Whitefish and Beaver Ecology of the Yukon Flats, Alaska

by

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ABSTRACT

In recent years, the Alaska Department of Fish and Game has heard comments from residents of the Yukon Flats that area whitefish populations have declined. High beaver populations, and more specifically, an increase in the number of beaver dams disrupting whitefish movements is typically cited as the cause of this decline. To examine this issue, fifteen lifelong residents of the Yukon Flats were identified as local experts and interviewed as a source of traditional ecological knowledge, or TEK, on whitefish and beaver. Interview topics specifically included Native names and local taxonomies relating to whitefish, seasonal movements and life history information, information on the harvest and use of whitefish, and the impacts of beaver dams on whitefish.

Respondents provided significant insights on these topics. On the central question of how beaver dams impact whitefish, respondents collectively described a complex and delicately balanced natural system involving the flow and movement of water through the Yukon Flats. In this system, whitefish rely on the semi-regular occurrence of floods and high water events to recharge fish habitats with fresh water and to maneuver around beaver dams. A number of changes observed by respondents over their lifetime may have combined in recent decades to adversely impact whitefish populations on the Yukon Flats. These changes include: 1) reduced harvests of beaver by local residents, 2) abandonment of traditional stream management practices to clear streams and promote passage of whitefish into key habitats, 3) environmental changes resulting in area lakes and wetlands drying up, and 4) less frequent occurrence of rejuvenating floods and high water events since 1991.

There was general consensus that significantly fewer whitefish are harvested today on the Yukon Flats than in prior decades when there was a more universal reliance on wild foods, including whitefish, to feed families and maintain family dog teams. Despite this reduced exploitation, a majority of respondents thought whitefish populations had declined in recent years. While whitefish still appear to be broadly distributed across the Yukon Flats, declining whitefish numbers is a concern among users of the resource. Beaver dams have probably contributed to localized declines in whitefish populations in some drainages. Whether high beaver populations are the primary cause for the more generalized decline in the whitefish resource over the entire Yukon Flats is less clear given the other factors advanced by respondents. These local experts suggest that larger scale changes in Yukon Flats weather patterns and hydrology also play prominent roles. Suggestions for further research are offered to better understand these dynamic relationships on the Yukon Flats.

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INTRODUCTION

The area commonly referred to as the Yukon Flats is a broad wooded lowland intersected by the Yukon River in eastern central Alaska. It is bordered by the White Mountains to the south, the Brooks Range to the north, the U.S./Canada border to the east and Yukon River canyon or "ramparts" area in the west. The Arctic Circle traces an east-west line through the center of the Yukon Flats. Figure 1 shows the major geographic features associated with the Yukon Flats region as well as historic and present-day settlement locations.

There are 10 contemporary communities in the Yukon Flats region[1], the populations of which are predominantly Gwich'in and Koyukon Athabascan. The total population of the region is approximately 1,400. Fort Yukon, located at the confluence of the Yukon and Porcupine rivers has a population of about 570 people (Alaska Department of Labor 2000) and serves as a regional center to smaller outlying communities. Subsistence hunting, fishing, and trapping are integral parts of the economy and way of life on the Yukon Flats. The subsistence economy of the region has been described in previous work by Caulfield 1983, Sumida 1988 and 1989, and Sumida and Andersen 1990. Major wild food resources on the Yukon Flats include salmon (*Oncorhynchus sp.*), moose (*Alces alces*), caribou (*Rangifer tarandus*), a wide variety of waterfowl, and non-salmon fish species such as whitefish (*Coregonus sp.*) and northern pike (*Esox lucius*).

A variety of whitefish inhabit the waters of the Yukon Flats and are used for subsistence purposes by local residents. A study of wild resource use by residents of Fort Yukon in 1987 documented more than 52,000 pounds of whitefish and sheefish (*Stenodus leucichthys*) harvested for household use in a 12-month period (Sumida and Andersen 1990). Only king salmon (*Oncorhynchus tshawytsha*), chum salmon (*O. keta*), and moose were harvested in greater quantities, placing whitefish among the most utilized sources of wild food. In describing the seasonal round of subsistence activities in the

[1] Contemporary Yukon Flats communities include Arctic Village, Beaver, Birch Creek, Canyon Village, Chalkyitsik, Circle, Fort Yukon, Rampart, Stevens Village, and Venetie.

