% of the residents are Alaska Native (DCCED 2013), most of who are Yup'ik. Stebbins has road access to the village of St. Michael, located approximately 12 road miles to the north. Travel to other communities is primarily by small plane, boat, or snowmachine during the winter months. There are a limited number of wage-based employment opportunities in Stebbins and many are seasonal. Subsistence hunting, fishing and gathering remain very important to Stebbins residents. The most recent research on the total subsistence

harvest by Stebbins residents estimated a total of over 276,200 pounds of subsistence foods harvested for the period of July 2005 to June 2006 (Ahmasuk et al. 2008:289).

Subsistence Use of Fish in the Region

There is little information about the Bering Strait region regarding the number of people who fish for non-salmon fish, or the amount of fish that are harvested. The recent study by Ahmasuk et al. (2008) was the first and most comprehensive for the region, but only covered the 2005-2006 season. It is clear from that study, and some research in adjacent regions (e.g., Georgette and Shiedt 2005; Jones 2006), that non-salmon fish species are regularly harvested by northwest Alaska residents and are valued subsistence foods. Data on environmental change in northern Alaska has shown changes in sea and freshwater ice thickness and other ice characteristics which may be impacting access to important non-salmon species (e.g., Huntington and Fox 2005; Krupnik et al. 2010; Nuttall 2005; Whiting 2002), particularly those harvested through sea or river ice. None of these species appear to be experiencing increased harvest, though environmental changes may be making access to these species difficult in other ways.

The most recent data (other than that provided in this report) for Wales, Shishmaref, Brevig, Teller, and Stebbins comes from the Ahmasuk et al. (2008) North Pacific Research Board-funded community harvest survey. That research shows that all five study communities made extensive use of non-salmon species during 2005-2006. For example, in 2005-2006, Shishmaref harvested a total of 29,381 pounds of non-salmon fish, compared to 24,914 pounds of salmon (*ibid.*: 55-77).

For the same period the village of Wales harvested 8,505 pounds of salmon and 1,547 pounds of non-salmon fish; the village of Teller harvested 32,355 pounds of salmon and 7,716 pounds of non-salmon fish; the village of Stebbins harvested 92,166 pounds of salmon and 31,850 pounds of non-salmon fish; and the village of Brevig Mission harvested 20,712 pounds of salmon and 1,590 pounds of non-salmon fish (Ahmasuk et al.:55-77). These data also show that, in addition to being a significant subsistence resource for the communities as a whole, non-salmon fish are also significant in terms of the mean weight of fish consumed per person (*ibid.*).

The current research is critical at this point in time for a variety of reasons. Though there is little documented information regarding the subsistence use of non-salmon fish in these communities, it is clear that these species have played a crucial role at times in the lives Bering Strait region residents (Burch 1985; Conger and Magdanz 1990; Jones 2006; Magdanz 1981; Oquilluk 1981; Sobelman 1985; Thomas 1982; Wolfe and Ellanna 1983). While no research of this exact nature has been conducted in Kawerak region communities, several studies with similar objectives have been successfully carried out by Alaska Department of Fish and Game (ADFG) staff. For example, Andersen et al. (2004), Brown et al. (2005) and Ray et al. (2010) each examined non-salmon subsistence harvests (in Interior Alaska and Yukon and Kuskokwim River communities). Their research emphasized the importance of non-salmon fish species to communities and broadened existing knowledge to benefit both managers and subsistence users.



Figure 7: The author and Teller expert Thomas Ablowaluk during an interview.
Photo by Jolene Okleasik.



Figure 8: Wales fishers during a spring harvest of non-salmon fish in the late 1980s.
Photo courtesy of Vernae Angnaboogok and family.

Summary of Current Non-Salmon Fishing Regulations

Both State of Alaska and Federal fishery regulations apply to the areas used for fishing by the five study communities. This section summarizes the State and Federal regulations related to non-salmon fishing in these areas. The reader should refer to the statutes and regulations noted for their full text and additional details.

State regulations apply to State of Alaska lands and waters. The communities participating in this project are located in the Kotzebue Area and in the Norton Sound-Port Clarence Area as defined by current Alaska statutes regarding fishing (5 AAC 01.100 and 5 AAC 01.150). Shishmaref is

located in the Kotzebue Area and the locations used by Wales residents for non-salmon fishing are located in both the Kotzebue and Norton Sound-Port Clarence Areas. Brevig Mission, Teller, and Stebbins are located in the Norton Sound-Port Clarence Area.

Legal gear types for non-salmon fishing in both areas include set gillnet, drift gillnet, beach seine, fish wheel, pot, longline, fyke net, dip net, jigging gear, spear, lead, or hook and a line attached to a rod or pole (5 AAC 01.120 and 5 AAC 01.170). Additionally, in both areas, herring and herring roe, and all finfish, are recognized as species that are customarily and traditionally taken or used for subsistence (5 AAC 01.136 and 5 AAC 01.188). Subsistence fishing permits are not required for non-salmon fishing in either area (5 AAC 01.130 and 5 AAC 01.180). Bag and possession limits for harvest of non-salmon fish in the Kotzebue Area and the Norton Sound-Port Clarence Area are found in 5 AAC 70.011; these limits, which do not apply to harvest of non-salmon fish through the ice or when fishing with gear other than a hook and line attached to a rod or pole, are summarized below as they relate to the areas typically fished by Shishmaref, Wales, Brevig Mission, Teller, and Stebbins:

- Arctic char/Dolly Varden and lake trout (harvested from lakes): 2/day in combination, no size limit
- Arctic char/Dolly Varden/lake trout (harvested from flowing and salt water): 10 (only two of which may be 20" or longer, only 2 may be lake trout)
- Arctic grayling: 5, no size limit, except:
 - Northern Norton Sound (all waters draining into Norton Sound from Cape Darby to Cape Prince of Wales) - the daily bag and possession limit is 5 fish, only one of which may be 15" or longer
- Sheefish: 10, no size limit
- Northern Pike: 10, no size limit
- Halibut: 2, 4 in possession, no size limit
- Burbot: 15, no size limit
 - The aggregate number of hooks may not exceed 15
 - The hooks must be single hooks with a gap between point and shank larger than $\frac{3}{4}$ inch
 - Each hook must rest on the bottom of the lake or stream
 - Each line must be physically inspected at least once every 24 hours
 - All other fish caught while fishing for burbot must be released immediately
- Other fish: no limit

In Alaska, the Federal government regulates subsistence fisheries on rivers and lakes and some marine waters within and adjacent to Federal public lands (36 CFR 242 and 50 CFR 100) and provides for a rural subsistence priority through the authority of Title VIII of Alaska National Interest Lands Conservation Act. Federal regulations do not require subsistence fishing permits to harvest non-salmon fish in either Federal subsistence fishing area described below.

Federal subsistence regulations for the Federal Kotzebue Area (same geographic area as the State's Kotzebue Area), for the areas typically fished by Shishmaref and Wales residents, specify no harvest limits on non-salmon fish. There is one gear restriction related to sheefish (i.e., gillnets may not be more than 50 fathoms in length, 12 meshes or less in depth, or have a stretched-mesh size larger than 7 inches). For the Federal Norton Sound-Port Clarence Area

(same geographic area as the State's Norton Sound-Port Clarence Area), Federal subsistence regulations for the areas typically fished by Wales, Brevig Mission, Teller, and Stebbins residents specify no harvest limits on non-salmon fish. For non-salmon fish, gear is restricted to: gillnet, beach seine, fish wheel, pot, long line, fyke net, jigging gear, spear, lead, or a rod and reel.

STUDY OBJECTIVES

The following are the objectives of the project:

- 1) Estimate harvests of non-salmon fish species by community for the 2009-2010 harvest season.
- 2) Estimate the households' evaluation of this harvest compared to other recent years.
- 3) Document the percentage of households using, harvesting, receiving, and giving away non-salmon species.
- 4) Document local ecological knowledge and information on non-salmon fish species.

METHODS

Overview

This project was conducted with the prior consent of regional tribal councils and individual participants. A letter of informed consent was sent to tribal councils requesting permission to conduct the proposed research via tribal governing resolution. A resolution was received from each tribe. Participation in the research was completely voluntary; individuals were given the opportunity to decline participation with no negative consequences to them, or to decline to continue participation at any time in the research process. Harvest survey participants were informed about the purpose of the survey and how the survey data would be used and provided a verbal consent before participating. Each interview participant signed a written consent form prior to participating in the project.

The methods used to collect data for this project included household subsistence harvest surveys and local expert interviews, including mapping. Participant observation of non-salmon fishing and related activities and archival research were also conducted. Archival research was conducted primarily at the Eskimo Heritage Program archives, which are housed at Kawerak's Nome office. These archives include audio, video, and written records (including interviews and interview transcripts) on each community in the Bering Strait region.

The household survey portion of the project aimed to collect information from 80% of the households in each community. The interview portion of the project focused on working with local experts in each community. Local experts are defined as individuals who have lived in the area for an extended period of time and are intimately familiar with fishing for non-salmon species. Local experts were identified through a specific question on the harvest survey and through consultation with the tribal council in each community.

The methods used to carry out the subsistence harvest surveys and the semi-structured interviews are described below. The interview guide is included as Appendix 1 and the harvest survey instrument is included as Appendix 3.

Household Harvest Surveys

Kawerak has been conducting household harvest surveys on a variety of fish and wildlife species for years and has a standard methodology that has been consistently used, which is outlined below. The same methods used by Ahmasuk et al. (2008) were used for this study, with the exception that the Ahmasuk et al. study aimed for participation of 100% of the households in each community, and the goal for this study was 80%.

Study Design

Participation of 80% of the households in each community was the goal for the harvest surveys (estimated household numbers: Shishmaref 137, Wales 46, Teller 78, Brevig Mission 85 and Stebbins 128). This goal was met and exceeded in Wales, Brevig Mission, Teller and Stebbins. In Shishmaref, only 66.9% of the households were surveyed. Local surveyors were hired in each community and trained together in Nome. The training took place at Kawerak and was conducted by Eric Trigg, the Subsistence Special Projects Assistant, and Julie Raymond-Yakoubian, Anthropologist and principal investigator for this project. Mr. Trigg has facilitated multiple surveyor training sessions for Kawerak. Surveyors were trained on the use of tracking sheets, general harvest survey protocol, how to use the survey instrument and associated photo prompts for each non-salmon fish species, and on the overall goals and purpose of the project. After completing their training, surveyors returned to their communities and then traveled from house to house to request consent to administer the survey.

Data Collection and Reduction

The household survey instrument and associated photo prompt booklet (which included photos of each non-salmon species that surveyed households were asked about) was created by Kawerak Subsistence Resources Program, Fisheries Program and Social Science Program staff. For households that agreed to participate, harvest surveys were completed with the head of the household. Surveys were typically completed at the kitchen table of the participating household and took approximately 35 minutes to complete (some high-harvesting households took much longer).

Kawerak's most recent community household lists were sent to tribal council offices to be updated by local surveyors. Each list contained columns for the household's identification number, the head of household's name or names, and a column labeled "Comments", where surveyors noted if a household had moved away, moved to another household, or is deceased. Blank rows were included for adding new households in the community. After receiving the updated household lists, Kawerak randomized the list of households for each community. This randomized list was then used as a tracking sheet by surveyors. The tracking sheets provided the surveyors with a method to record their progress. Surveyors were instructed to begin at the top of the randomized household list and to work their way down the list, recording whether or not the household had completed a survey, declined to participate, if no contact was made with the

household, or if the household had moved away, moved to another household, or was deceased. There was also a column for surveyors to record “Comments” about the household (e.g., if the surveyor was asked to return at another time, etc.).

The households were not stratified to control for high-harvesting households. Data from previous harvest surveys exists that indicate which households were high-harvesters at the time of the last survey, but this information was not used to stratify the sample for this project. This is because individual household harvests vary over time based on a number of factors; households that were high-harvesting five years ago may no longer be.



Figure 9: Krista Kugzruk, harvest surveyor, completes a harvest survey with a Teller resident.

After receiving completed survey forms from the local surveyors, Kawerak staff entered all survey data into Microsoft Excel files. A worksheet was created for each community for “non-salmon fish” data. There were two sections in each non-salmon worksheet; one for data entry and one called “data set”. The data entry section was used for the actual data entry. If no harvests were reported or no response was given to other questions, cells in the data entry section were left blank. The “data set” section uses formulas to insert zeros or blanks where no harvests or responses to other questions were provided by survey respondents. This eliminated the need to enter zeros in each community’s harvest data file. Household data from pages one and two of the survey instrument were entered separately in a household worksheet.

Harvest surveyors were paid \$30.00 for each survey form they completed. Each household that completed a survey was given a Kawerak logo outdoor thermometer, a calendar and was entered into a random drawing to win \$100.00 of fuel or food from the local store.

Data Analysis

Initial harvest data analysis was completed using Microsoft Excel 2003. Excel data sets were created containing usable pounds harvested. Other data analysis utilized SPSS and SPSS Tables software. Resource harvest numbers by gear type and month were displayed in the pivot tables.

Total reported harvests, mean per household harvests, total reported usable pounds harvested, and mean pounds per household harvested were displayed in the pivot tables. To determine the number of usable pounds harvested, the average weights of subsistence harvested fish from the ADFG Community Profiles Database and Community Subsistence Information System was used (i.e., usable pound conversion factors were used).

The IBM® SPSS® Statistics 19.0 program and add on module IBM® SPSS® Custom Tables 19.0 was used to create the tables for this report. SPSS is a statistical software program and can open or retrieve different data file formats from various software programs. All Excel harvest data file worksheets can be opened and saved as SPSS files for additional analysis.

The harvest estimates presented in this report are for entire communities (i.e., not just the surveyed households in each community). The methods for data expansion used to produce these estimates can be found in Ahamasuk et al. (2008:24-28).

Semi-Structured Interviews

Kawerak has been conducting semi-structured interviews with local experts on many topics for several years. This study utilized a standard interview guide (Appendix 1) and included a mapping procedure that was carried out with a purposive sample of elders and active fishers (local experts).

Study Design

The principal investigator, Julie Raymond-Yakoubian, provided each tribal council a list of possible local experts, identified through a question on the harvest surveys, for consideration and asked the councils to add or subtract names. The final list as revised by each tribal council was used to contact experts and ask for their participation in the project. Local experts were defined as individuals who have lived in the area for an extended period of time and are intimately familiar with fishing for non-salmon species. Each local expert was paid an \$80.00 honorarium for participating in an interview in recognition of their time and knowledge.

The principal investigator made an initial visit to each community to introduce the project in detail to the tribal councils and the public and to answer questions about the project. Tribal councils had previously been asked to provide the names of potential local assistants to help conduct the study. Some interviews for the job of local assistant took place during these visits; others were interviewed over the telephone.

The principal investigator made an additional trip to each community to conduct interviews with local experts (described below). These trips took approximately one week in duration and some communities were visited more than once. After conducting preliminary data analysis, she also conducted a data-review workshop in each community (described below). All local experts that participated in the project and the tribal council members were invited to participate in these workshops.

The principal investigator also participated in fishing related activities with community members. This participant observation provided an opportunity to engage with subsistence

fishers during preparations to go fishing, the practice of fishing, preparing and storing fish, eating fish, and talking about fish. She gained valuable insights and views on particular species, harvest methods and other topics.

Data Collection and Reduction

The semi-structured interviews were conducted by the principal investigator. One local assistant from each community was temporarily hired by Kawerak assist with interviewing and to act as a local guide and liaison. The principal investigator trained each local assistant how to use the interview guide, operate equipment, and conduct the mapping technique (described below). Three interns were also hired over the course of the project to assist with interviewing, archival research, transcriptions and other project activities. The purpose of the internships was to provide job experience to young adults from the region and to introduce them to social science research and research methods. The internships were advertised through local tribal councils, schools and other community venues.

The interview guide was developed in collaboration with the five tribal councils. An intern and the local assistants from each community also provided input for the interview guide. The interview guide covered several topics:

- Taxonomy of non-salmon fish species
- Changes in population numbers
- Changes in species health
- Changes in species distribution
- Current and previous harvest locations
- Current and previous harvest methods
- Current and previous processing, storage, and preparation methods
- Economic importance of non-salmon fish
- Cultural importance of non-salmon fish
- Non-salmon fish related place names
- Habitat preferences, spawning areas, and seasonal movements of non-salmon fish
- Observations about climactic changes that may impact non-salmon fish species or subsistence harvest of non-salmon species

The principal investigator digitally recorded each interview (with permission of the interviewees). The majority of interviews were transcribed by one individual. Each local expert was provided an opportunity to review their transcript prior to it being finalized and archived by Kawerak. The Eskimo Heritage Program at Kawerak is the repository for the transcripts.

Mapping

Most local experts were asked to map locations where they harvest non-salmon fish species; where non-salmon fish are known to be found; where environmental changes may be impacting non-salmon fish or harvest activities (i.e., water bodies that are drying up, etc.); locations with place names related to non-salmon fish; or any other spatial information that related to non-salmon fish (e.g., spawning areas, harvest areas, fish camps, etc.). U.S. Geological Survey topographic maps (1:250,000 scale) topped with mylar sheets and colored markers were used to

record this information on the maps (c.f. Andersen et al. 2004). The spatial data was digitized in ArcGIS 9.3 by Kawerak Land Management Specialist Obie Simonis, who also produced maps for community review and inclusion in this report.



Figure 10: Stebbins expert, Daisy Pete, and Yup'ik translator, Julie Henry, during an interview.

Data Analysis

Kawerak used Atlas.ti qualitative data analysis software to code and organize the interview transcripts. The principal investigator used the software to identify patterns and trends in the data through keyword, co-occurrence, and other queries. A list of codes was created (132 total) and applied to the interview data by the principal investigator. This was an iterative process in which each transcript was reviewed multiple times during the coding process as codes were created, deleted, combined and otherwise revised (e.g., Friese 2012). The 132 codes were applied to over 3,400 individual quotations. Quotations were organized by code, community, and other factors during the process of analysis to determine patterns, trends and anomalies in the data.

During analysis, the principal investigator created summaries of information for each fish and for each potential topic of interest (such as climate data, sharing, flounder, etc.) for each village. Data from the harvest survey portion of the project and draft maps of the non-salmon harvest areas and other spatial data were also available at this point. After compiling these summaries, the principal investigator worked with the tribal coordinator in each community to schedule data review workshops.

During the workshops, local experts and tribal council members were given all of the summary sheets and the draft map was displayed and discussed. The principal investigator reviewed the summaries for as many fish and topics as possible, but not all fish or topics were discussed in every workshop due to time constraints. The summaries were left with workshop participants, and they were encouraged to review material that had not been covered at the workshop and to report any changes or additions that were necessary to the principal investigator. Each workshop

participant was paid a \$50.00 honorarium. Kawerak also provided snacks for participants and door prizes at the conclusion of the workshop. Feedback received from workshop participants was incorporated into this report. Draft copies of this report have also been reviewed by project participants, tribal council representatives, and Kawerak Natural Resources Division staff.

RESULTS

Experts in each of the five participating communities emphasized that every village has a slightly different body of knowledge about each species of non-salmon fish. This is due to local interests and preferences, distribution of various non-salmon fish, and local ecological differences. In deference to these actual and perceived differences, the ethnographic information collected on each species of fish during the interviews and expert workshops is organized by community with a section on each fish species. This allows for a comparison of the type and depth of information possessed by each community. While some of the information may appear redundant, it helps the reader see differences in knowledge and practice between communities. There are separate sections on other non-salmon related topics, which are presented independently of the community data.

Harvest Surveys

In Shishmaref, 66.9%¹ of households were surveyed; in Wales, 92.1% of households were surveyed; in Brevig Mission, 84.7% of households were surveyed; in Teller, 80.3% of households were surveyed; and in Stebbins, 82.1% of households were surveyed. Table 1 illustrates number of households in each community as well as percentages of participation, refusals, and other information relevant to the harvest surveys. The results presented in this section address study objectives one, two and three.

Estimated 2009-2010 Non-Salmon Harvest

The figures and tables below illustrate the estimated harvest of non-salmon fish in each community by species and individual number of fish harvested. Readers should note the differing scales on each graph, which are necessary due to the widely varying levels of harvest in each community. Survey respondents reported harvests of other non-salmon fish that were not included in this survey; these fish are included in the category “other” in the following graphs and tables. As noted previously, this study used methods similar to those used by Ahmasuk et al. (2008). Harvest survey results from this study are compared to those from Ahmasuk et al. (*ibid.*) because in addition to using similar methods to this study, Ahmasuk et al. (*ibid.*) also contains

¹ Kawerak has some concerns regarding the harvest survey data from Teller and Shishmaref. Because of difficulties in obtaining participation of households, a portion of the harvest surveys from Teller and Shishmaref were completed 2011. Surveys completed in 2011 were asking respondents to recall harvests from over one year in the past and may suffer from inaccurate respondent recall. There is no accepted method to determine how accurate respondent recall is. Respondents that completed the survey in 2011 were reminded of the harvest period they were being surveyed about multiple times during the course of the survey to ensure that their responses were as accurate as possible. Through conversations with respondents, local assistants, and tribal councils, we have determined that the data collected in 2011 is reliable enough to be included in the estimates presented in this report.

the most recent non-salmon harvest data for the study communities². Table 2 illustrates the total estimated harvest of non-salmon fish in each study community as documented by Ahmasuk et al. (2008) and this study. The estimates presented in this report are for entire communities (i.e., not just the surveyed households). The methods for data expansion used to produce these estimates can be found in Ahamasuk et al. (2008:24-28).

Table 1. Sampling and participation.

Stratum Variable	Shishmaref	Wales	Brevig Mission	Teller	Stebbins	Totals
Initial Estimated Households	139	41	86	67	119	452
Revised Estimate of Households	133	38	85	66	112	434
Households Surveyed	89	35	72	53	92	341
Households Refused	0	2	4	5	14	25
Households Not Contacted	44	1	9	8	6	68
Households Moved away / Moved to other HH / Deceased	6	3	1	1	7	18
Refusal Rate	0.0%	5.3%	4.7%	7.6%	12.5%	5.8%
Percentage of HHs Not Contacted	33.1%	2.6%	10.6%	12.1%	5.4%	15.7%
Percentage of HHs Surveyed	66.9%	92.1%	84.7%	80.3%	82.1%	78.6%
Survey Weighting Factor	1.494	1.086	1.181	1.245	1.217	1.273
Sample Population	393	124	317	178	418	1,430
Mean Household Size	4.4	3.5	4.4	3.4	4.5	4.2
Estimated Population	587	135	374	222	509	1,827

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Notes: Refusal rate = number of households refused divided by revised estimate of households. Percentage of HHs Not Contacted = number of households not contacted divided by the revised estimate of households. Percentage of HHs Surveyed = households surveyed divided by revised estimate of households. Survey Weighting Factor = revised estimate of households divided by households interviewed. Estimated Population = sample population multiplied by household weighting factor.

A preliminary note must be made on the survey data regarding burbot and lingcod. Lingcod was included in the project because people from several communities had previously commented on lingcod prior to this project, indicating the possible necessity for including this species. However, current information from the biological sciences indicates that lingcod are not extant in the study region. It was discovered during the ethnographic research that many people in the Bering Strait region refer to burbot by the name “lingcod”. In the interpretation of the survey data below, it is likely that the burbot numbers should additionally include much of the numbers reported for lingcod (i.e., the burbot numbers are likely an underestimate). It is thus impossible to determine what number of survey responses for lingcod were simply incorrectly identifying the presence of a species in this region which is not extant, and which number actually

² Appendix 2 includes Tables that illustrate the total estimated non-salmon harvest by each community, by month.

represented the identification of burbot via the local nomenclature for this species (i.e., “lingcod”). (In these latter cases one would imagine the respondents simply responded to the species name as the basis of their answer and were not basing their answer on the photos used by surveyors.) It should also be noted that this issue is not a concern with the ethnographic data because the interviewer explored this issue with experts and came to recognize this variance between local nomenclature and the nomenclature of western science. Therefore in the ethnographic data, all instances of the local use of the term “lingcod” should be considered to refer to what western fisheries science calls “burbot.” (There was a much less common occurrence in which ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

Table 2: Comparison of the total estimated harvest of non-salmon fish in the study communities in 2005-2006 and 2009-2010.

	Shishmaref	Wales	Brevig Mission	Teller	Stebbins
Total estimated 2005-2006 harvest	56,588	576	1,926	16,137	86,938
Total estimated 2009-2010 harvest	93,971	679	4,102	32,688	56,564

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Notes: The 2005-2006 data is from Ahmasuk et al. (2008): Kawerak, Inc., North Pacific Research Board, Alaska Department of Fish & Game, 2005-2006 Comprehensive Subsistence Harvest Survey, Bering Strait/Norton Sound Region.

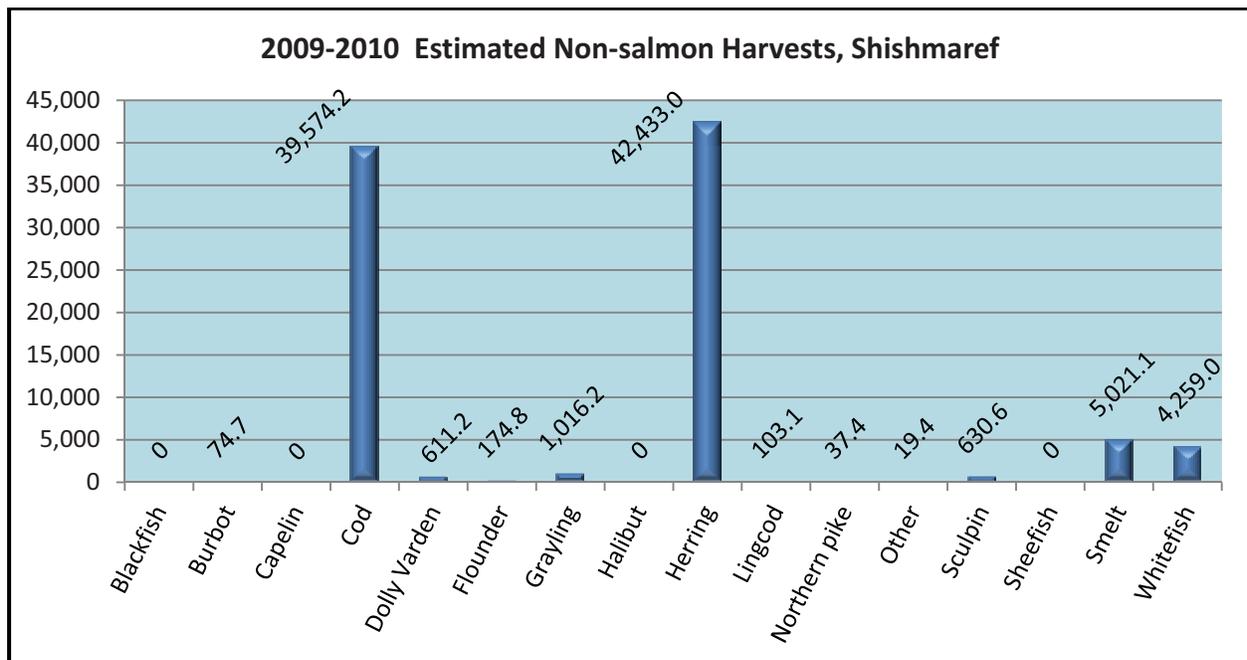


Figure 11: 2009-2010 estimated harvest of non-salmon fish, Shishmaref. Numbers of fish harvested by species.

Shishmaref: In 2009-2010 the harvest of non-salmon fish in Shishmaref focused on cod (tomcod, saffron cod, and blue cod) and herring (Figure 11). The estimated harvest of non-salmon fish for Shishmaref during 2009-2010 shows an almost 50% decrease in the community's harvest of cod and herring, the non-salmon fish with the highest harvest numbers, since the most recent estimate of the 2005-2006 harvest (Ahmasuk et al. 2008:68). Shishmaref's harvest of smelt decreased by more than 50% and harvest of whitefish stayed approximately the same during the same period. The harvest of sheefish increased, while the harvest of Dolly Varden, grayling and sculpin declined (*ibid.*). For the 2009-2010 harvest, there was an overall increase in the estimated total number of non-salmon fish harvested by residents of Shishmaref.

Wales: In Wales, Dolly Varden and whitefish had the highest harvest numbers (Figure 12). The estimated harvest of non-salmon fish for Wales during 2009-2010 shows a slight decrease in the harvest of Dolly Varden and an over 50% decrease in the community's harvest of whitefish, the non-salmon fish with the highest harvest numbers, since the most recent estimate of the 2005-2006 harvest (Ahmasuk et al. 2008:69). Wales did not harvest any capelin in 2009-2010, compared to a harvest of 95 in 2005-2006. Wales's harvest of cod (tomcod, saffron cod, and blue cod) and flounder increased while the harvest of smelt decreased by approximately 90% during the same period (*ibid.*). There was an overall increase in harvest of non-salmon fish in 2009-2010 compared to 2005-2006.

Brevig Mission: In Brevig Mission cod (tomcod, saffron cod, and blue cod) and smelt were the most frequently harvested fish (Figure 13). The estimated harvest of non-salmon fish for Brevig Mission during 2009-2010 shows a more than 50% increase in the community's harvest of cod, smelt, pike, herring and whitefish since the most recent estimate of the 2005-2006 harvest (Ahmasuk et al. 2008:70). Brevig Mission's harvest of Dolly Varden and flounder stayed approximately the same during the same period (*ibid.*). There was an overall increase in harvest of non-salmon fish in 2009-2010 compared to 2005-2006.

Teller: Teller harvested cod (tomcod, saffron cod, and blue cod), smelt, herring and whitefish in the greatest numbers (Figure 14). The estimated harvest of non-salmon fish for Teller during 2009-2010 shows a substantial harvest of herring, whereas, no herring harvest was reported in 2005-2006 (Ahmasuk et al. 2008:71). There was an approximately 600% increase in Teller's harvest of whitefish from the 2005-2006 survey. Teller's harvest of cod increased by approximately 25% and harvest of Dolly Varden, pike and smelt stayed approximately the same during the same period. Teller did not report a harvest of any grayling or sculpin in 2005-2006, but reported small harvests of these fish in 2009-2010 (*ibid.*). There was an overall increase in harvest of non-salmon fish in 2009-2010 compared to 2005-2006.

Stebbins: Stebbins, like Shishmaref, had a harvest focused on cod (tomcod, saffron cod, and blue cod) and herring (Figure 15). The estimated harvest of non-salmon fish for Stebbins during 2009-2010 shows an almost 50% decline in the community's harvest of herring and an almost 1300% increase in the cod harvest as compared to 2005-2006 (Ahmasuk et al. 2008:77). Stebbins also reported a harvest of several species of which there was no reported harvest in 2005-2006: blackfish, burbot, and capelin. Stebbins's harvest of Dolly Varden, sheefish and smelt declined about 50%, while there was an increase in the harvest of sculpin. While there was no harvest of flounder reported in 2005-2006, there was a modest harvest reported for 2009-2010 (*ibid.*). There

was an overall decrease in the harvest of non-salmon fish in 2009-2010 as compared to the harvest in 2005-2006.

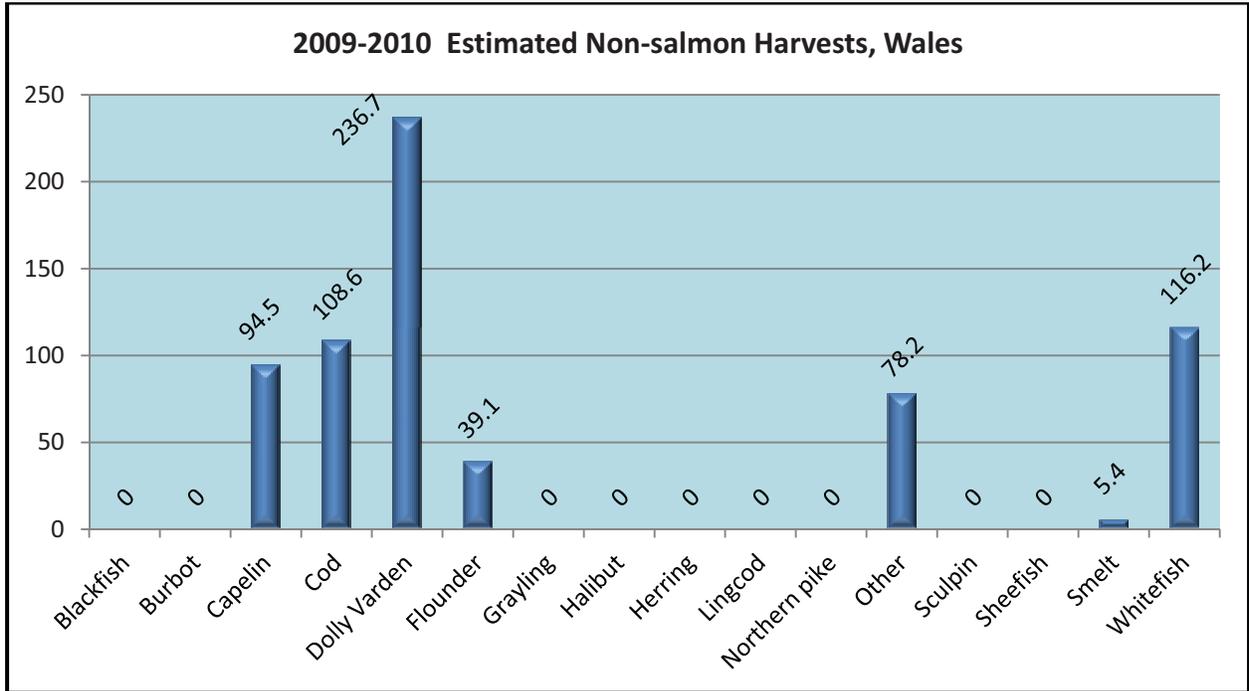


Figure 12: 2009-2010 estimated harvest of non-salmon fish, Wales.
Numbers of fish harvested by species.

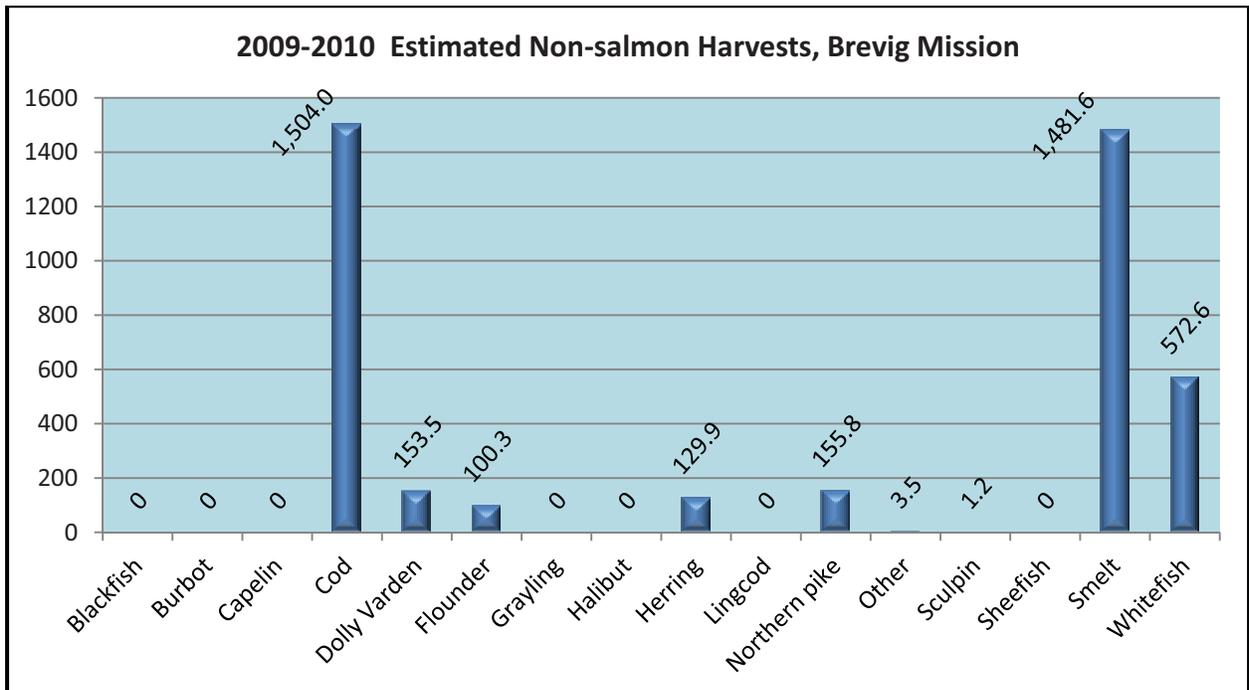


Figure 13: 2009-2010 estimated harvest of non-salmon fish, Brevig Mission.
Numbers of fish harvested by species.

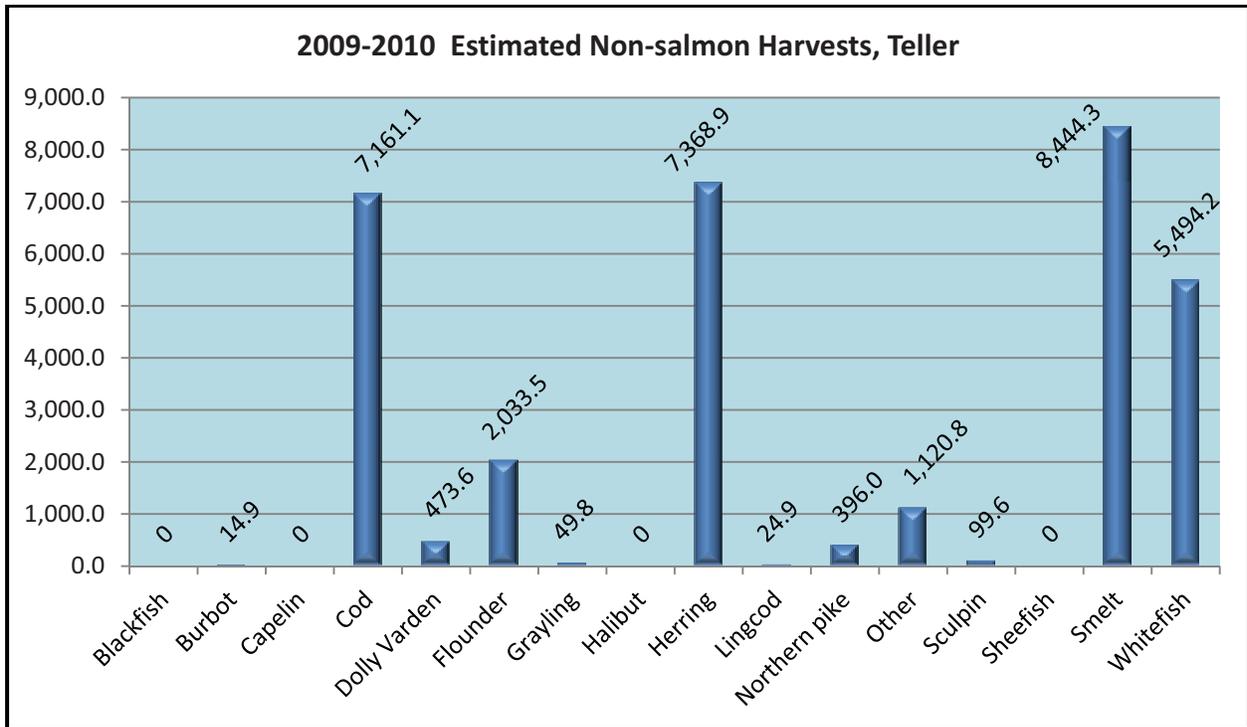


Figure 14: 2009-2010 estimated harvest of non-salmon fish, Teller. Numbers of fish harvested by species.

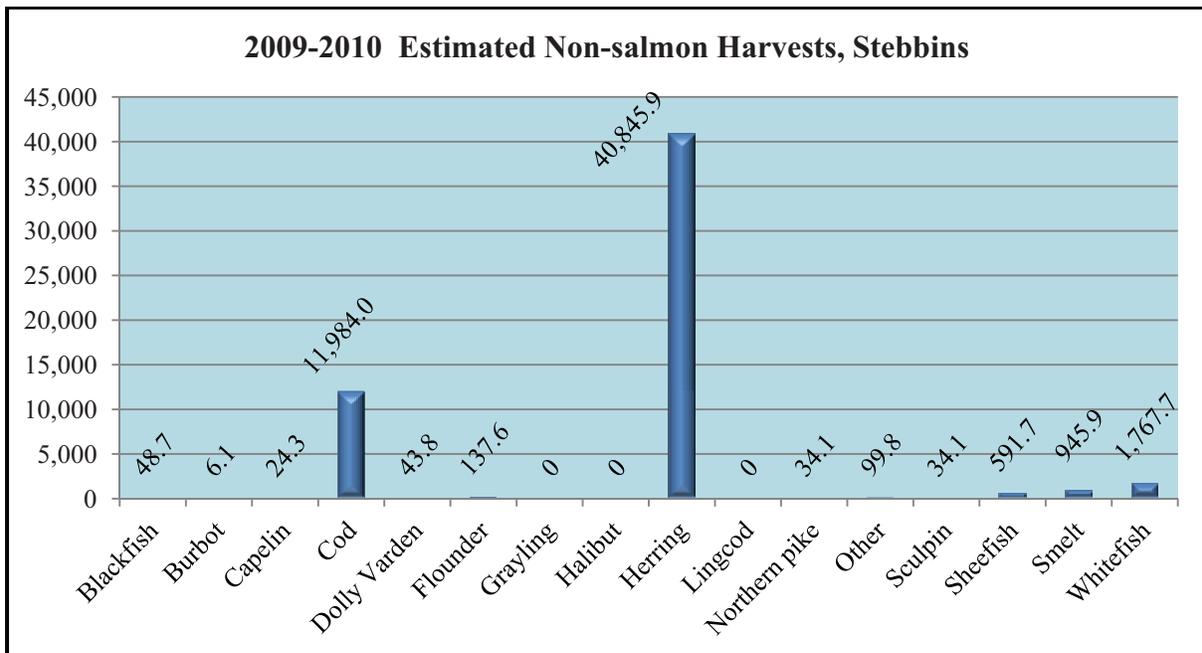


Figure 15: 2009-2010 estimated harvest of non-salmon fish, Stebbins. Numbers of fish harvested by species.

Evaluation of the 2009-2010 Non-Salmon Season

Harvest survey respondents were asked to rate the 2009-2010 fishing season for each non-salmon species as very good, average, or poor, compared to previous years. Tables 3-7 indicate how many respondents gave a rating for each species and how fishing for these species was rated overall by respondents (e.g., the majority of Shishmaref respondents indicated that non-salmon fishing in 2009-2010 was “average”).

Fishing for blackfish in 2009-2010 was rated as “average” by one respondent in Brevig, who was the only respondent (in all five communities) that provided a rating. Burbot fishing was rated as “average” by the majority of Shishmaref, Wales, and Stebbins respondents, and as “average” and “poor” by one respondent each in Teller. No respondents in Brevig Mission reported trying to harvest burbot during the survey period. Fishing for capelin was rated as “average” by the only two respondents who provided a rating (one each in Wales and Stebbins). The majority of respondents in all communities rated fishing for cod (tomcod, saffron cod, and blue cod) in 2009-2010 as “average”. Fishing for Dolly Varden was also rated as “average” by the majority of respondents in each community. The majority of respondents in Shishmaref and Stebbins rated fishing for flounder as “average”, and the majority of respondents in Teller rated flounder fishing as “very good”. The majority of respondents in Wales rated flounder fishing as “poor”, and in Brevig Mission two respondents rated fishing as “very good”, two rated it as “average”, and one rated it as “poor”.

Fishing for grayling in 2009-2010 was rated as “average” by the majority of respondents in Shishmaref and Teller. Respondents in other communities did not try to harvest grayling. Halibut fishing was rated as “poor” by the majority of respondents in Shishmaref, Wales, and Teller, and Brevig Mission, and Stebbins respondents did not attempt to harvest halibut. Fishing for herring was rated as “average” by the majority of respondents in Shishmaref, Brevig Mission, and Stebbins. Wales residents did not try to harvest herring and in Teller two respondents rated fishing for herring as “poor” and two rated it as “average”. The majority of respondents in Shishmaref and the only Teller respondent rated lingcod (possibly referring to burbot) fishing as “average”, and the respondents in other communities did not try to harvest the fish. Fishing for Northern pike was rated as “average” by the majority of Shishmaref, Teller and Stebbins respondents. Wales respondents did not try to harvest Northern pike and of the two Brevig Mission respondents, one rated fishing as “very good”, and the other rated it as “poor”.

Fishing for sculpin in 2009-2010 was rated as “average” by the majority of respondents in Shishmaref, Brevig Mission and Stebbins. The only respondent in Wales rated fishing as “poor” and the majority of respondents in Teller rated it as “very good”. The majority of respondents in Stebbins rated fishing for sheefish as “average”. The only respondent in Teller rated sheefish fishing as “poor”, and in Shishmaref, three respondents rated it as “average”, two as “very good”, and one as “poor”. No Brevig Mission respondents reported a harvest of sheefish. Fishing for smelt in 2009-2010 was rated as “average” by the majority of respondents in Shishmaref, Teller, and Stebbins. In Wales, the majority of respondents rated fishing as “poor” and in Brevig Mission six respondents rated smelt fishing as “very good”, seven as “average” and four as “poor”. Fishing for whitefish was rated as “average” by the majority of respondents in Shishmaref, Teller and Stebbins. The majority of respondents in Wales rated whitefish fishing as

“poor”, and in Brevig Mission, four respondents rated it as “very good”, six as “average”, and three as “poor”.

Table 3. Shismaref resident’s assessments of the 2009-2010 fishing season.

Shismaref: How was fishing compared to previous years																	
Resource																	
Comparison	Blackfish	Burbot	Capelin	Cod	Dolly Varden	Flounder	Grayling	Halibut	Herring	Lingcod	Northern pike	Other	Sculpin	Sheefish	Smelt	Whitefish	Total
Very good	0	0	0	17	4	2	2	0	12	1	0	1	1	1	9	5	55
Average	0	6	0	31	18	5	24	0	15	8	2	2	11	3	23	40	188
Poor	0	2	0	6	4	2	5	1	0	4	1	0	6	2	5	9	47
Total responses	0	8	0	54	26	9	31	1	27	13	3	3	18	6	37	54	290

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 4. Wales residents’ assessments of the 2009-2010 fishing season.

Wales: How was fishing compared to previous years																	
Resource																	
Comparison	Blackfish	Burbot	Capelin	Cod	Dolly Varden	Flounder	Grayling	Halibut	Herring	Lingcod	Northern pike	Other	Sculpin	Sheefish	Smelt	Whitefish	Total
Very good	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	0	0	1	3	10	2	0	0	0	0	0	4	0	0	0	2	22
Poor	0	1	0	1	3	3	0	1	0	0	0	2	1	0	2	3	17
Total responses	0	1	1	4	13	5	0	1	0	0	0	6	1	0	2	5	39

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 5. Brevig Mission residents’ assessments of the 2009-2010 fishing season.

Brevig Mission: How was fishing compared to previous years																	
Resource																	
Comparison	Blackfish	Burbot	Capelin	Cod	Dolly Varden	Flounder	Grayling	Halibut	Herring	Lingcod	Northern pike	Other	Sculpin	Sheefish	Smelt	Whitefish	Total
Very good	0	0	0	5	1	2	0	0	1	0	1	0	0	0	6	4	20
Average	0	0	0	11	5	2	0	0	2	0	0	1	1	0	7	6	35
Poor	0	0	0	5	0	1	0	0	0	0	1	0	0	0	4	3	14
Total responses	0	0	0	21	6	5	0	0	3	0	2	1	1	0	17	13	69

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 6. Teller residents' assessments of the 2009-2010 fishing season.

		Teller: How was fishing compared to previous years															
		Resource															
Comparison	Blackfish	Burbot	Capelin	Cod	Dolly Varden	Flounder	Grayling	Halibut	Herring	Lingcod	Northern pike	Other	Sculpin	Sheefish	Smelt	Whitefish	Total
Very good	0	0	0	7	5	4	0	0	2	0	1	0	2	0	11	3	35
Average	0	1	0	16	13	3	2	0	2	1	14	1	0	0	18	16	87
Poor	0	1	0	7	1	0	1	1	0	0	1	0	0	1	2	4	19
Total responses	0	2	0	30	19	7	3	1	4	1	16	1	2	1	31	23	141

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 7. Stebbins residents' assessments of the 2009-2010 fishing season.

		Stebbins: How was fishing compared to previous years															
		Resource															
Comparison	Blackfish	Burbot	Capelin	Cod	Dolly Varden	Flounder	Grayling	Halibut	Herring	Lingcod	Northern pike	Other	Sculpin	Sheefish	Smelt	Whitefish	Total
Very good	0	0	0	7	0	0	0	0	4	0	0	1	0	2	0	1	15
Average	1	1	1	31	4	5	0	0	31	0	2	2	2	13	5	16	114
Poor	0	0	0	3	1	3	0	0	2	0	0	0	1	1	3	1	15
Total responses	1	1	1	41	5	8	0	0	37	0	2	3	3	16	8	18	

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Overall, the respondents in all five communities rated the 2009-2010 fishing season for all non-salmon fish species as “average.” Respondents were asked, for each species, why the 2009-2010 fishing season was different than previous years. Responses included beliefs that there are less fish in the area, people going fishing less frequently, changes in run timing, increases in non-salmon predators, and the impact of environmental changes.

Use, Harvest, Attempted Harvest, Sharing and Receiving of Non-Salmon Fish

Tables 8-12 record the percentage of surveyed households in each community that used non-salmon fish, tried to harvest non-salmon fish, harvested non-salmon fish, and gave and received non-salmon fish during the 2009-2010 survey period.

Shishmaref: During the 2009-2010 harvest season 74.2% of households surveyed in Shishmaref used (i.e., harvested or were given) at least one species of non-salmon fish (Table 8). The majority of Shishmaref households that were surveyed indicated that they used whitefish, cod and smelt more than other non-salmon fish. Shishmaref respondents tried to harvest whitefish, cod and smelt more than any other non-salmon fish species and were also most successful in their harvest of those fish. The non-salmon fish species that were most frequently shared include whitefish, cod and herring and 57.3% of surveyed households shared non-salmon fish.

Shishmaref respondents received whitefish, cod, herring and smelt more often than other species of non-salmon fish, and 58.4% of surveyed households received at least one species of non-salmon fish from another household.

Wales: During the 2009-2010 harvest season 51.4% of households surveyed in Wales used (i.e., harvested or were given) at least one species of non-salmon fish (Table 9). The majority of Wales households surveyed indicated that they used Dolly Varden more than other non-salmon fish. Wales respondents tried to harvest Dolly Varden more than any other non-salmon fish species and were most successful in their harvest of this fish. The non-salmon fish that was most frequently shared was Dolly Varden and 42.9% of surveyed households shared at least one species of non-salmon fish. Wales respondents received Dolly Varden and “other” fish more often than the other species of non-salmon fish, and 28.6% of surveyed households received at least one species of non-salmon fish from another household.

Table 8. Percentage of surveyed households in Shishmaref that used, tried to harvest, harvested, gave away and received non-salmon fish during the 2009-2010 survey period.

Resource	Try to harvest non-salmon		Harvest non-salmon		Use non-salmon		Give non-salmon		Receive non-salmon	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Blackfish	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Burbot	5	5.6%	7	7.9%	7	7.9%	4	4.5%	4	4.5%
Capelin	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Cod	54	60.7%	54	60.7%	59	66.3%	30	33.7%	40	44.9%
Dolly Varden	25	28.1%	24	27.0%	26	29.2%	12	13.5%	18	20.2%
Flounder	5	5.6%	8	9.0%	9	10.1%	6	6.7%	7	7.9%
Grayling	32	36.0%	31	34.8%	33	37.1%	14	15.7%	22	24.7%
Halibut	0	0.0%	0	0.0%	6	6.7%	0	0.0%	6	6.7%
Herring	27	30.3%	27	30.3%	29	32.6%	20	22.5%	25	28.1%
Lingcod	10	11.2%	13	14.6%	14	15.7%	1	1.1%	8	9.0%
Northern pike	3	3.4%	3	3.4%	3	3.4%	1	1.1%	1	1.1%
Other	3	3.4%	3	3.4%	3	3.4%	1	1.1%	2	2.2%
Sculpin	17	19.1%	19	21.3%	18	20.2%	12	13.5%	12	13.5%
Sheefish	7	7.9%	6	6.7%	16	18.0%	1	1.1%	12	13.5%
Smelt	39	43.8%	38	42.7%	40	44.9%	17	19.1%	25	28.1%
Whitefish	55	61.8%	53	59.6%	55	61.8%	37	41.6%	43	48.3%
All Non-salmon	282	70.8%	286	69.7%	318	74.2%	156	57.3%	225	58.4%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Brevig Mission: During the 2009-2010 harvest season 33.3% of households surveyed in Brevig Mission used (i.e., harvested or were given) at least one species of non-salmon fish (Table 10). The majority of Brevig Mission households surveyed indicated that they used cod, smelt and whitefish more than other non-salmon fish. Brevig Mission respondents tried to harvest cod, smelt, and whitefish more than any other non-salmon fish species and were most successful in their harvest of those fish. The non-salmon fish that were most frequently shared include cod, whitefish and smelt and 23.6% of surveyed households shared at least one species of non-salmon

fish. Nearly 7% of Brevig Mission respondents received cod, whitefish or smelt from another household.

Teller: During the 2009-2010 harvest season 84.9% of households surveyed in Teller used (i.e., harvested or were given) at least one species of non-salmon fish (Table 11). The majority of Teller households surveyed indicated that they used smelt, cod, and whitefish more than other non-salmon fish. Teller respondents tried to harvest smelt, cod, and whitefish more than any other non-salmon fish species and were most successful in their harvest of those fish. The non-salmon fish species that were most frequently shared include smelt, cod, whitefish and Dolly Varden and 47.2% of surveyed households shared at least one species of non-salmon fish. Teller respondents received whitefish, smelt and Northern pike more often than other species of non-salmon fish, and 66.0% of surveyed households received at least one species of non-salmon fish from another household.

Table 9. Percentage of surveyed households in Wales that used, tried to harvest, harvested, gave away and received non-salmon fish during the 2009-2010 survey period.

Resource	Try to harvest non-salmon		Harvest non-salmon		Use non-salmon		Give non-salmon		Receive non-salmon	
	Yes		Yes		Yes		Yes		Yes	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Blackfish	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Burbot	0	0.0%	0	0.0%	0	0.0%	1	2.9%	1	2.9%
Capelin	1	2.9%	1	2.9%	1	2.9%	0	0.0%	1	2.9%
Cod	4	11.4%	4	11.4%	4	11.4%	3	8.6%	2	5.7%
Dolly Varden	12	34.3%	13	37.1%	13	37.1%	9	25.7%	4	11.4%
Flounder	5	14.3%	4	11.4%	5	14.3%	1	2.9%	0	0.0%
Grayling	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halibut	0	0.0%	0	0.0%	1	2.9%	0	0.0%	2	5.7%
Herring	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lingcod	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Northern pike	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	5	14.3%	5	14.3%	6	17.1%	3	8.6%	4	11.4%
Sculpin	1	2.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sheefish	1	2.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Smelt	2	5.7%	1	2.9%	2	5.7%	0	0.0%	1	2.9%
Whitefish	5	14.3%	5	14.3%	5	14.3%	4	11.4%	1	2.9%
All Non-salmon	36	54.3%	33	51.4%	37	51.4%	21	42.9%	16	28.6%

Source: Kawerak, Inc., U.S. Fish and Wildlife Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Stebbins: During the 2009-2010 harvest season 73.9% of households surveyed in Stebbins used (i.e., harvested or were given) at least one species of non-salmon fish (Table 12). The majority of Stebbins households surveyed indicated that they used cod, herring, and whitefish more than other non-salmon fish. Stebbins respondents tried to harvest cod and herring more than any other non-salmon fish species and were most successful in their harvest of those fish. The non-salmon

fish that were most frequently shared included cod and herring and 47.2% of surveyed households shared at least one species of non-salmon fish. Stebbins respondents received sheefish, herring and cod more often than other species of non-salmon fish, and 54.3% of surveyed households received at least one species of non-salmon fish from another household.

Table 10. Percentage of surveyed households in Brevig Mission that used, tried to harvest, harvested, gave away and received non-salmon fish during the 2009-2010 survey period.

Resource	Try to harvest non-salmon		Harvest non-salmon		Use non-salmon		Give non-salmon		Receive non-salmon	
	Yes		Yes		Yes		Yes		Yes	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Blackfish	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Burbot	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Capelin	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Cod	21	29.2%	20	27.8%	21	29.2%	9	12.5%	3	4.2%
Dolly Varden	6	8.3%	6	8.3%	6	8.3%	2	2.8%	0	0.0%
Flounder	4	5.6%	5	6.9%	5	6.9%	0	0.0%	0	0.0%
Graying	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halibut	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Herring	3	4.2%	3	4.2%	3	4.2%	1	1.4%	0	0.0%
Lingcod	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Northern pike	2	2.8%	2	2.8%	2	2.8%	1	1.4%	0	0.0%
Other	1	1.4%	1	1.4%	1	1.4%	0	0.0%	0	0.0%
Sculpin	1	1.4%	1	1.4%	1	1.4%	0	0.0%	0	0.0%
Sheefish	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Smelt	17	23.6%	16	22.2%	17	23.6%	9	12.5%	1	1.4%
Whitefish	13	18.1%	13	18.1%	12	16.7%	10	13.9%	2	2.8%
All Non-salmon	68	33.3%	67	33.3%	68	33.3%	32	23.6%	6	6.9%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region project.

Table 11. Percentage of surveyed households in Teller that used, tried to harvest, harvested, gave away and received non-salmon fish during the 2009-2010 survey period.

Resource	Try to harvest non-salmon		Harvest non-salmon		Use non-salmon		Give non-salmon		Receive non-salmon	
	Yes		Yes		Yes		Yes		Yes	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Blackfish	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Burbot	1	1.9%	2	3.8%	2	3.8%	1	1.9%	0	0.0%
Capelin	0	0.0%	0	0.0%	2	3.8%	0	0.0%	2	3.8%
Cod	30	56.6%	30	56.6%	36	67.9%	17	32.1%	12	22.6%
Dolly Varden	20	37.7%	19	35.8%	24	45.3%	14	26.4%	12	22.6%
Flounder	7	13.2%	7	13.2%	7	13.2%	5	9.4%	1	1.9%
Grayling	3	5.7%	2	3.8%	2	3.8%	1	1.9%	0	0.0%
Halibut	2	3.8%	0	0.0%	5	9.4%	0	0.0%	4	7.5%
Herring	4	7.5%	4	7.5%	5	9.4%	3	5.7%	2	3.8%
Lingcod	0	0.0%	1	1.9%	1	1.9%	1	1.9%	0	0.0%
Northern pike	17	32.1%	17	32.1%	25	47.2%	7	13.2%	17	32.1%
Other	1	1.9%	1	1.9%	2	3.8%	0	0.0%	1	1.9%
Sculpin	1	1.9%	2	3.8%	2	3.8%	1	1.9%	1	1.9%
Sheefish	1	1.9%	2	3.8%	2	3.8%	0	0.0%	0	0.0%
Smelt	31	58.5%	31	58.5%	41	77.4%	19	35.8%	17	32.1%
Whitefish	23	43.4%	23	43.4%	31	58.5%	14	26.4%	18	34.0%
All Non-salmon	141	67.9%	141	67.9%	187	84.9%	83	47.2%	87	66.0%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region project.

Table 12. Percentage of surveyed households in Stebbins that used, tried to harvest, harvested, gave away and received non-salmon fish during the 2009-2010 survey period.

Resource	Try to harvest non-salmon		Harvest non-salmon		Use non-salmon		Give non-salmon		Receive non-salmon	
	Yes		Yes		Yes		Yes		Yes	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Blackfish	1	1.1%	1	1.1%	13	14.1%	4	4.3%	13	14.1%
Burbot	1	1.1%	1	1.1%	5	5.4%	0	0.0%	4	4.3%
Capelin	1	1.1%	1	1.1%	1	1.1%	0	0.0%	0	0.0%
Cod	43	46.7%	42	45.7%	57	62.0%	27	29.3%	22	23.9%
Dolly Varden	6	6.5%	5	5.4%	13	14.1%	3	3.3%	10	10.9%
Flounder	7	7.6%	8	8.7%	9	9.8%	1	1.1%	1	1.1%
Grayling	0	0.0%	0	0.0%	2	2.2%	0	0.0%	2	2.2%
Halibut	0	0.0%	0	0.0%	3	3.3%	0	0.0%	3	3.3%
Herring	41	44.6%	41	44.6%	50	54.3%	23	25.0%	23	25.0%
Lingcod	0	0.0%	0	0.0%	1	1.1%	0	0.0%	1	1.1%
Northern pike	2	2.2%	2	2.2%	11	12.0%	1	1.1%	9	9.8%
Other	5	5.4%	5	5.4%	6	6.5%	1	1.1%	1	1.1%
Sculpin	7	7.6%	4	4.3%	8	8.7%	1	1.1%	3	3.3%
Sheefish	16	17.4%	16	17.4%	36	39.1%	14	15.2%	26	28.3%
Smelt	8	8.7%	9	9.8%	13	14.1%	3	3.3%	6	6.5%
Whitefish	19	20.7%	19	20.7%	44	47.8%	19	20.7%	32	34.8%
All Non-salmon	157	63.0%	154	63.0%	272	73.9%	97	51.1%	156	54.3%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region project.

Ethnographic Interviews

Shishmaref

Residents of Shishmaref harvested herring, cod (tomcod, saffron cod, and blue cod), smelt, and whitefish in the greatest numbers during the 2009-2010 harvest season (Figure 11). For that same period, over 56% of Shishmaref households surveyed say they did not get enough non-salmon fish to meet their needs (Table 13). Map 1 (map pocket) shows the Shishmaref area, including locations where Shishmaref residents harvest various non-salmon fish species, and other locations associated with non-salmon fish. As in the past, non-salmon fish continue to be highly important to Shishmaref residents. Shishmaref experts recognize non-salmon fish as being available year round and a traditional source of food for their ancestors.

“...And there’s fish anywhere in lagoon [Shishmaref Inlet]. If you go hunting in the summertime an’ you get stuck out there, as long as you have a net you won’t be hungry. At least you can eat some kind of a fish. So there’s fish all over the lagoon. An’ [you can] set your net anywhere. Even if you get stuck, you’ll never go hungry. An’ we set it like that, an’ then we catch a lot of tomcods, an’ flounder, an’ whitefish, up along the coast, up an’ down.” –Johnson Eningowuk

“Shishmaref’s main food is fish. People fished all year round, never stopped.” –Shishmaref Workshop Participants

Table 13. Percentage of surveyed households in Shishmaref that reported having enough non-salmon fish to meet their needs during the 2009-2010 survey period (66.9% of households surveyed).

Did your household get enough non-salmon for your needs?			
Yes		No	
Count	Percent	Count	Percent
39	43.8%	50	56.2%

Source: Kawerak, Inc., U.S Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish Used for Subsistence in the Bering Strait Region project.

Tomcod:

Tomcod are an important non-salmon fish species for Shishmaref, as well as the other study communities. Most people enjoy both fishing for and eating tomcod though, interestingly, many people have an allergic reaction to the fish and get itchy lips or an itchy face when they eat it. When visiting Shishmaref after freeze-up you can often see many people fishing through the ice just behind the village in the waters of the lagoon; some just fishing for dinner and some trying to put this fish away in large numbers.

“Basically the whole community likes tomcods. So even, you know, my kids or just about everybody will have it as, not sushi, but frozen.” –Fred Eningowuk

In addition to their status as a culturally preferred food, elders have also reported that eating the belly-meat of the tomcod is a remedy for anyone that is feeling sick. The skin should be removed first. This is considered a remedy for any kind of illness where the sufferer does not feel well. Bones from the head of the tomcod can also be used to play a two-person game. When eating the fish, remove the two “anchor-shaped” bones from the head. Lock them together and pull; the person holding the bone that does not break is the winner. One Shishmaref elder (Alvin Pootoogooluk) was well-known for making earrings with ear bones from the tomcod, as well.

“Lucy’s grandmother used to say that if you don’t feel good to...peel the skin off-an’ then you eat the belly part over here, an’ it makes you feel better. An’ she always tell our kids when we have frozen tomcod, be sure you eat this part. ...Yeah, belly meat. They say that if you don’t feel good, you eat this part. An’ I don’t know if it’s true or not, but maybe it’s because it’s never eaten too much, you know. It get left behind, so. Because lotta time they weren’t wasteful, you know. You should eat the whole thing, if you can. An’ it’s edible. So, that’s the only time I hear about parts is, my wife would say, ‘My grandmother say if you don’t feel good, you eat this part.’” –Johnson Eningowuk

Tomcod Biology:

There are two kinds of tomcod recognized by Shishmaref residents: “regular” tomcod and blue cod. Blue cod are noted to be far less abundant than tomcod. Tomcod travel in schools, eat other small fish, and stay in the vicinity of Shishmaref all year long. They move from the lagoon and river areas behind Shishmaref and into the ocean in the summer months. Tomcod movements

during the course of a day are thought to be directed by local currents. Many people noted that you can catch more tomcod if there is a strong current. These fish are usually found deeper in the water column than other fish, like smelt, and fishing lines or nets need to be adjusted accordingly to successfully catch them.



Figure 16: Shishmaref expert Harvey Pootoogooluk with dried tomcod.

“...And there would be current coming into the lagoons...If you have a little bit more current, the fish would move more, during the current. So as long as you have good current, it really don’t matter what time of day, it’s good fishing.” –Johnson Eningowuk

Tomcod were noted to be increasing in size (length and girth) over the past several years, some of them being “humongous” compared to what people have historically caught. Tomcod have eggs in the fall and their livers also increase in size during this time of year. They have spawned by January; probably somewhere in the Inlet or nearby lagoons, though Shishmaref interviewees were not certain of the location because freeze-up has already happened by the time spawning occurs.

Shishmaref experts noted that blue cod have a less salty taste than tomcod and that their bones are very soft and can be eaten along with the rest of the fish.

“We catch ‘em - we call ‘em blue cod - but rarely. Once in a while we’ll get whole bunch of small ones in the early fall, late fall, but they’re small. ...This one has real soft bone in ‘em. If you have the teeth, they’re chewable, bone an ‘all, [when they are] quaq.” – Morris Kiyutelluk

The population of tomcod is thought to be stable, even though interviewees say that they are harder to catch in recent years. Spotted and ringed seals have been spending longer periods of

time in the waters of the inlet behind the village, maintaining breathing holes and, most likely eating a lot of fish. People believe that the seals are both eating tomcod (and other fish) and that they may also be scaring the fish into areas where people are not fishing (thus making them more difficult to catch). There have always been seals in the inlet, but it is believed that seals are staying in the area longer because of later freeze-up and decreases in ice thickness. Blue cod were noted by Shishmaref residents to be much less abundant than tomcods and are considered to be a rare delicacy. Shishmaref did not report any concerns about the health of tomcod or blue cod.

Tomcod Harvest:

There are two main methods for harvesting tomcod: by hooking and with nets set under the ice. The most commonly used method in Shishmaref is hooking. Blue cod are caught by the same methods and are occasionally harvested when they wash up on the beach immediately after fall storms when there is slush ice present. Tomcod have also been harvested from open water areas of Shishmaref Inlet where tomcod have come close to the surface, their gills have frozen, and they died.

To hook for tomcod you need a hole or crack in the ice and a hook on a line. People often remove the barbs from the hook, but sharpen the hook itself; some people also make their own hooks. The barbs are removed to facilitate removing the fish from the hook once it has been caught; this helps fishers get their hook back in the water as fast as possible, and also makes it easier to remove the fish with hands covered in bulky winter mittens or gloves. The nylon fishing line is typically wound around a stick that is notched at both ends. Some fishers also use a second stick to help them pull up the line quickly when a fish has been hooked (Figure 17). As noted above, an active current is a help when hooking. People describe how fishing during a slack tide (little water movement) is not usually very successful. Blue cod are occasionally harvested when hooking for tomcod, but this is rare. Fishers decorate their hooks with brightly colored beads, yarn, or other materials to attract tomcod. In the past, ptarmigan eyebrows and auklet beaks were used as lures because of their bright coloring (Figure 18).

“Whoever’s fishing through the ice that catches the most, that [is] non-stop pulling up his line, we [are] always kinda peeking at the hook, what kind of beads she or he is using, how long a line from the sinker. (Laughter)” –Tommy Obruk

Historically, people would make holes in the ice with a pick. Today, most people use gas-powered or hand cranked augers to drill holes. Making a fishing hole with a pick is a time consuming process as ice thickness can be as much as five or more feet. While fishing holes were shared in the past, some elders noted that they also had a kind of ‘property value’ to them. If the maker of the fishing hole left, it was open for anyone to use, but if they returned, protocol indicated you should return access to the maker. In the past, particularly good fishing holes may have been traded for sealskin pokes or other items. Fishers sometimes cover their fishing holes with plywood or some other covering to try and keep the hole from re-freezing quickly so that it can be used again.

Tomcod are also harvested with nets set under the ice. These nets are typically about 25 feet long. They are set under the ice with a series of holes through the ice and a long pole; essentially

threaded from one hole to the next until the net is spread, under the ice, from the first to last hole. Nets are typically set when the ice is only two to three feet thick. Interviewees noted that it is important to make your net holes in a straight line (to facilitate setting), and that it is good practice to put a weight in the middle of the lead line (the rope at the bottom of the net) to keep it hanging in the water column properly. Nets must be checked frequently, usually every day, or they can get frozen into the ice. Additionally, if nets are left for too long, seals will eat the fish off of nets.



Figure 17: Woman ice fishing.

Photo courtesy of the Wien Collection; Anchorage Museum, B1985.027.2411.



Figure 18: Colorful parts of auklets (L) and ptarmigans (R) were used as fishing lures.

Photos from (L) eastsideaudobon.org and (R) proprofs.com.

“I use tomcod nets. I have a short tomcod net, maybe only about 25 feet long. That’s enough fish. It’ll catch a lot of fish. An’ sometime it’ll catch some blue cod.”

–Johnson Eningowuk

Some people prefer to hook for tomcod (and other fish) because they find it more enjoyable; they like going out on the ice with friends and family and being in the outdoors. Nets can be an efficient way to harvest a larger number of fish, but they are more labor intensive (when setting and checking and removing the fish from the net) and more expensive than a hook and line. Nets also harvest large amounts of tomcod; more than is necessary for many families. Dog teams formerly consumed large amounts of tomcod, making nets an efficient harvest method, but there are few dog teams still in existence today.

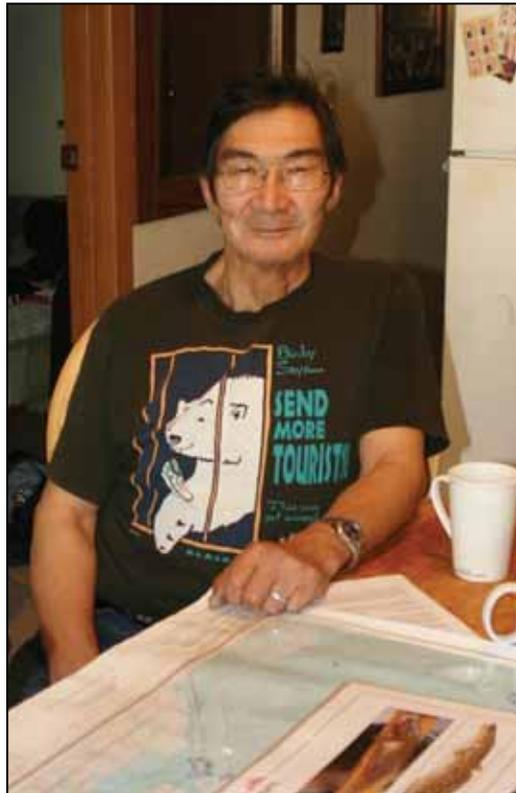


Figure 19: Johnson Eningowuk, Shishmaref expert.

Tomcod Processing:

There are many ways to process tomcod for storage and for consumption. Because it is so cold during much of the tomcod harvest season, the fish naturally freeze when left on the ice while hooking. For many, this is the best way to preserve tomcod; frozen naturally and then eaten *quaq* (frozen) and often dipped in seal oil. Livers, eggs and stomachs (cleaned) can also be eaten this way. Tomcod that are frozen can also later be thawed out and boiled. Frozen tomcod that are left outside can also gain a slightly aged state due to changes in outside temperature and undergoing a freeze-thaw process throughout the winter. A more lengthy process of ageing of tomcod, involving burying them in the ground, was practiced in the past, but this form of processing is no longer done by Shishmaref residents.

“Yeah, those used to be our old folks’ delicacy, the [tomcod] eggs, especially when you cook ‘em, an’ boil ‘em, or even when you quaq ‘em, frozen. An’ right now they’re, whatever they get from up here, they’re drying them now. An’ then that’s when their liver is big. We always boil

those an' mix 'em with berries. So they got their own taste. They are delicious.” – Morris Kiyutelluk

Tomcod are also often dried. To dry tomcod a piece of twine (or rawhide, plastic shipping straps, or other material) is put through the gill and out the mouth of a gutted fish, with multiple fish per length of twine. In the past, willow branches were collected expressly for the purpose of stringing tomcod on them to dry, but twine is most frequently used in Shishmaref today. Thin, young willow branches were harvested in the fall time, when the branches were springy, from up the rivers across from Shishmaref on the mainland. The eggs of the tomcod can also be removed and dried, separate from the fish. The eggs take much longer to dry than the meat of the fish. Tomcod are also often half-dried (with or without the eggs still attached) and then frozen.

Fresh tomcod, including their eggs, are also often boiled. While not as common today as in the past, a special delicacy made from tomcod livers and berries, called *tiġulik*, is still prepared by some Shishmaref residents. This dish is often a favorite of elders. It is prepared by carefully cooking tomcod livers, and then mixing the cooked livers with salmonberries or blackberries (crowberries). Some cooks also add tomcod milt to the dish. Milt is the seminal fluid produced by male fish.

“...I cut the heads off for my wife, frozen. I used to be able to just grab the head an' I'll have it. You just get a point of your knife an' take the-whatever liver's left in there. My wife learn it, so, I can't grab her head anymore. (Laughter) An' I used to be able to eat all the liver I want. Now I can't. If you learn 'em, they're good.” –Fred Eningowuk

Dolly Varden (Trout):

Residents of all five participating communities were asked specifically about Dolly Varden trout in both the harvest surveys and interviews. Some individuals did not distinguish between different species of trout, however, and the information below should be viewed in that light; it may refer to multiple species of trout.

Trout are not intensively harvested by the community of Shishmaref. A good harvest location, *Nuluk*, is about 30 miles to the northeast, and is know by many but not frequently utilized due to the high cost of transportation to get there (e.g., gasoline and oil for boat motors). Trout were also occasionally harvested at Serpentine Hot Springs by hand, through the ice.

“There is trout up there [Serpentine Hot Springs]. Mother used to say they used to make a hole an' kill those trouts with their hands. An' they grab 'em by the gills, an' pull 'em up, an' then they'll be in a bank of the rivers, an' when they make hole [in the ice], they'll find pot of 'em. But they won't be a same place. If you catch 'em, try an' get as much as you could, 'cause they won't be in a same place [if you wait]. ...People don't do it nowadays. Mother used to say they used to be mostly by that cliff, on a north side of Hot Springs. They say there's big ones up there.” –Johnny Weyiouanna

Trout Biology:

The trout that Shishmaref residents catch on the ocean side of Shishmaref are noted to be quite large; as big as some salmon. Trout are considered to be fairly rare in the Shishmaref area, and

experts could not comment much on historical versus contemporary abundance. No concerns about the health of trout were documented.

“There are very, very few of those. I saw those in Nome area. Solomon, Nome. Every once in a great while we’ll get one around here, in a net. Very uncommon.” –Davis Sockpick

Trout Harvest:

Shishmaref residents harvest trout with nets (salmon and whitefish nets) and by rod and reel, and by hand in the past. While some people specifically target trout, others catch them in their nets (or by rod and reel) accidentally when harvesting other species like salmon or whitefish. Trout are most often caught in front (ocean side) of Shishmaref, in the Serpentine River and its tributaries, in the *Nuluk* area, and in Trout Creek (as far up as the west side of Ear Mountain).

Trout Processing:

Trout can be baked, boiled or frozen for future use. They are also often eaten *quaq* by many Shishmaref residents. While not done frequently today, trout can also be hung to dry and allowed to slightly age.

Whitefish:

Whitefish are a popular fish, especially as a breakfast food with pancakes. Whenever the topic of whitefish was raised during interviews someone was sure to mention breakfast.

It was noted that whitefish can pretty much be found anywhere. People often set a whitefish net when they are out boating, picking berries or doing other activities out in the country.

“...But I always [am] most grateful for whitefish. Boil it in morning...eat it with hotcakes, syrup, bacon. ...That’s main part of good breakfast when you’re camping in August, with berries. Feel better when you pick more berries. Yeah, whitefish. Whitefish is ok!” – Tommy Obruk

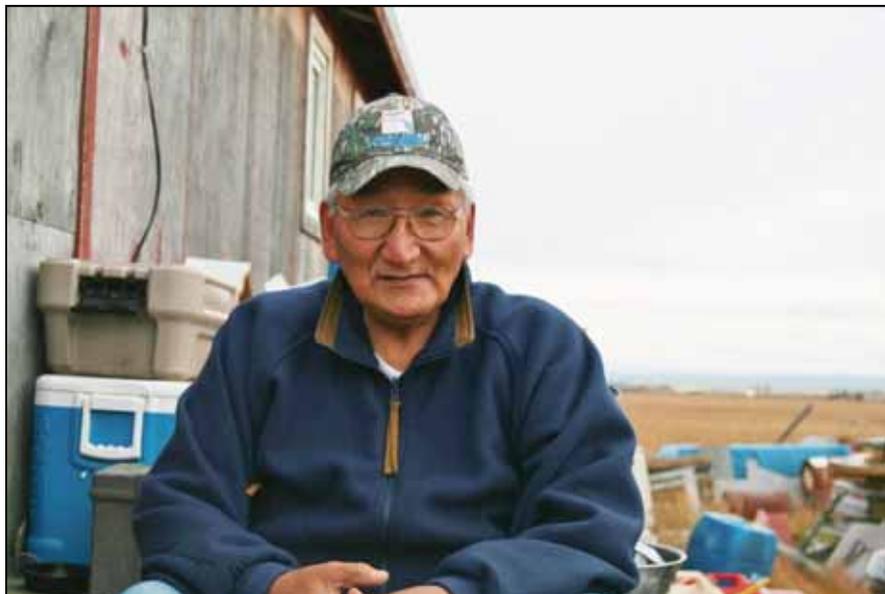


Figure 20: Shishmaref expert Tommy Obruk.

Whitefish Biology:

There are several different kinds of whitefish recognized by Shishmaref residents (Table 13). Differences between whitefish harvested in the ocean versus in freshwater have also been observed. For example, ocean-caught whitefish are fatter and larger than freshwater-caught whitefish. The fish also taste different based on where they have spent the majority of their time (i.e., clear versus muddy waters), and people have individual preferences about these tastes. Many whitefish overwinter in deeper waters, such as in deep holes along rivers, and other whitefish are migratory.

“We know the difference between the whitefish that spent the winter up here. We call those, when we start catching them, we call the anisraqs - they’ve spent their winter up here, an’ then they’re skinnier than the fresh ones that migrate. ...So there’s some that stay here all year, but there’s some that leave and come back.” –Morris Kiyutelluk

Whitefish eat a lot of small ‘shrimp’ and are thought to be very dependent on them. These shrimp are called *izrivaluk* in the Shishmaref Iñupiaq dialect. Some local experts believe that the population of these shrimp greatly decreased several years ago, but that they are now increasing again. Shishmaref residents have noted that whitefish, in general, seem to be increasing in body size over time.

One major change with whitefish is that they are arriving later in the year.

“I dun’no if the population change. But I know for sure that they start coming in later. Just few years back, to catch whitefish, when we go salmonberry picking like in August. An’ its’ not like that no more, you know. They’re getting further an’ further behind, I think.” –Tommy Obruk

There is no clear consensus from Shishmaref interviewees about the abundance of whitefish (i.e., if they have increased, decreased or stayed the same). While some people believe that the population has decreased, others have noted that whitefish are susceptible to disturbance from boat traffic, and that there has been an increase in small boat traffic in local whitefish harvest areas. It is possible that whitefish are spending more time in smaller tributaries or in other areas with less boat traffic, while their overall abundance has not changed. Whitefish are perceived to be in good health.

Whitefish Harvest:

Whitefish are primarily harvested with nets, though in the past they were also harvested with traps under the ice. Whitefish rarely bite at hooks, but are occasionally harvested today by rod and reel. Nets can be set under the ice as well as in open water. Whitefish experts have noted that river water has become warmer and never gets “real cold”; as a result, nets must be checked more frequently than in the past, because the warmer water temperatures impact how long the fish will stay fresh. Depending on the time of year, and local water temperatures, nets may need to be checked within 24 hours of setting them.

Nets set under the ice should be checked every two days, at a minimum. People generally stop setting under-ice nets when the ice gets too thick, because if it gets too thick the nets will start to

freeze to the ice or the bottom. Whitefish harvesters frequently use the same spot every year to set their under-ice nets.

While whitefish can be found pretty much anywhere in the vicinity of Shishmaref, according to local experts, popular places to harvest are the Arctic and Serpentine Rivers during berry picking season (August - September) and in front of the village (ocean side) as soon as the ice goes out (June - August). Other locations often visited by Shishmaref residents to harvest whitefish include Whitefish Lake (north of Shishmaref on the mainland), Trout Creek, *Qaġaaġzruk* (a small lagoon near *Sinŋazaat*), *Kuugaaġzruk* (a river above *Sinŋazaat*) and *Nuizaaqpak* (area west of Serpentine River with a large lake).

“An’ in the fall time, we pick a lotta berries, salmonberries. An’ we’d camp in certain parts of the river. An’ we always had net. We always had whitefish for breakfast, boiled whitefish...”
–Johnson Eningowuk

“We always set nets, any crick. First thing we do is set a [whitefish] net after we put a tent up. Most - all the major cricks, we always set net. Good stuff with hotcakes. Better than bacon an’ eggs.” –Clifford Weyiouanna

Whitefish Processing:

One of the most popular ways to eat whitefish is freshly caught and boiled. They can also be salted when fresh. Eggs and cleaned stomachs are often boiled along with the rest of the fish. Whitefish are filleted and frozen and the eggs can be frozen; both can be eaten *quaq*, with seal oil. Filleted whitefish can also be half-dried and then frozen, baked, or fried. It can take several days to half-dry a filleted whitefish, depending on the weather conditions. In the past, whitefish were also aged, but this is rarely done anymore.

“Just boil— anyway, you can cook ‘em. Fried, dried, half-dried, boil, bake, frozen.” –Johnny Weyiouanna

“Serpentine. I got some whitefish. I used to be able to use that river water for cooking water, an’ hardly have to add any salt. An’ then last time I tried it again, I knew it was getting fresher. I tasted it, hah, there hardly any salt content on that water. So, we’re getting LOTTA fresh water from somewhere.” –Morris Kiyutelluk

Smelt:

Smelt are an easily harvested fish that are most often eaten fresh, shortly after being caught. When baked, they have a distinctive odor, which some people consider to be “stinky”. Shishmaref smelt are considered to also have their own distinctive taste - saltier than smelt from other villages. Seals have been remaining in the waters of the Shishmaref Inlet, behind the village (mainland side), for longer periods of time than in the past and are believed to eat large amounts of smelt, as well as other non-salmon fish. Smelt are a culturally preferred food and are also considered to be “good food” because they are not scavengers.

“The trouble with Teller, when you get ‘em from there, they’re not as salty, because of fresh water going through Tuksuk Channel into Grantley Harbor an’ Port Clarence. An’ then, Molly

Seetot from Brevig Mission used to order tomcods an' smelts from here, my wife, because they're more tastier because of the salt contents in the body. Over there, because of the fresh water comin' down the Tuksuk Channel, they're not as salty." –Clifford Weyiouanna

Smelt Biology:

Smelt usually arrive in the Shishmaref area after the ocean has begun to freeze, shortly after tomcod have arrived. Once in the area, schools of smelt move around with the tidal currents present in the Inlet and spend their time higher up in the water column than tomcod do (thus their status as a “good”, non-scavenger, fish). Shishmaref experts have observed that many smelt are larger today than in the past.

Smelt have been observed to lose their eggs some time after February, but because of ice cover, the exact timing and location of spawning was not known, though it is believed that they spawn in the Inlet and the surrounding area.

Smelt populations have been reported to be healthy in the Shishmaref area, with no reports of disease or other afflictions. Shishmaref experts believe that smelt populations have either remained steady, or that the fish have been more difficult to get over the past 4-5 years. Reasons proposed by experts for smelt being more difficult to obtain in recent years were that the population of smelt has actually declined, or that seals may be eating them or forcing them into areas where most people are not fishing. While some experts had noted this possible decline due to seals or other reasons, no one was concerned about the status of smelt populations in the region.



Figure 21: Shishmaref expert Morris Kiyutelluk with some of his grandchildren.

“[smelt]...unlike tomcod, they're not up there at same time, I mean day after day. Once in a while they'll disappear for few days an' then come back again. They're more nomadic apparently. More nomadic than tomcod.” –Morris Kiyutelluk

Smelt Harvest:

The primary method for harvesting smelt is by fishing with hooks through the ice. The same hooks are used for both smelt and tomcod, including the brightly colored lures, such as pieces of yarn that are tied to the line. Many people make their own hooks by modifying store-bought ones (filing off barbs), or by crafting their own from locally available materials. Fishers typically have more success harvesting smelt when there is a strong current. Because tomcod and smelt are available at the same time, one does not go hooking for just tomcod, or just smelt.

“We get them same time with tomcods, you know. If it’s a day for smelts, fine. If it’s a day for tomcods, fine. We’ll try an’ catch whatever we can catch.” –Fred Eningowuk

In the past, smelt were also seined with a small mesh (maybe ½ inch) net, but they are no longer harvested this way. Smelt are also occasionally caught in herring and salmon nets during the summer and in tomcod nets in the fall. Smelt can be used as bait for burbot, as well.

Smelt are primarily harvested in the inlet behind Shishmaref from approximately January through May by hooking and sometimes in tomcod nets right after freeze-up. They can also be harvested (hooking) in the channel south of the village around April and May. The mouth of Serpentine River is also a well-known smelt harvest location.

Smelt Processing:

Most Shishmaref residents do not put smelt away and prefer to eat them shortly after harvesting them. The entire fish can be eaten, stomach and all, because of the fishes’ good diet. The fish are often roasted or baked whole, breaded and baked, boiled or fried (whole). To put smelt away for later use, they are frozen in a zip-lock bag with a small amount of water (and usually baked or boiled at a later date). Smelt were dried in the past, but this is no longer practiced. Shishmaref experts noted that dried smelt have a sweet taste to them.

“...some people might eat ‘em frozen. But they melt a lot easier than other fish. I don’t know why. ...like if you put ‘em on table, an’ then you eat, then they’ll thaw out faster than the other fish. I dun’no. They’re strong [smelling] when you cook ‘em, but they almost resemble - almost like a crab meat like in some way.” –Johnny Weyiouanna

Herring:

Herring are an intensively harvested fish by Shishmaref residents and are a highly culturally preferred food. In recent years, the seals that have been staying in Shishmaref Inlet for longer than typical amounts of time have made herring harvests more difficult for some fishers.

“I know spotted seals eat a lot of them. The common seals, and whatever belugas that are passing by.” –Fred Eningowuk

Herring Biology:

Herring travel in schools and are thus best harvested with a net. During the winter, when the inlet is frozen over but has cracks, herring can often be found frozen to death in the open water at cracks. This happens when their gills freeze and they float to the surface. Shishmaref residents

have noted that herring from the inlet are typically more watery than those harvested from rivers, which have firmer meat.

Herring spawn under the ice in the spring, usually May and June, in creeks in the Shishmaref area, as well as in lagoons along the coast. Large numbers of herring have been seen moving into the Serpentine River in the fall, around September. Shishmaref experts recognize only one run of herring in their area, noting that they “hang around” for several months.

“But I know they would spawn in the spring time, an’ we’re still too covered with ice, so. Exactly where they spawn I don’t know. But I know they spawn here, too, because I seen seals with lots of herring eggs. They’ve been eating herring eggs.” –Johnson Eningowuk

Shishmaref experts agree that the population of herring in the area is stable. The fish are also healthy and are possibly becoming larger in size over the years. Several years ago, all of the herring turned red for an unknown reason, but that has not happened again since.



Figure 22: Fred Eningowuk, Shishmaref expert.

Herring Harvest:

Shishmaref elders described how they know when it is time for herring fishing; when local grasses are turning from green to brown, it is almost time to begin harvesting.

“Timing, actual timing category we use probably...would be when the grasses are turning from green to like it is now, yeah, brown, brown. An’ that’s how we know, well, it won’t be long before the herring come.” –Morris Kiyutelluk

The primary way to harvest herring is by setting a herring net. In the past, people would also seine with herring nets. Seining was done cooperatively with families or groups of people working together. Herring seining is no longer done because of the amount of fish harvested with this method. The amount of fish caught by seining is considered “too much” and more than is necessary to meet the needs of the family or group doing the seining. In order to prevent waste, nets are set, instead.

“That was in the fall. We used to seine. My grampa had a seine, up at Arctic River. An’ then we would set herring nets. An’ they would put ‘em in pokes for ageing, so they could be eaten springtime. An’ they used to sack some. An’ then when they run out of sacks, they used to make a hole in a ground, an’ line it with grass, an’ really cover it up good so the shrews won’t get to it after they cover the herrings with grass again, an’ put sod over ‘em. But those they would open up right away, right after freeze-up. For couple reasons: one was for food, one was for dog feed. An’ so herring was the one that we mostly - we still do. We still practice getting lotta herrings in fall, but not as much as we used to.” –Clifford Weyiouanna

Herring nets can be set at various locations in the inlet behind Shishmaref including near the mouth of Serpentine River, or at 18 Mile. Shishmaref experts noted that a very high tide is not conducive to fishing near the mouth of Serpentine River. Herring can also be occasionally caught in salmon nets in front of the village around August, prior to freeze-up. In the fall, before freeze-up, is considered the best time to harvest herring. They can also be harvested with nets under the ice after freeze-up. This is often done near the mouth of Arctic River. Nets are not set in the channels leading out of the inlet to the ocean because there is too much current and debris in the channels. Herring can also be caught on hooks, through holes in the ice, in the spring time anywhere in the vicinity of Shishmaref.

If there is open water or a crack in the ice, a person could check this area every day for herring that have died due to frozen gills and just collect those fish. Seagulls can sometimes be found near these areas of open water feeding on herring or other fish that have died due to frozen gills.

Herring Processing:

Herring can be stored and processed in many different ways. Today they are most frequently eaten fresh or frozen (*quaq*). Fresh herring are eaten fried, boiled and baked; herring eggs are frequently left with the meat when preparing the fish in these ways. Herring are also frozen to be eaten *quaq* (including the eggs), or to be prepared in other ways at a later time. The boiled liver of multiple herring can be mixed with berries, similar to *tiqulik* made with tomcod livers and described above.

Other processing and preparation methods for herring include salting them (scaled, then salted in small buckets), pickling them, smoking them (using salmon brine), half-drying them and then baking them, and ageing them. Hanging or stringing herring to fully dry is not practiced in Shishmaref. To age herring, whole (not gutted) fish should first be scaled and then:

- Placed in gunny sacks and left in the cold to ferment to your taste;
- Placed in gunny sacks, bowls or wooden boxes, placed in holes in the ground and buried until early winter (For example, old gas boxes were often used in the past. The herring

would be laid neatly side-by-side in the box, and then it would be nailed shut and left in the cold until winter.);

- Placed directly in a shallow depression (lined with vegetation) and covered until winter or spring; or
- Packed in seal pokes until spring time.

Fermented herring were described as having a “tingy” or tangy taste by one elder.

“We freeze ‘em, ferment ‘em. An’ long ago they used to put ‘em in a seal poke. But it’s kinda hard to make seal pokes now, nobody really doing it. They use gunny sacks, an’ plastic bags, but you had to keep ‘em away from the sun...when you use plastic, but gunny sacks, you can just cover ‘em with something. So, just away from the sun. ...You can’t expose ‘em to the sun if you plan to ferment ‘em, cause they won’t - I dun’no, they might form some kinda poison, maybe.”

–Johnny Weyiouanna

“An’ what we do is, we used to use pokes what my mom make. Use pokes an’ put ‘em in the poke, to age ‘em. An’ then after that we bring ‘em down. But then before they freeze, she used to make sure that I turn that poke around so that the blood of the herring, or blood they have, could kinda mix with all the fish, you know, so just won’t be on one part. That help age it, or put the flavor in. An’ then turn it every other day.” –Tommy Obruk



Figure 23: Fish freeze-drying on a swing set in Shishmaref.

Burbot:

(As was noted earlier in this report, in the harvest survey results section, the majority of local experts and others often use the term “lingcod” to refer to what western scientists call “burbot.” However, a few local experts and others, use the same nomenclature as western scientists. This fact of nomenclature was discovered during the ethnographic field research. The reader will note that a number of quotes below may use the term “lingcod”. All uses of the term “lingcod” in

these ethnographic sections refer to what western scientists call “burbot.” For the sake of clarity, given that this report will have a broad audience, this section will be titled “burbot” and all references in the author’s voice will use the term “burbot.” This is simply done for clarity; neither nomenclature is considered to be more correct than the other. It should also be noted that there was a much less common occurrence in which a few ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

Burbot Biology:

Burbot are often found in the shallow waters of rivers in the Shishmaref area. They eat small fish, which can be found in their stomachs after being harvested. They naturally have a large liver, which is eaten. Burbot move far up into rivers, such as Serpentine River, by approximately October or November.