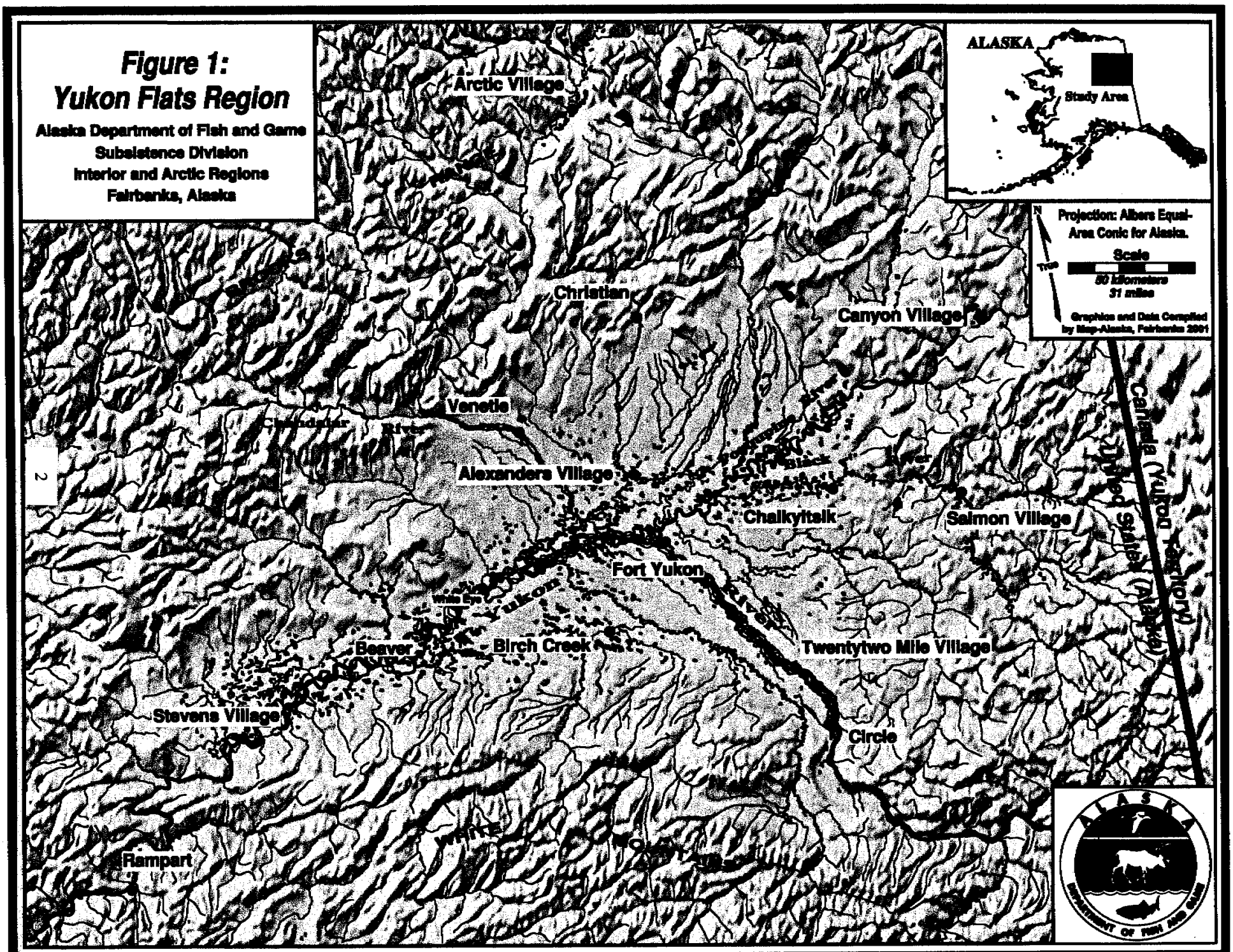

Figure 1: Yukon Flats Region

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Interior and Arctic Regions
Fairbanks, Alaska

upper Yukon River, Caulfield (1983:74-75) spoke of the overall importance of fish, and whitefish in particular, as follows:

> Traditionally fish were one of the most reliable and abundant food resources in the Upper Yukon-Porcupine region, and this fact remains true today. In aboriginal times, the availability of fish often meant the difference between survival or starvation, and the harvest of fish was a major component of the annual cycle for most bands in the region.....As in the past, a fishnet remains an important piece of equipment for traveling in the country today. A trapper whose family lived much of their life on the Black River remembers that the first thing his mother would do upon arrival at a new camp was to place a small net in the water. Today, fishcamps remain a focus for resource harvesting and sociocultural activities such as teaching traditional skills and values and relating oral traditions.
>
> Whitefish are usually taken in late spring and in early fall for human consumption and for dog food, but are also harvested during winter and summer. Lake and creek systems having large runs of these fish are well known to area residents. Both gillnets and small fishtraps have traditionally been used to harvest these species in specific areas. (Caulfield, 1983: 74-75)

As might be expected, access to fishing areas has played an important role in settlement patterns on the Yukon Flats. Many area settlements located inland from the main Yukon and Porcupine rivers were specifically situated to take advantage of prime fishing areas for whitefish. Arctic Village, Alexander Village, Birch Creek, Chalkyitsik, and Twenty-Two Mile Village are some of the settlements on the Flats that fall into this category according to respondents contacted in the course of this research. The following interview excerpts illustrate the past and present-day importance of the whitefish resource in these areas:

> Whitefish are important to some groups of people that live off of the main salmon streams. Not everyone fishes for king salmon. Some people live off whitefish—people around Arctic Village, Birch Creek—places like that. Lot of lakes up in Arctic Village have fish in them that people use—pike, graying, whitefish—Arctic Village is located where it is because of fishing opportunity. Some people get a good feeling—spiritual maybe—catching their own food. Whitefish is good for that because it is easy to get and always there. A111600
>
> Alexander Village was known as a whitefish fishing place. They settle there because of the reliability of that resource. Jackfish too—whitefish and pike mostly—no salmon up that way. It was a fall activity there—big caches of smoke-dry whitefish when I was young. P021401

> Sho (Shovun Lake, the site of Alexander Village) is 60 feet deep in places and connects to 14 other nearby lakes with sloughs—that's what makes it a good whitefish fishing area. [My] grandfather fished there for whitefish before whitemen came and Alexander Village is located there in part because of the good whitefish fishing. N021501