While not many burbot are harvested by Shishmaref residents, those familiar with the fish report that they seem healthy and that their population is stable.



Figure 24: Shishmaref expert Johnny Weyiouanna shares some flaked burbot.

Burbot Harvest:

Burbot are only harvested by a few people in Shishmaref, and are not necessarily harvested every year. Burbot are harvested with hook through the ice. A simple “J” hook is most often used. Burbot bite more predictably at night, so hooks can be set in the evening and checked in the morning. A hook and line attached to a stick are shoved into the ice and snow around a fishing hole. Tomcod, smelt or herring can be used as bait. The most common place to harvest burbot in this way is far up Serpentine River and on Grayling Creek (a Serpentine tributary), beginning in November.

During break-up in the spring burbot can sometimes be caught in salmon nets or by rod and reel as they are swept downriver by powerful currents of melting ice and water. From July through

September they can be caught in the Serpentine River with a salmon net, and at the mouth of the Serpentine, El Dorado and Arctic Rivers, and near Shishmaref, with a rod and reel from a boat during break-up. In the past, wooden traps were used to catch burbot under the ice, but these are no longer used.

“Lingcod, we get those - same time we’re grayling fishing. We call it tuititaaq [hook with a piece of bait to catch lingcod], where we just put a line with bait, right above the bottom of the river at Grayling Creek. An’ just set ‘em. Sometimes we’ll check ‘em throughout the night. But in the morning, we go an’ pull them out. Hopefully we’ll have a lingcod there.” –Fred Eningwouk

Burbot Processing:

Burbot are often frozen and eaten *quaq*. They are also boiled and eaten, and the boiled fish can be dried and flaked for use in burbot *agutuk*. The livers can be boiled separately. Burbot can also be fried. In the past, burbot were aged in depressions in the ground, but this is no longer practiced.

Johnson: *“...we would catch a lot of those in our [salmon] net. An’ we’d, we’d kinda clean ‘em out, or just hang ‘em by their tail, an’ keep ‘em, or bury ‘em, half bury ‘em in the ground with some stink weed. Make a layer in a little depression, an’ put stink weed there, an’ cover ‘em with stink weed, an’ they would keep ‘em cool. An’ they we could camp for couple days, an’ they’d still be fresh. I guess the ground kept ‘em cool. It’s in the fall time anyway.”* Interviewer: *“Oh, so you would put them in the hole with the stink weed, without even cleaning them?”* Johnson: *“Yeah, without even cleaning ‘em lotta times, an’ just put ‘em in there, in a shallow depression, an’ keep ‘em that way. If we’re gonna stay longer, then we’d have to try to cook ‘em an’ eat ‘em. If we were gonna not stay too long an’ come back, we could throw ‘em in a freezer an’ they’ll be good, till...”* –Johnson Eningwouk

Grayling:

Shishmaref experts noted that residents do not harvest as many grayling as in the past and people will often discard grayling that are caught in salmon nets in the summer because they are “too busy” working on other fish. The best places to harvest grayling are quite far from Shishmaref and are therefore expensive to get to by boat because of the price of gasoline and motor oil, which impacts peoples’ ability to harvest them. Some Shishmaref experts were also concerned about the potential impact of beaver dams on peoples’ ability to access and harvest grayling in the upriver area and tributaries of Serpentine River.

Grayling Biology:

Shishmaref experts have observed grayling to be present year round in freshwater rivers and creeks in the area. Grayling stay in deep water areas of rivers during the winters. Experts have noted small fish and an unidentified species of water “weed” in the stomachs of grayling. One expert once harvested a grayling with a lemming in its stomach. Some experts believe that grayling are impacted by noise from boat traffic and that the fish may attempt to move away from such noise.

Interviewer: *“Do you ever look in their stomachs, and see what they’ve been eating?”* Clifford: *“No, it’s none of my business what they eat. (Laughter) They’re little fish. Just like the big bank*

eat the little banks, buy 'em out. Same way with fish; fish eat the little fish. That's what you see in most of the fish when you clean 'em. An' then some kind of grayling eat some kind, like a little weed or something. But I never did check to this day, what kinda weed it is, because we always eat the stomach of a grayling." –Clifford Weyiouanna

The grayling population is perceived as healthy. In terms of abundance, grayling numbers are described as generally stable with natural fluctuations from year to year. Very low and very high abundance years, as long as high or low numbers do not persist from year to year, are seen as normal variations in the grayling population.

Grayling Harvest:

Shishmaref residents often harvest grayling in conjunction with other subsistence activities such as greens gathering or bird hunting. In the past, traps were built to harvest grayling, but this is no longer practiced. The most common methods for harvesting grayling today are by rod and reel in the summer and hooking through the ice in the winter. Grayling can also be caught in whitefish nets during the summer.

Grayling can be found in all the major rivers in the Shishmaref area, typically further up river and away from saltwater. The Serpentine River and Grayling Creek are areas known for good grayling fishing. Grayling from *Nuluk* are larger than those from Grayling Creek, but are also considered to be "more boney." *Qaglu*, a deep lake near the first bend of Serpentine River, was a frequently used camp site when people traveled by dog team and was known for good grayling fishing. Shishmaref experts have noted that grayling are distributed much more widely during break-up, when water is rushing out of rivers, and various species of fish are moved around with these temporary surges.

"When they went up for grayling fishing, they come back with ptarmigans, grayling, an' willows. You know, the bark that we always eat - willow." –Tommy Obruk

Grayling Processing:

While Shishmaref residents do not harvest as much grayling as in the past, it is still considered a good, healthy and preferred fish. The stomachs of grayling, in particular, are considered to be the best part of the fish when frozen and eaten *quaq* with seal oil. The stomachs can be cleaned out or eaten with their contents.

The meat of grayling is also frequently eaten *quaq*, with seal oil, or is eaten fried while fresh. The fish can be dried in the summer, but not many people dry them anymore. When Grayling are harvested in the winter, they often freeze naturally before they can be brought back to the village. At other times of the year people put the fish in the freezer to preserve it. Shishmaref elders noted that there is a distinctly different taste between naturally frozen and freezer-frozen grayling.

Flounder:

None of the Shishmaref experts interviewed specifically target flounder during any of their fishing activities, and some had never tasted a flounder. Some people do not consider them to be

a very edible fish. Flounder are often caught in salmon nets and are considered by some to be a nuisance because of the difficulty of removing them from nets.



Figure 25: Beatrice Davis cleaning flounders.
Photo courtesy of the Kawerak Eskimo Heritage Program (SH.EN.83.F020.11).

Flounder Biology:

Flounder are considered to be plentiful by Shishmaref experts. There are two types of flounder recognized by Shishmaref residents: smooth flounder and rough or starry flounder. Experts have noted that the rough flounder seem to be getting larger in size. Flounder are the most robust in the fall; they are thicker and have eggs. They are also most widely distributed (“all over”) during the fall the time. During the summers flounder can be very “watery” and experts have observed that you can almost see through them at this time of year.

In general, people preferred smooth flounder over rough flounder, and some considered smooth flounders to be a delicacy.

“But in summertime, they’re real watery. Same way with the flounder. They’re real watery, so nobody eats ‘em. In fact you could even see the bones of flounders. You could see all the way through them things.” –Clifford Weyiouanna

Flounder Harvest:

As noted above, flounder are not specifically targeted in contemporary times. In the past, flounder were often harvested with spears, through the ice, in the winter. Spears were three or two pronged with barbs. Spear prongs were constructed from ivory or nails. The spear holder would lie on the ice and look through the hole to spear the flounder. The fisher would have a lure in addition to the spear, to attract the flounder into position under their hole.

Flounder can also be hooked through the ice and caught in whitefish nets (primarily smooth flounder) and in salmon nets (rough skinned flounder). Flounder were also seined, in the past.

“I used to go there [Whitefish Lake]. That little creek goes to Whitefish Lake, where they set [nets in] winter. An’ James Kaigruk an’ couple other guys used to go set net in that lake, Whitefish Lake, where I know there’s a lotta damn flounders up there, an’ they’re good in fall, when we go pick salmon berries about middle of September. They’re nice an’ thick, too.”

–Clifford Weyiouanna

Flounder Processing:

Flounder, when kept for processing, are most frequently eaten *quaq*, with seal oil. They can also be fried or boiled when fresh. In the past they were also aged, either in gunny sacks kept outside, or by placing them in a bowl, covering the bowl with cloth, putting it in a hole in the ground and covering the hole with plywood.

“No, throw ‘em back in the water. You eat good food like salmon. Not flounder kind. We don’t eat ‘em that much. We’ll cook a few of ‘em. Back here, that’s not the area for flounders.”

–Shishmaref resident

Sculpin:

Sculpins are more commonly called “bullheads” by Shishmaref residents. These fish are seen as requiring a lot of work to prepare and are considered a nuisance when they get caught in nets. Bullheads are rarely targeted by Shishmaref fishers in recent years.



Figure 26: Shishmaref expert Clifford Weyiouanna.

Sculpin Biology:

Shishmaref residents recognize three kinds of bullheads: spotted, plain and “very big”. The very big variety of bullhead is not common near Shishmaref. Bullheads are bottom feeders and are

also more likely to bite a hook after dark. They have “horns” on their head that can stick people and cause pain. Bullheads are very boney fish, particularly in the head area. They are noted to have firm meat in the spring and watery meat in the summer.

Sculpin Harvest:

Bullheads are primarily harvested by hooking through the ice. Fishers use the same style hook as for tomcod and smelt, and also use red or pink colored beads or yarn tied to the line as lures. Bait is not used for bullhead fishing. Bullheads are also caught (unintentionally) in salmon, whitefish and herring nets. The best time to hook for bullheads is in the spring, prior to break-up, in the inlet behind Shishmaref.

Sculpin Processing:

Shishmaref experts describe the entirety of bullheads as being edible, despite the amount of bones in the head. To get the most meat off of the fish requires a lot of “picking” at the bones. Bullheads can be boiled or eaten *quaq*. Their stomachs, eggs, and livers are considered to be the best parts.

“Well, when we were young we’d fish a lot of bullheads for our grandparents. An’ they ate ‘em. An’ then us, they’re just too much work, too bony, an’ not much meat in ‘em. But when they boil ‘em, they clean out the stomach an’ boil the whole thing. An’ the whole thing would be eaten. They have a little part of their stomach look like little pair of pants. An’ ...we call those pants; ‘We wanna eat the pants grandma!’, an’ they would get it for us. But every part of it had - you can pick on the lips, an’ everything...most everything on it is edible.” –Johnson Eningowuk

Sheefish:

Sheefish are not common in the Shishmaref area, and people only occasionally catch them. When harvested, usually only a single sheefish is caught. Shishmaref residents enjoy eating sheefish and generally are not concerned that they have begun to recently appear in their area. Residents are familiar with sheefish because they were previously able to purchase sheefish from the Kotzebue area at the local store and had bartered and traded for them with family and friends from the Kotzebue area, as well. Experts noted that the few sheefish that have been caught near Shishmaref are much smaller than the Kotzebue-area sheefish they had seen in the past.

Shishmaref experts are aware that sheefish are mostly a freshwater fish. They have been occasionally harvested in salmon and whitefish nets, most commonly during salmon harvesting time and in the vicinity of the Serpentine River.

Blackfish, Capelin, Halibut and Pike:

Shishmaref experts indicated that they do not harvest these species of fish and no information about them was documented.

Table 14 provides the Iñupiaq names for non-salmon fish harvested by Shishmaref, as well as examples of other words and phrases related to non-salmon fish or fishing.

Table 14. Shishmaref Iñupiaq words for non-salmon fish and fishing-related terms.

Common English name/phrase	Other name	Iñupiaq name
tomcod	-	iḡaḷuaq
blue cod	-	qaluaq
trout (all trout)	-	qiblaqiq
trout that are dark on top	-	nunalik
herring	-	iḡaḷuaqpak
smelt	-	iḷhuaḡniq
burbot / lingcod	-	kanizunaq
grayling	-	sulukpaugaq
sculpin	regular bullhead	kanizuḡaq
sculpin	spotted bullhead	kanizuik
sculpin	very large bullhead	iḡiak
flounder	smooth skin flounder	nataaḡnaq
flounder	rough or starry flounder	ipkaanalik
whitefish	small whitefish	tivuk
whitefish	large whitefish	siglataq
frozen fish	-	quaq
fishing with a hook	-	manaqtuq
knife with a semi-lunar shaped blade	-	ulu
fish liver and berry mixture	-	tiḡulik
any aged (fermented) fish	-	aḡinaq
small shrimp eaten by whitefish	-	izrivaluk
a person without a wooden spoon for eating broth	Kiyutelluk (a contemporary last name in Shishmaref)	qaiyutailaq

Wales

In household harvest surveys, Wales residents reported that trout, whitefish and cod (tomcod, saffron cod, and blue cod) were the non-salmon species harvested in the highest numbers during the 2009-2010 harvest season (Figure 12). For that same period, over 54% of Wales households surveyed said they did not get enough non-salmon fish to meet their needs (Table 15). Map 2 (map pocket) is a map of the Wales area, including locations where Wales residents harvest various non-salmon fish species, and other locations associated with non-salmon fish. Non-salmon fish continue to be an important resource for Wales residents today, as they have been in the past.

“Well, as far as the younger generation, I wanna teach nephews and nieces how important it is to keep this up. Because it is a way of life, subsistence, you know.” –Larry Sereadlook

“We cannot get away [from] our Native food for our survival, because they’re good when they’re stored. Good food. But we have to be very - try to be clean, to store them away...”

–Faye Ongtawasruk

Table 15. Percentage of surveyed households in Wales that reported having enough non-salmon fish to meet their needs during the 2009-2010 survey period (92.1% of households surveyed).

Did your household get enough non-salmon for your needs?			
Yes		No	
Count	Percent	Count	Percent
16	45.7%	19	54.3%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Trout:

Residents of all five participating communities were asked specifically about Dolly Varden trout in both the harvest surveys and interviews. Some individuals did not differentiate between different species of trout, however, and the information below should be viewed in that light; it may refer to multiple species of trout, though Dolly Varden was the focus. Dolly Varden trout remain an important fish for Wales residents, though they are not harvested in as high numbers as in the past.

Trout Biology:

As noted above, residents harvest species of trout other than Dolly Varden, but Wales residents note that Dolly Varden are the largest trout they harvest. Experts from Wales say local trout are comparable in size to silver salmon. Trout eat other smaller fish and spend time feeding in the coastal lagoons before going up rivers for the winter. Trout usually enter Lopp Lagoon through the first inlet (*Sinḡauraq*) or the third inlet (*Aguliḡaq*). They spawn in the Mint River (and likely other nearby rivers) and other areas along the coastline in the fall. Wales experts report that most trout are healthy, but that they may have more parasites than in the past, and some have dark spots on their skin. They also report trout with minor cuts related to escaping from predators or nets, but these injuries are not common and have not increased in frequency. Experts posit that the increase in parasites and spots on the skin of trout may be related to warmer water temperatures. Wales experts were unsure if the population of trout has changed over their lifetimes, but one noted that people used to catch more, and suggested that the difference in harvest may be due to changes in the weather that make it more difficult for people to fish in recent years.

“I think there might be changes in the population, or it might be just the weather that prevent us from catching more. ‘Cause it’s not usually very calm on the ocean, like it used to be, a lot calmer and more days calmer on the ocean [in the past].” –Gene Angnaboogok

Trout Harvest:

Trout are primarily harvested by Wales residents between July and September with salmon nets. Trout can occasionally be caught in June, right after the ice breaks up. Trout are often caught by fishers who are targeting salmon; while individuals are not necessarily targeting trout at this time when they are caught in salmon nets they are retained. Fishers primarily set their nets in front of the village, though the weather has to be “right” to set nets there. Nets can also be set at the mouths of rivers that flow into Lopp Lagoon, but these locations are not preferable because nets accumulate a lot of mud. On Mint River in particular, fishers will set nets upriver from the mouth

to target trout. The third inlet into Lopp Lagoon, near *Millitagvik*, is another location where nets can successfully be set for trout in the summer.

Trout can also be caught with a rod and reel. Mint River or any of the other rivers that feed into Lopp Lagoon, in front of the village, or at the point are all well-known rod and reel trout fishing locations. When traveling in the vicinity of Tin City or York during the summer, trout may also be harvested by rod and reel.



Figure 27: Fish drying outside of a Wales home.

Trout Processing:

Wales residents have various methods for processing and putting away trout. Freshly caught trout can be boiled, fried or frozen to eat later as *quaq*. Trout are also often dried or half-dried, though the weather has to be right (not too wet) to dry them properly. Some Wales residents salt their trout. To do this they are first gutted and the stomachs are removed, but some people leave the liver and heart with the meat. A special trout-based dish is boiled, river-caught Dolly Varden that is then mixed with boiled trout livers, reindeer fat and salmonberries.

“...when the weather was not so wet I used to try to hang ‘em, dry ‘em. And if it’s too wet...then I would have to cook the half-dried fish, instead of let it stay out in the weather an’ spoil.”

—Gene Angnaboogok

Flounder:

Most Wales residents do not specifically target flounder, though small flounder harvested through the ice in early spring and eaten *quaq* were considered a delicacy in the past. One resident was reported to have tried flounder spearing in the past several years. Most flounder that are harvested incidentally are thrown back and not kept. In the past flounders were seen as a welcome winter food, but today younger fishers view them more as an “elder food.”

“Just like first time this winter they never do floundering. That Crisci boy, he try to make hole an’ then the storm came, the ice move up. An’ then those ice pile up out there, pushes the shore ice, an’ what Crisici’s make, fishing hole, got no water. It land more up, near the shore line. That’s why they never do fishing. I ask him, ‘Billy, did you get fish?’ He said, ‘No,’ because his fishing hole push up. Did you see those ice pile up out here on the beach? That’s our problem. No fishing for blue cods, tomcods, flounder. Even bullhead, ah?” –Faye Ongtawasruk

Flounder Biology:

Wales experts believe that flounder have decreased in abundance. Flounder can be found in the vicinity of Wales all year; people have caught them in the winter and the summer. There are two kinds of flounder recognized by Wales residents; the smooth flounder and the starry flounder, also called a rough flounder. Flounder go in and out of inlets and lagoons with the tide and come closer to shore on high tides. One of their known spawning locations is at the third inlet into Lopp Lagoon, near *Millitaġvik*, in September.

Flounder Harvest:

As mentioned above, most residents of Wales do not specifically target flounder; one or two residents attempt to spear flounder when the conditions are right. Flounder are primarily caught in salmon nets during the summer fishing season, and also occasionally on hooks when people are fishing for tomcod. Most flounder caught in salmon nets are thrown back, unless someone else in the village has asked that they be retained. When flounder from salmon nets are retained, only the larger ones are kept. Flounder can occasionally also be caught with a rod and reel in the summer in the vicinity of Tin City and in inlets to Lopp Lagoon with nets in the fall.



Figure 28: Flounder spears from Wales.

Clockwise: Ivory spear (Kelly Anungazuk), copper spear (Kelly Anungazuk), ivory spear (Pete Sereadlook), ivory spear and detail of same ivory spear (Faye Ongtawasruk).

Flounder spearing was an activity carried out by many Wales residents in the past and was seen as a fun activity that many youth and women participated in, though men frequently participated, too. It is best to spear for flounder when there is not a south wind as winds from that direction will push water up over the holes onto the ice (where the spear holder should be laying). Hooking is still possible in these conditions. Well-known locations for flounder spearing include right in front of the village, at the point or adjacent cove, at *Sinŋauraq* (the first inlet into Lopp Lagoon), at *Millitaġvik*, and other inlets. The best time of year for flounder spearing is usually February through March.

The details of flounder spearing were related by several Wales experts. Once a location for spearing was determined, people used to use a *tuuq* to make a hole through the shore ice; sometimes three feet or more deep. Today people use gasoline or hand powered augers to make the holes. A windbreak made of snow blocks was usually built on at least one side of the hole to help keep the fisher warm and a reindeer skin would be laid down for them to fish on. Warm fur clothes were needed to stay out flounder spearing all day. Fishers were instructed to be as quiet as possible on the ice so as to not scare the flounder away. A long spear with a three-forked point was used. The prongs were traditionally made out of ivory and had barbs on them but can also be made of nails. The middle prong is the longest and the outer two are shorter, with barbs on the inside portion of them.

“[The lures were] some sort, like a little fish, or flounder shape. I have [one] with ivory, but I dun’no what I do with it. Ivory an’ design it with beads, string them together. An’ my mamma used to get those...Diomedede, they have...orange stuff [gesturing to face]...[referring to auklet beaks] Faye: “Yeah. That’s the kind those people from Diomedede used to give her, or send to her, because my mom used to use ‘em for lure, to trick the flounders to come for it!” –Faye Ongtowsruk

In addition to the spear itself, a lure was also used. The lure was usually flounder-shaped and was “jigged around” to attract the fish. The lure also sometimes had bright colored beads on it, but not always. Like Shishmaref fishers, Wales fishers would also use brightly colored auklet beaks as lures (Figure 18). To harvest flounder, the fisher would lie on an animal hide placed next to the hole and use one hand for the lure and the other to hold the spear. The spear was held partially in the water and when a flounder came to investigate the lure, the fish was speared. Fishers would usually choose larger flounders to harvest. One Wales expert related a prohibition against spearing certain flounders, which he learned from his elders:

“The only other taboo I remember when we used to go floundering, when we seen one upside down, you could tell because it’s white, they tell us not to spear those ‘cause those are the ones that gonna go lay the eggs. ...But then, the one time I speared flounder, it was upside down an’ I got scolding from my parents. An’ they said long time ago they don’t used to spear those fish, ‘cause those are the ones that are gonna go lay eggs somewhere. An’ I didn’t know that. So I quit spearing the ones that were upside down, or white sides are showing up.” –Gene Angnaboogook

Flounder Processing:

Wales experts noted that the skin of the flounder must be removed prior to eating the fish. If frozen, the skin is easily removed. Flounder are primarily eaten *quaq*, with seal oil and salt. Freshly caught flounder are also baked, boiled and fried. Fried flounder are sometimes eaten dipped in seal oil.

“Pan fry. You use flat pan an’ fry it just the way it is. Just lay ‘em out, fry ‘em. Get a saucer of seal oil, an’ you’re set. ‘Cause that was usually served with dry meat an’ seal oil, an’ blubber. An’ (lip smacking sound). I like ‘em fried. I like ‘em quaq too, but you eat too many, you kinda like, you’re eating something raw, you gotta digest it... I think they used to know when to serve it that way. Makes you sleepy, ‘cause you gotta digest.” –Gilbert Oxereok

“Freeze ‘em, an’ just cut ‘em up, an’ eat ‘em. Dip ‘em in seal oil an’ salt.” –Larry Sereadlook

Whitefish:

Whitefish continues to be one of the highest harvested non-salmon fish by Wales residents.

Whitefish Biology:

Wales experts describe a decline in whitefish populations. While they recognize that compared to the past there is overall less effort being put into harvesting of whitefish, they also note that even though people are setting nets, they are catching less fish per set than they would in the past. Whitefish move into coastal lagoons and inlets, and up into rivers, before freeze up. Some Wales experts think that the fish have been arriving earlier than in the past, but there is no agreement on this issue, perhaps indicating quite a bit of variability in whitefish run timing. Wales experts do not distinguish between different species of whitefish. They consider whitefish to be a fatty fish.



Figure 29: Net drying on the beach at Wales.

Whitefish Harvest:

Whitefish are harvested with whitefish nets, primarily in August and September, but potentially also in October. The most common place to set a whitefish net in contemporary times is in front

of the village. Nets can also be set at various locations in Lopp Lagoon, including at the south end where several cabins are located, at Mint River, or at *Anaruk*. Nets are typically set in the lagoon area during berry picking time, when the ocean is often too rough for setting. Some Wales residents do not harvest whitefish because they do not own a net. Others work with family members who do own nets.

“I usually like to set my net right when it gets dark an’ pull it the first thing in the morning. Not like the salmon, just stay out all the time, when it’s nice out. ...The whitefish used to swim right next to the beach at night. So I’ll set one end of the net on the top of the beach, and the other straight out.” –Kelly Anungazuk

Whitefish Processing:

Whitefish, especially when eaten *quaq*, is a culturally preferred food for Wales residents. To prepare *quaq* whitefish can be frozen whole or gutted. Freshly caught whitefish are often boiled (including the eggs), or fried. Fried whitefish eaten with sourdough pancakes is a popular meal when whitefish are available. Additionally, whitefish are dried, half-dried and salted by Wales residents. Salted fish are typically stored in wooden barrels. Whitefish were also aged in the past, but this is no longer practiced. The fish would be stored in an underground cache (whole, not gutted).

“We eat ‘em with seal oil. But we don’t put ‘em in seal oil unless they are dried, completely dried.” –Faye Ongtawasruk

Tomcod:

While tomcod are considered a culturally preferred food for Wales residents, local experts acknowledge that there is less participation in fishing for tomcod than in the past. Wales experts were interviewed specifically about tomcod, but also noted that they harvest blue cod; both are discussed here.

“When I was growing up, about forty years ago, forty, fifty years ago, every household seemed to be fishing for tomcod during wintertime.” –Kelly Anungazuk

Interviewer: *“Did everybody go fish for these [tomcod]?”* Pete: *“Everybody go fishing. When people [aren’t] lazy, they go fishing. My dad always tell me, ‘People don’t get lazy that don’t get hungry.’ They’re lazy, they always hungry.”* –Pete Sreadlook

Tomcod Biology:

Wales experts have seen a decrease in the tomcod population over the past ten to twenty years. They have also observed that the overall size of tomcod has decreased. In February, tomcod have small, developing egg sacks which are full-size by spring. Multiple Wales residents reported minor allergic reactions to tomcod; primarily reporting that they get itchy lips or a rash around their mouth when they eat tomcod. Some of these individuals continue to eat tomcod because they enjoy it so much, and try to put pieces of the fish directly into their mouths (without letting it touch their lips) to avoid a reaction to it. This same allergic reaction was reported by some Brevig Mission and Teller residents.

“[I]n the springtime they kinda have more eggs than anything else. In February, they do have a small amount of egg batches starting to develop. Their pouches start to get full. An’ by spring they’re kinda like...[making a hand gesture indicating they are large].” –Gilbert Oxereok

As noted above, Wales residents also harvest blue cod. Blue cods are smaller than tomcods. Tomcod are known to spawn in the shallows along the shore, but Wales experts were not familiar with specific locations or the exact timing of spawning.



Figure 30: Wales expert Pete Sereadlook at a Kingikmuit dance group practice.

Tomcod Harvesting:

Today, Wales residents harvest tomcod by hooking through the ice and with small mesh nets which are set. Tomcod can also be speared through the ice, but this is infrequently practiced. In the past, tomcod were also seined. Tomcod are occasionally caught in whitefish nets in the fall. Wales experts noted that tomcod seem more abundant after strong south winds in February and March. Tomcod are harvested primarily from January through May.

For hooking tomcod, ivory hooks attached to wires with a sinker were used in the past, but most people use “Pixie”, “Dare Devil”, or spinner hooks today. If not hooked through a crack in the ice, a fishing hole has to be made. In the past this was done with a *tuuq*, an ice pick, but today is done with gasoline or hand powered augers. The Native Village of Wales owns a gas auger which residents can borrow to make holes. Tomcod are hooked right in front of the village, including at the point and the Tin City side of the mountain, through holes and at cracks in the ice in the spring.

Wales residents who set nets for tomcod generally use a short net, about fifteen feet in length. The shorter length net is necessary because there are rarely large cracks or areas of open water to set them in. Wales experts noted that people who set nets tend to get more tomcod than those who hook. Spearing tomcod through holes in the ice is infrequently done. When spearing, a line with an orange piece of plastic with several barbs on it is used as a lure to attract the fish to

within spearing range. Wales residents set nets for tomcod anywhere in the vicinity of the village where appropriately sized cracks are available. Some Wales residents also travel to visit relatives in Teller in the summer, and sometimes seine for tomcods while there.

“It’s usually in the spring [when people use nets for tomcod]. But in order to catch the tomcods, you gotta have a short one [net], maybe only about 15 feet where you don’t have much open water to set it. ... ’cause there’s very little open water space to set your net, if you wanted to. An’ it’s usually done with hook an’ line.” –Gene Angnaboogok

Tomcod Processing:

Tomcod are prepared in a variety of ways by Wales residents. Wales experts noted that when eating a tomcod, you should not eat the skin, and when they are *quaq* you can peel the skin off, like a banana. Fresh tomcod can be boiled (including the eggs), baked and fried. Special dishes prepared from tomcod include boiled tomcod liver mixed with greens or mixed with berries. Tomcod are also frozen to eat *quaq*, with seal oil. Wales residents also dry tomcods and tomcod stomachs. In the past, when drying tomcods, they would be strung on rope made from *ugruk* (bearded seal). Additionally, tomcod were previously stored in seal skin pokes, or in pits, neither of which are currently practiced.

“Put ‘em [tomcod] in our - we have a pit to put our stuff under the ground, to protect from the dogs so they won’t bother. Long time ago they have three kinds of place to store them; the one they put in seal oil would have different pit, an’ for the meat, an’ for the whale. But every season they clean those, what they prepare for food. I used to help my mom....we are trained how to help our parents. Right now young people change. I never see that no more.” –Faye Ongtawasruk

Capelin:

Wales residents are familiar with capelin, but have not harvested them in high numbers in recent years. Experts noted that capelin still come close to the beach in front of Wales, but do not beach themselves or get pushed up by the waves like they used to.

Capelin Biology:

Wales experts have observed capelin spawning on the beach in front of the village and on the beach in front of Tin City, south of Wales. Wales fishers believe that the capelin prefer or require sandy beaches for spawning, and that they may be dependent on the current or tides to push them to shallow water for spawning. Wales experts did not feel familiar enough with the fish in recent years to make statements regarding the abundance of capelin, but proposed that the population may have stayed the same even though they no longer seem to spawn in front of Wales. Some Wales residents did not differentiate between capelin and smelt.

Interviewer: *“Have you ever seen them [capelin] in the lagoon...?”* Gene: *“Not in the lagoon. Most of ‘em I’ve seen only were on the ocean side. ...we’re sure we could see ‘em, ‘cause those seagulls are out there, diving into the ocean an’ coming up with ‘em. But they’re just off the beach now, where they don’t beach themselves like they used to before around here. But they’ll come up close to the beach, but they won’t be brought in by the waves like they used to.”* –Gene Angnaboogok

Capelin Harvest:

Capelin are usually in the vicinity of Wales only one or two days per year. This is when the ice is gone, potentially in June. When the fish arrive, which is indicated by the large number of seagulls in front of the village, they can typically be easily scooped or netted by someone standing on shore. Wales residents have created dipnets from the mesh bags that fresh produce such as potatoes and onions are packaged in (Figure 31), have scooped them up by hand and tossed them on to the beach, and have even used shovels to get them out of the water and on to the beach.

“An’ then dad used to make me dip net. Remember those onions used to come in with that mesh? ...That used to be my net. Grab the handle, drag it up, an’ put it in something. ...Get enough to hang, get enough to eat for couple days.” –Gilbert Oxereok



Figure 31: Example of the type of mesh bag that can be used to harvest capelin.

Capelin Processing:

Freshly caught capelin can be boiled, fried or baked (gutted or whole). Some residents have also dried or half-dried them (gutted first) strung on old telephone wire or grass.

Sculpin:

Sculpin, also commonly called bullheads, are rarely harvested by Wales residents. Many of the experts and others asked about the fish had never tasted one and they are not a preferred fish for most people.

Sculpin Biology:

Bullheads are seen in the Wales area throughout the year. Wales residents consider them to be a very boney fish and warn those who accidentally catch them to be careful of their “horns”, which

will cause swelling if they poke you. Wales experts believe that the population of bullheads has decreased from what it was approximately twenty years ago.

Sculpin Harvest:

As noted above, bullheads are not currently a preferred fish. They are primarily harvested accidentally in salmon nets, and most people do not keep any of them. They are also occasionally harvested accidentally by rod and reel fishers, particularly near Tin City. When the fish were purposefully targeted by Wales residents in the past, they could be hooked through the ice with the same type of hook as is used for tomcod. They were also speared in the past, through the ice. Wales experts explained that to spear a bullhead, you have to aim further back because of all the bones in their head. Additionally, ivory spear blades tend to break, for the same reason. The best place to find bullheads for hooking or spearing near Wales is at the point and in the rocky areas surrounding it.

“An’ if you spear ‘em, you gotta spear ‘em little bit further back, ‘cause of the bone. An’ ivory blades tend to break on it. So, the ladies know where to hit.” –Gilbert Oxereok

“We do get quite a few during the year, but we never keep any. There’s one family that do like to eat bullheads, an’ they do ask if we could save a few so we could give ‘em to them.” –Kelly Anungazuk



Figure 32: Kingikmuit girls ice fishing at Wales, circa 1906.

Photo courtesy of the University of Washington Libraries, Special Collections (NA3247).

Sculpin Processing:

Wales experts were most familiar with boiling as the method for preparing bullheads. The boiled liver of a bullhead was sometimes eaten with seal oil.

“[S]he [mother] would just boil the liver and eat it the way it is, usually with seal oil. Or have it along with your soup; the soup that was made from the fish, or broth.” –Gene Angnaboogok



Figure 33: Wales data review workshop participants.

L to R: Debra Seetook, Robert Tokienna, Jr., Pete Sereadlook, Larry Sereadlook, Kelly Anungazuk and Gene Angnaboogok.

Burbot:

(As was noted earlier in this report, in the harvest survey results section, the majority of local experts and others often use the term “lingcod” to refer to what western scientists call “burbot.” However, a few local experts and others, use the same nomenclature as western scientists. This fact of nomenclature was discovered during the ethnographic field research. The reader will note that a number of quotes below may use the term “lingcod”. All uses of the term “lingcod” in these ethnographic sections refer to what western scientists call “burbot.” For the sake of clarity, given that this report will have a broad audience, this section will be titled “burbot” and all references in the author’s voice will use the term “burbot.” This is simply done for clarity; neither nomenclature is considered to be more correct than the other. It should also be noted that there was a much less common occurrence in which a few ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

Wales experts were not very familiar with burbot. The fish have been seen washed up or beached on the shore in front of the village during clamming season (around September). When the fish wash up or are found beached, they are collected if they are fresh. This is usually right around freeze-up. Wales experts noted that burbot are a very boney fish.

Sheefish:

Sheefish have not been seen in the Wales area, but residents are familiar with them and like to eat them. Wales residents obtain sheefish from family or friends in Shishmaref and they are also occasionally sold at the Wales store.

Smelt:

Wales residents get smelt primarily from family or friends in Shishmaref. Smelt are also occasionally caught in nets when people are trying to catch trout, whitefish or salmon. Smelt have also washed up on the beach and when fresh, people have collected them. Experts indicated that they usually prepare smelt by boiling them.

Herring:

Wales experts noted that herring were harvested by village residents in the past. In contemporary times, during the fall, herring are occasionally snagged when rod and reel fishing for pink salmon (“humpback” or “humpies”), or are caught in salmon nets in front of Wales or at the point just south of the village. In the past people aged them, but today they are primarily boiled.

Grayling:

Wales experts noted that they have not seen grayling in the area, but that residents occasionally travel up to the Shishmaref Inlet area to catch them by rod and reel around August.

Halibut:

Halibut are only seen occasionally when they wash up onshore during clamming season.

Pike:

Wales experts have not seen pike in the area, but occasionally receive them from relatives in the Teller area.

Blackfish:

Wales experts indicated that they do not harvest this species of fish and no information about them was documented.

Table 16 provides the Iñupiaq names for non-salmon fish known by Wales experts, as well as examples of other words and phrases related to non-salmon fish or fishing.

Table 16: Wales Iñupiaq words for non-salmon fish and fishing-related terms.

Common English name/phrase	Other name	Iñupiaq name
tomcod	-	igaluq
blue cod	-	qaluq
herring	-	igaluqpak
sculpin	bullhead	kanauq
flounder	-	nataagnaq
whitefish	-	siglitaq
Dolly Varden trout	-	igalukpik
capelin	cigar fish	sigaaq

fishing with a hook	-	manaqtuq
frozen, raw fish	-	quaq
ice pick used to make holes for fishing	-	tuuq
place where Wales people fish	“place to land when jumping” (translation from Iñupiaq), on the west side of the third inlet	miłłitaġvik
inlet where Wales people fish	first inlet	sinᅇauraq
inlet where Wales people fish	third inlet	aguliġaq
an underground cache pit where people stored food, including fish	-	sigluaq
spearing	-	kaġiaqtuq
spear	-	kaupaq
seining	-	qaaqtuuq

Brevig Mission

In household harvest surveys, Brevig Mission residents reported that cod (tomcod, saffron cod, and blue cod), smelt and whitefish were the non-salmon species harvested in the highest numbers during the 2009-2010 harvest season (Figure 13). For that same period, over 76% of Brevig Mission households surveyed say they did not get enough non-salmon fish to meet their needs (Table 17). Map 3 (map pocket) is a map of the Brevig Mission area, including locations where Brevig residents harvest various non-salmon fish species, and other locations associated with non-salmon fish. Non-salmon fish continue to be critical subsistence resources for Brevig residents today, as they have been in the past.

Table 17. Percentage of surveyed households in Brevig Mission that reported having enough non-salmon fish to meet their needs during the 2009-2010 survey period (84.7% of households surveyed).

Did your household get enough non-salmon for your needs?			
Yes		No	
Count	Percent	Count	Percent
17	23.6%	55	76.4%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

“Any kind of fish, there’s different ways you could preserve ‘em, for different taste. You could smoke ‘em, dry ‘em, an’ salt ‘em. ... As long as you have fish, you’ll never be hungry. As long as you know how to preserve Native way, on any kind of meat, whether it be fish or meat, there will always be food on table. Today everything is store bought, an’ that cost money. An’ very few jobs in the communities, very few.” –Robert Rock, Sr.

“Traditional food is more important to me than cash. When I want certain type of food, I’ll trade. But I won’t offer any cash. Because I know they want something different, too.” –Jones Barr

Trout:

Residents of all five participating communities were asked specifically about Dolly Varden trout in both the harvest surveys and interviews. Some individuals did not differentiate between different species of trout, however, and the information below should be viewed in that light; it may refer to multiple species of trout.

Brevig Mission experts explained that village residents do not fish for trout as frequently or harvest them in as high numbers as in the past, and that fishers used to have nets out all the time.

“But with people not setting nets constantly or being on there like 24-7, some of ‘em used to have their nets out all the time. Nowadays it’s pretty much when the weather permits or when the south wind stops, at least on our shoreline.” –Elmer Seetot, Jr.

Trout Biology:

Some Brevig Mission experts have observed a potential decrease in the size of trout over the course of their lifetimes but believe that they are healthy overall. Occasionally a trout with an unhealthy liver is harvested, but not retained; an unhealthy liver is dark and has small, narrow worms. Additionally, some experts believe that the population of trout may have decreased over the past several years.

Trout move into the Brevig Mission area from the ocean in the spring and start running into local streams in the second week of August. Trout are known to overwinter on California Creek and to spawn there and to also overwinter on Agiapuk River. The spawning area on California Creek is locally known as *qañizvik*. Experts indicate that trout overwinter in deepwater areas of creeks and rivers, which do not freeze down to the bottom in winter. Many Brevig Mission residents believe that beaver dams may be impacting trout and their ability to migrate up area streams, as well as impacting water quality and potentially other fish species.

Trout Harvest:

Trout are harvested primarily with salmon nets; the nets can be set or used for seining. Trout can also be harvested with a rod and reel or, in whitefish nets. One method of harvesting trout is to walk in a creek and ‘herd’ them into a net by splashing or otherwise scaring them. A south wind often prevents Brevig Mission residents from setting nets in front of the village.

California Creek, northwest of the village, is the most popular place to go for trout. Nets are typically set under the ice during the winter, or in the fall time around October, before freeze up. Salmon nets set in front of the village will also harvest trout in the summer and fall. Other well-known trout harvest locations include Canyon Creek, Agiapuk River, American River, Nuluk and Budd Creek. Brevig Mission experts also noted that trout can be found area lakes in the late summer or early fall.

“They would catch ‘em in any old lake, late summer, early fall.” –Elmer Seetot, Jr.

“Trouts are, for me, they’re whole lot better eating like fall time, in the month of August. They start running around the second week of August. They start running, go into the streams. There’s a stream down there, it’s a river called California River [sic], it goes way, way up. An’ all species of these trouts goes into that river, an’ goes way up. Not only the trouts, all different kinds of fish. An’ then out here, I catch ‘em with whitefish net, the regular, bigger trouts. ... It’s real deep, ‘cause even in mid-winter, it don’t freeze all the way down. That’s where they spend their winter, an’ then come back out springtime ...[T]here’s a lake up there somewhere.” –Jones Barr



Figure 34: Community meeting for the non-salmon project in Brevig Mission.

Trout Processing:

Trout are often eaten freshly caught and boiled, fried or baked. Trout are also allowed to freeze naturally after harvest and then stored in gunny sacks. They then age slightly through the freeze-thaw action of fluctuating winter temperatures. Trout are also frozen in freezers and then later eaten *quaq*, or boiled. Some Brevig Mission experts half-dry trout, and one has smoked trout. Eggs can be saved to use as bait for whitefish.

“Because during the winter they kinda freeze, an’ then they re-freeze. You know, they have that icicle content, in the fish itself. An’ that’s what...quaqlaq, icicle taste, or you know, there’s piece of icicle in there.” –Elmer Seetot, Jr.

Whitefish:

Like other species of non-salmon fish, whitefish are not fished as intensively as they have been in the past by Brevig Mission residents. This is because of a combination of weather, interest, access to transportation and other factors.

Whitefish Biology:

Brevig Mission experts did not agree on the status of local whitefish populations; some saying the population had declined in recent years, and others saying it has stayed the same. Some pointed out that it is difficult to determine because there has been less whitefish fishing in recent years by village residents. None of the experts were certain, but some suggested that whitefish run timing may have changed, making it more difficult for fishers to know when to try and harvest them. Later freeze-up can also make it difficult to travel to harvest locations at the right time. None of the experts reported any health problems in the whitefish population, though they

have noted that they are smaller in size than in the past, most being twelve inches in length or shorter.

Some Brevig Mission experts distinguish between multiple species of whitefish, though not all do. Experts reported harvesting humpback whitefish, arctic Cisco, broad whitefish, round eye whitefish and short nose whitefish. Many Brevig Mission experts and residents primarily distinguish between three whitefish: large, round eye, and broad. Broad whitefish, or “brownish” whitefish are commonly thought to be the whitefish best suited for drying during the spring time. The short nose whitefish is considered to be a fat, oily fish. Round eye whitefish are smaller and leaner whitefish.

“They’re real good. There’s regular whitefish, they’re white. An’ there’s darker ones. The real white ones, you don’t dry, because they get real oily. But the darker ones, they make real good dry fish. You don’t make cuts on ‘em. You just dry ‘em like that.” –Jones Barr

In the Brevig Mission area, whitefish are the first fish to come around after break-up. Some whitefish have been caught in Brevig Lagoon while people were hooking for tomcod through the ice, so it is possible that some species of them overwinter in that lagoon. The meat of whitefish is “mushy” in the summer and more solid in the fall. The fish are also fatter in the fall. Whitefish are known to eat *kiqut*, tiny “shrimp” or little “jumping bugs”, as well as “water moss”, both of which are commonly found in their stomachs. Arctic Cisco have been seen in the vicinity of the Kuzitrin River bridge in the winter and are thought to overwinter there.

“There’s always whitefish. But they don’t catch ‘em summertime. They’re just too mushy. They get solid [in the] fall time, the meat.” –Jones Barr

Whitefish Harvest:

Most Brevig Mission residents harvest whitefish with whitefish nets. There are different whitefish nets for setting in open water and for setting under the ice. Nets for under-ice harvesting have different floats that are smaller and further apart. Brevig Mission experts indicated that the most ideal time to harvest whitefish is right around break-up, usually in late May, though many people also fish for them in the fall time. Whitefish can also be caught by hooking through the ice, usually in Grantley Harbor. Ivory hooks with trout eggs as bait are often used.

“...like during the winter or like springtime, when the current is going out from Brevig Lagoon, sometime people always catch whitefish or herring on their jigging hooks. So I would think that Brevig Lagoon has maybe winter herring an’ also winter whitefish, or Cisco, that winter there.”
–Elmer Seetot, Jr.

Common locations to set whitefish nets in the fall (before freeze-up) are Windy Cove, Cobblestone River, Brevig Lagoon, the area north of the spit, and Glacier, Canyon and Duck Creeks. Under-ice nets are set in Cobblestone River, Agiapuk River, or near the mouth of Kuzitrin River. Areas of the Agiapuk River maintain open water after freeze-up, and nets can be set there, as well. In the spring, nets are set in open water near cracks that form in the ice around break-up time in front of the village.

While whitefish fishing, many Brevig Mission residents are also doing other subsistence activities such as berry picking. Typically, a harvester will travel to the area they want to fish, set the net, then proceed to pick berries somewhere in the vicinity. After berry picking, they will check their net and collect any whitefish they have caught. A common area to do this is near Jones Point.

Helena: *“That was for - when we went blackberry picking. We went camping down there how many times, maybe four times, this fall.”* Interviewer: *“So while you’re picking your berries, you also have your [whitefish] net set out?”* Helena: *“Yep. Eat ‘em for breakfast, or supper.”*
–Helena Seetot



Figure 35: Nets stored on the beach in Brevig Mission.

Whitefish Processing:

As in other communities, whitefish is a preferred breakfast food when it is available, and can be prepared in many ways. Freshly harvested whitefish are boiled, including the eggs. Some people also enjoy the stomachs. After they are cleaned, stomachs can be boiled with the rest of the fish or baked. Eggs from freshly caught fish can also be eaten raw. Whitefish livers are considered to be very good and are typically boiled along with the rest of the fish. Fresh fish are also baked, fried and roasted.

“Like from now ‘till maybe after Christmas, wherever they can get whitefish, that would be include[d] every other day, breakfast.” –Elmer Seetot, Jr.

Many Brevig Mission experts eat whitefish *quaq*, especially broad whitefish, including the eggs. Fillets of whitefish are also frozen to prepare in other ways at a later date (e.g., baked, boiled, etc.). Some Brevig Mission residents dry or half-dry whitefish. After being gutted and filleted, it

can take several days for whitefish to become half-dry. Half-dried whitefish can be eaten with fresh willow greens, *suzah*, in seal oil. Whitefish are also occasionally smoked. After gutting and filleting them, they are hung over a smoldering fire of willow branches and driftwood.