Because of the nature of the information presented, and the way it was collected, data like the observations cited above fall into the broad category of what is now commonly referred to as traditional ecological knowledge, or TEK. In recent decades, a growing body of literature grounded in TEK research has emerged (Freeman 1992, Hunn 1988). While definitions vary, TEK can be most simply described as ".....a system of knowledge developed by a given culture to classify the objects, activities, and events of its universe...." (Hardesty 1977:291). Indigenous populations have been keen observers of their environment for thousands of years. But it has only been relatively recently that these observations have begun to be systematically combined or juxtaposed with western science. In a northern context, Wenzel (1999:114) commented that "Traditional ecological knowledge, as a conceptualization and expression of what Inuit know about their environment and its processes, has formed an important aspect of scientific inquiry among Inuit far longer than TEK, as a "research type" has had "intellectual currency."" While TEK has been more widely embraced by western science in recent years, the relationship between these two "systems of knowing" is just developing. The authors here work from the premise that questions about the natural world can best be addressed by using both systems to compliment one another and the information compiled in this report is offered in that spirit.

Linkous (1995) included Fort Yukon residents in a TEK study of beaver (*Castor canadensis)* and traditional beaver management systems. Linkous examined TEK and approaches to beaver management in two geographically and culturally distinct Alaska locations, Selawik and Fort Yukon. While the focus of that study was on beaver rather than fish, one of the findings was that residents of both communities expressed concern over the adverse impact of beaver dams on whitefish populations. Fourteen of the 17 Fort Yukon residents interviewed as part of that study attributed declines in local whitefish populations to beaver dams (Linkous 1995:130-131).

In recent years, similar complaints have been received by the Alaska Department of Fish and Game from Yukon Flats residents. Those reports frequently blame increasing populations of beavers for declines in whitefish populations, stating that beaver dams have restricted fish access and waterflow to key whitefish habitats. Prompted by these reports, this project was designed to collect more detailed information on the ecology, life history, and status of area whitefish populations from long-time local residents and users of these resources in order to better understand the dynamics between beavers and whitefish on the Yukon Flats.

METHODOLOGY

This project was a cooperative endeavor between the Alaska Department of Fish and Game (ADF&G), Division of Subsistence and the Council of Athabascan Tribal Governments (CATG), Natural Resources Office. The U.S. Fish and Wildlife Service (USFWS) provided funding for this research under cooperative agreement numbers 701010J308 and 701010J309, with oversight by the USFWS Fisheries Information Service (FIS), project number FIS00-06.

Data were collected through key respondent interviews with Yukon Flats residents identified as local experts on whitefish. CATG personnel were primarily responsible for identifying potential key respondents and setting up interviews in Fort Yukon. In Beaver, respondents were identified and interviews arranged with the assistance of a village elder. A total of 15 individuals were interviewed. Respondents were all of Gwich'in Athabaskan descent and included three females and twelve males ranging in age from 36 to 87 years old. Their combined ages represents a total of 891 years of observing Yukon Flats flora and fauna. One third of the respondents were more than 70 years old. The average age of respondents was 59 years. Their expertise with regard to whitefish had generally been gained from decades of observing, fishing for, and harvesting whitefish. More than one-half of the respondents indicated that they were, or had been, active trappers and had insights into area beaver populations as well.

While all of the respondents resided in the communities of Fort Yukon (11 respondents) and Beaver (4 respondents) at the time of the interviews, many reported having been raised in remote camps or having spent years living in other local communities or former communities. Former residences included Chalkyitsik, Arctic Village, Venetie, Canyon Village, Salmon Village, and Alexander Village. Because of the geographic dispersion of respondents, the collective information should be viewed as having a relatively broad Yukon Flats perspective.

Most interviews took place in respondents' homes, although several interviews were conducted in the CATG Natural Resources office in Fort Yukon. While many of the respondents were Gwich'in speakers, all were comfortable with the English language and all interviews were conducted in English. With the knowledge and permission of the respondents, interviews were recorded using a microcassett tape recorder. One respondent declined to be recorded and information from that interview was recorded using hand-written notes. Respondents were offered an honorarium in recognition of their time. Interviews ranged in length from 25 minutes to two hours.

Two researchers, one each from ADF&G and CATG, participated in all interviews. An interview guide (Appendix A) served to direct the discussions toward specific questions and topics. Discussions frequently took unexpected detours from the interview guide and these minor, often interesting detours were not discouraged. Photographs of Yukon Flats whitefish species were shown to respondents and proved to be an effective visual prompt both for framing questions to informants and for eliciting their responses.

In addition to taped interviews, mapping sessions were conducted with most respondents. Mapping sessions were omitted for several respondents who were pressed for time or who had poor eyesight and could not easily view the maps. Clear acetate sheets placed over maps were used to record whitefish fishing sites, locations of beaver dams, and other places referred to during interviews. Various base maps were used at scales of both 1:250,000 and 1:63,360. Map data resulting from interviews have been compiled by CATG and will be submitted as a separate companion product to this report.

The information presented in this report is organized under a number of main topics. The authors have selected among the interview materials in portraying traditional knowledge systems, but have presented the complete set of materials as appendices. The authors have made extensive use of interview excerpts to support statements, illustrate key points, and let the respondents' narratives have a significant voice in this report.

All interviews were transcribed and statements organized by topic into a keyworded, searchable database using the database management program askSam version 4.0. This database consists of 169 keyworded interview entries or records. Agencies cooperating on this research have been provided with a searchable version of the database on CD-ROM. For all readers, a plain text version of the interview entries has been included as Appendix B.

FINDINGS

Gwich'in and Other Taxonomies Relating to Whitefish

Gwich'in classification recognizes five types of **łuk daagąįį** ("whitefish") in the waters of the Yukon Flats: **neeghan** and **chihshoo** ("big whitefish"), and **ch'ootsik**, **khałtąį'**, and **treeluk** ("little whitefish"). The five fish types are listed in Table 1, along with corresponding terms from two other classification systems—Linnaean and common English. In Gwich'in taxonomy the general term, **łuk daagąįį**, refers to the five fish types collectively. **Łuk Daagąįį** is almost equivalent to the common English term, "whitefish", as used outside the Yukon Flats, but is not precisely equivalent. Outside the Yukon Flats, the sheefish (*Stenodus leucichthys*) is commonly classified as a whitefish, along with a number of other fish varieties not found on the Yukon Flats. In Gwich'in taxonomy (and the regional English taxonomy used on the Yukon Flats), the sheefish or **shryah** is not generally included as a whitefish. Keeping in mind these subtle discrepancies, **łuk daagąįį** will be called "whitefish" in the remainder of the report as a simple gloss to refer to the five types recognized by Gwich'in taxonomy.

Table 1. Names and Classifications of Yukon Flats Whitefish

ENGLISH NAME	LINNAEAN NAME	GWICH'IN NAME		Other Local Names & Classifications		
Humpback Whitefish	*Coregonus pidschian*	**neeghan**	**Łuk Daagąįį**	Lake Fish	Big Whitefish	
Broad Whitefish	*Coregonus nasus*	**chihshoo**				
Least Cisco	*Coregonus sardinella*	**ch'ootsik**			Little Whitefish	**łuk daagąįį tsal**
Round Whitefish	*Prosopium cylindraceum*	**khałtąį'**		River Fish		
Bering Cisco	*Coregonus laurettae*	**treeluk**				herring
Sheefish or Inconnu	*Stenodus leucichthys*	**shryah**				cony or coonie

As shown in Table 1, each of the five varieties of **ɬuk daagąįį** appears to be equivalent to a fish variety recognized in the Linnaean system and the common English system. While Gwich'in taxonomy recognizes the five types of whitefish, in the course of this research we found that only a few local experts were familiar with all five Gwich'in terms for the whitefish species. Most knew the Gwich'in terms for the main varieties of whitefish such as **chihshoo** and **neeghan**. Some were not familiar with any of the Gwich'in terms, using only the English terms listed in Table 1.

References were made to several informal subclassifications of whitefish based on size or habitat preference. As stated above, some respondents made the distinction between "big whitefish," meaning humpback (*Coregonus pidschian*) and broad whitefish (*Coregonus nasus*), and "little whitefish," a reference to least cisco (*Coregonus sardinella*), Bering cisco (*Coregonus laurettae*), and round whitefish (*Prosopium cylindraceum*). This differentiation has practical applications with regard to fishing gear selection and net size. Respondents might say, for example, that they use nets with a mesh size that would target the "big whitefish" and let the little ones go through.

Another method of classifying whitefish involves identifying species as "lake fish" or "river fish." Under this classification scheme, humpback whitefish, broad whitefish, and least cisco are most often included as "lake fish" meaning that they can often be found in lakes. Round whitefish, Bering cisco and sheefish are more frequently identified as "river fish" meaning that they are less likely to be found in lakes and more often found in moving water habitats. These categories appear to be more general than absolute. There seemed to be general acknowledgement that all species can be found in a mix of habitats and that whitefish of a particular species may occasionally be found in unexpected places.

Juvenile whitefish, because of similar size and appearance, can be difficult to identify by species. In general, respondents did not distinguish subadult fish by species. Instead, respondents commonly referred to juvenile whitefish of all species (up to approximately eight inches in length) as "sardines."

Of all the whitefish species, broad whitefish (**chihshoo**) were most often identified by respondents as the preferred or most frequently targeted species. This can be attributed to their relatively large size, favored (rich) quality of the meat and eggs, and their apparent widespread availability in a variety of habitats.

> I go for them broad ones (broad whitefish) because they are bigger and have good meat. E021501

> I go for the broad whitefish. Lots of people go for those. Good roe—big roe—eggs are best in August. L121200

Respondents indicated the least familiarity with round whitefish (**khaɬtąį'**), perhaps indicating that they are less common on the Yukon Flats or less widely distributed than the other whitefish species. The English translation of the Gwich'in term **khaɬtąį'** is "sled handle," a reference to their round shape.

As stated above, sheefish are not considered a type of whitefish in local English and Gwich'in taxonomies. One respondent reported differences in size and color of sheefish caught in the Yukon River compared to those caught in a Porcupine River tributary, suggesting there are "two kinds" of sheefish on the Yukon Flats:

> There seems to be at least two kinds of sheefish here—the big ones on the Yukon—up to 40 pounds—and the Black River ones which are more purple-ish and smaller. G021401

Another respondent commented on size differences between summer and fall sheefish:

> Sheefish in the fall run about 2 pounds. Summer sheefish—the ones we catch in wheels can go eight to ten pounds. L121200

These observations point to possible sub-species distinctions or differences in run timing of sheefish based on age or sex criteria that could be explored further.

Whitefish Life History

Information provided by respondents relating to whitefish life history included the following general observations:

- Whitefish are different from salmon in that they are long-lived and do not die after they spawn.
- Some live to be 15 or 30 years old.
- Some overwinter on the Yukon Flats, while some come each year from areas as far away as the ocean.
- Not all females appear to spawn every year.