Walter: *“An’ my dad used to smoke some whitefish too, you know, in a past, an’ just about everything, smoke whitefish, an’ herring, whatever, trout.”* Interviewer: *“Did he use a specific kind of wood, when he was smoking whitefish?”* Walter: *“Those willows, you know, out here, an’ these regular willows along with wet driftwood, just to keep the fire burning.”* –Walter Seetot

Ageing whitefish is another way to prepare them. Whole whitefish are placed in a tub in a cool place, in pits in the ground, or under the snow and left to age. Experts know the fish are ready to eat when their stomachs have turned a little bit red.

Tomcod:

Tomcod have been an important fish for Brevig Mission residents and their ancestors for generations. They were, particularly in the past, a food that could typically be depended on when other subsistence resources may have been lacking. In recent years, Brevig Mission residents have seen a decline in the abundance of tomcod. Local experts have also observed that there are fewer individuals and families harvesting tomcod in recent years than in the past. In addition to being a source of food for humans and for dogs, tomcod were also a source of mealtime amusement. People used to play a game with tomcod head bones that are shaped like anchors. Two players would lock their “anchor” bones together and pull. The player with the bone that did not break would be the “winner”.

“My grandpa used to say people from Qawiaraq say that they were saved from starvation because tomcods were plentiful, because tomcods are always there.” –Rita Olanna

“Speaking of tomcod, we don’t get tomcod as much as we used to out here. We used to get a lotta tomcod. People are saying that it must be the seals that are out the channel here, both channels.” –Reggie Barr

“You could see that in tomcods’ head [the anchor-shaped bones], when you eat. We used to hook for those, an’ after everybody had tomcods, then we would do that. Inuuuqtuun, we call it. Everybody would take turns with it (laughs) around the table.” –Rita Olanna

Tomcod Biology:

Many Brevig Mission experts have observed a decrease in the local tomcod population, though a few say the population has stayed stable. Experts have noted that they, and other village residents, can fish for tomcod all day, but hardly catch any. Like in the Shishmaref area, seals have been staying in the Brevig Mission-Teller area later in the year due to changes in the timing of freeze-up. Some experts have noted that Teller residents have been much more successful in their tomcod harvests, leading to the conclusion that seals are likely chasing or scaring tomcod away from the Brevig Mission area towards Teller. This suggests that the overall tomcod population may not be in decline, but that the fish are just avoiding areas where Brevig Mission residents usually fish.

Tomcod from the Brevig Mission area are considered to taste better than other tomcod and to be larger than Nome-area tomcod. Brevig Mission residents did note that even larger tomcod can be found near the cliffs in the vicinity of Teller. Experts suggested that there are two different types of tomcod in their area, a smaller and a larger type. These are not just juvenile and adult tomcod, but two distinct kinds of tomcod. Blue cod can also be found in the area and are occasionally harvested by Brevig Mission residents.

Experts explained that tomcod travel in schools. They seem to be in the Brevig Mission area year round. Tomcod spawn sometime around January because experts have noted that they “run out of eggs” after December. Experts were not sure where the tomcod spawn, but suggested they went up rivers to do so. Tomcod harvested by Brevig Mission residents are healthy. Occasionally tomcod with tapeworms or with dark, unhealthy livers are harvested. These unhealthy tomcod are either thrown away or fed to dogs.

“The tomcods are out here year round. We mainly catch ‘em fall time, wintertime, but not mid-summer. Springtime, too, they do dry them. Catch ‘em springtime, an’ dry them up. They’re regular dry. But fall time, they’re freeze-dried.” –Jones Barr



Figure 36: Tomcod freeze-drying outside a Brevig Mission home.

Tomcod Harvest:

Brevig Mission residents most commonly harvest tomcod by hooking. Some Brevig residents make their own tomcod hooks, but many use commercial three or four pronged hooks. Small,

colored beads are used as lures. The hook and line for tomcod fishing is often wrapped, lengthwise, along a short, flat stick with notches at either end. Some fishers use a second stick to assist in brining the line with a hooked fish to the surface, but not all do (see Figure 17). Locations where Brevig residents frequently hook through the ice for tomcod include anywhere in Grantley Harbor, Port Clarence, Point Jackson, and on the Teller side, below Teller New Site and at Four Mile Point. The most convenient location was formerly in front of Brevig Mission, when they were abundant there, but now people must travel to these other locations to attempt to harvest tomcod. As noted, Brevig Mission residents also occasionally harvest blue cod. Blue cod can be hooked through the ice in the channels that lead into Brevig Lagoon.

“That way takes too long [with one stick]. But with a stick, you know, you could pull one up I guess real fast, put ‘em away, take it out, put it down. See it’s faster. I’m glad you mention that. See, that’s what this guy was doing [referring to photo]. He pull up the hook, holding the part of the rope, up, with a stick. That’s what he’s doing. ...So that’s why they use the stick, not two hooks, one plain stick, one with the hook. [T]hat’s the traditional [way] up here. Maybe they do it differently somewhere else.” –Jones Barr

“Some are store bought, an’ others are handmade, whatever. Just so they have sinkers, or something, you know, decorations, they’ll work.” –Walter Seetot

Tomcod can also be seined with a very small mesh net or with a herring net. Seining is typically done just before freeze-up, around September or October. When local residents have whitefish and herring nets set, they occasionally also catch tomcod in them. And during the summer salmon season tomcod are sometimes caught by hooks or by rod and reel, usually by children fishing in front of the village. Summer-caught tomcod are not prepared for human consumption because their condition is not prime at this time of year.

“In the [19]60s people used to go by dog team when it freeze over near Teller in Grantley Harbor, they would get sled loads of tomcods, which they use for dog food, too. An’ some we hang. Now we don’t even get that much. We try to fish for tomcods last week with a herring net, but all we get was few. Maybe two days, maybe 20 each, an’ only six herring. We used to get LOTS. Fall time we used to put the net out an’ we would get maybe a 30 gallon container full of fish, but we don’t even get them like that anymore.” –Rita Olanna

“...I remember, over at Nook, toward Teller, remember camping, where their primary camping chore was to collect or dry tomcods. Or fish for herring. An’ they did it family by family, or communal, you know. Everybody fish, everybody get a share. Nowadays it’s, ‘I fish. Oh, no-uh, you never go help me.’ (Laughs) Or you know some people aren’t considerate like that. They, they think that the time an’ effort they put into getting something like that, they don’t need to share because they did all the work. It differs from person to person.” –Elmer Seetot, Jr.

“They always have to - we always have to go all over. If we can’t find here, we go look some place, make hole. I used to go with Reuben Adam and Irene. We used to try look for the tomcods, in Grantley Harbor, even way over here. Some people even go further up. All over, look for fish, tomcods.” –Helena Seetot

Tomcod Processing:

Tomcod are often eaten *quaq* with seal oil, including the eggs. The freshly caught tomcod, like other fish, are allowed to naturally freeze and are then stored in tubs, gunny sacks, or other containers. They can also be strung and left to freeze and thaw over the course of the winter; this ages them and they gradually lose their moisture and become “freeze-dried”. Freshly caught tomcod are boiled, including the eggs, or baked. The broth from boiling tomcod has been used for baby food in dire situations.

Tomcod are also dried and half-dried in the spring, though they can get “rock hard” if left to hang too long. In the distant past people strung tomcod on sinew. In the more recent past people would unravel thick tugboat rope and string them on that, but now they often use regular cotton twine. Tomcod are usually stored in bundles of twenty to twenty-five fish.



Figure 37: Dried tomcod hanging on a rack in Brevig Mission.

Tomcod livers were prized for *tiḡulik* in the past, but are now infrequently saved to make this dish. To make *tiḡulik* the livers would be cooked in a large pan and then mixed with blackberries. The *tiḡulik* would then be stored in *puuqs*, seal pokes. The oil from cooking the livers was saved and used when making hotcakes.

“My grandma used to - big pan - cook the liver in big pan. An’ then serve the liver, or cod liver oil. An’ then use that for when she make breakfast, hotcakes, liver flavored hotcakes. Boy they’re good. Miss that. Usually use that liver for mixing with blackberries, after they boil it.” –Robert Rock, Sr.

“In the winter, you just leave ‘em out there [hanging] an’ they’ll be real good, by time springtime come around.” –Helena Seetot

“I dun’no what they call ‘em, what white man calls these [blue cod]. We have these up here, an’ one of these two [looking at fish photos], maybe both. They have real soft bones. ...[W]hen

you're eating them frozen, just take the fins off, an' then dice 'em, including the bones, an' just eat 'em. Just take the guts off. An' these could be eaten dried, frozen...dried an' frozen or cooked, too. They're real good. Right now the people they, fall time, they string 'em, hang 'em outside, they're freeze-dried. An' they real good like that. Once water starts freezing out there, ice gets thick enough, they'll be fishing for tomcods." –Jones Barr

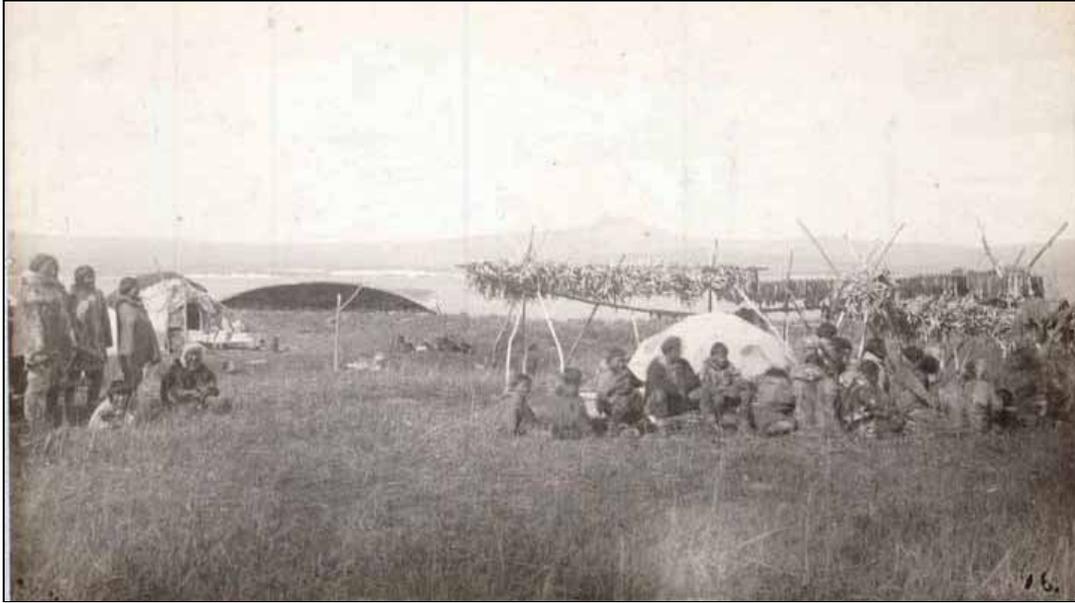


Figure 38: Drying fish at Grantley Harbor.

Photo courtesy of the Fred Wildon Fickett papers, Archives and Special Collections, Consortium Library, University of Alaska Anchorage.

Herring:

In Brevig Mission, herring were intensively harvested in the 1950s and 1960s, but according to local experts, there is much less effort put into herring fishing today. Herring are used for dog food and bait, in addition to being caught for human consumption. Brevig Mission experts describe having a more difficult time catching herring (with nets) in recent years, possibly because of the seals staying in the vicinity of the village later in the year.

Herring Biology:

Brevig Mission experts are not in agreement over the status of herring populations. That they are declining, increasing, or have stayed the same were all suggested. Some who suggested that the population may be declining also added the caveat that it may just seem that way, since less people are harvesting herring. The fact that less people are harvesting herring today than in the past was commented on by many experts.

"Herring, yep. There's herring, but we hardly go for 'em. ...I dun'no how come we lose interest on getting herrings. Not like when we were growing up, they sure used to get lots." –Leonard Olanna

Herring travel in large schools. They are not in the Brevig Mission area year round. The herring pass by Brevig in June, headed towards Grantley Harbor, and then Tuksuk Channel. Herring

spawn in the spring in Brevig Lagoon. A possible Port Clarence spawning location at “seal island”, near Jones Point was suggested because so many seals are seen with herring eggs on their faces in May and June. Experts noted that fall herring are preferable to spring herring because of the texture of their meat. The herring harvested by Breivg Mission residents are considered to be healthy.

“I caught herring as far as Windy Cove. That was...maybe five, six years ago. During a strong southeast wind, I had my net on the opposing shore an’ the waves, but I got at least ten gallons, herring. Last year we ran into a herd of spotted seals that were in that same area, that were, I think, feeding on herring. So herring do go in there. An’ then I do think that they go into Brevig Lagoon, during the spring, to spawn. I have seen them at the channel where, you know, you’re just what, 12 feet, where you can’t see the bottom, because there’s so many herring. So, they do come into the channel here.” –Elmer Seetot, Jr.

Herring Harvest:

Brevig Mission residents today harvest herring primarily by setting nets, but they can also be seined. Experts noted that they typically catch more herring at night than during the day. Some fishers will set their nets and leave them out overnight, or seine at night (against the current), to take advantage of this fact. Herring nets can be set in open water and under the ice. Herring can also be occasionally caught when hooking. According to experts, the best time to harvest herring is in September and October, before freeze-up.

Brevig Mission residents used to camp at *Nook*, on the point, to fish for herring, but few people still do this today. Seining is done at Teller Point and the mouth of Tuksuk Channel. Brevig residents also set nets in front of the village, throughout Grantley Harbor and in Windy Cove. Nets can also be set under the ice, right after freeze up, in front of Sunset.

“That channel over there, this side of Teller, in between - there’s channel there between Teller an’ Brevig. That one over there on this side is called Nook. An’ on other side used to be old Teller airfield. An’ on this side of Nook, they catch ‘em, they seine those...herrings. Not during the day, at night. They pull the net - they have to wait till the current is going that way [going towards Grantley Harbor].” –Jones Barr

Herring Processing:

Freshly caught herring can be baked or fried. Herring are often eaten *quaq*, also. Many people enjoy aged herring, but only a few go through the process of ageing them today. Herring can be aged by digging a hole into beach gravel, laying a tarp in the hole and putting the herring on the tarp. The hole is then covered with, for example, plywood, and the fish are left to age. Herring can also be stored in sacks which are then put in plywood-lined holes in the ground, and covered. Wooden barrels can also be used. Other methods used by Brevig Mission residents for processing and putting away herring include salting them in barrels, pickling them after salting, and smoking them in the fall time.

Jones: *“[What] I need to do, is get a hold of a wooden barrel, even a small one. Catch ‘em, an’ if I do get one, then I’ll ferment my own. ‘Cause it’s very simple. You wash ‘em off, make sure the barrel is clean, an’ then stack them up neatly until it’s filled up. Then put a lid on it, keep it*

outside. Like right now the weather gets real cold, then it gets warm, an' then it melts. An' that's how they ferment. They freeze an' thaw out, freeze an' thaw out. But they won't spoil. An' their meat gets sort of like crystal, lotta little crystals. When you get 'em out of the barrel, then you wash 'em off again, before eating them. So they're real good, real good.” Interviewer: “By that time have the bones softened up, so you can just eat them?” Jones: “Yeah, some do crunch on the bones. They have real soft bones. But not the fins, you could cut off the fins. ...Some even used to munch on the heads, 'cause the whole thing is fermented. So, they're real tasty.” –Jones Barr

Interviewer: “Do you string them, when you're smoking them?” Walter: “Just kinda leave 'em out...line 'em up with a willow bark tree [branch] or something, you know, an' just kinda hang 'em up through the gill. Just kinda string 'em up like that. Or just lay 'em out in a oven rack. Just hang up that rack on the smokehouse, an' lay 'em out.” –Walter Seetot

Smelt:

Smelt is a fish regularly harvested during the winter by Brevig Mission residents. Like tomcod, though, residents have had a difficult time harvesting smelt over the past few years and think that seals may be to blame. In addition to its use as a food for human consumption, smelt are also used for dog food and as bait for crabbing.



Figure 39: Elmer Seetot, Jr., Brevig Mission expert, and Matilda Nayokpuk, local assistant.

Smelt Biology:

As noted, Brevig Mission experts report that smelt have been more difficult to get over the past few years. They also noted that smelt population numbers can be fairly variable from year to year. Experts are concerned that seals, which are staying in the area later in the year due to later freeze-up, are eating smelt, or are scaring them away from regular harvest locations. They are also concerned that the timing of smelt runs may have changed due to climate variations and that Brevig Mission residents are now fishing at the wrong time. Or, it is possible that both seals and climatological changes are affecting smelt.

Smelt are reported to be healthy, though occasionally some with small worms are caught. They are frequently found in the vicinity of tomcods, often being caught one after the other from the

same fishing hole. They also travel in schools and Brevig Mission experts have observed that they catch smaller smelt near shore and larger smelt out in deeper water and in channels.

Smelt Harvest:

Smelt are harvested primarily by hooking through the ice. Some fishers used homemade ivory or metal hooks, others use commercial hooks. Shiny, green sinkers are reported to be effective in attracting smelt. Smelt can also be harvested with herring nets. According to Brevig Mission experts, in the past every time a net was set for smelt, a “tub” worth of fish would be caught (approximately equivalent to ten gallons). This is not the case today or over the past several years.

Experts described having to make lots of holes to find smelt and that there used to be cracks in the ice in front of the village where people could fish, but these cracks have stopped appearing. The best time to harvest smelt is from December or January through March. Brevig Mission residents frequently hook through the ice for smelt in front of the village, all over Grantley Harbor, in Port Clarence, at Point Jackson and at Four and Six Mile Points. In the fall time, smelt can be found in Imuruk Basin rivers.

“Well, every year we have to look around for them, too, you know. At times they might be lots, or sometimes they might be none, even both with the smelt an’ tomcods. An’ we just always have to kinda look around here an’ there where we could find ‘em. But most of the - majority of them might be at Grantley Harbor, winter time.” –Walter Seetot

Smelt Processing:

Smelt are known as a “stinky” fish when cooked. Experts described younger family members leaving the house when smelt was being baked because they did not like the smell. Brevig residents mostly eat smelt when freshly caught and prepare them by frying (whole), roasting, baking or boiling. They can also be frozen and baked at a later date, but few people actually put smelt away. Some experts were familiar with ageing smelt. This was done primarily in the past; smelt would be allowed to naturally freeze and were stored in a sack and allowed to age by freezing and thawing over the course of the winter. Brevig Mission residents occasionally try to dry smelt, but experts noted that it was mostly *Qawiaraqmuit* people who used to dry smelt in the past (up on the Kuzitrin River).

“...like for smelt, I always just kinda go fish for two dinners, that would be it. Whenever I want fish again, I go fishing, instead of stockpiling, because most of that’s kinda eaten fresh.” –Elmer Seetot, Jr.

Sculpin:

Sculpin are called “bullheads” by most Brevig Mission residents. While bullheads were a regularly consumed fish in the past, many people today (experts included) have never tasted this fish or tried to specifically target them when fishing. Many salmon fishers get frustrated or annoyed when bullheads get caught in their nets (which can be a frequent occurrence) because it is a lot of work to get them untangled.

Bullheads also play an important role in the cultural geography of the region. One elder and expert from Brevig Mission shared a story about the origins of King Island that revolves around bullheads.

“One time - started up Imuruk Basin, during summer months, fall time. People weren’t getting too much fish up there, ‘cause there’s this one giant bullhead. So they ask the shaman if he can get - catch that bullhead an’ drag it out in the ocean. An’ he did. He caught it an’ drag it out, from Imuruk Basin to Tuksuk [Channel], Grantley Harbor, Port Clarence. Today it’s sittin’ out there; known as King Island. ...He [Paul Tiulana] mention the same thing, too. That used to be a big bullhead up there, an’ some aṅatkuq, shaman, hooked it an’ dragged it out there, turned into a stone. That tunnel where - he said that was where he hooked it. He took the hook off, turn it to stone. That tunnel is still there [the “deep freeze” tunnel where islanders stored food].” –Robert Rock, Sr.



Figure 40: Aerial view of King Island.

Sculpin Biology:

As noted, Brevig Mission residents do not target bullheads. As a result, experts did not have detailed observations by which to assess the population size, though the general assessment was that there seem to be plenty around and that the fish themselves seem healthy. Experts noted that if you get poked by the sharp “horns” on a bullhead’s head you will feel very sore, which is one of the primary reasons people do not like them; they get caught on salmon nets and then have to be removed. Bullheads are around the Brevig Mission area all year long and according to experts, prefer areas with a sandy or muddy bottom. Juvenile bullheads are often seen near creek mouths. Some people consider bullheads to be scavengers or bottom feeders and therefore do not like to eat them.

“There’s always numerous bullheads out there, seems like they’ll never run out. I don’t think they’ll ever run out of bullheads. Even when the kids are fishing out there with a fishing rod, they always catch a bullhead, bullhead an’ tomcods. They’re fishing, they’re not gonna try fishing for trouts, an’ humpies. All they ever mainly catch is bullheads an’ tomcods. They’re always out there.” –Jones Barr

Sculpin Harvest:

Bullheads can be harvested, according to experts, most anywhere near Brevig Mission. They can be caught in any net, such as salmon nets. Bullheads are also caught when hooking, especially near the point (both sides) in January and February. Children often catch them when using a rod and reel.

Sculpin Processing:

Most experts had not tasted bullheads, but those who had recalled that their livers are very good, particularly livers from young bullheads. They are also eaten boiled or *quaq*.

Rita: *“The big ones. One time Henry tell me to cook one. You know, we learn to eat big ones long ago from old people, an’ Henry told me to cook one. Before I serve it, I tell ‘em this bullhead had a big grape bubblegum in his stomach. (Laughs) It had swallowed a big bubblegum. (Laughs) An’ he said he du’wanna eat it! (Laughs)”* Henry: *“I never try ever since that time. I don’t wanna have bubblegum. ...I don’t even feel like to look at ‘em anymore, after that the story with the bubblegum.”* –Rita and Henry Olanna

Burbot:

(As was noted earlier in this report, in the harvest survey results section, the majority of local experts and others often use the term “lingcod” to refer to what western scientists call “burbot.” However, a few local experts and others, use the same nomenclature as western scientists. This fact of nomenclature was discovered during the ethnographic field research. The reader will note that a number of quotes below may use the term “lingcod”. All uses of the term “lingcod” in these ethnographic sections refer to what western scientists call “burbot.” For the sake of clarity, given that this report will have a broad audience, this section will be titled “burbot” and all references in the author’s voice will use the term “burbot.” This is simply done for clarity; neither nomenclature is considered to be more correct than the other. It should also be noted that there was a much less common occurrence in which a few ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

According to Brevig Mission experts, people do not really fish for burbot anymore.

Burbot Biology:

Brevig Mission experts had no information about burbot population numbers. Experts recalled that burbot bite at night and travel at night. They can sometimes be seen in deep water when looking for salmon. Burbot are in the vicinity of Brevig Mission all year.

Burbot Harvest:

Brevig Mission experts had fished for burbot primarily with three-pronged hooks and nets. Hooks can be set at night, with bait, and left until the morning. These would be hooks and lines tied to, and supported by, a stick. Nets can also be set at night and left until the next day. Burbot are also occasionally caught in whitefish nets that are set under the ice, or when hooking for other fish through the ice. When the water is clear, they can also be snagged. Burbot have also been caught in salmon nets set up rivers in the Imuruk Basin.

Burbot Processing:

Burbot can be eaten boiled or fried when freshly caught. Boiled burbot can also be squeezed or pressed to remove the moisture and then flaked for use in *agutuk* and the boiled livers can be saved to make *tiñulik*, with berries. Burbot can also be stored frozen and used at a later date.

Flounder:

Most Brevig Mission experts have not targeted flounder for many years. In the past, flounders were frequently used for dog food and some people still save flounder from their nets for that purpose. Spearing was a common way to harvest flounder, but no one could recall this being practiced for the past several years.

Interviewer: “How come you stopped doing that [spearing for flounder]?” Leonard: “Cause of the weather too, I guess. Where we do our floundering in the past, it used to be frozen by maybe January. Right now we get a lotta overflows an’ when it keep doing that, the ice, you know, builds up, an’ gets pretty thick. Kinda hard.” –Leonard Olanna

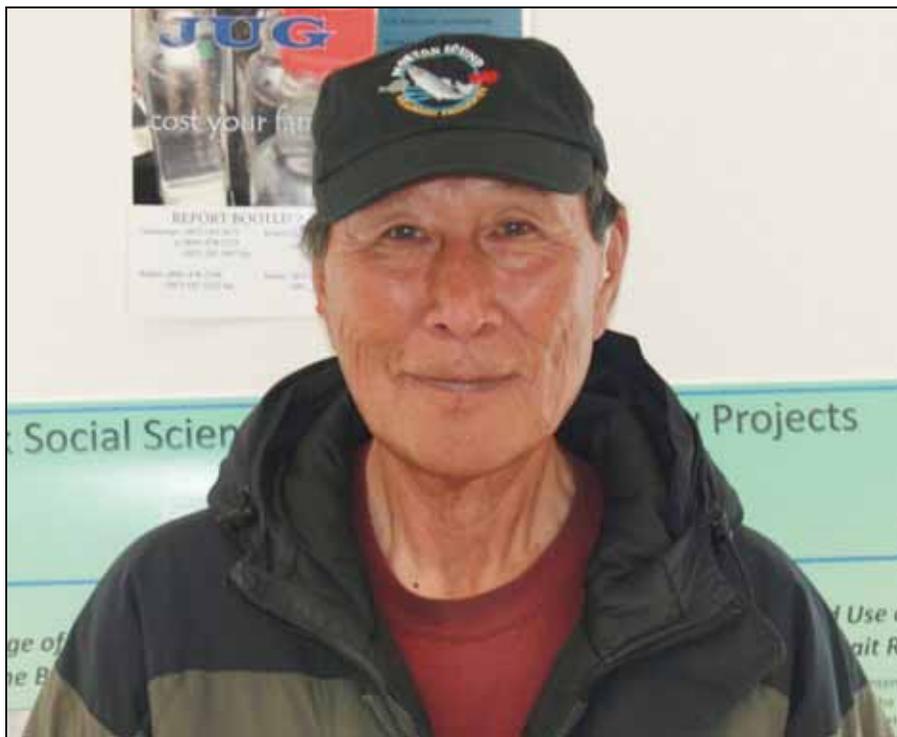


Figure 41: Jones Barr, Brevig Mission expert.

Flounder Biology:

Brevig Mission residents recognize and have harvested two species of flounder, the smooth flounder and the rough or starry flounder. According to most experts, both species of flounder are abundant, though they suggested that starry flounders might be more numerous than smooth flounders. Starry flounders are generally larger than smooth flounders, with a large flounder of any type being between one and two feet long. Flounders get larger and fatter (thicker) in the fall time, around September. The rough skin of the starry flounder makes peoples’ hands itchy if they do not wear gloves when removing them from salmon nets. Flounders are in the area all year, but

move around based on the season. Starry flounder move into Imuruk Basin to overwinter near Ptarmigan Point and smooth flounder are known to overwinter in Brevig Lagoon.

“They’re nuisance when we first, when we always [salmon] fish, there always be too many in the net. ...Gotta take ‘em off, yeah. (Laughs) They make our skin scratchy when you don’t use gloves. Gotta use gloves.” –Helena Seetot

Flounder Harvest:

Both starry and smooth flounders can be harvested by various methods, including spearing, hooking and with nets. Smooth flounder can be hooked through the ice in the winter, around December. Flounders can also be caught in whitefish nets and in salmon nets. Starry flounder from salmon nets are generally not retained, other than very fat (thick) ones. Brevig Mission experts noted that flounders are caught more often in cotton or twine nets as opposed to plastic nets, because they can slip out of the plastic mesh.

“Catch ‘em in a salmon net. They get caught ‘cause of the current. The current pushes ‘em onto the salmon net. ...checking their [net] for salmon...they caught the biggest ones. Then that how’s we catch ‘em. Not just mainly to fish for ‘em, but they get caught, either on whitefish net, salmon net, or any kind of net. ‘Cause they’ve got a real rough skin on ‘em.” –Jones Barr

Smooth flounders were harvested in the winter with spears through the ice, February being a prime month to spear. As mentioned, this harvest method has not been practiced for a few years by Brevig Mission residents. Local experts explained that when spearing flounder, it is best to have your hole far enough offshore to intersect the current and to try and harvest them on an incoming tide, which is when they are most active. Other effective locations to spear were noted to be in the channels that lead in and out of Brevig Lagoon, as well as near Point Jackson.

Spears varied in length, but need to be long enough to reach the bottom. The fisher would lie on a reindeer skin next to their hole and look down into the water to spot the fish they would spear. If it was windy, ice or snow blocks might be placed around the hole as a wind block. The spear has a three-pronged point, in more recent times often made of nails. The middle prong would be the longest with the outer two prongs being shorter and curved slightly inwards. The points were traditionally made out of ivory and the prongs had barbs on them. Brevig residents have reported finding numerous flounder spear points at archaeological sites in the area. Brevig Mission experts noted that the points were never made out of bone because it is too brittle. Some fishers, but not all, used a flounder-shaped lure that they would “jig” around and which had brightly colored beads on it. Tomcod hooks were also sometimes used as lures because they have beads on them.

Flounder Processing:

Freshly caught flounder can be eaten boiled, filleted and then fried, and the eggs can be eaten raw. Brevig Mission residents also fillet and freeze flounder, to be fried at a later date. Flounder are also frozen or allowed to naturally freeze after harvest and are then eaten *quaq*. Flounder were dried in the past, but Brevig experts were not aware of anyone doing this in the recent past. Flounder could be dried filleted or whole, usually strung together by the tail. Flounder were also aged in the past. The fish would be harvested in the fall and stacked in wooden barrels, whole,

and left outside. When winter arrived the flounder would be ready to eat after removing them from the barrel and rinsing them.

“They’re real good eating, even frozen, an’ we save some for dogs. They’re always like halibut meat.” –Rita Olanna

Pike:

Brevig Mission residents do not harvest as much pike as in the past. Pike are primarily found up the Kuzitrin River and other Imuruk Basin rivers. Experts have noted pike harvesting requires a boat, motor and large amounts of gasoline, which prohibits many people from harvesting them. Brevig Mission residents have heard stories of very large pike, including a giant pike on the Kuzitrin River. This pike is reported to be two feet wide between the eyes, and some people will not swim in the river or allow children to swim in the river because of it.

Pike Biology:

Some Brevig Mission experts believe that pike populations have increased over the past five years, potentially because of the fertilization that was done by the Norton Sound Economic Development Corporation at Salmon Lake (in the upper reaches of the Imuruk Basin watershed). The fertilization activities (intended to improve sockeye salmon returns) were believed by some to cause an increase in water grasses, which are a preferred habitat for pike. Other experts were of the opinion that pike may be decreasing because it takes fishers longer to harvest a gunny sack of the fish today than it did in the past.

Brevig Mission experts know that pike are a freshwater fish, that they prefer grassy areas, and that they will eat “pretty much anything”. There is some concern that pike may be negatively impacting the populations of other fish because they eat so much. Experts noted that pike have a lot of roe, are quite boney, and that when handling them you should grab them by the eyes because their gills will stick your fingers.

Pike Harvest:

Brevig Mission residents harvest pike with pike nets, either in open water or under the ice. As noted, pike are found up rivers in the Imuruk Basin. The most popular place to harvest pike is at the mouth of the Kuzitrin River where fishers will set nets under the ice, primarily between December and April. In the spring, during break-up, pike can occasionally be caught in nets in the Port Clarence area. Pike are also caught in whitefish nets throughout the year. They are rarely caught in salmon nets. Some Brevig residents also harvest pike with a rod and reel. Experts recommend pike fishing when there is a south wind in the winter and spring because of the high water level it creates.

Interviewer: *“So you don’t go out specifically to get pike, you just keep them if you get them in your net?”* Walter: *“Yeah. I know that couple years ago my brother an’ my nephew, they try to put a whitefish net an’ they end up getting nothing but pikes, like 30 apiece, in the morning after they set it overnight. I think these things are overpopulated up there in the basin, an’ Grantley Harbor an’ Port Clarence Bay, I mean. I was trying to do whitefishing net too, over there at our fish camp an’ I end up getting nothing but pikes that one spring. There were just small sizes [about 12 inches].” –Walter Seetot*

Pike Processing:

Brevig Mission residents prepare freshly caught pike by baking and frying them. They can also be dried. Pike are also frozen for use at a later date, or to be eaten *quaq*.

“I stopped over at Thomas an’ Carol Ablowaluk’s maybe about 15 years ago on my way up the river, an’ they said that they had baked pike, breaded in cornmeal. An’ the way they cooked it, the way they did it, they tasted so good.” –Elmer Seetot, Jr.

Sheefish:

Brevig Mission residents only occasionally catch sheefish, usually in the summer in salmon nets.

Halibut:

Brevig Mission experts have never caught halibut in the vicinity of their community.

Blackfish:

Brevig Mission residents do not currently harvest blackfish, but some experts do know the Iñupiaq name for them (*aluquunaaq*). Some experts think they have observed them in a creek that runs through the village, as well as in lakes nearby. Children play with them when they are able to catch them from the creek. One person was familiar with the fact that they can be frozen and then “come back to life” (referencing the antifreeze-like properties of their body fluids).

Grayling:

Most Brevig Mission experts occasionally harvest grayling, but few village residents target them intensively. Grayling can be harvested by rod and reel in the summer and with nets in the fall under the ice. They are known to like the deeper areas of rivers and salmon eggs are an effective bait when rod and reeling for them. Locations where Brevig residents harvest grayling include the Agiapuk River, American River and California Creek. They have also been seen on Fish Creek. Most people eat grayling *quaq* or freshly caught, filleted and fried.

Capelin:

Most Brevig Mission experts do not recall ever harvesting or eating capelin, but have seen them in the area. Some experts have not seen them for several years, but one recalls seeing them every year. Experts observed them traveling along the shoreline in the spring time, around salmon fishing season. While they have not harvested capelin themselves, experts know that a few adults and some children have tried to harvest them occasionally.

Interviewer: *“And you see them every year in the spring?”* Jones: *“Every year, every spring.”*

Interviewer: *“Do they come on to the beach, or just stay out there?”* Jones: *“Right along the beach. When I’m fishing for salmon, you know, watching the net, we see real small ripples, not very far out from the beach. Those are the cigar fish, traveling. When you look out there, if we’re scaring ‘em, you could see them. Make little noise, they zoom out. There’d be whole bunch of ‘em. They travel in schools, too.”* –Jones Barr

Table 18 provides the Iñupiaq names for non-salmon fish provided by Brevig Mission experts, as well as examples of other words and phrases related to non-salmon fish or fishing.

Table 18. Brevig Mission Iñupiaq words for non-salmon fish and fishing-related terms.

Common English name/phrase	Other name	Iñupiaq name
fish	-	iǵaluk
tomcod	-	iǵaḷuaq
blue cod	-	qaluaq
blackfish	-	aluquunaq
herring	-	iǵaḷuaqpak
sculpin	bullhead	kanizugaq
smelt	-	iḷhuaǵniq
flounder	-	nataaǵnaq nataaǵnaruyaq
smooth skin flounder	-	nataaǵnavaat
starry flounder	rough skin flounder	nataaǵnariit nataaǵnaruit
whitefish	large whitefish	siglitaq
round eye whitefish	small, lean whitefish	tipuk
broad whitefish	brown colored whitefish	kuuqunaq
pike	-	siulik
capelin	cigar fish	-
hook used in fishing	-	niksik
to hook or jig for fish	niksik-ing	niksik
willow greens (often eaten with fish)	-	suzah
channel into Brevig Lagoon where people fish	-	kuuḷaq
fish camp area on the spit	-	nook
area where trout spawn, near the headwaters of California Creek	-	qaḅizvik
having an ‘icicle’ taste	-	quaqlaq
seal skin poke	-	puuq
name for game with tomcod bones	“to win” (translation from Iñupiaq)	inuuuqtuun
Kauwerak: abandoned village on the Kuzitrin River	“place with a gravel bar” (translation from Iñupiaq)	qawiaraq
shaman	-	aḅatkuq
Tuksuk	channel between Grantley Harbor and Imuruk Basin	taqsruk

Teller

Smelt, herring, cod (tomcod, saffron cod, and blue cod) and whitefish were the non-salmon fish harvested in the greatest numbers by Teller residents in the 2009-2010 harvest season (Figure 14). For that same period, over 35% of Teller households surveyed say they did not get enough non-salmon fish to meet their needs (Table 19). Map 4 (map pocket) is a map of the Teller area

including locations where Teller residents harvest various non-salmon fish species, and other locations associated with non-salmon fish. Teller and Stebbins are the only two participating communities where more than 50% of surveyed households reported getting enough non-salmon fish to meet their needs during the 2009-2010 harvest season. Non-salmon fish continue to be very important to Teller residents today, as they have been in the past. Teller non-salmon experts recognize fish as being available year round, and as a traditional source of food for their ancestors.

Table 19. Percentage of surveyed households in Teller that reported having enough non-salmon fish to meet their needs during the 2009-2010 survey period (80.3% of households surveyed).

Did your household get enough non-salmon for your needs?			
Yes		No	
Count	Percent	Count	Percent
34	64.2%	19	35.8%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

“Fish [is] very, very, very important...where my parents an’ grandparents came from, which is up river. Fish was central life basically.” –Joe Garnie

“Learn how to cut the fish that you catch, an’ eat ‘em, instead of just throwing ‘em away or giving ‘em away. We’re not sport fishermen. To us, the fish were put there for a purpose, that’s to feed us. Then when you take care of ‘em, their habitat, if you don’t take care of their habitat, then you have no more fish.” –Norman Menadelook

Tomcod:

Teller experts recalled that their community, as well as other communities in the area, were highly dependent on tomcod in the past. Tomcod remains a popular fish today, but is not harvested as intensively as in the past. Tomcod are relatively easily harvested, with little gear, and are in the region all year, making them well-known to most residents. A game played with tomcod bones was also familiar to many Teller experts. This game, called *inuuaqtuun* by Brevig Mission residents (Teller experts did not provide an Iñupiaq name for it), involved finding the two anchor-shaped bones in the head of a tomcod, locking them together with a partner, and pulling. Whoever held the bone that did not break was the “winner.”

“Can’t see nothing wrong with all these non-salmon fish. They come in handy. Good change of diet. If there was no tomcods, there’d probably be no Eskimos. Tomcods has pretty much saved a lot of Eskimos’ lives, I guess” –Delbert Okbaok

Tomcod Biology:

Overall, Teller experts report that the population of tomcod varies from year to year, but that they are generally abundant. However, Teller experts have also observed over the past five to ten years that in many winters, the main run of tomcod has passed by the village prior to freeze-up. This reduces residents’ access to tomcod. One expert has observed that even though freeze-up is later, there still seem to be enough tomcod around after freeze-up, though this may vary from

year to year. Teller residents, like Brevig Mission residents, have also noticed an increase in the number of seals and the length of their stay in the Port Clarence and Grantley Harbor area. Teller residents have not attributed any decline or difficulty in harvesting tomcod to seals, however.

Tomcod are viewed as being healthy, though occasionally fish with green livers are harvested and experts say that these fish should not be eaten. As mentioned, tomcod are in the region all year long. Tomcod spend the summer in the Port Clarence area. According to experts, tomcod wait for a certain water temperature and amount of daylight before spawning. Teller experts were not certain of the exact timing or location of spawning, but believe that it takes place around January, possibly in the Tuksuk Channel area. They noted that tomcod they catch in the spring are spawned out.

“They’ll [blue cod] be around until December, just like other tomcods, they’ll be off some place, go spawn out. ‘Cause in January sometimes you get a whole bunch of the blue cods, that’s already caught [trapped], between Port Clarence an’ Point Jackson, an’ the water just be boiling. That’s how many fish there is - there’s great big schools. They just run whole day, an’ the [water] just boils, an’ [there are] seals all over.” –Norman Menadelook

Experts say that tomcod do not seem to have changed their movements within the local watershed but that changes in freeze-up, as noted, have impacted fishers. Blue cod show up near Teller at the same time as tomcods, and smelt and tomcod are often found together when people are fishing. Experts have observed that tomcod generally leave the vicinity of Teller for spawning prior to the time when smelt do. Tomcod are known to feed on “anything that is moving” and will also eat any fish innards that are thrown back into the water. Some Teller residents have an allergic reaction to tomcod and experience itchy lips after eating them.

Tomcod Harvest:

Tomcod are harvested by Teller residents by hooking through the ice and with tomcod nets. Nets can be set under the ice, set in open water areas such as cracks, or used for seining prior to freeze-up. Experts say that a “Swedish Pimple” lure is effective for tomcod fishing through the ice, and that fishing is generally better closer to shore as opposed to out in the middle of a water body. Spring and winter, through the ice, are the best times to fish for tomcod. Any tomcod caught during the summer are not retained.

Most tomcod fishing by Teller residents is done in the winter through the ice of Grantley Harbor, in front of the village, including at Teller Point and nearby Four Mile Point. Some fishers also travel into the Imuruk Basin to areas like the mouth of Tuksuk Channel or Ptarmigan Point to harvest tomcod. As noted, the timing of winter tomcod fishing has changed because freeze-up happens later than in the past. Some fishers report difficulty harvesting as much tomcod today as in they have in the past, possibly because of later freeze-up.

“Tomcod is, as far as the Eskimo community, it’s always been a mainstay. Through my entire life tomcod was our mainstay as far as fish goes, ‘cause we fished ‘em through the ice right at freeze-up, when the ice was just thick enough to walk. We really harvest ‘em, as many as we could for the winter. An’ these are kind of a delicacy amongst our people. We can eat them frozen practically every day without getting tired of ‘em. An’ so we would get as many as we absolutely could to sustain us for the winter both for the dogs an’ ourselves. We harvest them

also in the spring of the year, in May, when there's still ice; fishing either in cracks in the ice or if we chopped a hole through the ice. We jig them in the spring also. An' we get 'em with nets before freeze-up, from September until freeze-up. An' these we hang to get dried or half-dried."

–Joe Garnie



Figure 42: Tomcod fishing on Grantley Harbor, near Teller.

Tomcod Processing:

A preferred way to process tomcod in Teller (as in other communities) is to harvest them in the winter and leave them hanging until spring while they undergo the slow freeze-thaw process of drying and ageing. Tomcod are also eaten fresh and boiled. Tomcod livers are saved by some residents to make the traditional dish of *tiñulik*; cooked livers mixed with blackberries (crowberries). Some cooks also use tomcod in *agutaq*. The boiled tomcod is squeezed or pressed dry of all its moisture and the fish is then flaked into a mixture of fats and oils (mixtures differ between cooks).

Tomcod and blue cod can be frozen to eat *quaq*, with seal oil. When frozen, the blue cod can be eaten whole, bones and all. They can also be frozen and later boiled or baked. Tomcod are dried or half-dried by some residents. Experts recalled that traditionally, when drying tomcod, the eggs would be left inside to dry with the fish, but that many people today take the eggs out before drying the fish. To dry or half-dry tomcod, they should be gutted and then strung on a willow branch through the gills to hang. Some people today use sweatshirt material (cut into strips and tied into a rope) to string tomcod to dry. Dried tomcod are eaten with seal oil and greens. Half-dried tomcod are also eaten with seal oil and greens or are baked.

"I just learn what way my dad an' mom [did it]. My dad was the one that teach me, an' then he said like this. He just let me know what time of the year to catch 'em. They're no good after [they get] too skinny, or something. 'Cause they go out an' go lay their eggs an' they're skinny. An' the males, the males we don't care for too much. But we still eat 'em quaq, anyway."

Okleasik

Smelt:

For most Teller residents, smelt is a fish that is rarely stored and is primarily eaten fresh. Some even consider it a “special occasion” fish. Because seals are known to eat a lot of smelt, Teller experts are concerned that seals, which as noted previously are staying in the area later in the year, are impacting smelt harvest. They are also concerned that because of later freeze-ups smelt are more difficult to harvest.

Interviewer: *“How important is smelt to you?”* Thomas: *“Very important. ‘Cause it’s a traditional diet, pretty much. Everybody likes the smelt. People from Nome, all over, come here to fish them when fishing’s good.”* –Thomas Ablowaluk

Smelt Biology:

At the current time, because of seals lingering in the area longer and because of changes in freeze-up timing, both of which have impacted harvest, Teller experts did not feel confident to comment on trends in the smelt population. Overall, the health of the population of smelt is good.

“In the past, we used to get lots. Now we don’t get as much due to our late freeze-up. That’s what I blame it on, late freeze-up. Same thing with the tomcods, you know. But with smelts, they’re pretty much fat, the ones that we’ve been catching, year after year. ...They’re healthy.”
–Norman Menadelook

Smelt, like tomcod, are in the region year round. Smelt are observed to have eggs when harvested in December and January. Experts indicated that smelt leave the vicinity of Teller around May and then travel into the Imuruk Basin and its tributaries. Smelt are known to get fat in the spring and to spawn around June on the Kuzitrin River near Coffee Dome and in the Cobblestone River. Smelt are considered to be a boney fish and they have strong stomach acid. Some experts have seen the stomach acid eat through the flesh of the smelt when hanging to dry, if the fish were not gutted first.

Smelt Harvest:

Smelt are harvested by Teller residents primarily by hooking through the ice. Smelt can also be seined with small mesh nets, harvested with a dip net, or snagged with hooks. Many Teller experts use the “Swedish Pimple” lure for smelt as well as tomcod, but noted that anything shiny will be effective. Adding a piece of red yarn above the lure has also been noted to help attract smelt because they think something is wounded. It is not possible to target smelt when hooking and any fishing hole usually produces both smelt and tomcod.

Experts indicated that smelt can be harvested any time from October to April (essentially from right after freeze-up to right before break-up). Smelt are hooked through the ice by Teller residents anywhere in the vicinity of the village, on the Port Clarence and Grantley Harbor sides of the spit. Some people also travel to Tuksuk Channel, Ptarmigan Point, the Pilgrim Hot Springs area and other locations to harvest. One expert had experience dip netting smelts at a particular bend in the Cobblestone River with a long handled dip net.



Figure 43: Smelt harvested by John Okleasik, Teller expert.

“Ihhuagniq - course we harvested a lot more when I was a child. My grandparents did, an’ my parents they dried ‘em on the Kuzitrin River. They specifically stayed in the spring to - they would take a boat load of ‘em an’ dry ‘em. Dried smelt was really good. I haven’t dried smelt since my parents are gone. I haven’t done that anymore, because mainly it’s - there again, change of lifestyle. At that time of the year we’re doin’ something else. An’, of course, don’t live on the river as much. Our time is divided; we harvest a lot from around the Pilgrim Hot Springs area. An’ the latitude across, straight across, is the Kuzitrin, right from both roads, on down to here, to Teller. An’ this Port Clarence Harbor is kinda our harvesting area. An’ at that time of year, we’re doin’ something else down here. So we aren’t drying smelts like we were. ...the only time we’re using smelt anymore is, I’m getting them in the nets in October, first part of November I’m getting some in my nets. ...I get a mix of herring, whitefish an’ tomcod an’ smelt in the fall. This I’m using for human consumption an’ for the dogs. An’ I’m probably getting twenty or thirty pounds in a day.” –Joe Garnie

Smelt Processing:

As noted, most Teller residents do not put away very much smelt, if any. Smelt is primarily eaten fresh and boiled, roasted and baked. When baked, smelt is often eaten with seal oil as a condiment. Experts explained that it is considered to be a very strong tasting fish, and many people prefer to just eat a few meals a year of it. Additionally, smelt that is put away in a freezer often does not taste as good as fresh smelt. Some Teller residents do freeze smelt, though, and later fry, roast, boil or bake them. Smelt are also eaten *quaq*, usually with seal oil.