More detailed information with respect to seasonal movements, diet, and spawning is offered below.

Seasonal Movements of Whitefish

Many respondents offered observations concerning seasonal movements of whitefish species based largely on when and where certain species could be caught. Comments from individual respondents might pertain to only one or two species of particular interest to that respondent, or be confined to observations made at one particular fishing site. Some respondents acknowledged being puzzled by the movements of whitefish even after decades of fishing for them:

> The movement of these whitefish is hard to figure out. They seem to go up and down river at all times. L121200

Taken as a whole, however, the observations offered by respondents paint a fairly complete picture of fish movements through the calendar year.

Overall, respondents report a general upstream movement of whitefish species during the spring and summer months into smaller streams, lakes, and lake systems. This upstream movement has several facets to it. Some whitefish are said to over-winter in deep holes in the main (Yukon and Porcupine) rivers. At around the time of spring break-up on the main river, these fish make a brief movement into side streams where the ice action is typically delayed or less turbulent. Fishermen hungry for the taste of spring whitefish set nets for these fish as soon as breakup conditions allow. They are caught when they are

moving into sloughs or side streams or returning to the main river shortly after the ice has left.

> In springtime, when the ice is going out in the main river the fish move out of the way of the ice back into the back sloughs and side creeks. They might just go in there for a few days and check it out back in the lakes and then come back out to the main river. Some people net them at this time just to have a taste of it but they are not quite fat yet. P021401

Respondents reported catches of broad whitefish and least cisco at this time of year.

As spring progresses and inland streams and lakes thaw, respondents referred to a more prolonged movement of whitefish into productive lake systems where they are said to feed and fatten through the summer months. Spring floods and high-water events reportedly play an important role in providing fish access into areas that might not be accessible in periods of lower water. These high water events are viewed by respondents as being very beneficial to the Yukon Flats environment and were variously described as "flushing out", "recharging", and "rejuvenating" area wetlands with fish and fresh water.

> Flooding is healthy. When everything is flooding, fishing is good—means we get for fish for the next few years. Don't flood for a while and we don't get no fish. They all get trapped and die off in the lakes. H021501

> Floods are considered a good, healthy thing 'round here. Last good spring flood was 1991. Floods rejuvenate the Flats. A111600

> Floods help these fish out you know—high water lets them move around wherever they want to go—they know where they are going. There's flood and then there's high water. Last summer it was not flood but it was high water all summer. Fish can move around those [beaver] dams and go where they want. B021601

Fish continue an upstream movement throughout most of the open water period. Several respondents claimed that small numbers of whitefish and ciscoes can be caught at main-river fishing locations all spring and summer long.

> I put net in at the mouth of Porcupine River as soon as the ice goes out and catch whitefish all summer long—maybe 15 or 20 a day. H021501

Some species appear to be moving upstream in more distinct "runs" and are targeted by fishermen at specific times or in certain locations. One respondent noted, for example,

that in the spring, ciscoes (no species identified) could be caught with dipnets at certain locations and very specific times of the day:

> Dipnets can be used to catch ciscoes in the spring time. You look for eddies along a cut bank and put your dipnet in and you will catch those. You need to do this late at night—11 PM to maybe 2 AM. They rest in those eddies at night. L121200

Fish overwintering at more distant (and unspecified) down-river and ocean locations arrive later in several recognizable "runs." According to informants, there is a run of Bering cisco in this region of the upper Yukon region that coincides with the arrival of king salmon during the month of July. Numerous respondents made statements to the effect that Bering cisco "come with the kings" and were frequently caught in fishwheels targeting king salmon.

> Those (Bering cisco) come with the king salmon and we use them—good eating—you get kind of tired of king salmon after while so we eat those for a change of taste. B021601

Another respondent spoke of a run of whitefish that entered the Porcupine River between the king and chum salmon runs around August. He stated that a fishwheel placed at the mouth of the Porcupine River during this run could catch 200 whitefish (mixed species) a day.

The general movement of whitefish upstream during the summer is followed by a fall out-migration. According to respondents this down-stream movement of fish takes place during late September or October and is triggered by dropping water levels and/or water temperature. Numerous respondents noted that whitefish seemed particularly sensitive to changes in water level and movement, and that small changes in water flow could precipitate a rapid out-migration of fish from inland lake systems to the main rivers and areas downstream.

> These fish are sensitive to the movement of water and the way water goes up and down. They pay attention to it and move accordingly—that's their survival. P021401

> Whitefish feel the pull of the water pretty good. They go in and out of all the lakes they can and as soon as the current changes they're out of there. They detect the water current real good—as soon as they feel a draw, they go with it and they are heading out of everyplace. H021501

Others offered that a drop in water temperature triggered the downstream movement. One respondent said the fish knew when it was time to move downstream when fall leaves began hitting the water.

Respondents noted that the fall movement of fish out of lakes and creeks into the main river is not restricted to whitefish and that there appeared to be an order to the downstream movement by species. Whitefish, specifically young whitefish, were the first to move downstream according to one respondent, followed by adult whitefish and northern pike. Longnose suckers (*Catostomus catostomus*) were the first to begin the fall out-migration followed by whitefish according to another respondent.