Smelt can be dried when they are harvested in the spring, but this is no longer practiced by Teller residents. To dry smelt, they can simply be laid on gravel bars or rocks, as the former residents of Kuzitrin River villages would do. They can also be strung on willow branches and hung to dry.

The broth from boiling smelt has been used to feed babies in the past, before formula, when the mother was not able or available to feed the baby. Smelt were also aged in the past in grass-lined holes. Some Teller residents harvest smelt to use as crab bait.

“There’s big gravel bars [on the Kuzitrin River], an’ they dry really quickly, in a couple of days, because they don’t have any more body fat an’ their stomach is completely empty. You don’t even have to bother guttin’ ‘em. There’s really nothing there.” –Joe Garnie

“...about maybe 75 smelt, that’s pretty much. We don’t usually want too many. ...smelt - they don’t last too long seems even when you freeze ‘em, they kinda get strong.” –Delbert Okbaok

Whitefish:

As with the harvest of some other fish, whitefish harvests are being affected by late freeze-up. Experts have observed that the peak of the whitefish run passes prior to freeze-up, and as a result fishers are missing some, or all, of the run. Teller experts report that village residents do not harvest as much whitefish as in the past, despite the fact that whitefish are a preferred fish.

“I haven’t noticed anything different [about whitefish]. The only thing I know different is freeze-up is so late now. We also have one season where we fished whitefish, exclusively both Teller an’ Brevig, we fish the same run. An’ we usually fish startin’ in October until about Christmas. The fishing would slow, an’ we’d put nets under the ice for them, up on Salt Lake, which is called Imuqruk. An’ we harvested them for trade, an’ we sold some, an’ got some to eat. And freeze-up is so late now that we can’t hardly harvest this. That’s the biggest change in whitefish fishing is freeze-up is so late, the ice is so thin, we can’t get to the fishing ground until the run is basically over. So it’s really not worth fishing that run anymore.” –Joe Garnie

Whitefish Biology:

Teller experts believe that the population of whitefish has remained stable. Whitefish are considered to be abundant and healthy. Some whitefish get very large. Teller experts recognize several different species of whitefish (Table 20), but cannot always distinguish between them. Experts are familiar with small and large Arctic Cisco, humpback, broad, short nose and round eye whitefish. Additionally, experts have identified another type of whitefish, which is specific to the Imuruk Basin, which they call “Salt Lake” whitefish in local nomenclature. Salt Lake whitefish are larger than the other species, have a hooked nose, a greenish back and reportedly taste better when *quaq* than other whitefish. Salt Lake whitefish are considered too fat for drying.

Teller experts have observed that whitefish eat small water bugs that look like shrimp and that they will feed on any fish guts that people throw back into the water. Experts believe that whitefish wait for a certain water temperature and amount of daylight to spawn. Not all whitefish stay in the region year round; some leave the region in the spring and then come back in the fall. The specifics of which species are resident in the region, and which are not, and the exact timing of these movements were not known. Teller elders have observed that when the first snow starts falling and sticking to the ground, that is when the Arctic Ciscos are heading up river (i.e., towards the Imuruk Basin).

“But that Arctic [Cisco]; old people say that by the time, when a first snow start falling down, start sticking on a ground, that’s when the Arctic [Ciscos] are up river. ...can’t get ‘em down here anymore.” –Norman Menadelook

Whitefish Harvest:

Whitefish are primarily harvested in nets. Nets can be set in open water or under the ice and can also be used for seining. Nets specific for whitefish are used, except for broad whitefish, for which salmon nets are used. When setting nets in cracks in the ice, Teller experts recommend setting them in cracks that run parallel to the beach for best results. Residents frequently set nets in cracks in the ice in front of the village, when they are available. As noted, later freeze-up is impacting Teller residents’ ability to harvest whitefish at the peak of their run.

The most common place to set nets under the ice is at the east end of Imuruk Basin, near the mouth of the Kuzitrin River. Teller residents also set nets at other locations throughout the Imuruk Basin (and its tributaries) and along the Kuzitrin River in both the summer and the winter. One Teller expert described how New Igloo residents would go two bends up the Kuzitrin River from Mary’s Igloo near the end of September, to seine for whitefish. They would take the fish back to New Igloo to dry.

“But those tipuks they call, they catch ‘em up river too, lot of ‘em. Like fall time, my mom an’ my two sisters, we always go past...Old Igloo, we call it Old Igloo [Mary’s Igloo], two points up river. An’ we seining, like in end of September. We get couple sacks, an’ we come down to New Village [New Igloo], an’ my mom would hang ‘em. Make whitefish dry fish, real good.” –Agnes Noyakuk



Figure 44: Teller boats at New Site during a November 2011 storm.

“My father an’ I used to...when it first freeze-up, we go set our nets. An’ it’s all the way from here to here, a good almost 30 miles. He had a snowmachine or a dog team. We both used to go with dog team. ...we’d make sure we find the channel, you know. There’s another good place - that was Duck Creek, another good place he used to like to set his net, too.” –John Okleasik

Whitefish are also occasionally caught in salmon nets during salmon season. They can be speared on a low tide, and also hooked during salmon season if salmon eggs are used as bait. In the past traps were used to harvest short nose whitefish; no further information was available about these traps.

Additionally, the residents of the abandoned village of Mary's Igloo would construct a stone fish trap across the Kuzitrin River each year to harvest whitefish. The stones would form a fence that blocked the river except for a narrow opening. At the narrow area a dip net would be used to harvest the whitefish. Once enough fish for the community were harvested they would remove enough stones to let the remainder of the fish pass. According to one Teller expert, some of the stones used in the construction of the trap are still visible in the water near the village.

“Well, there was a lot more community fishing happening, where it was organized fishing happening, whether it be clans getting together an’ tyin’ their seines together an’ making one big seine to acquire the bulk. An’ also at Mary’s Igloo, where my parents an’ grandparents lived, the whole community fished together. The stones are still piled there. They actually used stones an’ made a community fish trap where they blocked the river an’ had them comin’ through a narrow area, where they just stuck a dip net. An’ each family dipped...until they got enough whitefish for each family, an’ everybody’s dogs, an’ the entire village. Then they took the stones back out, an’ let the rest go. ...an’ the stones are still there.” –Joe Garnie

Whitefish Processing:

Whitefish are a popular fish and Teller experts described many different ways to process and prepare them. Like pike, all whitefish must be scaled before anything else is done with them. When freshly caught, whitefish are baked, fried, and boiled, including the eggs. The cleaned stomachs can be fried along with the meat.

Whitefish are allowed to naturally freeze and are eaten *quaq*. They can also be frozen and later baked, boiled or fried. According to Teller experts, Salt Lake whitefish, unique to this area, are only frozen. Arctic Ciscos are eaten fresh or are frozen because they are too fatty to dry. Humpback whitefish, however, are considered good for drying. Round eye whitefish are typically dried, half-dried or smoked, and when people lived at New Igloo, they would dry a lot of these fish. Some people also use various whitefish in *agutak*.

Some Teller residents also age whitefish. They can be aged in a pit in the ground or in 55 gallon drums. Teller experts noted that people used to look for a white, round piece in the intestines of whitefish. This would be cleaned and then chewed on. Teller data review workshop participants identified it as the area circled, approximately, in Figure 45.

Interviewer: *“Are there any parts of the whitefish that people used to eat in the past, that they don’t any more today?”* Thomas: *“Yeah. This regular whitefish, you rip ‘em open, there’s a little - I dun’no what they call it. I forgot what you call it, like a balloon - it’s like a roundy thing, an’ just knife that off, an’ split it open, an’ clean it little bit, an’ chew on it. I never did like ‘em.”*

Interviewer: *“Was it their swim bladder?”* Thomas: *“It’s inside their ...intestines, like it’s a white, funny looking thing.”* –Thomas Ablowaluk

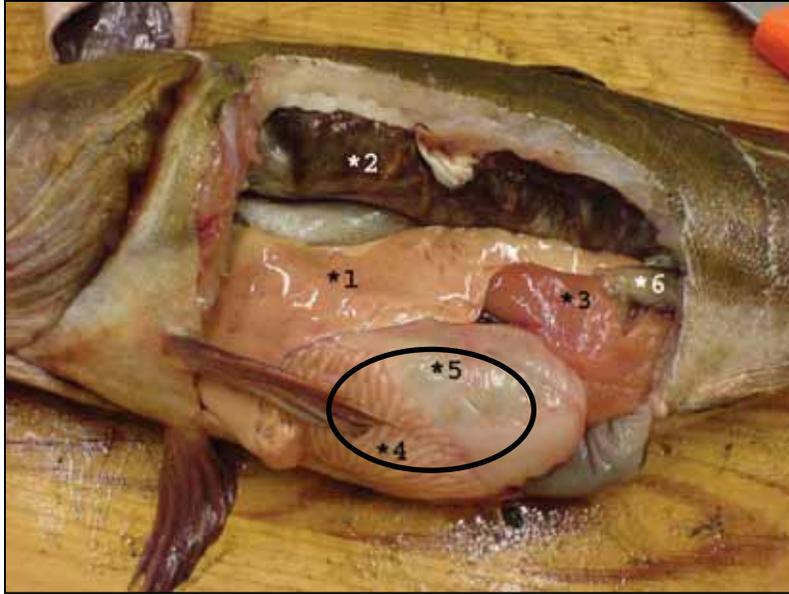


Figure 45: Teller experts would save the circled area in whitefish, burbot and pike. Liver (1), gas bladder (2), roe (3), pyloric caeca (4), stomach (5) and intestine (6).

Photo from: <http://en.wikipedia.org/wiki/Fish>.

Pike:

Pike are a preferred fish for many people; however harvest levels for pike are not high. According to Teller experts this is because fishers must travel up into the Imuruk Basin for pike fishing and transportation (i.e., gasoline as well as boats, motors, etc.) is expensive. Some Teller experts are concerned about the low harvest levels of pike, as compared to in the past, and think that salmon populations would be higher if more pike were harvested. Pike are frequently shared with elders because many of them grew up with them and crave them.

“Because when the people lived on the river up there, we actually specifically targeted ‘em. We targeted pike like nobody’s business. We set nets for ‘em, nets under the ice for ‘em, jigging for ‘em, specifically targeting them. They were the first fish that got dried. Nobody’s drying pike anymore. We used to dry a lot of pike.” –Joe Garnie

Pike Biology:

Teller experts believe that pike populations have stayed stable, or have possibly increased because of lower harvest levels. Pike are in the Teller region year round and seem to prefer areas with water plants, though they can be found in many habitat types. Pike are freshwater fish, but are occasionally found out of freshwater. They are very active in the spring when the ice is breaking up and water levels are high. Teller experts noted that pike are also very active during storms.

Pike are considered to be healthy, though some pike are occasionally seen with scars or seal bites. Many people consider pike to be “gluttons” and very aggressive; they are known to eat virtually anything, from young salmon (especially silver salmon) to smelt, to birds, but can also go for long periods without eating anything, if they have to. Pike can also live a long time outside of water. Teller experts have noted that pike will bite at anything tied to a hook, though

they seem to prefer dark colored things, like old ivory and red yarn. Bone or reindeer horn hooks or moose hoof or horn hooks can also be effective. Experts have also observed that pike attack their prey from the front, not the tail, because you will see them with tails sticking out of their mouths.

Norman: *“I haven’t seen any animals eating pike, but I seen pike eating other animals. One summer picking salmonberries, we thought there was a piece of wood drifting down that was a pike. An’ the birds were starting to fly, an’ one bird land on that log [pike], and the log [pike] ate it! ... It was a small bird.”* Interviewer: *“Do you think the pike did that on purpose?”*

Norman: *“Oh yes, they’ll eat anything. ...It was just floating along with the current, just like a piece of wood. So it was not the first time it done that. It probably seen some other pike do that.”*

–Norman Menadelook

Pike Harvest:

Pike can be harvested with a rod and reel, with nets, or by hooking. As noted above, pike will bite at almost anything; one Teller expert described making a small wooden pike lure shaped like a bird that was effective for pike fishing. Teller residents rarely set nets under the ice for pike anymore, but they are occasionally caught in under-ice whitefish nets. Pike have also been caught in salmon nets during the spring, after break-up when water levels are high (in front of the village or in Tuksuk Channel).

Wesley: *“We used to race, when we used to go reindeer herding up here wintertime, an’ then we’d go to rivers an’ race, three of us, with tuuqs. We’d see who could chop the hole the quickest an’ get the first pike, an’ loser would have to cook or do dishes.”* Interviewer: *“That sounds like fun. What was your hook made out of?”* Wesley: *“My brother made it. It was moose hoof, an’ the nail that he had sharpened. It was a moose hoof that he just shaped into a little fish, an’ then he put a nail through it, an’ sharpened the end.”* –Wesley Okbaok

Teller experts explained that early spring, approximately March through May, is the best time to hook for pike. Teller residents hook for pike in the Kuzitrin River area in the spring. From October through February pike can be harvested with whitefish nets. Experts have harvested or seen pike in all of the rivers and creeks that feed into Imuruk Basin.

Pike Processing:

Experts proposed that an additional reason why pike harvest levels may have decreased is because they can be a lot of work to process. Before they are filleted, dried, frozen, etc., they must be scaled. Additionally, while cutting them to dry, bones often have to be removed because pike have so many. A common way to put pike away today is to clean and scale the fish and then freeze it, to cook at a later time. Freshly caught pike can be boiled and fried, and fresh eggs from pike caught in the spring are eaten. Pike were frequently dried or half-dried in the past, but Teller residents rarely do this today. Pike are cut the same way a salmon would be cut to dry or half-dry. In the past, pike stomachs would be cleaned and boiled, but most Teller residents no longer do this. Fried pike is said to be very good when eaten with reindeer meat and dried pike is good with willow greens. In the past, when there were many dog teams in the village, pike would be aged for dog food. One expert has experienced difficulty with ravens eating or stealing any pike that he tries to dry outside of his house, so he now just freezes them instead.

“Very important, yeah, main source of food for just anybody that knows how to debone ‘em. The only reason why people don’t like pike is they’re so boney. They got wide bones on ‘em, not like the other fish. I still don’t know how to debone ‘em, but - you debone ‘em, deep fry ‘em, they’re really tasty. Dried, you can dry ‘em. ...An’ boil ‘em, you can boil ‘em. But no matter what you do to ‘em, you gotta scale ‘em.” –Thomas Ablowaluk

Sculpin:

Teller experts indicated that most village residents do not specifically target sculpins, also called bullheads, when fishing. Bullheads are considered to be more of an “elder food” (i.e., something that mostly elders are familiar with and like eating). Though they are not targeted, many bullheads are caught in salmon nets when salmon fishing. They are also caught when hooking for other fish through the ice. In both instances, they are rarely retained. Salmon fishers will remove them from nets and throw them back and ice fishers will remove them from hooks and throw them back or leave them on the snow. Teller experts considered bullheads to mostly be a nuisance because they are difficult to remove from nets.

“They do [discard them] when they accidentally they catch them, out there [while hooking]. Just leave ‘em out there on top of snow.” –Agnes Noyakuk



Figure 46: Agnes Noyakuk, Teller expert, and Jolene Okleasik, local assistant.

Sculpin Biology:

Teller experts report that bullheads are very abundant and some believe that they are increasing in number. Bullheads are in the Teller area year round. They can get very large in the fall. Teller experts have observed several different types of bullheads distinguished by size, color (of skin and eggs) and shape. In general there are very small bullheads and larger bullheads. Some experts have observed that if you strike a bullhead, with a spear or stick, their skin will change color. It was not clear if all bullheads have this ability, or if it is a certain species. The greenish colored bullheads are the most common bullhead in the Teller area. Bullheads have large, orange livers.

Bullheads are thought to spawn after February because at that time they still have eggs when hooked. They are considered to be bottom feeders, a very boney fish, and to have potentially dangerous “horns” on their heads. These horns are retractable and contain a poison that will make a person very sore if poked.

“...if you look at ‘em, but their horns on them are kinda of like a cat’s claw. They can retract, or, you know, the exact same thing like a cat’s claw. They’re clear, an’ they’re boney. They do have little bit of poison when you do get ‘em. They’re strong enough to go through a rubber boot. So, they’re to be handled gently. ‘Cause, you know, you’ll fester up when you get horned by one, an’ it hurts for a few days.” –Joe Garnie

Sculpin Harvest:

Bullheads are most commonly caught in salmon and whitefish nets in Tuksuk Channel and the Imuruk Basin. They can also be harvested by hooking through the ice and by rod and reel. As noted, bullheads are in the Teller area year round, but experts explained that they are most abundant in the first week after the ice breaks-up. Bullheads start to get caught in salmon nets around the second week of June, and fewer of them seem to be around later in the summer. The smaller type of bullhead is most abundant in the winter, around October and November, when people are fishing for other fish with nets under the ice. As noted, bullheads are rarely targeted, though one Teller expert with a dog team will target them with salmon nets if he is in need of dog food.

“I don’t fish for ‘em. We catch ‘em in a net once in a while. An’ they’re just bothersome fish when you’re fishing for salmon. They just get all tangled up...” –John Okleasik

“Yep, lotta bullheads, tryna fish for salmon, in a salmon net. When first set ‘em, an’ clean up, clean out the bullheads around your net after a while. I just toss ‘em away, though. But when I was young, I think my mother an’ some of the elderly people used to eat the bullhead. But I never got no desire. They don’t look very edible.” –Delbert Okbaak

Sculpin Processing:

Despite their abundance, many Teller residents are not interested in eating bullheads because of their appearance, boney bodies and horns. Some residents do save them for both dog food and crab bait, however. The contemporary methods of preparing bullheads primarily revolve around freshly caught fish: filleting and frying and boiling (including the liver and eggs). Experts noted that you must remove the skin of the bullhead before eating the meat (but after cooking it). Bullheads can also be dried or frozen for *quaq* (the whole fish, with the eggs). Some of the Teller experts believe that people are primarily put off by the way the fish looks, and therefore do not want to try eating it. But for those who have tasted the fish, most agree that it is quite good.

“Bullheads - I get a lot of ‘em. I get ‘em in the spring of the year. Very beginning of salmon season, for some reason, they’re in the bay pretty heavy, then they kinda thin out for the summer. But I use a lot of ‘em for dog food, an’ actually we eat some an’. I haven’t done it in a long while, but we used to dry a lot of bullhead. I haven’t done that in a while. Course I got a lot of dogs, so all the bullheads go to dog food. ...[To prepare them] I remove the head, but it’s

amazing how much flesh there is from here to the very tail. We fillet 'em an' fry 'em, or fillet 'em, or just cut 'em in sections an' boil 'em. The liver is excellent. Skeins of eggs are excellent. The whole thing is edible except outside of the head.” –Joe Garnie

“Very nutritious fish. It’s an excellent eating fish. ...It is excellent fried. The texture is unbelievable. It’s almost as firm as like a tender steak. Very firm fish. Excellent flavored. They’re just a little darker than a cod. They’re gray, but leaning toward white meat - gray, kinda grayish.” –Joe Garnie

Flounder:

Flounder are not frequently targeted by Teller residents today, except by one resident who uses them to feed a large dog team. Experts indicated that many consider them to be a nuisance because they frequently become tangled in salmon nets. Some of the flounder caught in salmon nets are retained for human consumption, others for dog food, but the majority are thrown back.

Flounder Biology:

Teller experts recognize two distinct types of flounder; the starry or rough flounder and the smooth flounder. Starry flounder have little “spikes” on their skin and if you are poked by them it will sting. Flounder travel in groups of 30-40 fish and are in the area all year long. Flounder become thicker during the fall (as daylight hours begin to decrease) and are skinnier in the spring. Teller experts have reported that the population of flounders is stable and that the fish are also healthy. A flounder that is approximately 12 inches long is considered by Teller experts to be a large flounder that is worth retaining.

“Yeah, rough skin on them. So, they always get real good, like in September, end of August, in Tuksuk. I like to eat their eggs.” –Agnes Noyakuk

Teller experts explained that starry flounder spawn near Jones Point in the southern part of Port Clarence near the end of May or early June. There is a low, sandy island here where seals haul out and where there are a lot of water grasses. Smooth flounder spawn in Brevig Lagoon around March and April. Starry flounder are also known to overwinter in the vicinity of Ptarmigan Point.

Flounder Harvest:

Flounders can be harvested in salmon nets, by spearing and by hooking. Teller experts related that everyone could go flounder spearing, but that women and children most frequently speared. Spearing was done for smooth flounders through holes or cracks in the ice during the winter and until the ice would break-up in the spring. Spearing for starry flounder was done primarily from January to March. To spear for flounder, the fisher must be located over shallow water so that the spear can reach the bottom, and there must be calm weather so that the surface of the water is still and the fisher can see the bottom. A three-pronged spear is used. Many spears were made with three nails as prongs, but other pieces of metal or ivory are also used. Teller experts indicated that it is best to have barbs on the prongs, because they hold the fish better. It is also recommended to have a small flounder-shaped lure and to jiggle it around to attract flounder. A wind block would be created if the weather required one. Fishers could stand or lay on a reindeer skin, depending on the length of their spear and the depth of the water. Teller residents can spear

flounder anywhere in the vicinity of the village on both the Port Clarence and Grantley Harbor sides. Spearing was practiced much more in the past than in recent times.



Figure 47: A variety of fish hooks displayed in a Teller home.

Fishers prefer starry flounder, especially in the fall when they are thicker. The starry flounder are caught in salmon nets during salmon fishing season in front of the village or in the Tuksuk Channel area. Some have also been caught near Jones Point. Most fishers only retain the larger flounders and throw the smaller ones back. One expert noted that the smaller ones usually swim away unharmed. Starry flounder can also be caught on hooks through the ice in the spring in Grantley Harbor in front of Teller and behind the village in Port Clarence.

“I don’t hardly see a whole lot of people fishing flounder for eating, myself. I get people asking me for flounders, occasionally, but there’s less activity as far as - all the way around - as far as fishing goes.” –Joe Garnie

Flounder Processing:

Teller experts described preparing freshly caught flounder by boiling them (including the eggs), filleting and frying them, frying them with the eggs still inside (considered a delicacy), and grilling them. Flounder eggs are also enjoyed fresh and raw. Flounder can be frozen to eat *quaq*, including the eggs, or frozen to boil later. Some Teller experts had dried flounder by cutting the heads off and then hanging them to dry. The skin must be removed before eating a flounder and is easily removed when the fish are heated.

“Flounders, in a past, we used to dry ‘em, but we don’t dry ‘em anymore, but we still boil ‘em. Or have quaq. ...They don’t dry ‘em anymore. Once in a great while we’ll see some hanging. An’ they hang ‘em only in the springtime.” –Norman Menadelook

Trout:

Residents of all five participating communities were asked specifically about Dolly Varden trout in both the harvest surveys and interviews. Some individuals did not differentiate between different species of trout, however, and the information below should be viewed in that light; it may refer to multiple species of trout.

Trout Biology:

Most Teller experts say that trout populations have basically remained stable, but that they do fluctuate from year to year. One expert believes that the population has been increasing over the past 8 or so years, and one noted that the trout population during the 2011 season was unusually low. Trout are the first fish to arrive in the Teller area in the spring after break-up. At this time they are moving past Teller toward the Agiapuk, Kuzitrin and Pilgrim Rivers, and other rivers and creeks in the Imuruk Basin. One Teller expert has observed that trout are getting larger (both longer and wider in girth) and that some are even “salmon sized.”

“They’re the first fish that seem to come, that migrate. So, trout would be the first before the salmon. End of June, beginning of July, seem like right after the ice goes out.” –Wesley Okbaok

Trout Harvest:

Teller fishers harvest trout primarily in salmon nets in open water during salmon season and under the ice during the winter. They can also be harvested with a rod and reel and have been harvested with traps in the past. Trout can be harvested in Port Clarence after the ice breaks-up. They can also be harvested along the spit in front of the village, along Tuksuk Channel and in rivers and creeks in Imuruk Basin. Teller experts are also familiar with trout in California Creek, on the Brevig Mission side of Port Clarence. There is a second run of trout in the fall, which was harvested by Mary’s Igloo (on the Kuzitrin River) residents in the past and by some Teller residents today.

Thomas: *“He wouldn’t show me where, ‘cause he said, ‘Too dangerous for you.’ Say it’s a snow hole in there, upriver...”* Interviewer: *“But he would use a trap?”* Thomas: *“... Yeah, fish trap. ... They were plentiful in Pilgrim River, somewhere, close to Pilgrim Hot Springs.” –Thomas Ablowaluk*

“Yeah, they used to, in fall time, people always get real big trout, up there where our village was [Mary’s Igloo on the Kuzitrin River], end of September and first week of October, where we were, where our house used to be. An’ they set their net out, an’ they get big trout.” –Agnes Noyakuk

Trout Processing:

Teller residents prepare freshly caught trout by boiling, baking or filleting and frying them. The can also be frozen and eaten *quaq*, smoked, cut into strips and frozen, dried or half-dried and aged through the freeze-thaw process. Many Teller experts agreed that trout are generally too fatty and greasy for drying. When aged through the freeze-thaw process, trout get a mildly fermented taste which many experts say they prefer. Trout are generally only dried when harvested in the spring. Teller experts enjoy trout baked with slices of bacon and diced onion, and also with pancakes for breakfast.

“Dolly Varden, yeah, I target them. An’ I wanna get as many as I could in the spring when they’re running. An’ those, I put up for freezing. We smoke some. I’ll smoke a bunch of ‘em. They’re not a bad dried fish, but excellent filleted an’ fried, boiled, you could do anything with ‘em.” –Joe Garnie



Figure 48: Nets stored on the beach in Teller.

Herring:

As with many other non-salmon species, herring is not harvested as intensively for subsistence today as they were in the past by Teller residents. Teller experts have concerns about the seals that have been staying in the area later in the year and their potential consumption of herring. Additionally, pike are known to eat herring and the pike population in the area is thought to be very healthy. Herring are still widely used as dog food, as they were in the past.

Interviewer: *“Do you think herring is still an important fish for Teller people today?” Wesley: “Maybe for certain people. And I know a lot of it was for dog food. An’ my uncle an’ my cousin said they would have a spot near the Tuksuk where they would set their herring net, an’ when they get to ‘em their net would be sunk, because every hole on the net would be filled with herring. An’, you know, they’d go to that same spot every year.” –Wesley Okbaok*

Herring Biology:

Teller experts report that herring populations have remained consistent and that they are abundant in the area. Experts also report that herring they harvest are healthy. In the fall time, herring move up into Imuruk Basin through Tuksuk Channel. Experts have observed that this migration is “noisy”, with a lot of splashing. Once in the Basin, herring over-winter around Windy Cove and in other areas. Herring spawn in the Basin around May, and then head back out of the Basin, through Tuksuk Channel.

“Yeah, they were very healthy. They had no disease on ‘em.” –Norman Menadelook

Herring Harvest:

Herring are primarily harvested with herring nets. Herring nets can be set or used to seine. Nets can be set in open water or under the ice. Herring are also caught in whitefish nets. Herring harvest locations include anywhere in Imuruk Basin, at Ptarmigan Point, along Tuksuk Channel, in front of the village and in Port Clarence. Teller experts have observed that in the fall time herring are arriving earlier than in the past.

Interviewer: *“If you wanted to set a net for herring some place other than right in front of town, what would be a good place to go?”* Marvin: *“I wouldn’t even know. I just know we always get ‘em right out here. Yeah, right out here is good.”* –Marvin Okleasik

Herring Processing:

Teller residents dry, freeze and age herring, in addition to preparing them when freshly caught. When fresh, herring are fried, roasted, pickled and salted and herring eggs are eaten raw. Herring are also allowed to naturally freeze and undergo the freeze-thaw cycle before being eaten *quaq*. Herring are still aged in grass-lined depressions in the ground, covered with grass and earth. Above-ground plywood boxes are also used for herring fermentation, as are gunny sacks. Herring were also dried in the past; harvesters strung them on willow branches, 15-20 fish per branch, and hung the branches with fish to dry.

Interviewer: *“And so do you try and ferment half the herring you get? All the herring?”* Joe: *“Usually all of them, ‘cause it’s that time of year. ...Our fish pits an’ fish containers are huge an’ we don’t have walk-in freezers or anything, so it’s a perfect way to store up dog food.”*
Interviewer: *“And you do that the same way you explained before with the grass lined pits?”*
Joe: *“The same [as] with whitefish, yes. An’ there again, if it’s late enough, we use above ground containers, also. Above ground, that’s fine, just some retainer walls.”* –Joe Garnie

Burbot:

(As was noted earlier in this report, in the harvest survey results section, the majority of local experts and others often use the term “lingcod” to refer to what western scientists call “burbot.” However, a few local experts and others, use the same nomenclature as western scientists. This fact of nomenclature was discovered during the ethnographic field research. The reader will note that a number of quotes below may use the term “lingcod”. All uses of the term “lingcod” in these ethnographic sections refer to what western scientists call “burbot.” For the sake of clarity, given that this report will have a broad audience, this section will be titled “burbot” and all references in the author’s voice will use the term “burbot.” This is simply done for clarity; neither nomenclature is considered to be more correct than the other. It should also be noted that there was a much less common occurrence in which a few ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

Teller experts recalled that when people lived “upriver”, at villages such as Mary’s Igloo and *Qawiaraq* (Kawerak), people fished for burbot frequently. Some experts also told a story of a legendary huge burbot that lived in the vicinity of *Qawiaraq*. The entire community combined

their nets together to seine and caught this huge fish. The burbot was so large that it stuck out of a boat on both ends. Today, Teller residents infrequently fish for burbot.

“Yeah, we get them. We get them actually quite a bit in our whitefish nets, in the same season. Then we also specifically targeted them with our pike nets in the river. They are top shelf as far as eating goes....[People aren’t] targeting them anymore.” –Joe Garnie

Burbot Biology:

Teller experts could not comment on the abundance of burbot. Teller residents are most familiar with burbot in the upper Imuruk Basin and Kuzitrin River area and say that they stay in that area year round. They are freshwater fish, so are not found in the waters closest to Teller. Burbot typically bite at night, have large livers, and are known to eat whitefish. People have harvested burbot that have whitefish tails sticking out of their mouths. When harvested through the ice with hooks in the winter they have eggs.

“...we just boat around, look for ‘em. They’re - seem like they were kinda brave fish, or not very bright. An’ just boat right up to them an’ they wouldn’t really move until you really disturbed ‘em.” –Delbert Okbaok



Figure 49: Clearing out a partially re-frozen fishing hole in Grantley Harbor.

Burbot Harvest:

When specifically targeting burbot, Teller fishers use pike nets, or hooks, and occasionally spears. In the past, traps were also used. Burbot can also be caught in whitefish nets. As noted, burbot are freshwater fish and are not found in the immediate vicinity of Teller and experts are most familiar with harvest locations in the rivers of Imuruk Basin, particularly the Kuzitrin River. Burbot have also been occasionally harvested in nets at *Kugsruktauraq* in the spring (during high water after break-up).

To hook burbot, fishers would often set up a “trap line” of holes in the ice. The hook and line would be attached to a stick of some kind and buried in the snow or ice. Baited hooks would then

be put into the holes and left overnight. Teller experts indicated that burbot like pike tails when used as bait. Hooking has been done at the confluence of the Kuzitrin and Pilgrim Rivers. Some experts have speared burbot, also. In order to spear burbot, the weather must be very calm so that you can see the bottom. Experts had done this on the Agiapuk River and near Mary's Mountain (on the Kuzitrin River, near Mary's Igloo).

"Yeah, you can even go fishing for them where you're fishing for pike. Night time, though. Put a piece of a pike tail with a stiff wire - just wrap it with a string and just drop it over the side into your fish hole. And then check on it later on, or in the morning, you'll have a lingcod. And the young lingcod, they also catch them at Agiapuk River." –Norman Menadelook

In the past, Mary's Igloo and Teller residents used traps to harvest burbot. Traps used in the more recent past were constructed of chicken wire and wood. The traps were box-shaped and had doors and a funnel. Burbot would enter through the funnel, but not be able to escape. Willow branches were also used to block off the river so that fish would be directed towards the trap. One trap could harvest 20-30 burbot at a time. The trap would be set under the ice, as would the willow branches.

"I remember following my uncle up in the Agiapuk...seem like he go up here just to get lingcods, and he would spear them. He would use a bucket handle and make it long enough, and pound it with a hammer until it gets sharp enough, and then tie it to the spear. And they'd have to be pretty long, like 12 foot, 14 foot poles. And then the lingcod would kinda congregate like halibut. They'd all have their heads together and you could see them. And you just spear them and hold them until they're done moving and then pull them up." –Wesley Okbaok

Burbot Processing:

Teller experts consider burbot to be a very good fish. Freshly caught burbot are often boiled, baked and fried. The livers of burbot are considered to be especially good (boiled or roasted), as are roasted tails, and cleaned and boiled stomachs. Frozen burbot that is slightly aged (through freeze-thaw action) is often baked. Burbot can also be used for *agutuk*, or Eskimo ice cream. One Teller expert recalled creatively using the "whiskers" and lower jaw of a burbot as a toy airplane when he was a little boy.

"I had that lower jaw, where this little whisker goes, an' I always had a little airplane. Kinda look like wings an' a tail, real short. An' I'm sittin' there for hours going (makes airplane sound). Oh! Great big airplane (laughs), lower jaw. An' they got teeth on 'em; they're funny feeling teeth." –Thomas Ablowaluk

"They're good eating. They have a great big liver. Roe an' eggs...an' it's good meat." –John Okleasik

"Plain boiled one was the main dish of 'em. An' then as they got older, as the fish aged a little, an' then they would bake the tail ends of 'em. ...if you had 'em in abundance an' they happen to be ageing just from the weather, gettin' slightly freeze-dried. Then they became more firm, an' what have you, an' they're really excellent for baking then, popped away from the bone, nice an' firm." –Joe Garnie

Halibut:

Teller residents do not harvest halibut, though experts indicated that if they were available, people would be interested in harvesting them for subsistence. Though no harvest of halibut was documented through the harvest surveys completed for this project (or in the Ahmasuk et al. 2008 survey of the 2005-2006 season), some residents reported occasionally getting a halibut in their salmon nets. They have also been seen, though not necessarily harvested, in locations such as Grantley Harbor, Tuksuk Channel, the point in front of Teller, and under the cliffs near Teller.

“... we used to walk, at springtime, to the cliffs to get seagull eggs. One time Rose an’ I were on top of the cliffs, an’ we saw three or four big halibut, congregating, or they were all together. An’ they were obviously too big for flounders, so they had to be halibut. When I was real young, Morris Kugzruk, he had set - normally people don’t usually set their net on the other side of the Point, this side of Teller - an’ he had set his salmon net there. An’ he accidentally caught a halibut in there, so. An’ that was like the early [19]80s.” –Wesley Okbaok



Figure 50: Non-salmon fishing gear from Teller.

Grayling:

Teller experts explained that fishing for grayling today is more “recreational” than a serious subsistence activity. By this, they mean that some people will just bring a rod and reel and potentially catch a grayling, but are not putting significant effort in to the harvest. The harvest itself is sometimes retained and consumed as a subsistence food. Teller residents today do not frequently target grayling as part of their fishing activities. Grayling can be harvested with a rod and reel or in salmon or whitefish nets, primarily in the fall.

Grayling are known as fish which stay in the region year round. Like other freshwater fish, though, they are primarily found in the waters of rivers and creeks that feed into Imuruk Basin (such as Agiapuk, Pilgrim and Kuzitrin Rivers, among others), and not in close proximity to the

village of Teller. Grayling with small rodents (possibly voles) in their stomachs have been harvested by Teller residents. Grayling are dried (filleted and cut in the same fashion as salmon) or frozen and eaten *quaq*, or frozen and boiled at a later date.

“I’ve caught a couple. I wasn’t really trying to fish for ‘em. They just happen to be there. I let ‘em go. We didn’t really have use for ‘em. ...I wasn’t really fishing for grayling anyway.”
 –Delbert Okbaok

“Grayling is a funny fish. I cut open - you’ve asked me several times if I cut open a fish. This one fish I cut open. I felt ill all week; dead mouse in its belly. A grayling! Swallowing a great big old mouse! (Laughs) ... ‘Ahhh, I don’t feel too healthy unc. I’m not gonna eat no more frozen grayling!’ Ever since then I wasn’t too interested.” –Thomas Ablowaluk

Sheefish:

It is rare to see sheefish in the Teller area, but they are seen more often now than in the past. Teller residents have and do buy or trade for sheefish with Kotzebue area residents (where sheefish are common). Sheefish have been harvested in salmon nets, during salmon fishing season, in Grantley Harbor, Tuksuk Channel, and the Imuruk Basin. Teller residents boil sheefish and eat them *quaq*, with seal oil.

“I’d love to see more sheefish here. But...they’re not so good as I’m gonna go out of my way to pay that much freight on ‘em from somewhere, when I can get all kinds of fish here.” –Joe Garnie

Norman: *“But at Diomedede we used to make jacks out of sheefish bones.”* Interviewer: *“Like out of the vertebra?”* ...Norman: *“Yeah, because jacks were real hard to come by in those days. If you break ‘em, they don’t come back.”* –Norman Menadelook

Capelin:

Teller experts and village residents were not very familiar with capelin. People noted that they had either not seen capelin very often or that they had seen them but were not sure what they were, at the time. Capelin are known to travel in schools and to spawn along the shoreline and have been observed near Brevig Mission and near *Nook*.

Blackfish:

No information about blackfish in the Teller area was documented with local experts.

Table 20 shows the Iñupiaq names for non-salmon fish provided by Teller experts, as well as examples of other words and phrases related to non-salmon fish or fishing.

Table 20. Teller Iñupiaq words for non-salmon fish and fishing-related terms.

Common English name/phrase	Other name	Iñupiaq name
tomcod	-	ig̃aḷuaq
large tomcod	-	ig̃aḷuaqpak
sculpin	bullhead, devil fish, “lazy one,	ig̃g̃iaq

	one that does not move or waits in ambush” (loose translation from Iñupiaq)	kanayuunaq
smelt	“sweet smelling fish” (loose translation from Iñupiaq)	iłhuagniġ
flounder	-	nataaġnaq
burbot / lingcod	-	kanayunaq kanayutnaq
pike	-	chiulik siulik
grayling	-	asaamiut
capelin	cigar fish	-
Arctic Cisco (regular size)	whitefish	sigliqtaq
Arctic Cisco (smaller size)	whitefish	puqliqtaq
round eye whitefish	small, lean whitefish	tipuk
short nose whitefish	-	tipuk kauguunat
humpback whitefish	-	tipuk
broad whitefish	brown colored whitefish	kuuqunaq kauguunaq
Salt Lake whitefish	-	-
Kawerak: abandoned village on the Kuzitrin River	“place with a gravel bar” (translation from Iñupiaq); Kauwerak (alternate spelling)	qawiaraq
Agiapuk	river that flows into Imuruk Basin	aguipak ayupaq
camping place on Tuksuk Channel	-	kugsruktauraq
ice pick used to make fishing holes	-	tuuq
Tuksuk	Tuksuk Channel: channel between Grantley Harbor and Imuruk Basin	tuqshuk tuqsuk tuqsruq
Imuruk	Imuruk Basin	imaġruk
fish eggs	-	suak
I am going fishing	-	manaġiaġataqtuġa
God or higher power	-	aġaayun
shaman	-	aġatkuq
Eskimo ice cream	-	agutuk
Eskimo ice cream with berries	-	kammak
fish liver and berry mixture	-	tiġulik tiġuqaq
half-dried fish	-	animaaq
whitefish broth	-	immakak
dialect of Iñupiaq spoken by		qawiaragmuit

people from the area around the now abandoned village of Kauwerak		
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Stebbins

In household harvest surveys, Stebbins residents reported that herring, cod (tomcod, saffron cod, and blue cod) and whitefish were the non-salmon species harvested in the highest numbers during the 2009-2010 harvest season (Figure 15). For that same period, over 35% of Stebbins households surveyed said they did not get enough non-salmon fish to meet their needs (Table 21). Map 5 (map pocket) is a map of the Stebbins area, including locations where Stebbins residents harvest various non-salmon fish species, and other locations associated with non-salmon fish. Non-salmon fish continue to be important subsistence resources for Stebbins residents today, as well as culturally preferred foods.

Table 21. Percentage of surveyed households in Stebbins that reported having enough non-salmon fish to meet their needs during the 2009-2010 survey period (82.1% of households surveyed).

Did your household get enough non-salmon for your needs?			
Yes		No	
Count	Percent	Count	Percent
59	64.1%	33	35.9%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

“Yeah, those kind, too. Yeah, good eating, really good. Like tomcods, an’ seal oil. ...Even those blackfish. I REALLY WANT SOME RIGHT NOW! (Laughs)” –Gertrude Pete

“Yeah, it’s really important. If you don’t hunt, if you got no money, you dun’no what to do. You can eat nothing. If you know how to hunt and fish, you’re alright. You can live. You can survive. If you dun’no how, you dun’no nothing.” –Francis Rivers, Sr.

Herring:

Stebbins experts explained that herring were an extremely important fish in the past and were harvested in very large amounts. Herring are not harvested in the same quantity today, but are still considered to be a very important fish. Herring and herring roe on kelp are harvested by Stebbins fishers. Many of the herring harvested by Stebbins residents are braided and dried, as described below. It is the task, primarily of women and girls, to both collect and dry the grass and to braid the herring. One Stebbins resident explained that a bright white bone from the head of herring was saved in the past and sewn to women’s dance gloves as decoration. Herring were a common dog food in the past and are still used today. Stebbins residents also use herring for crab bait.

“Herring was the main fish that they fished when she was growing up. ...It happens to this day. We still fish the herring.” –Julie Henry translating for Daisy Pete

Herring Biology:

Herring abundance varies from year to year, but local experts report that the herring population has basically remained stable and abundant over the course of their lifetimes. Experts have not observed any health problems in the herring they harvest. Herring eat sticklebacks and other small fish and experts have also found small pebbles in their stomachs. During the winter herring may be found dead at cracks in the ice because they came too close to the surface and their gills froze.



Figure 51: Sylvester Snowball, Stebbins expert, drying fish.
Photo courtesy of Rosemary Snowball.

“I still see herrings just about every year, in big numbers. They haven’t gone away yet.”
–Andrew Foxie, Sr.

Herring do not stay in the Stebbins region year round, though some experts say they can be occasionally caught in the fall, too. They arrive in the area approximately one week after break-up, after waiting for proper water temperatures that will allow for spawning and for their eggs to mature. Some Stebbins experts have observed that, because of variability in spring water temperatures (and air temperatures), break-up and the arrival of herring occur about three weeks earlier than in the past. Other experts have not observed this change in timing or do not think it has been consistent. Stebbins experts say that during years with a “bad” break-up, they catch less herring. A bad break-up is considered to be one where the ice just sits in place and melts, as opposed to floating away.

“Right after the ice break-up, maybe inside three, four days later, they come up. Yeah. Springtime it’s always calm every day. That’s when they come up.” –Leonard Raymond, Sr.

Stebbins experts explained that herring typically spawn in June in rocky areas and on kelp, where it is available. Major spawning areas include around Stuart Island, the beach north of Stebbins and Egg Island. Experts identified two runs of herring in June and July (approximately, depending on ice conditions and water temperatures). The first usually consists of fat fish, which are harder to dry, and the second run consists of leaner fish.

Herring Harvest:

Herring are harvested with herring nets. One net may be shared between two or more families. Stebbins experts say that herring are so abundant that often one set of a herring net will catch all the herring a family will need. One expert described the materials needed, such as animal sinews, to construct nets in the past, including herring nets.

“They used to make their own nets, long ago. An’ they, long ago, before the stores up here, they use sinew. You know animal sinews? They dry ‘em up, an’ they twist ‘em, an’ braid ‘em. LOTS, just like...from whale, reindeer. You know, bigger animals.” –Francis Rivers, Sr.



Figure 52: Salmon, herring, and tomcod drying on a rack in Stebbins.

In the past, when people had large dog teams to feed, they would check cracks in the ice for dead herring and harvest them for dog feed. During low tide herring also sometimes get trapped in the rocks in little ponds of water in the intertidal zone north of Stebbins and on Stuart Island. Fishers can harvest these trapped herring by hand. As noted, herring roe are also harvested. Experts say the best time to harvest kelp with herring eggs is at low tide, when it is more easily accessible. Kelp can also be harvested from boats with rakes.

“I’ve seen some people, after the herring spawn, go back there at Stebbins or down Stuart Island where the herring spawn. An’ there’s some herrings around there, in between the boulders, some are trapped. An’ people pick from there.” –Andrew Foxie, Sr.

While herring can be harvested along the entire coast north and south of Stebbins, they are known to often congregate around the mouth of the Stuart Island River. Other frequently used harvest locations include near the lighthouse, in front of the bluff, in front of the village, all around Stuart Island, and at Rock Point.

Herring Processing:

Stebbins fishers prepare herring in a variety of ways. Fresh herring are fried, salted (gutted, but with eggs still inside), frozen or dried. Herring eggs can be eaten fresh, boiled or frozen. Frozen herring are often eaten with seal oil and salt. Herring can also be aged and then frozen, with the eggs inside. Experts noted that people do not dry as much herring as in the past, and that many people just freeze them today.



Figure 53: Braided herring drying on a rack in Stebbins.

Herring can be dried on racks or on plywood after being cleaned. They are also frequently braided onto strings of grass (or sometimes cotton or nylon string); approximately fifty herring are typically braided to a string. Herring can be dried with the eggs still inside or after eggs have been removed. Dried herring, taken off of their grass braid, were formerly stored in seal pokes with seal oil, but today are stored in buckets with seal oil. Herring roe on kelp can be dried on a rack or plywood and later soaked in fresh water before being consumed. Eggs on kelp can also be frozen and eaten frozen. Half-dried herring are stored and allowed to age; these are called *ninnamayuk*. Aged herring is well-known as an excellent food to take when traveling in cold temperatures; it warms the body and keeps the stomach full.

“It is a back breaking, hard job. I always commend people who braid. Because, you know, it’s always mostly the mothers or the grandmothers that do the braiding ‘cause they get expert at it. When women or young ladies learn how to braid, we’re always like, ‘Wow!’ You know, lots of praise. An’ the women or the young ladies, they’ll feel really proud of themselves. An’ when my niece-in-law learned how to braid, an’ she started helping me, I was like, ‘Wow! Yeah! I got a helper!’ Somebody to help me braid. An’ the people that are the - mostly women - the women or young ladies that don’t know how to braid, they’ll just clean the fish. It is a lot of hard work braiding.” –Becky Atchak

“I’ve always just seen, you know, people drying, and storing them in seal poke, during my time. Nowadays it’s a five gallon plastics [bucket] with seal oil. If you want seal oil, then people use seal oil. Call it uukumiutaq. It’s oiled herring.” –Morris Nashoanak

Tomcod:

Stebbins residents formerly harvested large amounts of tomcod for dog food when dog teams were still used for transportation.

“My dad had dog teams, an’ a lot of the men in the villages had alung, like a big dog pots. They would make fire outside an’ then make their dog foods. Cook ‘em outside an’ they would feed their dogs tomcods.” –Becky Atchak

Some residents play or have played a game with bones from the head of tomcod, shaped like anchors or hooks. As in the other communities that play this game, opponents would hook their bones together and pull. The person holding the bone that did not break was the winner. The game is called *aksuk* in Yup’ik. Tomcod hooking is considered to be a fun activity by many Stebbins residents.

Tomcod Biology:

Stebbins experts report that tomcod are abundant in the region. Some residents have harvested tomcod with black lesions on their skin over the past two to three years. More recently, fishers have harvested tomcod where the lesion seems to have extended into the meat of the fish. Residents do not know what is causing these lesions, but are concerned about them. Any tomcod with a lesion is not kept or is retained only for dog food. Fish with these lesions are caught occasionally, not regularly, and no other health problems with tomcod were reported.

“One thing about tomcods, though, I wanna tell you that recently there’s some black lesions on the tomcods. And - it’s not only caught in this area, they’re caught in the Canal [River], too. Black spots. ...Quarter size [lesions] or more. ...First notice that back then, several years ago. My cousin caught one tomcod that had black spots on it. That’s abnormal. ...if there’s any deformities or any unusual tomcods, that sort of brings some sort of questions on people. What’s going on with this? Or what’s causing that? Course you know, people are consuming that, for eating.” –Morris Nashoanak

Stebbins experts explained that tomcod are in the region all year. Tomcod also sometimes get pushed by high water up into lakes and ponds where they can be trapped, not able to return to a river or the ocean. Tomcod will eat “just about anything”, including sticklebacks. They have

eggs in the fall time and head up rivers, including Canal River, around December to spawn. After tomcod have spawned their meat becomes thin and less desirable.

“Freeze-up, when the freeze-up comes - middle part of October [for hooking]. An’ fishing season, the under-ice season, would be November, all the way through December, January. An’ in January, that’s when the tomcods spawn out. My mother would tell me like this, ‘If you see a half moon, first week of January - that’s when they’re spawned out.’” –George Washington, Sr.

One Stebbins expert noted that tomcod have some kind of phosphorescent substance on their skin and recalled that when she was a young girl, boys would rub this phosphorescence on their own faces and then chase the girls in the dark while glowing. Another expert noted that you can sometimes see tomcod glowing in the dark when they are hanging on racks.

Tomcod Harvest:

Stebbins experts say that the best time to harvest tomcod is right before and during ice fishing season, approximately August through December, before the fish spawn. Today tomcod are usually harvested through the ice by hooking, but they can also be harvested with nets under the ice or by seining in open water, and traps have been used in front of the village the past. When hooking, three-pronged metal hooks or ivory hooks are used. During open water season, long bamboo sticks with a line and hook are used to fish for tomcod from the shore. Some fishers think that ivory hooks are better and that the fish are more attracted to them. Lures are often added to either kind of hook; beads or orange foam earplugs are said to work well. Some fishers use smelt, or seal meat as bait. Seining was primarily used in the past to harvest large amounts of tomcod for dog food. Stebbins fishers most frequently harvest tomcod in front of the village or in Canal River, hooking through the ice, or in nets under the ice. Some also travel to Píkmíktalik River to hook through the ice. Experts noted that tomcod can be found just about anywhere in the region, but the biggest and best tomcod come from Canal River.

“We’d just have a blast, you know. I just really - we’d have so much fun sometimes, catching all those tomcods. ...they’re nice an’ big an’ juicy looking.” –Becky Atchak

“After freeze-up, yeah, people would make some holes on the ice, I volunteer my auger. I make several holes around side of the Sourdough where people would come down, you know, fish for the family. It’s usually done after freeze-up, an’ for potlatch. People comin’ in from Kotlik. So people visiting would have some free time to go out and try their luck, jigging for tomcods.”
–Morris Nashoanák

Tomcod Processing:

Tomcod are eaten and preserved in a variety of ways by Stebbins residents. Freshly caught tomcod can be boiled (including the eggs), fried, frozen or dried. Tomcod for use in *akutaq* is boiled, the moisture is removed, and then the meat is flaked and added to the rest of the mixture. Tomcod livers can also be cooked and mixed with blackberries for a special *akutaq* dish. Frozen tomcod is either eaten with seal oil or defrosted and cooked. Eggs are sometimes separated from the fish and frozen separately. To dry tomcod, they will be braided onto grass or manufactured string to hang. Tomcod are braided and dried in the summer and winter. In the winter, the eggs are left inside the fish to dry. Dried tomcod can be stored in seal oil (in plastic buckets today, and

in seal pokes in the past). Winter harvested and freeze-dried tomcod will age slightly through the freeze-thaw process caused by varying air temperatures. Some people will also age tomcod for winter use by storing them in gunny sacks, 55 gallon drums (gutted) or pans. The bones of tomcod are said to be very “juicy” and some people eat them along with the rest of the fish.



Figure 54: Tomcod braided on grass to dry, Stebbins.

“Yeah, they’re both the same, females for the eggs an’ the male for the liver. You get whole bunch of ‘em an’ cook ‘em in a pot, an’ separate the liver. ...that’s where you can take the liver out an’ just put ‘em in hot water. Cook ‘em in hot water. Just get it to boiling or just cook ‘em in water. An’ use that for spread, bread spread, or mix with preferably blackberries [crowberries].” –Fred Pete, Sr.

“Tomcod, we harvest. They come too, with the herring. An’ they’re pretty big. An’ we dry ‘em up. I dry ‘em up, or I can half-dry ‘em an’ oven bake. ...Or you could half-dry - put ‘em in seal oil. Or when they’re dried up too, put ‘em in a bucket in seal oil, an’ store ‘em away.” –Marian Mike

Whitefish:

Stebbins experts are familiar with several different types of whitefish, though they do not always distinguish between species. Some Stebbins experts and fishers also consider sheefish to be a kind of whitefish. One Stebbins expert learned from her mother that if someone is sick (any kind

of sick), they should not eat whitefish because it will make them worse. Stebbins residents often bring a whitefish net with them when going out to pick berries. They will set their net, pick berries, and then check their nets at the end of the day.

“Yeah, right in here, about the headwaters of the slough. ...Yeah, that’s where I had gone in, to go up in these high points, to check for salmonberries. But I also had a little [whitefish] net that I took along.” –Fred Pete, Sr.

Whitefish Biology:

Whitefish populations have stayed stable and the fish are healthy, according to experts. Some whitefish can grow to three feet in length. In the fall time, whitefish are generally fatter and their meat is firmer. One expert described how he was taught to observe local grasses to determine the best time to harvest whitefish. When the “head” of this grass becomes fat and heavy and is bending over, the whitefish are also getting fat and are in prime condition for harvesting. Whitefish species vary in their movements around the region; experts noted that some are in the region all year, and some seem to leave. Arctic Ciscos are in the immediate vicinity of Stebbins when herring arrive. Stebbins experts have observed that whitefish eat sticklebacks and various water bugs, will eat fish guts that are thrown into the water, and that they spawn up in the rivers and sloughs of the region.



Figure 55: Setting a whitefish net in the Stebbins area.

“Most of the time it’s only needlefish [sticklebacks] that they’re eating, you know, that’s most. ‘Cause you see most of the time when you open the stomachs.” –Morris Coffey

Whitefish Harvest:

In addition to observing local grasses (see above) to determine harvest times, another Stebbins expert was taught by his elders that the best time to start fishing for whitefish is when the salmonberries are ripe. Whitefish should be fat and ready for harvest at this time. In the past, whitefish were harvested with traps, but this is no longer practiced. Stebbins fishers harvest whitefish with whitefish nets, by hooking, snagging, and with a rod and reel. They are

occasionally caught in salmon nets during salmon season, and also occasionally hooked through the ice in winter. While it is no longer practiced, some people formerly set nets in shallow creeks and “herded” whitefish into the net. Experts say that the best time to harvest them is August through November and that whitefish can be found in most rivers and sloughs along the coast. Stebbins fishers frequently harvest them in the Canal, Pikmiktalik and Kuiak Rivers, *Nanvarnaq* Lake at the head of Canal River and in Stuart Island River.

“I was told - I’ve heard it for many years, that normally the best time to fish for whitefish is after the salmonberries are ripe. So that means, you know, sort of indicator that the whitefish are nice and fat, and the meat’s just right. So, I follow that trend. I have my boys, if they’re going out hunting, take a small fish net out. This time of the year, August all the way up to November, best time.” –Morris Nashoanak



Figure 56: Whitefish harvested near Stebbins.

Whitefish Processing:

Whitefish, prepared in any manner, are said to be very good with local greens. Stebbins residents prepare freshly caught whitefish by boiling, frying, freezing or ageing them. They can be eaten raw, dipped in seal oil and salt and pepper. Some people also clean the stomachs and boil them with the rest of the fish. Intestines can be split, cleaned and dried, and then eaten with seal oil. To freeze whitefish they are usually scaled, gutted and then frozen in a ziplock bag with saltwater. Whitefish are also dried or half-dried, frozen, aged or smoked. Whitefish are cut in a particular way to prevent them from “folding over” on themselves when drying. Dried or fresh, whole whitefish can be stored in a bucket with seal oil; in the past dried whitefish would be stored in pokes or barrels. Stebbins residents aged whitefish in pits in the ground in the past; today they are aged in boxes lined with grass for four or five days, and then frozen. Some people also salt whitefish. For use in *akutak*, whitefish are boiled and then the moisture from the fish is removed and the flesh is flaked into the mixture. Cranberries are typically used in whitefish *akutak*.

“Some of the whitefish, like the black finned fish, you could see right here, these black finned, we get ‘em raw. We can eat ‘em raw. These ones we eat. The reason why we eat them raw is because there’s no aftertaste. With seal oil an’ salt an’ pepper.” –Becky Atchak

“Yeah, we dry ‘em , an’ put ‘em in seal oil. Or you can - when we get them, when I wanna put some away for ready to eat, I just take off the scales, the head an’ gut, an’ then I cut ‘em up an’ put ‘em in ziplock, then put salt [ocean] water. An’ they’re good to go. Just defrost ‘em an’ cook ‘em.” –Marian Mike

Sheefish:

Some Stebbins experts group sheefish together in the same category as whitefish. Sheefish are not harvested by many Stebbins fishers today, but experts believe that their population has stayed stable over their lifetimes. Experts have observed that sheefish became smaller in size for a time, but are getting bigger again now. Most sheefish harvested by Stebbins residents are harvested out of one lake, *Nanvarnaq*, located at the head of the Canal River, and from the Kuiak River. The Canal River and the lake are connected through sloughs and small creeks.

Sheefish are harvested in salmon nets that fishers set in the lake, both in open water and under the ice. They are also caught by rod and reel in the lake. Nets are set in open water in September and are set under the ice after freeze-up, around October. In Canal River, nets are set under the ice. Some sheefish harvesters leave their nets under the ice all winter and check them periodically. Sheefish are eaten fresh and boiled or fried, or boiled and used in *akutaq*. They can also be frozen and then eaten with seal oil. When eating frozen sheefish, the heads are often removed and saved for cooking. Sheefish can also be aged and then frozen.

“Yeah, on day trips, like maybe I’d go - after I set my net, under ice - I’d go out, maybe after couple days an’ check my net. An’ clean my net out, an’ reset it, an’ come back.” –Andrew Foxie, Sr.

“To me, it’s a really big whitefish [in a photo]. (Laughs) Yeah.” –Gertrude Pete

Smelt:

Stebbins experts explained that smelt was a very important fish for many elders, who grew up eating it. People today enjoy smelt and also sometimes use them for bait when tomcod fishing.

“An’ when we hook for tomcods, we use bait with a hook. Like seal meat... Then the other baits we use is those smelts, you know. Tomcods really go for them.” –Andrew Foxie Sr.

Smelt Biology:

Stebbins experts noted that while smelt abundance varies from year to year, overall the population seems to have remained stable over time. Smelt are reported to be healthy, as well. In the spring, smelt are abundant near the mouths of rivers. They can also be found in small lakes and streams. Smelt are known to spawn up Píkmíktalik River around June.

Smelt Harvest:

Stebbins fishers harvest smelt by hooking through the ice with three-pronged hooks, with nets, and with dip nets. Smelt and tomcod are often harvested together, for example from the same ice fishing hole, and are thought to spend time in proximity to each other. Stebbins experts say that the best time to harvest smelt is following the herring run, in May or June.

“Yeah, they get smelts in rivers when they’re hooking for tomcods.” –Morris Coffey

Smelt can be harvested in Pikmiktalik River with a dipnet in July. They can also be hooked through the ice in front of the village and by the bluff near the village (where there is an eddy). Other harvest locations include Canal River, Quyaq Slough and near the lighthouse.



Figure 57: Peter Martin, Sr., local assistant, and Morris Coffey, Stebbins expert.

Smelt Processing:

Experts in Stebbins explained that most people do not put away much smelt, and that they are mostly eaten fresh. When fresh, smelt are baked (whole fish or gutted), fried (whole fish) or frozen (whole fish). Whole smelt are also aged and then frozen. To dry smelt, they are either left whole or are gutted, and then are braided onto grass and hung to dry.

“Just like the herring, they braid the herring. They would braid the smelt, too.” –Julie Henry translating for Daisy Pete

Sculpin:

Stebbins experts noted that local fishers do not specifically target sculpins, which are also called devil fish and bullheads.

Sculpin Biology:

According to local experts, the population of bullheads has decreased over the past approximately five years, particularly the population of larger bullheads. Overall, experts say there are less bullhead and they are smaller in size. Stebbins fishers, like those in other communities, are experienced with bullhead “horns” and being stuck by them when removing bullheads from nets, resulting in soreness where they were stuck.

Stebbins experts recognize two distinct kinds of bullheads; large and small. Bullheads are also different colors to camouflage themselves among rocks (but according to Stebbins experts, they cannot change color). Bullheads are in the region year round, but spend time around the village starting at the same time as herring.

“The bigger ones - some of them they get really big. We don’t see those anymore. An’ we hook them right when the ice is melting. When the ice is rotting over there, they usually come. But for the past, seem like five years, we haven’t caught any. An’ it’s really strange, ‘cause we just love to eat those. So weird. Yeah, an’ we tried and tried last spring, summer, an’ nothing. We didn’t catch any. We caught small ones, but we didn’t catch the bigger ones.” –Becky Atchak

“Ever since my mother used to say, ‘Keep the big ones, an’ throw away [back] the little ones. They can grow, an’ they’ll come to us someday.’” –George Washington, Sr.

Sculpin Harvest:

Bullheads are harvested by hooking through the ice (at the same time as tomcod fishing), or after break-up. They can also be speared and sometimes get caught in herring nets and salmon nets. Some Stebbins fishers use “mouse food” for bait. Mouse food consists of roots that are harvested from burrows out in the tundra. Bullheads can be hooked below the bluff near the village right after the ice goes out. Some people also harvest them near Saint Michael when they visit that community.

Andrew: *“An’ right here, right below the bluff over here, another good spot. An’ I haven’t seen them for how many years now. Maybe pretty much five years, maybe.”* Peter: *“They haven’t really been around that much anymore. Sure, come to think about that. People usually get lots.”*
–Andrew Foxie, Sr. and Peter Martin, Sr.

“They come in different colors. They come in bright orange, an’ aqua color. An’ the taste is delicious. I like ‘em.” –George Washington, Sr.

Sculpin Processing:

Freshly caught bullheads are prepared by Stebbins residents by boiling or freezing. Eggs are also eaten raw. Some people make soup by boiling the heads from freshly caught fish. The body of the bullhead can be dried, and the heads can be frozen. The heads are then eaten frozen or boiled at a later date. Stomachs can also be dried. Bullheads can be used to make *akutaq*. Livers can be cooked and then mixed with blackberries, as well.

“They used to take the liver off these fish an’ use ‘em for Eskimo ice cream. Just like the tomcod and the whitefish. ...Yeah, an’ they add it with blackberries.” –Julie Henry translating for Daisy Pete

“I always hook this kind. Even they’re small. ...They’re really tasty. I always love them when they’re cooked.” –Sylvester Snowball

Trout:

Residents of all five participating communities were asked specifically about Dolly Varden trout in both the harvest surveys and interviews. Some individuals did not differentiate between different species of trout, however, and the information below should be viewed in that light; it may refer to multiple species of trout. In contemporary times, Stebbins residents do not frequently harvest trout. Trout are in the region year round, but Stebbins experts did not comment on their abundance.

“Over at Pikmiktalik, we got lotta trouts over there, too. An’ nobody fish them trouts. Nobody go after them.” –Andrew Foxie, Sr.

Trout can be harvested with nets under the ice, with a rod and reel, and with a hook in the summer. They are also occasionally caught in herring nets in the ocean near the bluff during spring. Stebbins experts noted that they can also probably be harvested by hooking through the ice, but no one does this. Trout can be harvested from the spring through the fall, but experts say the best time to harvest trout is in the fall time, around August. Trout are found in all rivers in the Stebbins area, but are most frequently harvested from the Pikmiktalik and *Nanvarnaq* Rivers. Freshly caught trout are eaten fresh or are dried. Formerly, dried trout would be stored in a barrel or seal poke with other fish and seal oil.



Figure 58: Clear Lake, between Stebbins and St. Michael.

Blackfish:

Stebbins experts reported that village residents rarely harvest blackfish today, but that they were more frequently harvested in the past. Blackfish can be found in water that does not freeze, like small sloughs with running water in the winter, or in lakes below the ice. Locations where Stebbins residents would look for blackfish include the Pikmiktalik River area, Clear Lake (Figure 58), Canal River and near Quyaq reindeer camp (in the surrounding lakes). Blackfish are harvested with traps and are usually frozen; they are also eaten frozen with seal oil. Today Stebbins residents obtain blackfish primarily through trade with Kotlik or other Yukon River area communities.

“Nobody goes out to trap the blackfish, anymore. I remember growing up with these. My dad would come home with maybe a sack of those. An’ we ate ‘em. Nowadays the Yukoners give us blackfish.” –Becky Atchak

Sticklebacks:

Several Stebbins experts added a fish that is called both “needlefish” and “sticklebacks” in local nomenclature to the list of fish that their community has harvested for subsistence, though they are not currently harvested today. No definitive examples of these fish were available for the principal investigator to view while in Stebbins, but based on the descriptions given this fish is most likely the ninespine stickleback (*pungitius pungitius*). These fish are small, only a few inches in length, and have sharp spines on their backs. In the past, huge amounts of these fish would be harvested by dip net, primarily for dog food, but also for human consumption. Stebbins experts warned that when eating this fish, you must be very careful or you will get poked by their spines. If they are dipped in hot water before being eaten their spines will not be as sharp. These fish are eaten fresh, dipped in seal oil, boiled, fried, and frozen.

One expert recalled her mother making waterproof salmon-skin mitts for her brother to use when dipping for sticklebacks/needlefish. They were formerly harvested in the creek behind Sourdough Point, Pikmiktalik River, Clear Lake and other small streams and creeks, primarily in the summer. One expert shared a traditional story about a very large needlefish that was singing while it swam. Some women nearby approached it and when they did, the needlefish became small again. They ladled the fish out of the water and ate it. During one visit to Stebbins, the principal investigator encountered several children who were possibly playing with some ninespine stickleback caught in a local stream.

Flounder:

Stebbins fishers catch flounder in their salmon nets and their herring nets, when fishing for those fish. Flounder can also be hooked. Two types of flounders are recognized by Stebbins experts: smooth and starry flounders. Flounder are believed to be abundant and some fishers consider them to be a nuisance because they must be removed from nets. Experts warn that you should wear gloves when removing starry flounders from nets because they will poke your skin and make you sore. Stebbins experts have observed that flounders were larger in the past; about seven inches in length compared to three to four, today. Some very large flounders can be up to one and a half feet in length. Flounders are in the region and can be harvested all year long. Fishers usually only retain the larger flounders that get caught in their nets and throw the rest back. They can be eaten boiled, fried or dried (gutted, filleted and hung). The skins must be removed before eating the meat. The eggs can also be eaten fresh in the fall time.



Figure 59: Small flounder caught in a whitefish net near Stebbins.

Burbot:

(As was noted earlier in this report, in the harvest survey results section, the majority of local experts and others often use the term “lingcod” to refer to what western scientists call “burbot.” However, a few local experts and others, use the same nomenclature as western scientists. This fact of nomenclature was discovered during the ethnographic field research. The reader will note that a number of quotes below may use the term “lingcod”. All uses of the term “lingcod” in these ethnographic sections refer to what western scientists call “burbot.” For the sake of clarity, given that this report will have a broad audience, this section will be titled “burbot” and all references in the author’s voice will use the term “burbot.” This is simply done for clarity; neither nomenclature is considered to be more correct than the other. It should also be noted that there was a much less common occurrence in which a few ethnographic interviewees would identify a lingcod image as “burbot”. It is unclear as to what is the cause of this; perhaps it is the result of a discursive ambiguity arising out of peoples’ awareness of two sometimes-conflicting taxonomies for fish, indigenous and western scientific.)

This fish is also called a “loche” (pronounced “lush”) by some Stebbins residents. Stebbins fishers used to harvest more of this fish in the past. They are considered to be a fat, meaty fish. These fish can be harvested in herring nets or when hooking for tomcods. Five or six burbot are considered a lot to harvest at one time (in a net or hooking). Stebbins residents are familiar with the fact that Yukon River area villages harvest a lot of burbot.

Capelin:

Some Stebbins experts were not familiar with capelin, while others have observed them in the spring time around the time when the herring are running. People do not harvest them today, but in the past capelin were harvested with dip nets in front of the village or in the Punguk River. Stebbins fishers would either freeze them or dry them whole.

Grayling:

Little data regarding grayling was documented with Stebbins experts. Some residents get them occasionally, but few people target them intensively. They can be found in the Kuiuak River.

Halibut:

Most Stebbins experts have never seen halibut in the area, though some reported that they occasionally get caught in herring nets. Halibut can be dried by gutting them and hanging them by the tail. The skin must be peeled off before eating them.

Pike:

Stebbins experts were not familiar with any pike in the local area, though some thought it was possible that they are present. Pike are considered to be a boney fish with not a lot of fat. Stebbins residents trade with Yukon River area villages to get pike.

Table 22 includes the Yup'ik names for non-salmon fish provided by Stebbins experts, as well as examples of other words and phrases related to non-salmon fish or fishing.

Table 22. Stebbins Yup'ik words for non-salmon fish and fishing-related terms.

Common English name/phrase	Other name	Yup'ik name
tomcod	-	iqalluaq
tomcods	-	iqalluat
dried tomcod	-	kinerrtaq iqalluaq
aged/fermented tomcod	tomcods left in gunny sack and aged in the cold through freeze/thaw action	urungnaaq
sculpin	large bullhead, devil fish, big mouth bullhead	qanerrpak
sculpin	small bullhead, devil fish	qayuqupak
smelt	hooligan	cemerliq
capelin	cigar fish	cikaaq
smelt	-	cemerliq
small flounder	-	naternaq
big flounder	-	uraruq
blackfish	-	imangat imangaq can'giiq
	rock fish	kalangkupell
burbot / lingcod	-	manignaq
herring	“big or important fish” (loose translation from Yup'ik)	iqalluarpak
herring in seal oil	-	uqumiutaq
fat/oily herring that age while they become dried	-	ninamaiyuk
herring eggs	-	qaarsaq

herring eggs on kelp	-	ellquat
dried herring eggs	-	imlaat
pike	-	cuukvvak
grayling	-	naptaq
wolf eels	-	qacuulluk
ninespine stickleback	needlefish	quarruuq
Dolly Varden trout	-	iqallugpanguaq
trout	-	Iqallugpanguaq
sheefish	-	Ciiq
Arctic Cisco	whitefish whitefish (plural)	imparpinraq imarpinraat
humpback whitefish	whitefish	qaurtuq
whitefish (with a black bottom fin)	small whitefish	qassayaq
game played with tomcod bones	-	aksuk
to braid	-	tupik
grass used to braid herring	beach grass	taperrnat
to eat raw	-	qassarluki
from the sea	-	imarpimek
fish trap	-	taluyaq
sack used to age fish	-	ellqaq
sack	used to age fish	missuuk
pot for cooking dog food	-	alungun
half-dried fish	-	egamarlluk
cut and dried fish head	-	egamarlluggkaq
picking on bones	-	pukuk
to fish with a hook	-	manaq
water	-	emeq
to swim	-	kuimaq
weather	-	cella
our weather	-	cellaput
to become fat	-	uqungcaq
kayak	-	qayaq
sourdock	a plant, sometimes eaten with fish	quaggciq
beach greens	can use to make ac'aarlluk (greens akutaq), or dip them in oil	cen'artaq
willow leaves	stored in seal oil in a jar	cuyaq
cliff greens	dipped in seal oil	ciutnguaq
marsh greens	dipped in seal oil	nasqupaguaq
cache	-	mamteraq
Nanvarnaq	a big lake where people fish located up the Canal River near the foothills	Nanvarnaq

Pikmiktalik River	a fishing location	Petmiggtaalik
Quyaq	a camping location	Quyaq
Nunaqaaq	a fish camp location	Nunaqaaq
Stuart Island	a hunting, fishing and camping location	Qiqertarrpak
Canal River	a fishing location	kanauvarpak
tasty, delicious	-	neq'nii
fish, berry and fat mixture	“Eskimo ice cream”	akutaq
akutaq made with aged salmon eggs	a kind of “Eskimo ice cream”	mak'aq akutaq
sandy beach	-	cen'aq

Challenges, Concerns and Threats Related to Non-Salmon Fisheries

Climate Change:

The broadest and most widespread change that non-salmon experts have observed, which manifests itself in many different ways, is that the weather has become much less predictable than in the past. This is not a new observation; northern communities, social scientists, physical scientists, and others have been describing these changes for years (e.g. Oquilluk 1981; Weller and Anderson 1998; Krupnik and Jolly 2002; Marino and Schweitzer 2009; Krupnik et al. 2010; Nakashima et al. 2012). The exact nature of this climatological unpredictability varies, however, from community to community. Rapid changes in local weather require subsistence fishers, as well as anyone else out on the water or in the country, to be very aware of their surroundings and to respond quickly as conditions change.

“...set it [your net] when it first gets calm now. ‘Cause now weather changes too fast. You gotta do things quicker, an’ have less time to set your net than before.” –Gene Angnaboogok, Wales



Figure 60: View of frozen Port Clarence, in front of Brevig Mission.

A major change observed in each of the five communities is a change in the timing, and in some cases the character, of freeze-up and break-up. These are the times of the year when local water bodies (e.g., the ocean, rivers, lagoons, inlets, lakes and ponds) first become frozen (freeze-up) and begin to melt (break-up).

While freeze-up and break-up times have radically changed from what they were in the past, they occasionally still happen ‘at the right time’ (i.e., when they did in the past). There is yearly variability in timing of these events. Across these five communities, which span the entire Bering Strait region, the change in freeze-up is happening up to four weeks late and the change in break-up is occurring two to four weeks early. These estimates are based on the observations of local experts who have compared recent events to those from their childhood and young adulthood and from what they learned from their own elders. Most experts estimate that these changes in freeze-up and break-up have become most noticeable over the last approximately ten years.

These changes in timing related to ice are having various impacts on non-salmon fishing activities in the Bering Strait region. For example, in Shishmaref and in the Teller and Brevig Mission area, spotted and ringed seals are spending more time in Shishmaref Inlet and Grantley Harbor-Port Clarence, respectively, because they can maintain their breathing holes in the thinner ice later into the year. These seals are believed to be eating large amounts of fish and forcing fish into areas where people do not typically fish, making it harder for some people to catch certain non-salmon fish species.

Ice that breaks up faster than in the past in the Brevig Mission and Teller area for example, means that there is little opportunity to fish in the cracks that typically form. Late freeze-up has also impacted Teller residents’ ability to fish for whitefish, smelt and tomcod; experts noted that the run is over before people can safely use the ice.

“...An’ freeze-up is so late now that we can’t hardly harvest this. That’s the biggest change in whitefish fishing is freeze-up is so late, the ice is so thin, we can’t get to the fishing ground until the run is basically over. So it’s really not worth fishing that run anymore.” –Joe Garnie, Teller

Interviewer: *“When you were a young boy, when do you think freeze-up was typically happening?”* John: *“I remember in the late 70s, early 80s maybe, me an’ one of my uncles walked down from, all the way from here, to Duck Creek, an’ we just, you know, went along here an’ crossed here. We came down Halloween day, so the ice was pretty thick back then. Especially crossing over here [Tuksuk Channel].”* Interviewer: *“An’ now when does freeze-up usually happen?”* John: *“Ahh - probably late November.”* Interviewer: *“It’s like a whole month different.”* John: *“Yeah.”* –John Okleasik, Teller

Ice conditions are also variable, but observations point to a definite overall decline in ice thickness throughout the region. Thinner ice, in combination with later freeze-up and other conditions, can have substantial impacts on subsistence fishers. Some additional examples of differences in ice conditions show the variety of changes residents of the region are experiencing:

- Very little old, polar ice comes down from the north anymore.

- In the vicinity of Wales there is generally thinner sea ice, but it piles up more, making it thicker, and in some cases too thick for augers to reach water below it.
- In the Brevig Mission area, ice is thinner, but there is often a lot of overflow (possibly due to changing wind conditions), which can make it very thick in some places.
- Sea ice near Shishmaref is thinner and more easily torn away from the shore by wind and currents.
- In the Shishmaref area, experts have noted that the water (in inlets, lagoons and other areas) seems to be getting fresher. As a result, the ice is also fresher and is less safe. Ice formed from fresh water is more brittle than ice formed from saltier water.

“Yes, it impact us, because the tomcods have their eggs and those fish they move around, so usually we go tomcoding up at Serpentine, at the mouth. Sometimes we don’t find ‘em there, because of - we’re going there later an’ later every year. An’ because of late freeze-up, we’re having a lot of seals in the lagoon that are keeping their seal holes open. Like for example, last year we weren’t able to fish for tomcods until December, probably. It should’ve been November. So there is a lot of difference on that global warming, when the ice is not thick. The seals are staying here, staying in the lagoon longer than before.” –Fred Eningowuk, Shishmaref

The direction, intensity and seasonality of winds combined with the current unpredictable weather conditions have impacted fishing for non-salmon fish species by making it more difficult to travel across the ocean or other bodies of water and making it necessary that people spend more time tending their nets. Nets can no longer be left in the water for days at a time anymore because of rough weather. Subsistence fishers have to frequently take them out and put them back (or not set them at all). Ice and wind conditions can combine to create dangerous conditions for boaters. For example, when ice is thinner, swells can get larger.



Figure 61: Windblown grass at Wales.

“It’s been like this for the past couple - few years. The weather’s been changing so quick, to where we can’t have our net out [more than] maybe like overnight. Whereas in the past, we used to have it out, pull in, clean it up, take out all the fish, put it back out. We’d have it like what?”

Maybe three, four days at a time it'd be nice. Now it's just sporadically, like in afternoon or overnight, an' that's it - then you gotta pull it in 'cause of the weather." –Larry Sereadlook, Wales

"Well, this year [2012]...the tide has been really low, low, low. An' I've seen some guys out fishing, an' they complain to me it's too low. ...An' so, even wintertime, when you have lotta east wind, it's a 'no-fish wind'. An' it affects all the species, I guess. Then you get south wind, then you'll see the ice float up, an' then there should be fish." –Morris Coffey, Stebbins

Wind, and changes to wind patterns, can have other potential impacts such as causing overflow, tearing thin and newly formed ice away from the shoreline, and even changing the growth patterns of local plants. One elder from Stebbins described changes to local grasses that he observed in his lifetime. When grass stalks were less disturbed by constant winds, they would grow taller and wider.

"Everything change. Even the weather, not like before. Long ago I used to hear no wind all the time, always good weather. An' those tall grass, they get wide. They's big as a man. No wind all the time... Only in wintertime, lots of wind. ...tall grass, they get wide, 'cause no wind all the time." –Francis Rivers, Sr., Stebbins

Rain patterns have also changed, making it too difficult to dry fish or sea mammals, and there has also been a lack of rain during periods when it used to regularly occur. Bad weather, and an increase in what is perceived to be bad weather, has definite implications for people's ability to harvest non-salmon fish. On the other hand, one Wales expert noted that when people do not fish because of bad weather, fish get a 'reprieve' from being harvested, which may be beneficial for their populations.

Experts across the region have noted other climate observations that can impact subsistence fishing, including:

- Variable and irregular summer and winter temperatures
- More flooding in the fall
- Water seems to be getting dirtier (contains more mud, silt and debris)
- Increased erosion, such as widening of channels, loss of beaches
- Drying up of tundra lakes
- Melting permafrost under trails and along riverbanks
- More water weeds and other aquatic plants in certain creeks and rivers
- Increasing water temperatures
- Different animals and insects are increasingly being seen (e.g., eels, sharks, unidentified fish and bugs)
- Because the timing of seasons is changing, timing of subsistence activities is changing

"Yep, just like upriver by our cabin - it's getting wider an' wider. There used to be a cabin in front of our cabin. It fall down into the river, before that there used to be a place for tents. It's eroding fast." –Rita Olanna, Brevig Mission

“...mostly if there’s old tractor trails, it seem like the ditches are getting bigger and bigger. You could see ‘em along the road to Nome. Like by Livingstone. An’ just past the dump here, there’s some real big thaws of permafrost, an’ just getting deeper an’ deeper.” –Wesley Okbaok, Teller



Figure 62: Melting permafrost and erosion along a Seward Peninsula river.

Overall Participation in Non-Salmon Fishing:

Local experts in each of the communities, and many community members, have observed that overall participation in non-salmon fisheries has dramatically decreased in the past few decades. This was not necessarily a concern for everyone, but for some experts it was expressed as a concern. Fishing, including non-salmon fishing and fish-related activities are recognized by many to be an important part of cultural identity.

Interviewer: *“How important would you say that herring are to your family, and to this community?”* Morris: *“Very. I couldn’t stress enough to say very, very, very important. And it’s been our lifestyle and should be for the next generations. And generations after that, too. It comes in abundance. If it’s managed right, it feeds the family. And, of course, gives us our identity, who we are. It’s very, very important to have resources come back. Otherwise, you know, people would be walking on the beach scratching their head, ‘Where’s the herring at?’ You know, ‘What are we going to eat next?’”* –Morris Nashoanak, Stebbins

The skills necessary for fishing are also considered a point of pride for many people. When people possess, share and use knowledge that was passed down over generations, they feel useful, connected to their roots, and valued. This extends to simply eating non-salmon fish, in addition to harvesting them and preparing them.

“An’ a lot of our kids, they wanna speak fluently. They wanna know their native language. They wanna know the food, how to subsist on food. They don’t wanna lose their tradition and their culture. ...An’ when I had the kids work on the fish, that calm day last fall, they were just all excited, ‘I know how to do this now.’ An’ they got faster an’ faster. So fun. The gleam in their face, it’s always so nice.” –Becky Atchak, Stebbins

Youth Participation in Non-Salmon Fishing:

Many of the local experts expressed a great deal of concern that young people in their communities were not participating in non-salmon subsistence fisheries and subsistence activities in general. This is, of course, not true for all youth. Many are very involved in subsistence activities and others desire to be. Reasons given by experts for a lack of participation in subsistence activities by youth varied but included:

- A lack of interest
- Not wanting to get “dirty”
- Not liking the smells associated with subsistence activities
- Lack of opportunity for them to participate
- Some like to harvest, but not put away the foods they harvest (they let others do it)

Local experts and other adults recognize that it is partly their responsibility to ensure that youth have opportunities and are encouraged to participate. Adults in all communities expressed multiple reasons why they believe youth should participate in subsistence activities like non-salmon fishing. For some, they expressed a desire for youth to learn and carry on traditional activities such as fishing because it was something they had “always done” and it is part of their cultural heritage. Other experts described how subsistence foods, including fish, are nutritious and healthy. Many talked about the prevalence of “junk food” and other store foods, and a belief that young people in particular eat too many non-subsistence foods.



Figure 63: Justin Komok Weyanna ice fishing in front of Teller.

Related to nutrition and healthy foods, some experts discussed how going out into the country to participate in activities like fishing provides both physical exercise and is beneficial to mental health. Experts described the feeling of being out in the country and leaving worries behind in the village, feeling happy while observing the natural world, and feeling good about themselves for being self-sufficient and obtaining foods for their families.

“There’s a lot of things you can - I’d have to get into so much detail, you’d probably run out of tape. You’d have to order more. No. (Laughter) It’s just, you know, being out in Mother Nature. You get away from all the noise. You go out there and - I dunno, it’s just to be out. Just to take a walk, be out in a sun, be out in a rain. You know, check for logs. You do some things, too. You look for logs too, on the way down. See if there’s a good pile of logs catches your eye. An’ then maybe later on, you’ll go pick a few. ...You’re being observant.” –Rennie Jack, Stebbins

Additionally, many adults were concerned that young people would need fishing and other subsistence skills to survive in the future. Some were concerned about the cost of store foods and the lack of wage employment, others were worried about global or local crises that would require people to obtain their own food from the country, and some were concerned about both. They are concerned that young people today will suffer in the future for their lack of skills and knowledge in this realm.

“I just wanna pass it down to my grandkids and children so that when I’m gone they will depend on these fish, too. They’re good. So they won’t depend on store food. But they eat lots of junk food, like pizza, pizza rolls, chicken nuggets...” –Helena Seetot, Brevig Mission

Amount of Fish:

In each community, residents communicated concerns about the amount of non-salmon fish they have access to, with some community members expressing that they do not get enough non-salmon fish to meet the needs of their household. During each household harvest survey and some interviews individuals were also specifically asked if they had enough non-salmon fish to meet their needs. When asked why they do not have enough, various answers were provided including:

- A wage-job was not flexible enough to allow time for fishing
- Not having the equipment necessary (e.g., a boat, motor, or specific kind of net)
- The price of gasoline and oil is too high
- Weather had prevented them from setting nets or getting to fishing locations
- Not receiving fish from anyone
- Did not try to fish

Contamination and Development Activities:

Many experts are concerned about pollution affecting non-salmon fish and other subsistence foods. Contamination concerns relate to both local sources such as landfills and wastewater outfalls to oil spills and discharge from commercial (e.g., cruise ships) and industrial ships (e.g., oil tankers). Experts and others realize that the foods they eat often travel great distances and have the potential to encounter various sources of contamination before being harvested by fishers or hunters and consumed by them and their families.

“Now they got that Japan [tsunami]. An’ then we got lots of waste that goes into the sea. There’s our dump. There’s water going, discharging, our waste water, discharging into the sea. There’s traffic. There’s a lot of traffic - barges an,’ you know. Could be anything. Plus - what they call that - global warming.” –Rennie Jack, Stebbins

Bering Strait region communities, including those that collaborated on this project, are extremely concerned about increased ship traffic through the Bering Sea and Bering Strait, offshore oil and gas exploration and development, and the potential for industrial fisheries moving into the northern Bering Sea. Ship traffic concerns relate to the disturbance of marine mammals and migratory fishes, legal and illegal discharges of gray water and other material, and the possibility of oil or other spills in the region. Communities recognize that an oil spill would be potentially catastrophic for subsistence resources and the communities that rely upon them.

“Well, development might happen, an’ some adverse development like a big spill might, might impact us.” –Johnson Eningowuk, Shishmaref

Offshore oil and gas development concerns relate to oil spills and disturbance of marine mammals. Industrial fisheries are also a concern to local experts and others. Due to warming temperatures in the Arctic it is predicted that fish species, some of which are harvested on a large, industrial scale, may move north. Some of these fish are harvested with bottom-trawl methods which can be very destructive to the benthic environment. Experts and others are concerned about potential bycatch of fish harvested for subsistence, as well as destruction of the benthic habitat important to the entire food chain.

“Just hearing from like bycatch from the big trawlers that are wasting the fish. Seem like if they deplete one species, an’ seem like always another species that rely on that, besides people, that it could have a domino effect. Stuff that’s happening to ‘em would.” –Wesley Okbaok, Teller

Loss of Diversity in Fish Processing Methods:

As described earlier by local experts, there are a variety of ways to process non-salmon fish for storage and consumption. Freezing is the most commonly practiced method to put away fish today. Some of the methods described previously are no longer practiced or are practiced by few people. Experts in all communities expressed some concern that various processing methods, particularly the ageing or fermenting of non-salmon fish, was being lost because youth and young adults were not learning or practicing it. Others lamented that certain dishes are no longer made. Additionally, for some preparations, special materials are required such as seal pokes or beluga stomachs, and few if any people know how to or continue to make these today.

The reason for the loss of diversity in fish processing is not entirely related to lack of interest. The weather was a reason cited by many for why they freeze the majority of their fish, rather than using other methods of putting them away. Summer weather is often not ideal for drying, half-drying or ageing fish, and as a result the fish are frozen. Others have noted an increase in bugs that can make it difficult to dry fish, and others have even cited an increase in birds such as gulls and ravens destroying or stealing their fish.

“There was no freezers then. They used traditional methods in putting their food away. Put ‘em in seal skin pokes. They also put ‘em in wooden boxes, an’ gunny sacks, an’ things like that. That’s the only way that they put ‘em away. One thing, they usually age ‘em that way. An’ they prefer them that way. But now, we freeze ‘em, an’ bag ‘em, an’ freeze ‘em. They also, our parents an’ grandparents, they also salt ‘em.” –Davis Sockpick, Shishmaref

As noted in the quote above, freezing is a common method of putting fish away today. Elders acknowledge that freezing fish is a convenient and easy way to process fish, and a method that did not exist for many of them when they were young (other than in the winter when fish could naturally freeze). They also described the many varied tastes, textures and smells of fish processed by other means. Some of these other methods are also believed to produce other potentially positive nutritional or other benefits. Aged fish, for example, is described as a food that provides hunters or others spending time in the cold with warmth and full stomachs for long periods. The enzymes and other characteristics of aged food are also known to be beneficial; known from experience by local experts and known by western science through controlled studies (e.g., Katz 2003). Many felt that the art of ageing foods is virtually lost and were sad that this was the case.



Figure 64: Island in the Kuzitrin River where whitefish were formerly aged in underground pits. Social Science Program research assistant Freida Moon-Kimoktoak stands next to a pit.

In addition to a loss of diversity in the ways in which non-salmon fish are put away and preserved, there has been a loss in terms of other preparation methods. For example, some parts of non-salmon fish that were saved and prepared in the past, no longer are. Some particular dishes are on the decline in some communities, as well. For example, dishes such as *tiŋulik* (a fish liver and berry mixture) are now made infrequently in some communities.

Seals:

The communities of Shishmaref, Brevig Mission, and Teller have observed that spotted and ringed seals are staying near their communities later in the year. In Shishmaref, the seals are in Shishmaref Inlet and in Brevig Mission and Teller the seals are primarily in Port Clarence and Grantley Harbor. Many experts believe that the seals are staying longer because of later freeze-ups and warmer temperatures that allow the seals to maintain breathing holes. Residents of these

communities have observed this for approximately the past five years and are concerned that seals may be eating a lot of fish and/or are scaring them away from frequently used fishing locations, impacting fishers' ability to harvest.

"But we'll catch 'em [smelt] by, mostly by jigging. An' we'll catch quite a bit, sometimes, when they're, you know... Right now there's too many seals in there, in the lagoon [Shishmaref Inlet] an' fishing is not very good. ...The seals are here, an' they've been bothering us all winter with our nets. An' we try to look for their holes, an' try to see if they'll come up. An' then sometime, last year, I think, a lot of the men that check their nets up here, each caught a seal in their net. So that got rid of some of 'em. But this year they've been, they're kinda big seals, an' they've been just tearing up our nets." –Johnson Eningowuk, Shishmaref

Reggie: *"Speaking of tomcod, we don't get tomcod as much as we used to out here. We used to get a lotta tomcod. People are saying that it must be the seals that are out in the channel here, both channels. I don't know what it is."* Interviewer: *"When did you first start to notice that there weren't as many?"* Reggie: *"Ahh - few years ago. I don't know, maybe about five years ago, som'em like that. Because there used to be a lotta whitefish, I mean tomcod an' smelt, out here. But, for a few years now, we haven't had any. You have to go out to Teller, out on east of Teller to catch whitefish an' smelt now. Not much out here."* –Reggie Barr, Brevig Mission

"Yeah, because there again, freeze-up is later. Seals always stay until they're froze out. An' there seems to be a lot more spotted seal, definitely. An' I think a part of it is attributable to the late freeze-up, an' excellent fishing grounds here in these bays. ...[T]hey're fish eaters. An' there's hundreds of 'em, them seals in here. An' they're eatin' fish every day. I'm sure they're having some impact. An' there again, not as many people are harvesting as much seals as they used to." –Joe Garnie, Teller

High Cost of Fishing:

One reason given by harvest survey respondents for why they did not have enough non-salmon fish to meet their needs relates to the cost of participating in fishing activities. Many local experts and other community members confirmed that cost is a concern for many people. The costs associated with fishing primarily come from major pieces of equipment such as a boat, a motor and fish nets. The cost of gasoline and oil to run boat motors is also prohibitive for some people. While fishing is potentially less costly than other subsistence practices (like marine mammal hunting), there is still a cost associated with it. Fishing rods can be purchased with food stamps under Alaska state regulations, but not all fishing can be done with a rod and reel. Hooking for fish only requires a hook, line and stick, but without an auger, fishers must either find abandoned holes and re-open them, or create their own with a *tuuq*, or ice pick.

Interviewer: *"Do you think if more people had boats and gas prices were lower, that they'd be going up into the [Imuruk] Basin to be fishing?"* Norman: *"Yes. You'd see lot more people fishing at their old camp. 'Cause nowadays, maybe might have just enough money to buy enough gas to go up to your camp an' come back."* –Norman Menadelook, Teller

"Aaah - price of gas, that affect us because we're kinda behind in our bills. You know, we got light bill, house bill, phone bills, internet - what we didn't have to pay ten years ago. So, you

know, that has an effect. Last trip, which was couple days ago, we spent over \$300.00 just on gas alone. An' that's not including food." –Shishmaref expert

Management Actions by Agencies:

Another area of concern for local experts and community members is in regard to actions taken by state and federal agencies, more specifically their actions in relation to regulations about fishing and subsistence in general. Experts noted that government bodies often take action without consulting local people at all or without truly listening to what local concerns are. At times, agencies also take action completely against the wishes of local people.

"But, the main one, I think, is that they, government or anybody, [Alaska Department of] Fish and Game should always come out, talk with the residents in villages if there's any kind of change they would like to make. Once Fish and Game changes it, changes the regulation, after they come out, they don't usually put it back in, you know." –Bering Strait region local expert

Many experts and residents shared concerns related specifically to salmon fishing regulations and how the Alaska Department of Fish and Game manages salmon. Detailing these concerns is beyond the scope of this report, but can be summarized as regulations (and managers) not being sensitive to local social and cultural traditions or to changing climactic conditions. When discussing salmon, many noted that local people are often not consulted and that more consultation and collaboration is needed.