The fall movement of whitefish out of creeks and into the larger rivers continues under the ice of late fall and early winter. Whitefish are commonly harvested in October and November by setting nets under young ice at key locations. Additional evidence that the downstream movement of whitefish continues into early winter under the ice is provided by the following statement:

> Sometimes after freeze-up the ice level on the main river drops and side streams will flow out on the top of the ice. In these places you can sometimes find whitefish laying frozen on top of the ice--in late fall they are still trying to move down out of those smaller streams. K121200

Questions about where whitefish spend the winter resulted in varied responses. Most respondents stressed the importance of finding "deep water," whether it was "deep holes" in the main river or "deep lakes." It was clear to respondents that there was no one single destination, pattern of movement, or over-wintering strategy adhered to by all whitefish, even among those of the same species. One respondent succinctly summarized the highly variable movements and over-wintering habits of whitefish this way:

> Not all these do the same thing. There are some whitefish that live year-round in Sho (Shovun Lake) and there are others that are coming and going—same species but doing different things. The ones that leave go to the main river (Yukon) to winter over. Those are the ones that rush back in the creeks in springtime. I think some are coming all the way from the ocean. The ones on the south side of the Yukon I think are ocean fish. P021401

Some respondents noted that sheefish begin to be caught in salmon gear during the month of July and could be caught in small numbers throughout most of the summer. Many respondents stressed the late run timing of sheefish on the Yukon Flats:

> You don't catch sheefish in the spring—they must come from somewhere long ways away—we see them in July. The fall run of sheefish out of the Flats is late—after freeze-up—and there are just one or two days they are going by and can be caught with hook under the ice. I've caught 200 in one day doing that at the mouth of the Grass River (on the Porcupine). L121200

> Sheefish, now those come very late. I get them in the nets in late September or even early October—the big ones are going by then. E021501

> Just when the ice is starting to run—late fall—when the water is cold there are lots of sheefish moving up the Yukon—those big ones, three or four feet long. They are moving up the south side of the Yukon. P021401

> I know a place (on the Yukon River) where I can catch only sheefish in the fishwheel—up to 90 a day. Late fall after the chums and ice is running it is good for sheefish. K121200

Diet—What Whitefish Eat

Respondents offered information on what whitefish eat based largely upon the observed stomach contents of harvested fish. Whitefish "guts" are commonly fried and eaten. In preparation for this, stomachs and intestines are cleaned of their contents, providing an opportunity for observations to be made about diet. Responses to questions about the diet of whitefish were sometimes very general, such as "bugs." Others were somewhat more descriptive or specific and included the following references to both plant and invertebrate food items:

> In the deep lakes they eat all kind of bugs—them black bugs—you seen 'em—and plants—they got different kind of plants way down under the lake—That's what they eat. Sheefish will eat other fish—the smaller ones like sardines. Lake whitefish have a special weed they eat all winter. F111600

> They eat plants and bugs in lakes and rivers. Soon after break-up the river bottoms grow moss and algae. The fish eat that, and bugs too. In winter they don't eat much and get skinny. A111600

> They eat bugs and little plants. Mostly water bugs of various sizes—what we call "chet-si. M111600

> I think they eat clams, beetles, snails, bugs. Sheefish eat other fish. L121200
>
> Broad Whitefish eat crustaceans like miniature snail, miniature clams—little bitty ones, almost clear, there's lots of them out there—piles of them. I've seen them eat gravel too—I don't know what they are doing with it but it works through their system. They eat the crustaceans when they first come into the lakes and everything start growing again. P021401
>
> Not much feed in the main river (Yukon)—they go back into the lakes to feed. I cut them open and clean out the stomachs and most of it is digested but I seen snail shells. H021501
>
> (He) sees them eating snails, red/orange shrimp, and flys. In winter they eat bottom stuff. N021501
>
> Spring time after the ice goes we start seeing them—sheefish, broad whitefish, going up. I think around June 10 or 15 something grow on the bottom of the river—that's what they live on—make them fat. C021601

There is a general sense that whitefish, particularly those wintering in the main rivers, do not feed much during the winter months. This causes them to be "skinny" and "mushy" until they begin to fatten up in the spring and early summer. This "fattening up" is said to occur fairly quickly starting about mid-June when lakes and river bottoms begin to provide sources of food. Lakes, on the other hand, were thought by several respondents to provide more productive year-round sources of food and accounted for the better year-round quality of "lake whitefish" overwintering in those locations.

> Whitefish from Sho are always good. Lake whitefish remain fat all year because they have food to eat while river whitefish get soft and skinny in winter. Lake whitefish taste different from river whitefish because what they eat makes them almost sweet. N021501
>
> Lake fish are generally fatter than river fish because there is food all winter in lakes. River fish don't have as much to eat until spring when food appears and grows on the river bottom. A111600

According to most accounts, whitefish are fattest in the fall after feeding all summer in productive lakes and sloughs. Several respondents cautioned that fall fish contain so much fat they will spoil quickly if nets are not checked frequently:

> By fall time these (whitefish) are all fat. Bering ciscoes get fat the quickest. Broad whitefish are so fat in the fall they will spoil—just turn to mush in one day if you leave them in the net. G021401

Respondents generally agreed that the diet of sheefish is different from the other whitefish species. Several respondents simply stated that sheefish "eat other fish." Respondents also indicated that while other whitefish tend to get fat and improve in quality over the summer, sheefish decline in quality as summer progresses:

> Sheefish are good in spring but get skinny over summer and fall time—no fat on them. C021601

Spawning

No respondent reported actually observing spawning whitefish. Most had drawn conclusions about the time and place of spawning based on the condition of eggs in harvested fish or on the presence of juvenile fish at certain locations.