Cultural Values Associated with Fish

Many of the local experts interviewed, as well as residents of the participating communities, place a high cultural value on fishing and fishing related activities. Some of the positive outcomes associated with fishing include promotion of community cohesiveness, enhancement of physical and mental well-being, social interaction between generations, community and self-sufficiency and having nutritious, local, traditional foods. Two of the most important cultural values or principals associated with fishing are *sharing* and *not wasting*. These values extend into other subsistence activities and community life in general, and were discussed with the majority of the local experts that Kawerak worked with for this project. Sharing and not wasting are both very important Iñupiaq and Yup'ik values as expressed by elders and community members and which have been illustrated in locally-made posters, clothing and other items. Not wasting and sharing are likely the two most frequently talked about cultural values and they are spoken about to both young people within the participating communities, as well as to non-indigenous people.

"That's how you gotta communicate, that's how you gotta do it, an' to share. That's how they [children] learn. An' that's how I learn, too, from my parents, to share [with] other people."
–Andrew Foxie, Sr., Stebbins

Ideas about what constitutes wasting and what appropriate levels of sharing are have changed through time. Today, some elders and experts feel that sharing is not being practiced as widely or consistently as in the past, and that some community members are not as strict about not wasting as people were long ago. For example, in the past, before snowmachines had replaced dog teams as the main winter mode of transportation, families both harvested more fish, and prepared it

differently. Some elders today lament that all fish heads, backbones and other parts (such as edible innards) are not saved and put away by most people. These parts of fish were saved in the past for dog food (as well as human consumption), but frequently are not saved today. Even though these “other parts” are still recognized as edible, most people do not prefer to eat them, and do not consider it to be wasting if such parts are not put away for human consumption. Because sharing and not wasting are such highly prized cultural values, experts are concerned about their apparent decline and its implications for future generations.

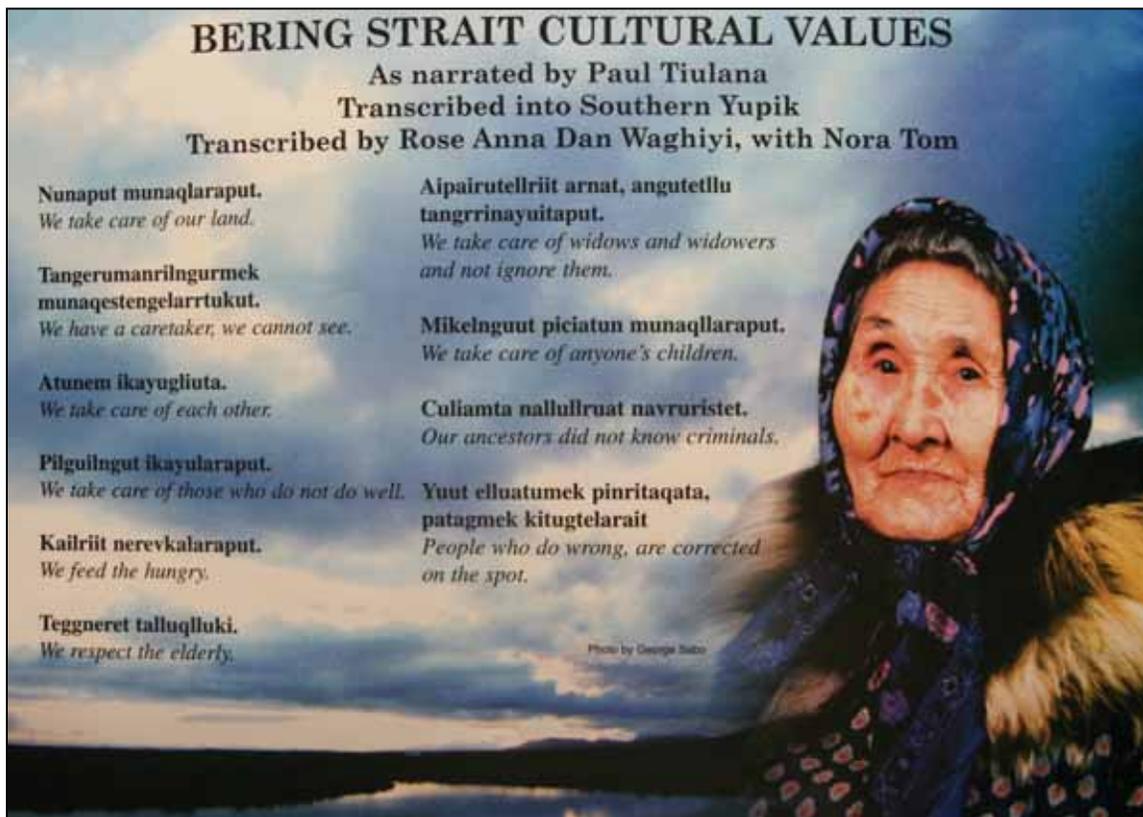


Figure 65: Bering Strait cultural values, as expressed on a poster.

“I can feel, it’s fading away some [sharing], in some of the families. Maybe those who are not trained.” –Wales expert

“We were always told not to waste food....I was noticing that some younger generations, they were just cutting the skin part an’ throwing all that meat away....My mom and I were like ‘Holy Cow!’ ...She wasn’t used to that, and she was disappointed. I was, too.” –Stebbins expert

“Everything just cost too much. An’ a lotta peoples think that they spend way too much to be giving things away. ...Maybe some people just have such a hard time trying to get what they get, they don’t think about sharing. They want more for themselves. I don’t know.” –Shishmaref expert

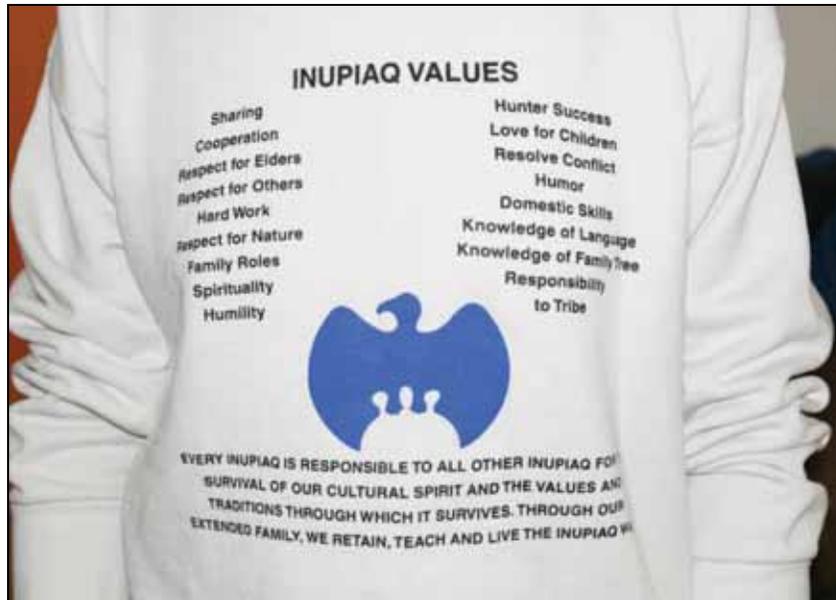


Figure 66: Inupiaq values, as expressed on a sweatshirt worn by an elder.

“But our guys that grown up together...age together, still give each other things now and then. I still do, to the people that I know. But lot of them don’t anymore. It’s different. So everything is changing. Not like long, long time ago.” –Brevig Mission expert

“People get along then, not like now. The methods that they use and that they share, everybody do the same thing together. As a result, they were united on the main goal to stay united, the community. They do same thing, same way, share everything together. Not like now.”
–Shishmaref expert

“Right now I used to see some woman cut fish, throw the bones with lots of meat, throw ‘em in the ocean, like that. They never hang ‘em, only skin hanging, some of ‘em.” –Stebbins expert

“Slowly going away [sharing]. I think it’s up to us to teach it, by example.” –Wales expert

Sharing with other community members takes a variety of forms. In the harvest survey, respondents were asked about whether or not they shared or received non-salmon fish during the survey period. As Tables 8-12 indicate, sharing and receiving non-salmon fish is common in the study communities. The most obvious kind of sharing is direct sharing of food items, like non-salmon fish. Other important types of sharing include the sharing of knowledge, sharing of equipment and sharing of labor, among others. All of the participants in this project participated in sharing by agreeing to tell Kawerak what they know about non-salmon fish and fishing. Kawerak will, in turn, share the compiled information (this report and other products) with residents of the region and other interested parties. While sharing is often reciprocal, it is not required to be, and many experts indicate that nothing should be expected in return.

“...But I don’t expect anything in return [for sharing fish]. One thing my parents said [was] give without expecting anything. A smile, a ‘hi’, is good enough.” –Gilbert Oxereok, Wales

“Oh no, I don’t expect anything back. ...They’ll make a batch [of something with the fish he shared], they’ll cook maybe that day or that evening, an’ then invite me over to have some. But I don’t expect anything back from them or anything, [the fish is] just given.” –Rennie Jack, Stebbins

“If you’re not stingy or anything, more we give, more you get back. In some way, you know. An’ that would make you feel good, too, to share.” –Tommy Obruk, Shishmaref

Sharing of actual fish is a valued activity by both the giver and the receiver. Those who share fish report that sharing gives them positive feelings and that they like helping others. Many who share also believe that the more you share (of anything), the more you will later get in return. As noted above, most do not expect something in return, but there is a general understanding that your generosity will likely be returned in the future, and perhaps by someone other than who you originally shared with. This delayed reciprocity (as well as direct, immediate reciprocity), is not the main reason that people share, however.

“You know, I’ve noticed that, too. An’ when I was younger, whatever I caught, share it all the time. Now at their age, our elder age, that food keep coming back, because we used to share it all the time.” –Peter Martin, Sr., Stebbins



Figure 67: Seal, fish and whale shared with the author by Pete and Lena Sereadlook in Wales.

Additional reasons that sharing is practiced, according to local experts, include:

- It is an Eskimo tradition to share
- It is a tradition to share the first catch of a young person
- The harvester enjoys harvesting, but does not necessarily need the catch
- There are people who do not have the equipment to get fish themselves
- Food is needed for a community gathering like a potlatch or funeral
- There are elders or others who are not physically able to get fish themselves
- Someone is craving a food they do not have
- An individual or family harvested more than they need (e.g., sharing to prevent wasting)

- It pleases the fish, Mother Nature, God, or some higher power
- It is respectful to the fish to share them
- It will help ensure successful fishing in the future

“That’s passed on [sharing]. It’s a tradition that’s still alive.” –Fred Pete, Sr., Stebbins

“’Cause I have craving for some sort of food an’ somebody give it me, certain part of the year. An’ I have feeling for them people, too, because that’s how they grew up, too, eating that kind of food. It’s same like when I’m craving for stink herring when I don’t have it. So, I don’t want them to feel the same way [and I share with them].” –Fred Eningowuk, Shishmaref

“If someone gets too much...we share with other people that don’t have the capacity to go out hunting an’ fish gathering. When you catch a little too much, there’s always somebody that could use it.” –Morris Coffey, Stebbins

“... ’cause whenever I got enough foods, I like to share my food with someone else.” –Agnes Noyakuk, Teller

“An’ they also told us our first catch, anything that we catch, gotta give away. That way I’ll have better luck in the future.” –Brevig resident

“My boys are trained like that. ...An’ when I get enough ugruks [bearded seal], in spring, I always tell [them] ‘enough’. An’ they’ll say, ‘Dad, can we go huntin’?’ I say, ‘Yeah. I’ll buy the gas, but if you get a ugruk or two, you gotta give ‘em away, to the elders. An’ if they wanna give you money that’s fine, but don’t ask for money. If they wanna give you gloves, take ‘em, otherwise they’ll be insulted.’ So they always hunt, for the pleasure of hunting, an’ helping people that are either got no hunter, or elders. I still teach that a lot.” –Clifford Weyiouanna, Shishmaref

“You got enough - give. Just give some of it away.” –John Okleasik, Teller

Some local experts who participated in this project can be considered to be part of “super-households”, a term coined by Wolfe (1987 and Wolfe et al. 2010) to describe high-harvesting households who share a large portion of their harvest with other households. These households harvest far more than they can personally consume and share widely within the community, providing for others who cannot or did not harvest themselves.

Kelly: *“...quite a few families like that [with no income], so they depend on fish that I catch.”*
 Interviewer: *“So how many families do you think you’re sharing your catches with?”* Kelly: *“Right now about six households... Used to be more, up to, about up to ten, maybe five years ago.”* Interviewer: *“When you were getting more?”* Kelly: *“No...some families moved out that used to get a share every time I set a net.”* Interviewer: *“So are all of those families contributing something to you, like labor or something to help you get fish?”* Kelly: *“If I tell them I’ll be pulling up the net, they’ll come down an’ help.”* Interviewer: *“So why is it that you catch so many of these fish and decide to share them with so many different people?”* Kelly: *“’Cause I don’t usually prepare them for winter. I just basically cut ‘em up an’ put ‘em in the freezer,*

whatever I got. My other family members do that, drying an' stuff like that." –Kelly Anungazuk, Wales

In addition to directly sharing non-salmon fish, community residents also share knowledge of good fishing locations, effective lures, observations about fish health, and other information. This type of sharing often takes place between family members or during the course of fishing activities and is a very important way that traditional knowledge regarding these activities is passed from generation to generation. This sharing of knowledge is important to project participants who are concerned that some young people may not be learning this knowledge because they do not have an interest in subsistence activities.

"I try to help the young people out. Not only on fish - on other game, on ice conditions, even. So [I] try to. But I always quit talking to 'em when they tell me, 'I know how to.'" –Clifford Weyiouanna, Shishmaref

Lack of fishing gear or other things needed to fish (i.e., a boat motor, gasoline, etc.) are common reasons that harvest survey respondents, local experts, and other community members cited for not participating in non-salmon fishing activities. Others who do have the necessary accoutrements, however, will often share or let others borrow equipment or other items from them. For example, someone with their own whitefish net might lend it to a friend or family member who does not have one. In return, a fisher may give a share of their catch to the net owner. Or, as another example, if a fisher is short on gasoline to get out fishing, an elder or other community member may purchase it for them in return for a portion of the catch.

"Long ago he [old man Topsekok] got all the seining nets, an', you know, fishing equipment. Even he invites people to seine with him. He always get LOTS of fish, with other people." –Rita Olanna, Brevig Mission

"That's what I pretty much rely on nowadays, is somebody sharing with us, you know, 'cause I have no way of going out and get 'em - unless it's just straight down the beach here." –Teller expert

Another type of sharing related to non-salmon fishing is sharing of labor. This can take different forms such as sharing a seining net. It typically requires multiple people to seine for fish; if a net owner does not have enough people to seine, she may invite others who do not own nets to help. Those who help seine receive a portion of the fish harvested (which may have been too much for the net owner to process alone). Some fishers purposely harvest more than they need with the intent of sharing the fruits of their labor with elders or others. Additionally, while most families have the equipment required to hook for tomcod (a line and hook), for example, they may not have an auger to drill a fishing hole. In some communities, individuals with access to augers will drill multiple holes so that others have the opportunity to fish. All of these forms of labor-sharing are recognized as important by local experts and community members.

Larry: *"My parents love 'em. Yep. I just catch 'em for the community."* Interviewer: *"And why do you do that?"* Larry: *"So the elders can eat. They love fish. I love fish too, but I'm not really*

into whitefish. I just like to catch ‘em for my parents an’ the elders in the village. An’ people who want fish.” –Larry Sereadlook, Wales

*“I tried to drill some holes for the elders and for people to fish past two, three years now...”
–Larry Sereadlook, Wales*

Not wasting subsistence harvested food, like sharing, is highly valued by both Iñupiaq and Yup’ik communities. Not wasting is a cultural value that is frequently discussed with young people and in general. Intent plays a large part in judging whether or not someone has truly wasted food. If a fisher purposefully catches fish, then lets them rot in a tub instead of cutting and hanging them because they are lazy, this is considered to be wasting. If someone catches fish, puts them away, and later determines they have gone bad or become freezer burned, and then feeds them to dogs, this is not considered wasting because the dogs consumed them and the person did not intend to waste. Additionally, an important part of not wasting is to not harvest more than you need. This rule can, of course, be ‘broken’ if one intends to share their excess harvest.

“Not to get too many, or too much. Just try to get enough for yourself. That’s one thing that they used to somewhat mention.” –Leonard Olanna, Brevig Mission

“Well, just the biggest thing was not wasting anything. That was the biggest taboo they had. An’ just cause you’re in a big thick run, keep in mind how much you’re gonna be using this. ‘Cause, by chance you ran into a main run that was so much fish that you could just haul ‘em in, but just take what you need.” –Joe Garnie, Teller



Figure 68: Becky Atchak, Stebbins expert.

“But when we have enough of the fish heads ...we just throw it out into the ocean. We give back to the ocean, the guts an’ the bones. An’ then we always threw back to the ocean. ...An’ our ancestors or elders always told us everything has to go back to the ocean. ...I think to me it was because it’s not spoiled. It feeds the smaller animals. ...Nothing goes to waste.”

–Becky Atchak, Stebbins

Not wasting foods, particularly subsistence foods, is a cultural value that is instilled in children from the time they are born. This is done through verbal instruction, but primarily through children observing the actions of their elders. This is not to say that wasting never occurs, but in general it is still very much frowned upon and is disturbing to those who strictly follow the ideal of not wasting. Experts and most region residents believe that there is always someone who could use or would appreciate any excess harvest, and therefore there is no reason to ever intentionally waste food.

“... my mom she used to tell me not to waste anything. Just catch what you going to eat. If you’re think of putting some away, then catch as many as you can, an’ put ‘em away for the winter. ‘Cause there’s people from way, way back, you know, they don’t like to waste anything. Nowadays they’re very, very wasteful. Not like before. They catch more than they could put away, or more than they could eat and they just leave the rest, which is a bad practice. Whenever I see that happen, I always talk to these younger kids, younger guys. An’ then once I tell ‘em once, an’ then I don’t repeat it, ‘cause they’ve already been told. Then I would talk to another person, maybe then when they see ‘em, they in turn talk to them, too.”

Mission

When asked about why you should not waste food, most experts found the question to be strange and the answer to be self-evident. When asked additional questions, various answers were provided as to why one should not waste, including:

- Food animals may not be abundant later in the year
- You might not have food later in the year (any kind of food; subsistence or store-bought)
- Starvation times are coming (a prophecy known by some)
- It is an Eskimo tradition not to waste
- It is disrespectful to the fish to waste them
- To ensure future success in fishing
- It is just not a good thing to do

“I think...a good fisherman is [someone] who shares his catch, an’ puts away food right, and’ don’t waste.” –Helena Seetot, Brevig Mission

“It’s just a tradition not to waste.” –Thomas Ablowaluk, Teller

“They used to tell us not to waste food because in the days to come we might be starving, short on [food] if after all we never put any [away], right way. An’ they used to tell us not to be lazy, to clean them an’ work on ‘em. ...When we never take care of our food, we waste ‘em.” –Faye Ongtawasruk, Wales

Interviewer: *“What would be the repercussion for wasting fish and not taking care of them?”*

Marian: *“She said they won’t come. We won’t be able to catch enough fish for the winter. An’ the spirit of the animal or the fish will tell other fish that this woman is not a good lady, she don’t take care of. So my mom told me to always take care of the fish. ...The fish that spoil, we throw ‘em back into the ocean.”* –Marian Mike, Stebbins

“Can’t waste long ago when I was growing up. They don’t even - salmon backbone, they used to dry them, to save for winter. For their eating, or dogs.” –Clara Topkok, Teller

Unintentional loss of food can happen for reasons outside the control of humans. For example, if unhealthy looking fish are caught, they are not retained. This is not considered wasting because the animal may have been unsafe to eat. Additionally, weather conditions may lead to the unintentional loss of food. If an individual or household has just harvested and prepared fish for drying and rainy weather arrives, some or all of the fish may be lost to spoilage. These fish may then be used as dog food, or may have to be thrown back into the water or otherwise disposed of. Neither would be considered wasting. However, if a person continues to fish when it is known that wet weather is coming, or has already arrived, some may consider them irresponsible and wasteful because they will likely not be able to properly dry the fish. Unpredictable or fast-changing weather may also mean that a whitefish net, for example, cannot be removed from the water prior to a storm arriving because the ocean is too rough for boating. When this happens, the net will continue to catch fish, but they may not be suitable for human consumption by the time the net is pulled.



Figure 69: Shishmaref data review workshop participants.

L to R: Morris Kiyutellik, Johnson Eningowuk, Clifford Weyiouanna, Tommy Obruk, Stanley Tocktoo and Davis Sockpick. Not pictured: Nancy Kokeok.

“An’ don’t try to waste ‘em too much, but you know, sometimes you can’t help it, because overnight they’ll get soft. An’ the soft fish, when you cut ‘em, they don’t turn out. So sometimes I pull my net out before I go to bed, or if it’s too stormy, you can’t help it though, to pull the net out.” –Fred Olanna, Brevig Mission

“...they’re pretty good about that - putting away fish. Except for some few that are still fishing when it’s raining out, you know. ...As for me an’ for my family, if it’s gonna be raining, then we’re not gonna be fishing.” –Norman Menadelook, Teller

Many Bering Strait region communities have traditional stories that provide instruction and examples about proper behavior, including not wasting. The story below is from Brevig Mission expert Robert Rock, Sr. and was told in response to the interviewer asking about what happens to someone who is wasteful.

Interviewer: *“What would happen to somebody who was wasteful?...”* Robert: *“I dun’no. Sometimes...they get kinda suspicious. ...they don’t catch anything anymore. They always just waste. Like this one story dad mention. There was one young guy, young hunter, he’s real good with harpoon, hardly ever miss, especially after ugruks. He use that all his life, ever since he learn to throw a harpoon. Make new one almost every day. Till one day he landed on a beach, he saw lotta ugruks with harpoons on ‘em. There was a person. This hunter wonder how come there was lots, lots of ugruks with harpoons on ‘em. An’ this person said, ‘Look, recognize that harpoon?’ He said, ‘Yauh, that’s the one I made. Look at ‘em. They’re all like that. All those harpoons are made by one person.’ Then he decide to go. Told that one, ‘Don’t look, don’t look back. Don’t look back when you go.’ It’s like that Bible story, Lot and his wife. After he left, he went little ways. He got curious, so he look back. ...was just a lot of driftwood, nothing but driftwood, not ugruks. But after that he never kill for fun anymore - learned his lesson. He learn to share, give to those that need it. That’s one of the stories dad mentioned.” –Robert Rock, Sr., Brevig Mission*

While not directly related to fish or fishing, this story illustrates some of the important ideas and values described by local experts. The cultural values of sharing and not wasting are clearly interconnected in Bering Strait residents’ thoughts and actions. Someone who shares is not wasteful, and someone who does not want to be wasteful, shares. In an ideal situation, the desires of the individual fisher also do not take precedence over the needs of community. As one Shishmaref expert and elder eloquently expresses in the quote below that the “important part is sharing.” Fishers have responsibilities, variously, to their own families, to the neediest in the community, as well as to the resource itself.

“Fish just enough, what they’ll be needing for the year, or put some away for future use. Not now, but later, when times get lean. Or if you have to, put ‘em up an’ feed your family. An’ always share. An’ always be thankful that you’ve been given the fish that you fish for. Important part is sharing. If you have enough for your family, share it with people, especially the ones are in need. Or the ones that don’t have no hunters to provide for them, you know. ‘Cause anything what you give, usually come back to you the easier way the next time, if you’re either hunting or fishing. ...An’ then sharing always kinda bring people together, too, I think. In a way just peaceful like, you know.” –Tommy Obruk, Shishmaref

The cultural values of sharing and not wasting continue to be contemporarily important to Bering Strait fishers. These values are passed on to younger fishers, are discussed with others who are not practicing them, and are also expressed to non-native fishers who are active in the region.

CAPACITY BUILDING

This project included considerable capacity building efforts in the Bering Strait region. Training and employment were provided to residents in each community, Kawerak's Social Science Program was expanded, and interns and project staff had substantial learning opportunities.

The project hired local assistants and collaborated with local experts and tribal councils. An intern was hired in July 2011 to assist with and learn about conducting interviews, holding community meetings, field observations, archival research, transcription, and other project activities. Vincent Matthias from Stebbins spent two weeks working out of Kawerak's Nome office and several weeks working from his home community. He conducted research at the Eskimo Heritage Program archives (Figure 70), helped prepare an interview guide for Stebbins, assisted in arranging and conducting interviews in Stebbins, did transcription work and organized a non-salmon fishing trip for the principal investigator and several residents of Stebbins.



Figure 70: Vincent Matthias doing archival research at the Eskimo Heritage Program.

Jolene Okleasik from Teller worked as a local assistant and continued to be involved in this project after that position was complete. Jolene was very interested in the information that she helped document in Teller and the principal investigator offered to arrange for Jolene to earn one college credit for preparing and presenting a paper about the Teller work at an academic conference.

The principal investigator worked with the Northwest Campus branch of the University of Alaska Fairbanks to create a one credit course titled *Communicating Anthropological Data* (ANTH F193P). As a requirement for the course, Jolene wrote and presented a paper about her work in Teller, in conjunction with the principal investigator, at the Alaska Anthropological

Association's annual meeting in Seattle, WA in March 2012 (Figure 71). She also completed the other course requirements and earned one credit for her work.



Figure 71: Jolene Okleasik at the 2012 annual meeting of the Alaska Anthropological Association.



Figure 72: Norman Menadelook, Teller expert, discussing his fishing gear. Kawerak Regional Conference workshop, 2012.

As part of the April 2012 Kawerak Regional Conference in Nome (several hundred people from Nome and the surrounding villages attend this conference each year), the principal investigator organized a workshop for attendees interested in non-salmon fish entitled *Traditional Knowledge Exchange: Non-Salmon Fish*. Norman Menadelook, a non-salmon fish expert from Teller, was invited to come to the conference and share his knowledge about non-salmon fish with the youth delegates to the conference and other interested attendees (Figures 72 and 73). Over 50 people

attended the workshop. Mr. Menadelook gave a presentation about various aspects of his knowledge of non-salmon fish, explained and passed around the fishing gear he brought, and participated in discussion with the audience. The principal investigator and Regional Conference staff received positive feedback about the workshop, including requests that similar events be done at future conferences.



Figure 73: Some participants in the Traditional Knowledge Exchange: Non-Salmon Fish.

In 2012 Kawerak hired another intern to assist with this project. Vernae Angnaboogok, from the village of Wales and currently a student in the University of Alaska Fairbanks Rural Development program, spent five weeks in Nome in June and July. Vernae was mentored in social science research methods including archival research, transcribing, data analysis, and community engagement. Vernae organized and assisted in conducting a meeting in her home community of Wales to provide residents with an update on this project (Figure 74).



Figure 74: Vernae Angnaboogok (L) and Wales residents reviewing a non-salmon project map.

“Comparing myself, before and after my internship, I have grown so much educationally, personally, and culturally. The wealth of knowledge Kawerak opened their doors to for me has forever enriched my soul. The best time of my life was listening to our elders speak of our

traditional way of life in all aspects of Inupiaq life. I strongly hope that others too will be able to experience what I have experienced, for I have learned so much.” –Vernae Angnaboogok, Intern



Figure 75: Vernae Angnaboogok at the 18th Inuit Studies Conference in 2012.

Vernae was very interested in and enthusiastic about the information she learned during her internship, and the principal investigator offered to arrange for her to earn one college credit for writing and presenting project information at an academic conference. The principal investigator again worked with the Northwest Campus branch of the University of Alaska Fairbanks to teach the same one credit course that she had created for Ms. Okleasik (*Communicating Anthropological Data*, ANTH F193P). Vernae wrote a paper based on the work she did, in conjunction with the principal investigator, and presented it in Washington, D.C. at the 18th Inuit Studies Conference in October 2012 (Figure 75). She also completed the other course requirements and earned one credit for her work.



Figure 76: Meghan Topkok conducting archival research.

In 2012, Meghan Topkok, who was a First Alaskans Institute intern at Kawerak, worked briefly as an intern for this project doing archival research (Figure 76). In 2013, Meghan again worked as an intern on this project through the Dartmouth College Lewin Post-Graduate Fellowship program (which provides funds for living expenses to one outstanding graduate per year to work for an organization that serves communities). Meghan helped design, edit and revise a book of non-salmon fish recipes and preparation techniques; a deliverable from this project³.

Kawerak also trained individuals from each community how to conduct subsistence harvest surveys and semi-structured interviews. These individuals were hired as harvest surveyors and local assistants. Tribal councils were involved in the project from its inception, approving the project, contributing to interview protocols, selecting local experts, participating in data review workshops, and reviewing draft products. Local experts have contributed their knowledge and reviewed and commented on draft products.

DISCUSSION AND CONCLUSIONS

This study has documented the harvest and use of non-salmon fish in the communities of Shishmaref, Wales, Brevig Mission, Teller, and Stebbins through harvest surveys, ethnographic interviews, mapping, archival research and participant observation. The harvest surveys provided baseline information about the current harvest and use of non-salmon species and the ethnographic interviews, mapping and other methods provided more detailed information on each species, as well local experts' perspectives on important topics such as cultural values associated with fishing.

All of the objectives of this study have been met. Objectives one through three were met with the harvest survey results and objective four was met through the ethnographic interviews, mapping, participant observation and data review workshops. In addition to meeting the project objectives, this research also had significant capacity building outcomes for Kawerak, region tribes, and the individuals hired to work on the project.

Interviews with local experts, community and tribal council meetings, and other interactions with residents all reinforced the idea that non-salmon fish remain important to individuals and communities in contemporary times. Harvest survey results also indicate that residents of these communities put significant effort into harvesting non-salmon fish and that they are shared widely within communities. Subsistence harvested non-salmon fish have important economic roles in study communities. Project participants expressed the economic benefits of non-salmon fish as arising from their savings from not having to purchase expensive store foods and having foods that they could barter or trade with for other subsistence foods they desired. The nutritional and health benefits of non-salmon fish over store-bought foods were also recognized; participants view non-salmon fish as a healthy, natural food in general, identify fish as a particularly healthful food, and also recognize the benefits to physical and mental well-being that

³ This book of recipes and preparation techniques is available through Kawerak's Social Science Program. Requests should be directed to: Social Science Program Director, P.O. Box 948, Nome, AK, 99762 or socsci@kawerak.org.

often follow from exercise and being out in the country while harvesting fish. The social and cultural benefits of non-salmon fish were also articulated as stemming from pride or good-feelings about carrying on a tradition, that fish and fishing are integral to some peoples' identity, the benefits derived from intergenerational interactions and social contact in general, and the fact that non-salmon fish are culturally preferred foods. Various other reasons for the importance of non-salmon fish to individuals, families and communities were also discussed by participants, such as believing that people will need to have subsistence skills in the future to survive, to being self-sufficient and having the ability to provide for self, family and community. As the above indicates, non-salmon fish continue to play a variety of important roles in contemporary village life.

Some other research highlights and interesting findings are discussed below.

Natural Indicators

Local experts described their knowledge of a variety of natural indicators that are used to determine the timing of fish movements and harvest windows. Moncrieff et al. (2009) have documented natural indicators related to salmon populations on the Yukon River. Similar to that study, local experts interviewed for this research discussed non-salmon indicators. Some examples of non-salmon harvest indicators include:

- In the Teller area, the first snowfall of the year indicates that Arctic Ciscos are heading up into Imaruk Basin.
- In Stebbins, the first half moon in early January indicates that tomcod have spawned out and are no longer good for harvesting.
- In Shishmaref, when local grasses begin turning from green to brown it indicates that it is time to begin herring fishing.

This information regarding indicators is unique to each community and its local ecosystem and has been passed down through generations of fishers. All of the indicators documented by this project are “correlative”. These indicators correlate residents' observations of natural phenomena to non-salmon fish behavior, runs or physical status (Moncrieff et al. 2009). This is different than “causal” indicators which are “events that influence the timing, size or quality” of a fish run in “a direct or indirect way” (*ibid.*:55). While it was not specifically mentioned by experts, it is possible that some indicators may become unreliable in the future due to changing climactic conditions, or that others have already dropped out of use for the same reason.

Climate Changes

Climate changes have been experienced across the region. In some cases, later freeze-up is delaying or preventing access to certain fish. Weather that is less predictable than in the past, including changes in seasonal temperatures, rain and wind patterns, and other factors have all impacted, to varying degrees, region residents access to non-salmon species. In some locations, increases in freshwater flow have diluted saltier water and have led to more brittle, unstable ice which can be problematic and dangerous for travel and some non-salmon harvests. It is anticipated that many of the climate changes observed throughout the region will have cumulative impacts on non-salmon fish, or subsistence harvester access to those fish, in the

future. This study provides new information and additional detail to previous fisheries and climate change research in the region (Raymond-Yakoubian 2009).

Obstacles to Fishing

In addition to climate changes, there are other particular challenges to the harvest of non-salmon fish for some region residents. For example many harvest survey respondents, as well as some interviewees and other region residents have indicated that non-salmon fishing is not possible (or not possible with the frequency they would prefer) because they lack reliable means of transportation such as boats, motors, or all-terrain vehicles. Lack of appropriate gear (such as nets), is also an issue for some. This research has shown that barriers related to transportation can be a major hindrance to many people who have a desire to harvest non-salmon fish (and other subsistence resources).

Stone Fish Traps

Another interesting result of this study was the documentation of the use of a stone fish trap on the Kuzitrin River. In the past, residents of the abandoned village of Mary's Igloo would construct a trap across the Kuzitrin River each year to trap whitefish. They would then use dipnets to harvest the fish. No other stone fish traps have been documented in the region, to the best of the author's knowledge. Documentation of this stone trap, as well as other information about previously used harvest methods, are important contributions to our knowledge of indigenous Bering Strait region fisheries. Additional research on harvest methods used in traditional times may uncover more information about other similar traps.

Non-Salmon Taxonomy

This study documented non-salmon fish taxonomy in each community. The phrase "non-salmon fish" was used to describe the wide range of fish that this study focused on. This category is not frequently used by local fishers, however. Region residents usually refer to each species of fish individually (rather than as a group of fish, the shared characteristic of which is *not* being a salmon). Communities recognize that all of these fish are important but few individual species have the same status as salmon in terms of desirability, amount of harvest effort, or actual harvest. Their importance as a group approaches that of salmon and other resources, however. Because of this, there is utility in grouping all of these various fish together into the category of "non-salmon".

Through the process of learning about local taxonomy it was discovered that Brevig Mission and Teller area experts have observed fish that they believe differ from what is known by western fisheries science. A type of whitefish locally known as "Salt Lake whitefish" are believed to be unique to the Imuruk Basin. Experts describe it as being larger than other species of whitefish and having a hooked nose and greenish back. These whitefish also taste different than others. In addition, experts believe that the tomcod in the area are of two types; one small and one larger. Expert observations have led to the conclusion that the size difference is not related to age, but that there are two distinct kinds of tomcod. Additional ethnographic and biological investigations into these species may prove fruitful.

Related to the above is the local nomenclature used for fishes known as burbot and lingcod. Many non-salmon fish are known by multiple names and names other than their common name. These names are not typically the known names of other fish, however. For example, sculpin are called bullheads and capelin are called cigar fish, but sculpin are never called capelin. In the case of burbot, many region residents refer to that fish as lingcod. This was confirmed by showing experts images of both fish and talking through their knowledge of them. For example, experts would view the burbot image and definitively call it a lingcod. Taxonomic ambiguity did arise with a few experts when viewing images of lingcod; some would call it a burbot, while others would say that they did not recognize it. This information is quite important for management and highlights one of the many reasons fisheries managers must be engaged with local communities and the value of this type of research.

Changes in Fisheries

This study has also highlighted multiple changes related to fisheries that have taken place within communities both over the course of the lifetimes of the experts interviewed, as well as over the course of generations. This includes decreases in participation in non-salmon fishing, which was described by the majority of local experts interviewed. While overall participation seems to have decreased, the actual harvest of fish has increased in some communities since 2005-2006 (Ahmasuk et al. 2008; Table 2), though harvests have certainly decreased from several decades ago and the more distant past. Several harvest survey results stand out for further discussion. In Teller, there was an approximately 600% increase in the harvest of whitefish from the 2005-2006 harvest survey (Ahmasuk et al. 2008) to the 2009-2010 harvest survey. And in Stebbins, there was an approximately 1300% increase in the harvest of tomcod from the 2005-2006 harvest survey (*ibid.*) to the 2009-2010 harvest survey. Individual local experts and data review workshop participants were asked about these large changes in harvest. No specific reasons for the increased harvests in either community were given. Experts and workshop participants all discussed the natural variability, sometimes great, in fish populations from year to year as well as variability in weather and ice conditions and believed that it explained these differences in harvest levels.

Youth participation in all aspects of non-salmon fishing (harvesting and preparation) is also a change that has been observed and is a concern that was expressed by many experts. While noting that many youth do participate, they feel that not enough do, which may put traditions and knowledge associated with non-salmon fish at risk.

Related to the above, another interesting result derived from local expert observations, is the idea that smells are a reason why many youth do not participate or hesitate to participate in subsistence activities. Experts have observed that some youth have no tolerance for smells outside of their typical, everyday experiences (e.g., school, store, home) and that processing subsistence foods like non-salmon fish can involve smells that youth interpret as “unpleasant”. One expert commented that when he was younger, around the time when snowmachines were coming into greater use, his grandparents would comment on how he reeked of fumes after returning from riding. This same expert pointed out the irony of the swift (basically one generation) change from considering human-created smells to be unpleasant, to the smells of subsistence foods being considered unpleasant. The olfactory aspect of indigenous foods is often

commented upon by non-indigenous people, but there has been very little investigation into how “subsistence-related smells” are perceived by indigenous people of various ages.

Cultural Values

Harvest survey results related to the giving and receiving of non-salmon fish (Tables 8-12) add weight to the comments of local experts and others regarding the cultural importance of sharing. Over 50% of the surveyed households in Shismaref, Teller and Stebbins received non-salmon fish from other households during the 2009-2010 survey period. In Wales, 28.6% of surveyed households, and in Brevig Mission 6.9% of surveyed households, received non-salmon fish from other households during the same period. Additionally, during the 2009-2010 harvest period, over 50% of surveyed households in Shismaref and Stebbins shared non-salmon fish with another household. In Wales, 42.9% of surveyed households shared non-salmon, in Brevig Mission 23.6% and in Teller 47.2% of surveyed households shared non-salmon fish during the study period. Local experts repeatedly discussed the importance of sharing, as well as the importance of not wasting, and highlighted these actions as being some of the most highly valued cultural practices.

This project has also elucidated the importance of storytelling, social interactions, and personal observations of and engagement with the environment as ways that knowledge of non-salmon fish is generated and passed on to others. This knowledge is made operational during the harvest and processing of fish. Some aspects of local and traditional knowledge of non-salmon fish held by older experts is no longer used or is in danger of disappearing due to lack of use, which was a concern expressed by community members. Despite the contraction of some aspects of this knowledge base, a large body of it remains in active use and new knowledge is added as fishers observe and adapt to changes in their environment. These results correspond to those of similar studies, as well (e.g. Anderson et al. 2004; Brown et al. 2005; Georgette and Shiedt 2005).

Management Implications

This research has several implications for fisheries managers. One is that residents of the five study communities expressed their desire for agencies to engage with them on a deeper level when it comes to any possible changes to fisheries regulations or management. Experts and others have a desire for community meetings and other outreach and wish to feel informed about and, especially, to feel included in decision making. This is not a new request, and is one that is expressed frequently when fish-related topics are discussed with experts and elders.

As noted above, it is important for managers to be familiar with local nomenclature regarding non-salmon fisheries, which is another reason to encourage more frequent community engagement.

Additionally, management of non-salmon fisheries must take into consideration the climactic changes that the region is undergoing. While there are no current regulations restricting the fishing season for non-salmon fish (see Summary of Current Non-Salmon Fishing Regulations), if any changes are proposed in the future they must include an evaluation of how they may impact non-salmon fish access.

This study has helped illuminate some of the broader cultural context and values associated with non-salmon fish for Bering Strait residents. Human relationships to fish are important, structured, and reflect larger cultural beliefs about proper behavior towards animals, the environment, and other people. This study will help managers understand the broader context of these fisheries and the importance of non-salmon fish to region communities.

Prior to the completion of this project, very little information had been documented regarding the subsistence use of non-salmon fish by Bering Strait region residents. Few previous harvest surveys have recorded non-salmon harvest numbers and no focused qualitative research had been conducted. The method of harvest surveys was not favored by some project participants; some indicated feeling “surveyed out” (too many harvest surveys), some reported that results from previous surveys had never been returned to their community, and some feared that survey results would be used against communities to restrict subsistence harvests. Semi-structured ethnographic interviews, however, were an ideal way to document expert information about non-salmon fish. Experts were able to focus on the fish species that they were most familiar with and to provide detailed information about habitat, preparation, observed changes, or other topics. While harvest surveys and ethnographic interviews can be very complimentary data sets, local desires must also be considered. Many interviewees and workshop participants expressed that it is important to share their knowledge with younger generations, as well as with fisheries managers and others, and that they appreciated the opportunity to talk about fish and participate in the project.

RECOMMENDATIONS

The recommendations below are directed to Federal and State agencies responsible for fisheries, communities and subsistence practitioners, and Kawerak or other similar organizations which provide services to Bering Strait region residents.

1. Agencies or organizations should conduct research similar to this project in other Bering Strait region communities.
2. Agencies or organizations should consider doing targeted work on the species that are most frequently harvested. Though large amounts of information were collected on each species, it is clear that much more could be documented if research focused on one or several species.
3. Agencies or organizations should document, in detail, fish preparation methods that are infrequently practiced in contemporary times, such as ageing fish, to aid in cultural preservation activities.
4. Agencies should fund baseline testing for contaminants and toxins in various species of non-salmon fish harvested for subsistence.
5. Agencies or organizations should work with local experts to learn more about the tomcod and whitefish populations in the Brevig Mission-Teller area that were identified as different species than are currently recognized by fisheries scientists.
6. Agencies or organizations should look more closely at the impact of seals on non-salmon fish and the role of climate change in possible changes to seasonal seal behavior.

7. Agencies should have more regular contact with village residents to gather information on emerging concerns and to develop stronger relationships.
8. Agencies should have community meetings with village residents and tribal councils as early as possible when regulatory changes are being considered.
9. Agencies, organizations and communities should submit comments to regulatory bodies on topics relating to non-salmon subsistence fisheries. Examples of this would include: submitting comments to the International Maritime Organization regarding development of the Polar Code and the need to prevent ship discharge in the region; or to the U.S. Coast Guard regarding port siting and the need to take subsistence practices and non-salmon habitat into consideration.
10. Organizations, communities and subsistence practitioners should facilitate youth and other community member participation in non-salmon fishing activities. Examples of this would include: organizing events such as “agutuk parties” to show people how to make whitefish agutuk or some other dish; or when going fishing, individuals could make an effort to invite a young person whose family may not fish often.

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APPENDIX 1.

Semi-structured Interview Guide

For each species of non-salmon fish:

1. Taxonomy
 - Do you know the Iñupiaq/Yup'ik name of X fish?
 - Are there any other names for this fish, in Iñupiaq/Yup'ik or English?
2. Current/ previous harvest locations
 - What time of year do you harvest X fish?
 - Where do you usually fish for X?
 - Are there places known as being particularly good for X fish?
 - Are there places that were fished in the past, that aren't anymore?
 - Do people own certain fishing locations?
3. Changes in species distribution
 - Have X fish moved into new locations that they never were before?
 - Are there places where they used to be, but aren't anymore?
4. Changes in population numbers
 - Do you think the number of X fish is increasing, decreasing, or has stayed the same over the course of your lifetime?
 - Can you tell me about any particular periods of change?
 - Why do you think these changes have happened?
5. Have you seen any changes in the health X fish?
 - When and where did you see them?
 - Have you seen an increase in fish with these problems over your lifetime?
 - What do you think is causing this?
6. Current/ previous harvest methods
 - What kinds of X fish do you prefer (male, female, juvenile, adult)?
 - How has fishing for X fish changed over your lifetime?
 - What gear do you use to harvest X fish?
 - Did people use different methods in the past?
 - What other kinds of methods could you use?
7. Current/previous processing, storage and preparation methods
 - How to you prepare/store X fish now?
 - Can you dry, freeze and ferment this fish?

- What are ways people prepared/stored X fish in the past?
8. Economic importance of fish
- How important is X to your family's food supply?
 - Do you sell or trade these fish for other foods or other things?
 - Are X fish used for anything else (like dog food, crafts, etc.)?
9. Cultural importance of fish
- Why are X fish important to you and your family and to your community?
 - What is your favorite fish and why?
 - Do you know any old stories about X fish?
 - Are there things that people are supposed to do or not do to make X fish plentiful?
 - Are there certain rules about or ways that X fish are supposed to be treated (like taboos)?
10. Habitat preferences, spawning areas, seasonal movements of fish
- What do you know about the seasonal movements of X fish? Where are they in the summer/winter?
 - What kind of conditions do X fish like, where do they like to live?
 - Where do they spawn? When do the eggs hatch?
 - What do they eat? How long do they live?
 - When do they usually show up near your community?
11. What animals eat these fish?
12. Climate and environmental changes that may impact fishing activities
- Have you observed any changes in the environment that are affecting either the fish or your ability to fish them? (erosion, flooding, drying of lakes)
 - Changes in ice conditions (timing of freeze-up or break-up)
13. Has the price of gas impacted your fishing?
14. Is there anything else related to non-salmon fish that you would like to talk about?

APPENDIX 2

This appendix includes Tables illustrating the estimated subsistence harvest of non-salmon fish for each community.

Table 23: Total estimated harvest of non-salmon fish, Shishmaref, 2009-2010.