Most respondents, theorized that whitefish spawn in the fall, perhaps during the period late September to late October. These opinions are based on observations of increasingly mature eggs in fish through the summer and early fall months:

> Well, I don't really know where they lay their egg, but I know they all have good eggs in them—broad, sheefish, cisco, humpback—when we first move to fishcamp in spring the eggs in all these whitefish are little tiny eggs. Then later we go back out after the king salmon to catch whitefish—August, maybe, and their eggs are good. Maybe that's when they are getting close to spawn. B021601

> Broad whitefish must spawn in the fall. They are full of eggs in August and in late September there is no eggs. L121200

> I see eggs in all these (whitefish) all summer long. They must spawn in the fall, eh? Even August and September I see eggs in them and the eggs are turning kind of yellow or orange. Early in summer the eggs are white. But I've never actually seen where they go to spawn. E021501

> They spawn pretty late I think—late October maybe—just about that time. P021401

> Bering cisco must spawn some time in the fall—we catch them then and the eggs are just really mushy and almost falling out of them. H021501

One respondent had observed that not all female whitefish ascending the rivers are in spawning condition and that fish moving downstream after spawing appear to have stopped eating:

> Not all females seem to have eggs. They travel up until late in October. When they come back downriver they have nothing in their stomachs. N021501

Most informants did not know of specific spawning locations and made very general references such as "back in the lakes and sloughs." One respondent was able to offer a bit more specific information on preferred spawning locations and on the laying of whitefish eggs:

> They just let their eggs go whenever they are ready, but not in strong water—not in main river but back in smaller creeks. The way it work is that some of their eggs gets eaten by other fish, but some turn to fish. The eggs that go under a rock or under the mud—those turn to fish, but some get eaten. C021601

Two respondents reported observing two sets of eggs of varying maturity in fish leading to speculation that some whitefish might spawn twice in the same year:

> [I think] broad whitefish may spawn twice a year in April and September because [I] sometimes see 2 sets of eggs. Humpbacks don't seem to have eggs in late fall and must only spawn once in the fall. N021501

> I don't know too much about their spawing but I have seen them with eggs in them both fall and spring. I have always wondered if they lay eggs twice a year maybe. M111600

Respondents reported seeing "baby" whitefish during the summer months in quiet, shallow, near-shore areas of the main rivers, sloughs, and lakes. This would lead one to believe that juvenile whitefish become very broadly distributed across the Yukon Flats during the summer and utilize a wide variety of habitats as rearing areas.

Two respondents indicated that they thought whitefish spawned during the spring in lakes. This minority opinion was based largely on the observation of juvenile whitefish in the near-shore areas of lakes during the summer months and the assumption that they must have come from eggs deposited there several months earlier.

> I guess they go back in the lakes to spawn in the springtime. I'm not too sure. G021401

> Whitefish go into the lakes and spawn in springtime where they have their little ones and stay all summer. F111600

Respondents generally agreed that sheefish spawn in the late fall. Fall-caught female sheefish are prized by some local residents for their rich eggs. Two areas on the Yukon River between Fort Yukon and Circle known as "Seventeen-Mile" and "Twenty-two Mile" were identified as spawning destinations for sheefish.

> On them sheefish, I know that between here and Circle it is some of the best sheefish spawning in Alaska and sheefish is the reason 22-mile village was there. And there are no lakes between here and Circle so those ones (sheefish) must be spawning in the Yukon—maybe around freezeup—late September, October—because I see them moving up and they have eggs in them. H021501

> Sheefish go up the Yukon as far as 17-mile, lay their eggs and go back downriver. They do this in late September. During late fall salmon fishing, most of the sheefish caught seem to be males—very few have eggs—Maybe the females go back into the lakes and the males stay in the river and travel late. N021501

Spawning sheefish are also reported to be heading up the Porcupine River, Porcupine tributaries, and even into area lakes. There is recognition that some sheefish returned to the ocean after spawing and that this downstream movement out of the Flats occurs under the ice.

> I've caught sheefish sometimes in Hospital Lake or even way up the Black River coming out of the lakes—they are everywhere—seem to be very widespread. I've heard that sheefish go upriver, spawn, and to back down to the ocean but I've also seen ones that stay around and over-winter locally. M111600

> Sometimes you catch sheefish in the net under ice in November. D021601

Whitefish Population Trends

When asked if they thought whitefish populations in their area were increasing, decreasing, or about the same compared to the past, no respondents reported that populations were increasing. Several respondents thought populations were about the same as they had always been. Most of the respondents offering an opinion on population status thought whitefish populations had declined in recent years. These

opinions are based largely on having experienced lower rates of harvests at favorite fishing areas:

> I think they (whitefish) are all in decline because in the places I fish for them at least, we don't see as much in our net as before. J021501

> I think maybe there is less of all these (whitefish) now—like salmon and everything else it seems to be in decline. E021501

Some respondents commented on a decline in whitefish quality in addition to numbers and offered theories as to why populations had declined:

> Seems like we get lots of pike now and less whitefish and the whitefish we get now don't seem as rich (fat). But I think there are too many pikes and maybe they are eating the whitefishes—lot of times we cut them open and see whitefish in their stomachs. Maybe that's the reason there are not as many. I fish same place as my mother, with same kind of net and don't get as many as she use to. D021601

> I don't know if there is more of less but I know people don't go after them as much now because not too many people have dogs anymore. That's when they really use to go after them. Seems like the whitefish they have over towards Christian River—over towards that way and back in them lakes is really poor. They get a mixture of all kinds back that way but they are really poor (quality)—not fat—not enough in them to make it worthwhile—so now I just fish at my spot on the main river. H021501