Resource	April	May	June	July	August	September	October	November	December	January	February	March	Estimated Number Harvested		Estimated Pounds Harvested		95% Conf Limit (+/-) Harvest	
													Sum	Mean	Sum	Mean		
Blackfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Burbot	-	-	-	-	40.3	28.4	-	-	-	-	-	-	-	74.7	0.3	313.8	1.2	62.3%
Capelin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Cod	158.4	-	-	-	-	527.5	4,931.5	10,251.5	7,980.0	5,633.8	8,746.6	1,344.9	39,574.2	148.2	8,310.6	31.1	53.3%	
Dolly Varden	-	-	79.2	119.6	94.1	258.5	9.0	20.9	9.0	-	3.0	17.9	611.2	2.3	2,017.0	7.6	33.7%	
Flounder	12.0	-	-	67.2	95.6	-	-	-	-	-	-	-	174.8	0.7	174.8	0.7	46.6%	
Grayling	-	-	-	-	95.6	77.7	47.8	687.4	25.4	7.5	74.7	-	1,016.2	3.8	711.3	2.7	25.3%	
Hallibut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Herring	-	-	-	-	1,868.0	27,922.5	8,084.6	3,631.3	807.0	59.8	59.8	-	42,433.0	158.9	7,637.9	28.6	50.9%	
Lingcod	-	-	-	-	68.7	12.0	3.0	14.9	4.5	-	-	-	103.1	0.4	-	-	53.2%	
Northern pike	-	-	-	-	1.5	29.9	-	6.0	-	-	-	-	37.4	0.1	104.6	0.4	93.5%	
Other	-	-	-	-	-	4.5	-	14.9	-	-	-	-	19.4	0.1	-	-	90.1%	
Sculpin	6.0	273.5	246.6	22.4	-	-	-	31.4	-	-	22.4	28.4	630.6	2.4	945.9	3.5	45.4%	
Sheefish	3.0	-	-	1.5	3.0	9.0	-	-	-	-	-	-	16.4	0.1	90.4	0.3	48.8%	
Smelt	95.6	-	-	-	-	-	110.6	1,769.3	827.9	633.6	715.8	868.2	5,021.1	18.8	703.0	2.6	33.1%	
Whitefish	-	-	95.6	675.5	815.9	783.1	917.6	672.5	298.9	-	-	-	4,259.0	16.0	12,777.0	47.9	24.5%	
All Non-salmon	275.0	273.5	421.4	886.2	3,082.9	29,653.0	14,104.0	17,106.2	9,952.6	6,334.7	9,622.3	2,259.5	93,971.2	352.0	33,786.4	126.5	131.0%	

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 24: Total estimated harvest of non-salmon fish, Wales, 2009-2010.

Resource	April	May	June	July	August	September	October	November	December	January	February	March	Estimated Number Harvested		Estimated Pounds Harvested		95% Conf Limit (+/-) Harvest	
													Sum	Mean	Sum	Mean		
Blackfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Burbot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Capelin	-	-	-	94.5	-	-	-	-	-	-	-	-	-	94.5	2.7	18.9	0.2	57.9%
Cod	32.6	-	16.3	16.3	-	-	-	-	-	-	27.1	16.3	-	108.6	3.1	22.8	0.7	28.5%
Dolly Varden	-	-	20.6	77.1	117.3	21.7	-	-	-	-	-	-	-	236.7	6.8	781.1	22.3	26.0%
Flounder	-	-	8.7	14.1	-	-	-	-	-	-	16.3	-	-	39.1	1.1	39.1	1.1	30.1%
Grayling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Halibut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Herring	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Lingcod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Northern pike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Other	-	-	5.4	29.3	43.4	-	-	-	-	-	-	-	-	78.2	2.2	-	-	30.2%
Sculpin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Sheefish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	
Smelt	-	-	-	-	5.4	-	-	-	-	-	-	-	-	5.4	0.2	0.8	0.0	57.9%
Whitefish	-	-	-	-	98.8	17.4	-	-	-	-	-	-	-	116.2	3.3	348.5	10.0	32.0%
All Non-salmon	32.6	-	34.7	231.3	281.2	39.1	-	-	-	-	43.4	16.3	-	678.6	19.4	1,211.1	34.2	59.6%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 25: Total estimated harvest of non-salmon fish, Brevig Mission, 2009-2010.

Resource	April	May	June	July	August	September	October	November	December	January	February	March	Estimated Number Harvested		Estimated Pounds Harvested		95% Conf Limit (+/-) Harvest	
													Sum	Mean	Sum	Mean		
Blackfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Burbot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capelin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cod	188.9	147.6	121.6	-	-	-	106.3	318.8	526.5	35.4	0.0	59.0	1,504.0	7.0	315.8	1.5	18.9%	
Dolly Varden	-	-	14.2	23.6	11.8	9.4	94.4	-	-	-	-	-	153.5	0.7	506.5	2.3	40.6%	
Flounder	-	-	47.2	-	-	35.4	17.7	-	-	-	-	-	100.3	0.5	100.3	0.5	41.8%	
Grayling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Halibut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Herring	-	23.6	47.2	-	-	-	59.0	-	-	-	-	-	129.9	0.6	23.4	0.1	47.3%	
Lingcod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Northern pike	2.4	-	-	-	-	153.5	-	-	-	-	-	-	155.8	0.7	436.3	2.0	77.2%	
Other	-	-	3.5	-	-	-	-	-	-	-	-	-	3.5	-	-	-	-	
Sculpin	-	1.2	-	-	-	-	-	-	-	-	-	-	1.2	-	1.8	-	78.4%	
Sheefish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Smelt	118.1	59.0	-	-	-	35.4	82.6	466.3	696.5	23.6	-	-	1,481.6	6.9	207.4	1.0	22.4%	
Whitefish	-	336.5	47.2	-	47.2	141.7	-	-	-	-	-	-	572.6	2.7	1,717.7	8.0	21.7%	
All Non-salmon	309.3	567.8	281.0	23.6	59.0	375.4	360.1	785.1	1,223.1	59.0	0	59.0	4,102.4	1.2	3,309.3	1.1	49.7%	

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 26: Total estimated harvest of non-salmon fish, Teller, 2009-2010.

Resource	April	May	June	July	August	September	October	November	December	January	February	March	Estimated Number Harvested		Estimated Pounds Harvested		95% Conf Limit (+/-) Harvest
													Sum	Mean	Sum	Mean	
Blackfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Burbot	-	-	2.5	-	-	-	-	6.2	6.2	-	-	-	14.9	0.3	62.8	1.2	76.0%
Capelin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Cod	979.0	655.3	-	-	-	1,639.0	-	1,145.7	909.1	1,016.2	348.7	468.2	7,161.1	135.1	1,503.8	28.4	28.1%
Dolly Varden	-	-	249.2	101.1	119.5	-	-	-	-	-	-	3.7	473.6	8.9	1,562.8	29.5	20.7%
Flounder	-	97.1	-	560.4	579.1	610.2	186.8	-	-	-	-	-	2,033.5	38.4	2,033.5	38.4	74.4%
Grayling	-	-	-	6.2	21.2	22.4	-	-	-	-	-	-	49.8	0.9	34.9	0.7	70.5%
Halibut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Herring	1,383.6	1,643.9	-	-	266.5	1,383.6	1,383.6	1,307.5	-	-	-	-	7,368.9	139.0	1,326.4	25.0	69.7%
Lingcod	-	-	24.9	-	-	-	-	-	-	-	-	-	24.9	0.5	-	-	89.7%
Northern pike	264.0	31.1	6.2	-	13.7	7.5	18.7	-	-	-	-	54.8	396.0	7.5	1,108.8	20.9	28.4%
Other	-	-	373.6	373.6	373.6	-	-	-	-	-	-	-	1,120.8	21.1	-	-	89.7%
Sculpin	-	-	12.5	12.5	12.5	49.8	12.5	-	-	-	-	-	99.6	1.9	149.4	2.8	64.9%
Sheefish	-	-	-	6.2	-	-	-	-	-	-	-	-	6.2	0.1	34.2	0.6	73.7%
Smelt	186.8	124.5	-	-	-	1,556.6	-	1,718.5	2,004.9	2,093.3	510.6	249.1	8,444.3	159.3	1,182.2	22.3	22.5%
Whitefish	1,534.2	1,357.4	295.1	188.0	155.7	149.4	-	871.7	871.7	-	-	71.0	5,494.2	103.7	16,482.6	311.0	71.0%
All Non-salmon	4,347.7	3,909.3	964.0	1,248.0	1,541.7	5,418.6	1,601.6	5,049.6	3,791.9	3,109.5	859.2	846.8	32,687.8	616.8	25,481.5	480.8	89.8%

Source: Kawerak, Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

Table 27: Total estimated harvest of non-salmon fish, Stebbins, 2009-2010.

Resource	April	May	June	July	August	September	October	November	December	January	February	March	Estimated Number Harvested		Estimated Pounds Harvested		95% Conf Limit (+/-) Harvest
													Sum	Mean	Sum	Mean	
Blackfish	-	-	-	-	-	-	-	-	48.7	-	-	-	48.7	0.5	3.4	0.0	84.3%
Burbot	-	-	-	-	-	-	-	-	6.1	-	-	-	6.1	0.1	25.6	0.3	84.3%
Capelin	-	-	24.3	-	-	-	-	-	-	-	-	-	24.3	0.3	4.9	0.1	84.3%
Cod	377.4	343.3	109.6	0.0	121.7	874.1	4,691.8	5,052.2	243.5	60.9	0.0	109.6	11,984.0	130.3	2,516.6	27.4	20.7%
Dolly Varden	-	-	12.2	20.7	11.0	-	-	-	-	-	-	-	43.8	0.5	144.6	1.6	40.5%
Flounder	-	14.6	104.7	18.3	-	-	-	-	-	-	-	-	137.6	1.5	137.6	1.5	30.8%
Grayling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Halibut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Herring	-	2,860.9	37,802.4	182.6	-	-	-	-	-	-	-	-	40,845.9	444.0	7,352.3	79.9	16.4%
Lingcod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
Northern pike	-	-	-	-	12.2	-	-	-	-	-	-	21.9	34.1	0.4	95.4	1.0	61.7%
Other	-	-	-	-	-	-	2.4	-	-	-	-	97.4	99.8	1.1	-	-	82.3%
Sculpin	-	-	34.1	-	-	-	-	-	-	-	-	-	34.1	0.4	51.1	0.6	53.3%
Sheefish	-	-	-	12.2	107.1	258.1	39.0	67.0	-	105.9	-	2.4	591.7	6.4	3,254.1	35.4	26.8%
Smelt	-	608.7	270.3	-	-	-	18.3	-	48.7	-	-	0.0	945.9	10.3	132.4	1.4	57.0%
Whitefish	-	121.7	28.0	60.9	60.9	607.5	255.7	608.7	24.3	-	-	0.0	1,767.7	19.2	5,303.0	57.6	33.3%
All Non-salmon	377.4	3,949.2	38,385.6	294.6	312.9	1,739.7	5,007.1	5,727.8	371.3	166.8	-	231.3	56,563.7	614.8	19,021.0	206.7	56.5%

Source: Kawerak Inc., U.S. Fish and Wildlife Service, Office of Subsistence Management, 2009-2010 Non-Salmon Harvest Survey, Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project.

APPENDIX 3

Harvest Survey Instrument

2010 Subsistence Non-salmon Survey

Shishmaref, Wales, Brevig Mission, Teller & Stebbins

April 1, 2009 to March 31, 2010

The purpose of the project is to add to U.S. Fish & Wildlife Service Office of Subsistence Management's subsistence harvest database to improve information on the nature and extent of subsistence harvest of non-salmon fish in your community. We will not report any results at the household level. We will not use this information for enforcement. The results of the survey will also be used to develop a research plan for documenting traditional knowledge about these species through interviews with Local Experts in 2011. Participation in this survey is voluntary. Even if you agree to be surveyed, you may stop at any time.

HOUSEHOLD ID:	
COMMUNITY ID:	
INTERVIEWER:	
INTERVIEW DATE:	
START TIME:	
STOP TIME:	
DATA CODED BY:	
DATA ENTERED BY:	
SUPERVISOR:	

Would you like to participate in this survey?..... Y N

How many people reside in your household?.....



Tomcod Fisher. Courtesy of the University of Alaska Fairbanks archives, Albert Johnson Photograph Collection.

COOPERATING ORGANIZATIONS

NATIVE VILLAGE OF WALES
P.O. BOX 549
WALES, AK 99783
907-664-3062

NATIVE VILLAGE OF SHISHMAREF
P.O. BOX 72110
SHISHMAREF, AK 99772
907-649-3824

BREVIK MISSION TRADITIONAL COUNCIL
P.O. BOX 85039
BREVIK MISSION, AK 99785
907-642-4301

TELLER TRADITIONAL COUNCIL
P.O. BOX 567
TELLER, AK 99778
907-642-3381

STEBBINS COMMUNITY ASSOCIATION
P.O. BOX 71002
STEBBINS, AK 99671
907-934-3561

KAWERAK, INCORPORATED
SUBSISTENCE & SOCIAL SCIENCE PROGRAMS
P.O. 948
NOME, AK 99762
907-443-4265

OFFICE OF SUBSISTENCE MANAGEMENT
U.S. FISH & WILDLIFE SERVICE
3601 C STREET, SUITE 1030
ANCHORAGE, AK 99503
907-786-3380

HOUSEHOLD MEMBERS

HOUSEHOLD ID

Between APRIL 2009 and MARCH 2010...
 ...who lived in your household?

ID#	IS THIS PERSON ANSWERING QUESTIONS ON THIS SURVEY?	MALE OR FEMALE?	ALASKA NATIVE?	IN WHAT YEAR WAS THIS PERSON BORN?	HOW MANY YEARS HAS THIS PERSON LIVED IN _____?	BETWEEN APRIL 2009 & MARCH 2010 DID THIS PERSON HARVEST NON-SALMON FISH?	BETWEEN APRIL 2009 & MARCH 2010 DID THIS PERSON PROCESS NON-SALMON FISH?
	(circle Y or N)	(circle)	(circle Y or N)	(year)	(number)	(circle Y or N)	(circle Y or N)
HEAD 1 01	Y N	M F	Y N		YRS	Y N	Y N
<i>Enter spouse or partner next. If household has a SINGLE HEAD, leave HEAD 2 blank.</i>							
HEAD 2 02	Y N	M F	Y N		YRS	Y N	Y N
<i>Enter children (oldest to youngest), grandchildren, grandparents, brothers, sisters, or anyone else living full-time in this household.</i>							
03	Y N	M F	Y N		YRS	Y N	Y N
04	Y N	M F	Y N		YRS	Y N	Y N
05	Y N	M F	Y N		YRS	Y N	Y N
06	Y N	M F	Y N		YRS	Y N	Y N
07	Y N	M F	Y N		YRS	Y N	Y N
08	Y N	M F	Y N		YRS	Y N	Y N
09	Y N	M F	Y N		YRS	Y N	Y N
10	Y N	M F	Y N		YRS	Y N	Y N
11	Y N	M F	Y N		YRS	Y N	Y N
12	Y N	M F	Y N		YRS	Y N	Y N
13	Y N	M F	Y N		YRS	Y N	Y N
14	Y N	M F	Y N		YRS	Y N	Y N
15	Y N	M F	Y N		YRS	Y N	Y N

PERMANENT HH MEMBERS: 01

SHEEFISH

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for SHEEFISH for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST SHEEFISH?..... N Y

Please estimate how many Sheefish ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include SHEEFISH you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY SHEEFISH DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)							
SHEEFISH	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400000																						
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)							
SHEEFISH	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400002																						
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)							
SHEEFISH	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400003																						
These columns should include all SHEEFISH harvested between April 2009 and March 2010.																							

Of your household's total SHEEFISH harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for SHEEFISH between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for SHEEFISH different compared to previous years?

Where does your household usually harvest SHEEFISH? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Sheefish River")

SHEEFISH: 03

Do members of your household USUALLY, SOMETIMES, or NEVER fish for LINGCOD for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST LINGCOD?..... N Y

Please estimate how many Lingcod ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include LINGCOD you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY LINGCOD DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)							
LINGCOD	N	Y	N	Y	N	Y													IND	N	Y	N	Y
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)							
LINGCOD	N	Y	N	Y	N	Y													IND	N	Y	N	Y
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)							
LINGCOD	N	Y	N	Y	N	Y													IND	N	Y	N	Y
These columns should include all LINGCOD harvested between April 2009 and March 2010.																							

Of your household's total LINGCOD harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for LINGCOD between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for LINGCOD different compared to previous years?

Where does your household usually harvest LINGCOD? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Lingcod River")

COD (TOMCOD, SAFFRON COD, ARCTIC COD, & BLUE COD)

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for COD for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST COD?..... N Y

Please estimate how many Cod ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include COD you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY COD DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...						
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)						
COD	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)						
COD	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)						
COD	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																							
These columns should include all COD harvested between April 2009 and March 2010.																							

Of your household's total COD harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for COD between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for COD different compared to previous years?

Where does your household usually harvest COD? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Cod River")

COD: 05

HERRING

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for HERRING for subsistence? (CIRCLE ONE BELOW)
 USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST HERRING?..... N Y

Please estimate how many Herring ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include HERRING you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY HERRING DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)							
HERRING	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)							
HERRING	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)							
HERRING	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																							
These columns should include all HERRING harvested between April 2009 and March 2010.																							

Of your household's total HERRING harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for HERRING between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)
 Very good Average Poor

Why was fishing for HERRING different compared to previous years?

Where does your household usually harvest HERRING? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Herring River")

HERRING: 06

Do members of your household **USUALLY**, **SOMETIMES**, or **NEVER** fish for GRAYLING for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST GRAYLING?..... N Y

Please estimate how many Grayling ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include GRAYLING you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY GRAYLING DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...								
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?							
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)								
GRAYLING	N	Y	N	Y	N	Y															IND	N	Y	N	Y
	126400000																								
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)								
GRAYLING	N	Y	N	Y	N	Y															IND	N	Y	N	Y
	126400002																								
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)								
GRAYLING	N	Y	N	Y	N	Y															IND	N	Y	N	Y
	126400003																								
These columns should include all GRAYLING harvested between April 2009 and March 2010.																									

Of your household's total GRAYLING harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for GRAYLING between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for GRAYLING different compared to previous years?

Where does your household usually harvest GRAYLING? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Grayling River")

NORTHERN PIKE

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for NORTHERN PIKE for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST NORTHERN PIKE?..... N Y

Please estimate how many Northern Pike ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include NORTHERN PIKE you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY NORTHERN PIKE DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...				
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?			
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH GILL NET OR SEINE													<i>(circle Y or N)</i>				
NORTHERN PIKE	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																					
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													<i>(circle Y or N)</i>				
NORTHERN PIKE	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																					
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH OTHER GEAR													<i>(circle Y or N)</i>				
NORTHERN PIKE	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																					
<i>These columns should include all NORTHERN PIKE harvested between April 2009 and March 2010.</i>																					

Of your household's total NORTHERN PIKE harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for NORTHERN PIKE between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for NORTHERN PIKE different compared to previous years?

Where does your household usually harvest NORTHERN PIKE? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Northern Pike River")

NORTHERN PIKE: 08

FLOUNDER

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for FLOUNDER for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST FLOUNDER?..... N Y

Please estimate how many Flounder ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include FLOUNDER you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY FLOUNDER DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)							
FLOUNDER	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)							
FLOUNDER	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)							
FLOUNDER	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																							
These columns should include all FLOUNDER harvested between April 2009 and March 2010.																							

Of your household's total FLOUNDER harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for FLOUNDER between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for FLOUNDER different compared to previous years?

Where does your household usually harvest FLOUNDER? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Flounder River")

FLOUNDER: 09

HALIBUT

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for HALIBUT for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST HALIBUT?..... N Y

Please estimate how many Halibut ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include HALIBUT you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY HALIBUT DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...						
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)						
HALIBUT	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)						
HALIBUT	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)						
HALIBUT	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																							
These columns should include all HALIBUT harvested between April 2009 and March 2010.																							

Of your household's total HALIBUT harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for HALIBUT between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for HALIBUT different compared to previous years?

Where does your household usually harvest HALIBUT? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Halibut River")

HALIBUT: 10

SCULPIN

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for SCULPIN for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST SCULPIN?..... N Y

Please estimate how many Sculpin ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include SCULPIN you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY SCULPIN DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...						
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)						
SCULPIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400000																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)						
SCULPIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400002																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)						
SCULPIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
126400003																							
These columns should include all SCULPIN harvested between April 2009 and March 2010.																							

Of your household's total SCULPIN harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for SCULPIN between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for SCULPIN different compared to previous years?

Where does your household usually harvest SCULPIN? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Sculpin River")

Do members of your household USUALLY, SOMETIMES, or NEVER fish for BURBOT for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST BURBOT?..... N Y

Please estimate how many Burbot ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include BURBOT you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY BURBOT DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...									
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?								
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)									
BURBOT	N	Y	N	Y	N	Y															IND	N	Y	N	Y	
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)									
BURBOT	N	Y	N	Y	N	Y																IND	N	Y	N	Y
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)									
BURBOT	N	Y	N	Y	N	Y																IND	N	Y	N	Y
These columns should include all BURBOT harvested between April 2009 and March 2010.																										

Of your household's total BURBOT harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for BURBOT between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for BURBOT different compared to previous years?

Where does your household usually harvest BURBOT? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Burbot River")

Do members of your household USUALLY, SOMETIMES, or NEVER fish for BLACKFISH for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST BLACKFISH?..... N Y

Please estimate how many Blackfish ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include BLACKFISH you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY BLACKFISH DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...						
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?				
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)						
BLACKFISH	N	Y	N	Y	N	Y	N	Y										IND	N	Y	N	Y
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)						
BLACKFISH	N	Y	N	Y	N	Y	N	Y										IND	N	Y	N	Y
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)						
BLACKFISH	N	Y	N	Y	N	Y	N	Y										IND	N	Y	N	Y
These columns should include all BLACKFISH harvested between April 2009 and March 2010.																						

Of your household's total BLACKFISH harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for BLACKFISH between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for BLACKFISH different compared to previous years?

Where does your household usually harvest BLACKFISH? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Blackfish River")

Do members of your household USUALLY, SOMETIMES, or NEVER fish for DOLLY VARDEN for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST DOLLY VARDEN?..... N Y

Please estimate how many Dolly Varden ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include DOLLY VARDEN you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY DOLLY VARDEN DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...						
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE													(circle Y or N)						
DOLLY VARDEN	N	Y	N	Y	N	Y													IND	N	Y	N	Y
<input style="width: 100px;" type="text"/>																							
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													(circle Y or N)						
DOLLY VARDEN	N	Y	N	Y	N	Y													IND	N	Y	N	Y
<input style="width: 100px;" type="text"/>																							
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR													(circle Y or N)						
DOLLY VARDEN	N	Y	N	Y	N	Y													IND	N	Y	N	Y
<input style="width: 100px;" type="text"/>																							
<p><i>These columns should include all DOLLY VARDEN harvested between April 2009 and March 2010.</i></p>																							

Of your household's total DOLLY VARDEN harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?
<input style="width: 100%;" type="text"/>			

How was fishing for DOLLY VARDEN between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for DOLLY VARDEN different compared to previous years?

Where does your household usually harvest DOLLY VARDEN? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Dolly Varden River")

SMELT

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for SMELT for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST SMELT?..... N Y

Please estimate how many Smelt ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include SMELT you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY SMELT DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...				
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?		
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)				
SMELT	N	Y	N	Y	N	Y	N	Y								IND	N	Y	N	Y
126400000																				
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)				
SMELT	N	Y	N	Y	N	Y	N	Y								IND	N	Y	N	Y
126400002																				
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)				
SMELT	N	Y	N	Y	N	Y	N	Y								IND	N	Y	N	Y
126400003																				
These columns should include all SMELT harvested between April 2009 and March 2010.																				

Of your household's total SMELT harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for SMELT between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for SMELT different compared to previous years?

Where does your household usually harvest SMELT? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Smelt River")

CAPELIN

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for CAPELIN for subsistence?

(CIRCLE ONE BELOW)

USUALLY FISH

SOMETIMES FISH

NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST CAPELIN?..... N Y

Please estimate how many Capelin ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include CAPELIN you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY CAPELIN DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?												DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?					
	(circle Y or N)			NUMBER CAUGHT WITH GILL NET OR SEINE												(circle Y or N)							
CAPELIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400000																						
	(circle Y or N)			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE												(circle Y or N)							
CAPELIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400002																						
	(circle Y or N)			NUMBER CAUGHT WITH OTHER GEAR												(circle Y or N)							
CAPELIN	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y
	126400003																						
These columns should include all CAPELIN harvested between April 2009 and March 2010.																							

Of your household's total CAPELIN harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for CAPELIN between April, 2009 and March, 2010 compared to previous years?

(CIRCLE ONE BELOW)

Very good

Average

Poor

Why was fishing for CAPELIN different compared to previous years?

Where does your household usually harvest CAPELIN? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Capelin River")

CAPELIN: 16

OTHER NON-SALMON

HOUSEHOLD ID

Do members of your household USUALLY, SOMETIMES, or NEVER fish for OTHER NON-SALMON for subsistence? (CIRCLE ONE BELOW)

USUALLY FISH SOMETIMES FISH NEVER FISH

Between APRIL 1, 2009 and MARCH 31, 2010 did your household USE or TRY TO HARVEST OTHER NON-SALMON?..... N Y

Please estimate how many Other non-salmon ALL MEMBERS OF YOUR HOUSEHOLD HARVESTED for subsistence use this year, including with a rod and reel. Include OTHER NON-SALMON you gave away, ate fresh, fed to dogs, lost to spoilage, or got by helping others fish. If fishing with others report ONLY YOUR SHARE of the catch.

	BETWEEN APRIL 2009 & MARCH 2010, DID YOUR HOUSEHOLD...			HOW MANY OTHER NON-SALMON DID YOUR HOUSEHOLD HARVEST BETWEEN APRIL 2009 & MARCH 2010?													DID YOUR HOUSEHOLD ALSO...							
	USE?	TRY TO HARVEST?	HARVEST?	April	May	June	July	August	September	October	November	December	January	February	March	UNIT	GIVE AWAY?	RECEIVE?						
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH GILL NET OR SEINE													<i>(circle Y or N)</i>							
OTHER NON-SALMON	N	Y	N	Y	N	Y	N	Y											IND	N	Y	N	Y	
.126400000																								
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH ROD & REEL OR HANDLINE													<i>(circle Y or N)</i>							
OTHER NON-SALMON	N	Y	N	Y	N	Y	N	Y												IND	N	Y	N	Y
.126400002																								
	<i>(circle Y or N)</i>			NUMBER CAUGHT WITH OTHER GEAR													<i>(circle Y or N)</i>							
OTHER NON-SALMON	N	Y	N	Y	N	Y	N	Y												IND	N	Y	N	Y
.126400003																								
<i>These columns should include all OTHER NON-SALMON harvested between April 2009 and March 2010.</i>																								

Of your household's total OTHER NON-SALMON harvest, how many were....

Caught for dog food?	Kept for personal use?	Used to trade for other resources?	Used to barter for other resources?

How was fishing for OTHER NON-SALMON between April, 2009 and March, 2010 compared to previous years? (CIRCLE ONE BELOW)

Very good Average Poor

Why was fishing for OTHER NON-SALMON different compared to previous years?

Where does your household usually harvest OTHER NON-SALMON? (Please be as specific as possible. For example, if you harvest "at camp", describe where camp is: "The mouth of Other non-salmon River")

OTHER NON-SALMON: 17

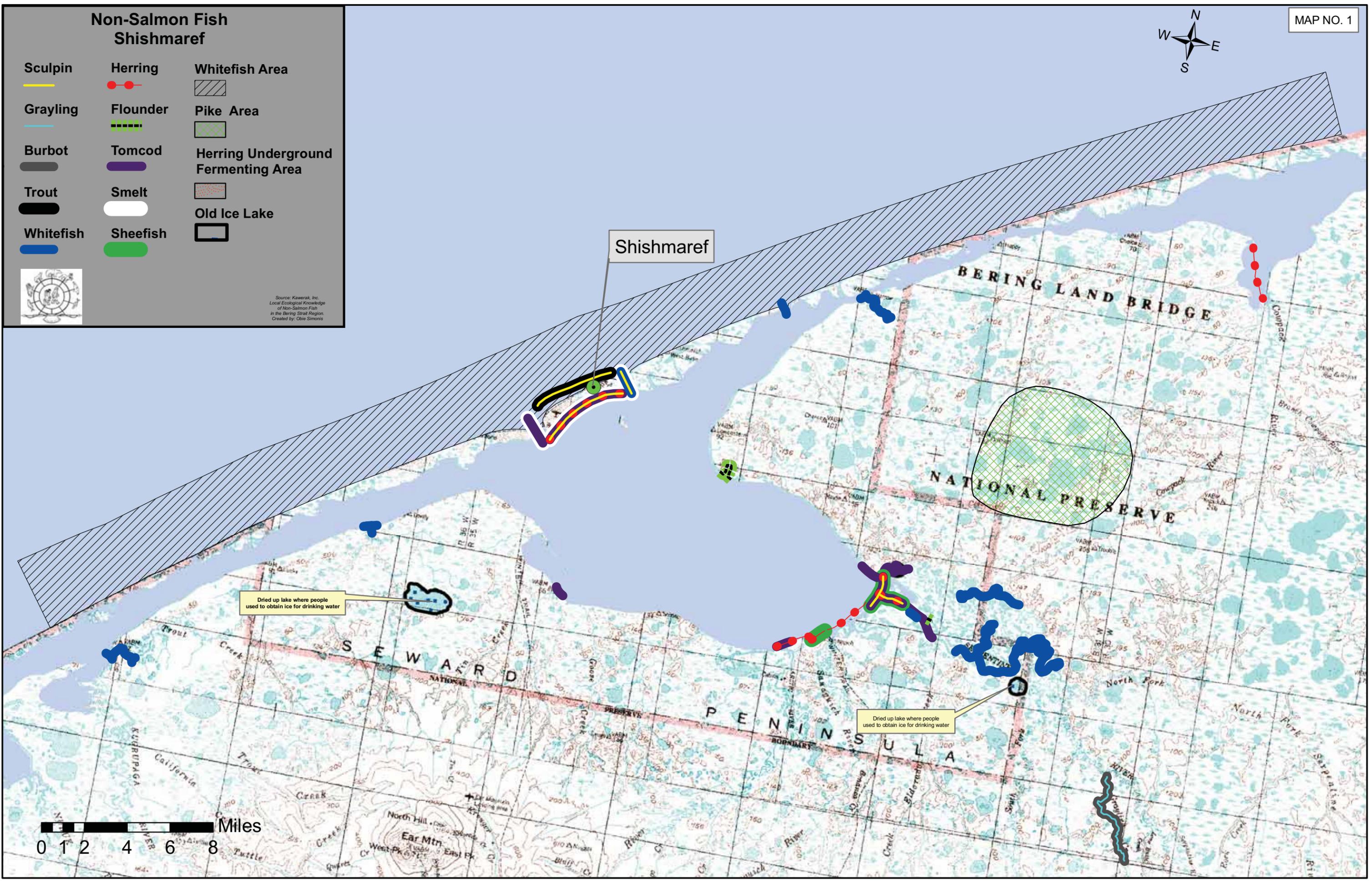


Non-Salmon Fish Shishmaref

- | | | |
|-----------------------|-----------------------|---|
| Sculpin
— | Herring
●—● | Whitefish Area
▨ |
| Grayling
— | Flounder
— | Pike Area
▧ |
| Burbot
— | Tomcod
— | Herring Underground Fermenting Area
▩ |
| Trout
— | Smelt
— | Old Ice Lake
□ |
| Whitefish
— | Sheefish
— | |



Source: Kawerak, Inc. Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region. Created by: Obie Simons



Shishmaref

BERING LAND BRIDGE

NATIONAL PRESERVE

SEWARD

PENINSULA

Miles

0 1 2 4 6 8



Non-Salmon Fish Wales

Harvest

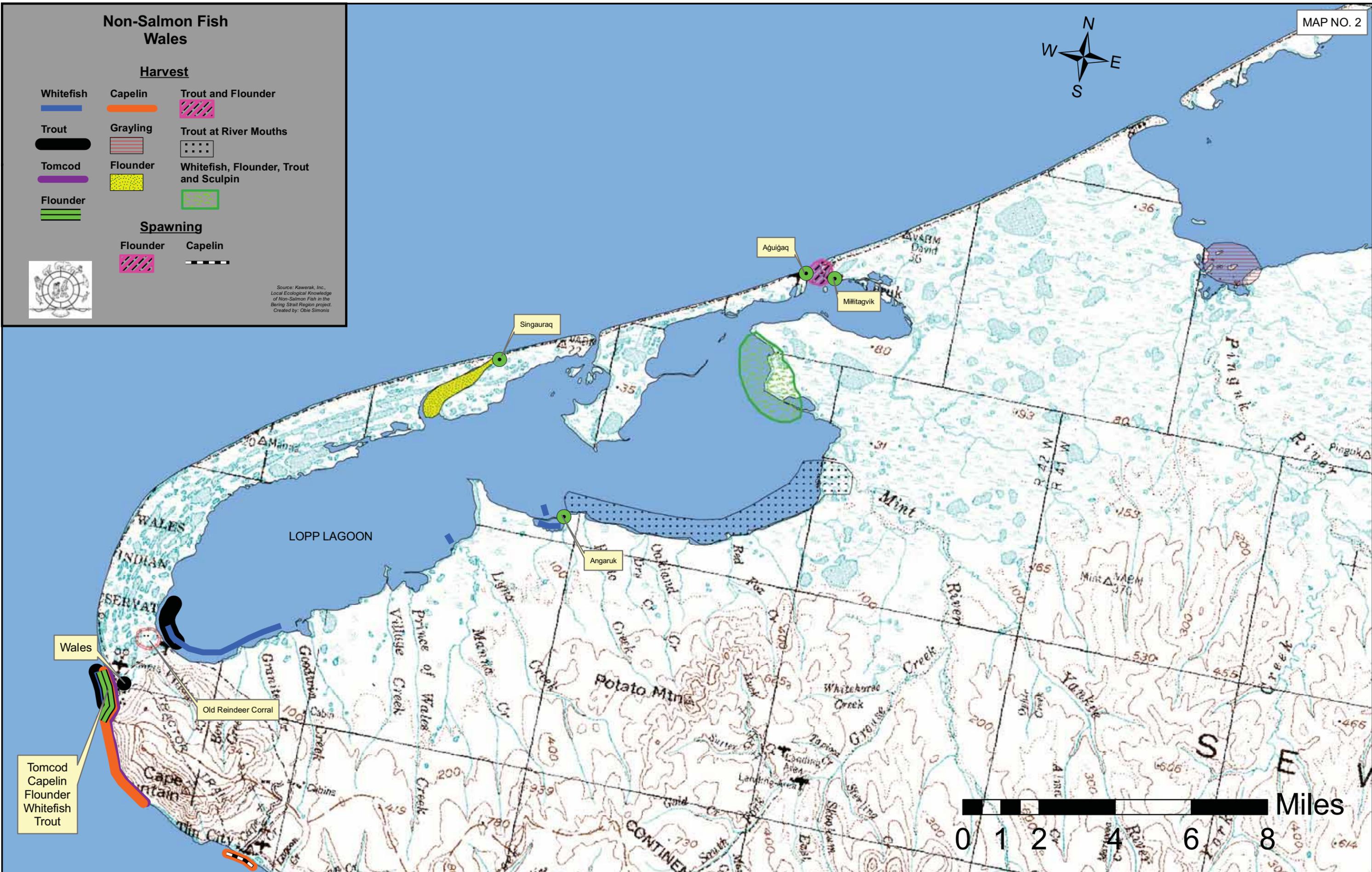
- | | | |
|---------------|--------------|--|
| Whitefish
 | Capelin
 | Trout and Flounder
 |
| Trout
 | Grayling
 | Trout at River Mouths
 |
| Tomcod
 | Flounder
 | Whitefish, Flounder, Trout and Sculpin
 |
| Flounder
 | | |

Spawning

- | | |
|--------------|-------------|
| Flounder
 | Capelin
 |
|--------------|-------------|



Source: Kawerak, Inc.,
Local Ecological Knowledge
of Non-Salmon Fish in the
Bering Strait Region project.
Created by: Obie Simons



Wales

Old Reindeer Corral

Tomcod
Capelin
Flounder
Whitefish
Trout

Singauraq

Angaruk

Aguiqaq

Millitagvik

0 1 2 4 6 8 Miles

Non-Salmon Species Brevig Mission

HARVEST

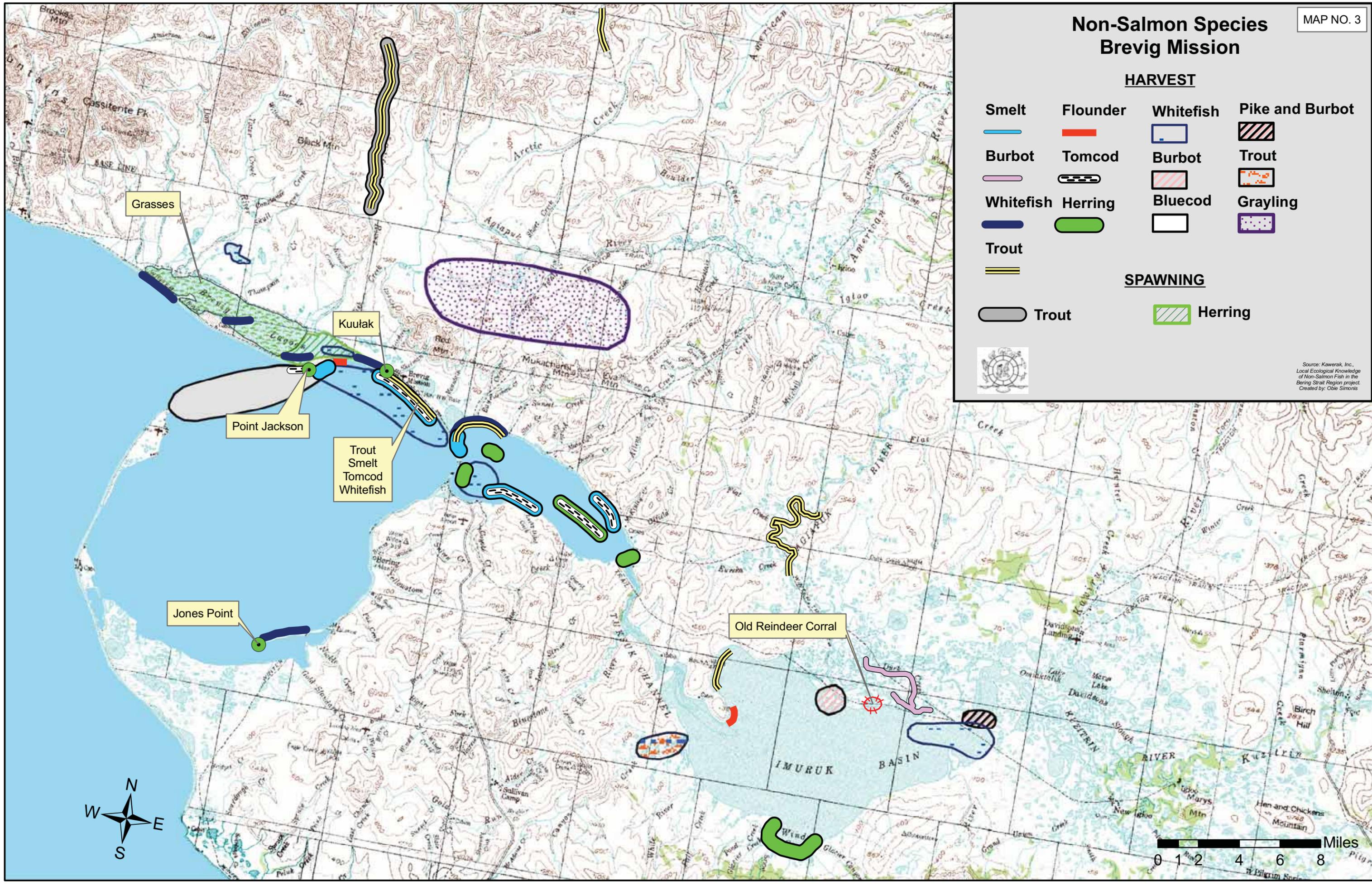
Smelt 	Flounder 	Whitefish 	Pike and Burbot
Burbot 	Tomcod 	Burbot 	Trout
Whitefish 	Herring 	Bluecod 	Grayling

SPAWNING

	Trout		Herring
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Source: Kawerak, Inc.,
Local Ecological Knowledge
of Non-Salmon Fish in the
Bering Strait Region project.
Created by: Obie Simons

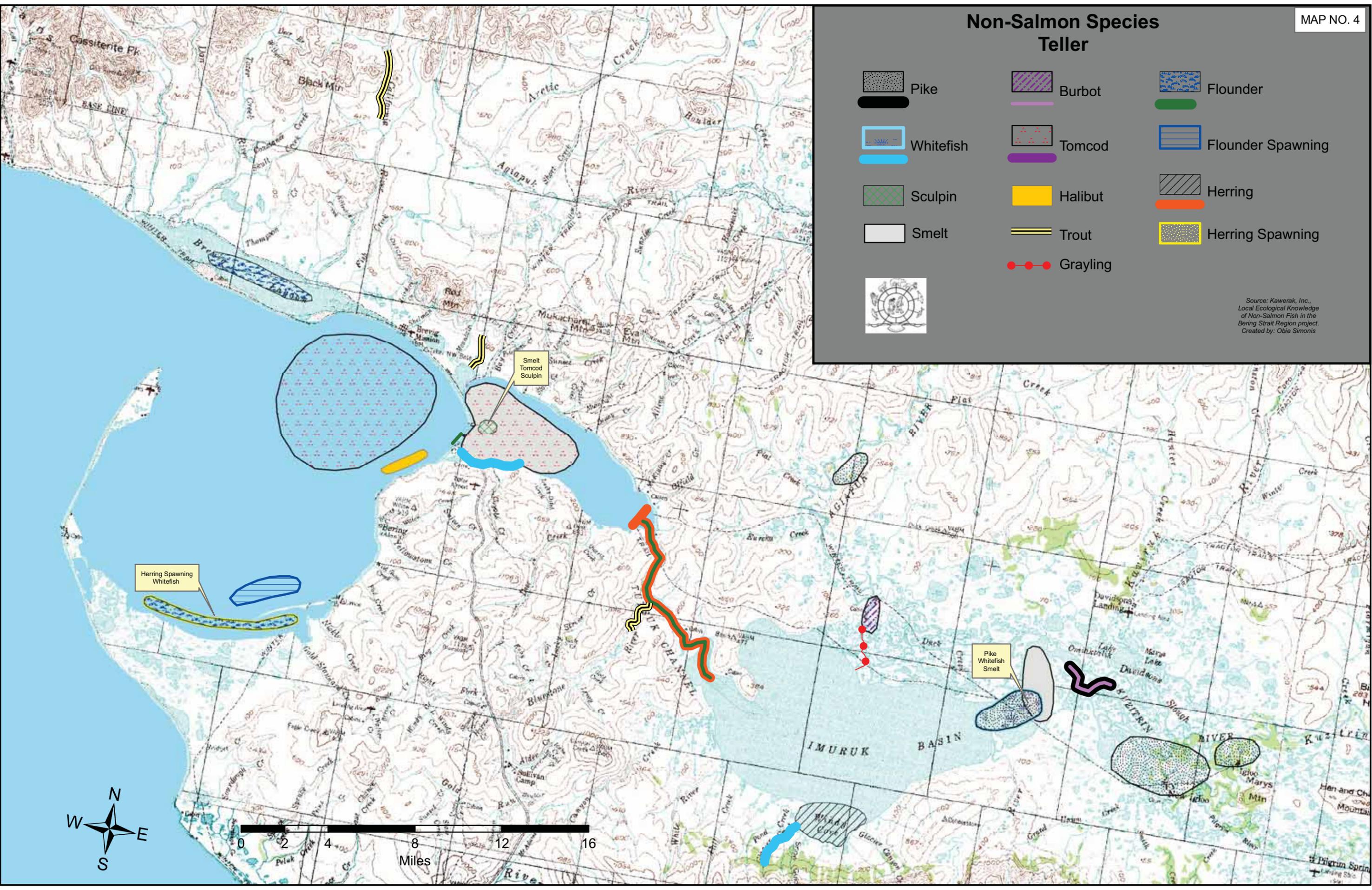


Non-Salmon Species Teller

- Pike
- Burbot
- Flounder
- Whitefish
- Tomcod
- Flounder Spawning
- Sculpin
- Halibut
- Herring
- Smelt
- Trout
- Herring Spawning
- Grayling



Source: Kawerak, Inc.,
Local Ecological Knowledge
of Non-Salmon Fish in the
Bering Strait Region project.
Created by: Obie Simonis



Non-Salmon Fish Stebbins

Ocean Harvest

- Wolffish 
- Sculpin 
- Herring 
- Kelp With Herring Eggs 
- Flounder 
- Tomcod 
- Smelt 

- Whitefish & Herring 

Land Harvest

- Whitefish 
- Sheefish 
- Tomcod 
- Smelt 
- Herring 

- Blackfish 
- Sheefish 
- Sheefish, Tomcod & Whitefish 

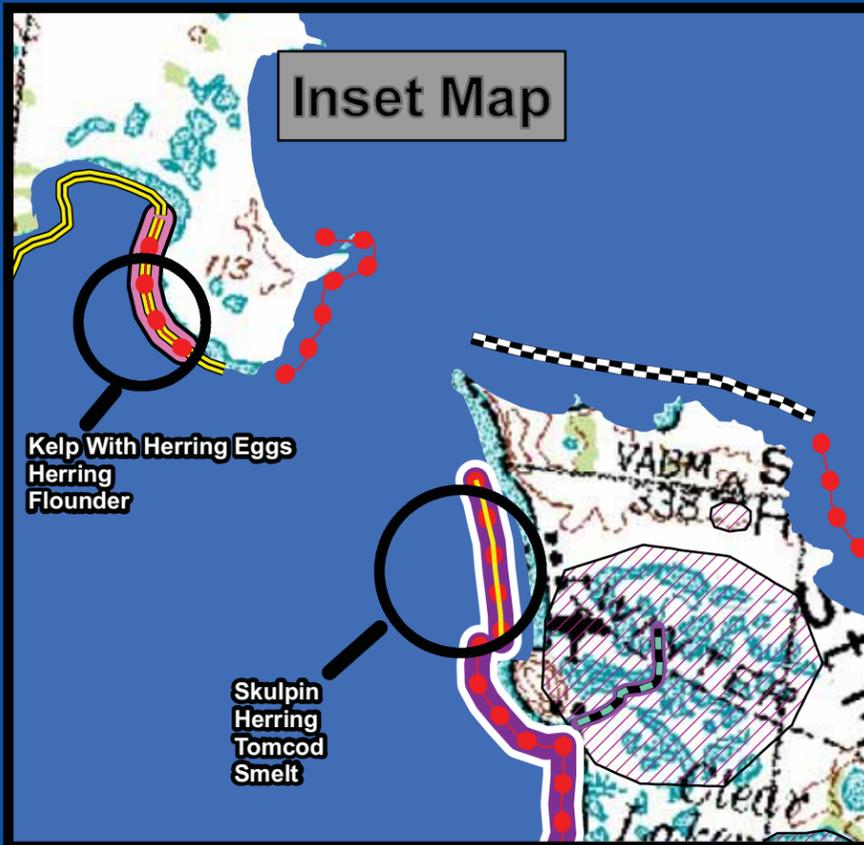
Spawning Ocean & Land

- Whitefish 
- Sheefish 
- Whitefish 



Source: Kawerak, Inc., Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait Region project. Created by: Obie Simonis

Inset Map



Direction of Herring Spawning

Direction of Herring Spawning

Sylvester Snowball's Old Camp

● Step Mountain