One respondent thought whitefish populations had remained stable in river-connected areas but had declined in some area lakes:

> Numbers of these species (whitefish) are doing okay. Some of the lakes don't seem to have the number of fish they use to, but the rivers seem to have good healthy populations. Some of the larger lakes, sloughs, and oxbows are still good fishing areas if connected to the main river. A111600

Fishing Methods for Whitefish

One of the reasons that whitefish are such an important subsistence resource is that they can be relatively easily and reliably harvested using a variety of methods during almost all months of the year. When responding to the question of what they looked for in identifying a good whitefish fishing location, one respondent explained:

> We just know the places that are good, you know, but you need place like where slough go back to a lake and then another slough go to another lake, and on back like that. That's where they are. The different kind are

> all mixed up in there I think, but some places are better to fish than other places. B021601

Whitefish are harvested using four major gear types: nets, fishwheels, traps, and hook and line. Each of these methods is discussed below.

The Use of Nets

Whitefish are most often caught using commercially manufactured gillnets set in open water areas or under the ice, depending on the time of year. A wide variety of net mesh sizes are reportedly used, including 1 inch, 1 ½ inch, 2 inch, 3 inch, 4 inch, 4 ¾ inch, 5 ½ inch and 8 inch. Mesh sizes were generally reported by respondents as "stretched mesh" dimensions. Multiple species of whitefish are typically present at most fishing locations and different mesh sizes can be used to target certain species according to respondents.

> Good whitefish areas have long been identified by elders and people know where these are—you learn about these growing up. You can't just put a net in anywhere and find these fish. The species you get depend on gear size. They all mix together but the harvest you get is based on net size. L121200

Respondents claim that nets with a mesh size of 4 inches and above are good for specifically targeting broad and humpback whitefish while letting smaller species pass through. One respondent noted that he uses chum salmon nets to harvest the larger whitefish. Broad and humpback whitefish reportedly "bounce off" nets with a mesh size of 2 inches or less. Those nets are effective, however, at catching a mixed bag of smaller whitefish species. The one respondent using a net with 8-inch mesh noted that it is primarily used to target large pike and only occasionally catches large whitefish. Some respondents own several nets of different lengths or mesh sizes to use at different sites, different times of the year, or to target different species of whitefish. A good description and photos of setting a net under the ice near Chalkyitsik is offered by Nelson (1973).

In addition to the common use of gillnets, one respondent mentioned using a dipnet to harvest ciscoes. This gear type is apparently used during the spring in river eddies along cutbanks where fish migrating upstream "rest" out of the main current. This method of fishing is said to be best at night.

The Use of Fishwheels

Fishwheels constructed and operated primarily for harvesting salmon are also used to catch whitefish. Bering cisco and sheefish are the species most often reported as by-catch in fishwheels targeting salmon during the months of July, August, and September. Several respondents also reported using fishwheels to specifically target whitefish and sheefish between salmon runs or after the salmon runs had passed.

The Use of Fishtraps

Historically, funnel, basket, or open-topped "sluice traps" made of willow branches tied with spruce roots were used to harvest whitefish. Traps were described as being six to eight feet long and several feet across. Several respondents remembered using such traps in their youth and noted this method has not been used for 30 or 40 years. Typically, traps were placed in narrow streams (or streams narrowed by artificial fences) known to have abundant runs of whitefish.

> Years ago we made fish traps out of a particular kind of willow. We used willow sticks fastened with roots. These were six or six and one-half feet long, maybe twenty inches wide. They were open on the top like this (drawing) with an entry ramp that the fish when up and dropped over. Last one made like that was about thirty years ago I think. A111600

> Up around Chalkyitsik I seen where they put a chute-trap in them small creeks—fall time when the fish are back rushing down and they put that chute in there with a little board for a ramp and they drop over the edge and go into the trap area. E021501

> At Chalkyitsik in the back sloughs we use to put basket trap in the water and catch a mix of whitefish and cisco—but not round whitefish. The traps were baskets maybe seven feet long with open top—made of willow. Put these in shallow water with an entry chute. We used these summer through fall—best when leaves are hitting the water in the fall—that's when the fish are moving—In the creeks, whitefish start running downstream when the fall leaves start hitting the water. The last time we use fishtrap was probably 1960s. L121200

According to respondents, fishcamps were often established at the site of these traps in order to process the large harvest of fish they produced. Respondents noted that traps were most often used during the fall when fish were fat, water levels were dropping, and fish were moving in large numbers out of lake systems toward the main rivers. A

modernized version of this technique using funnel traps made of chicken wire has been used by at least two respondents in recent years:

> Up at Canyon Village one time we put a trap in a creek coming out of the lake and caught lots of least cisco—just a 2' X 2' chicken wire trap set in the creek. It was so shallow, that one, that we had to dig it out a little bit just to put the trap in. H021501

> People use one-inch mesh nets in lakes or you can make a chicken wire trap like a square funnel trap and use that in those little creeks. G021401

A fishing method using gunnysacks or simple wire mesh baskets several feet high and approximately 18 inches wide is sometimes used to harvest whitefish trapped behind beaver dams. This fishing method is reportedly most effective in the fall and most commonly results in the harvest of juvenile fish or "sardines." The method involves breaching the beaver dam by cutting a small notch and placing the sack or basket on the downstream side to filter the water flowing through the notch. Whitefish trapped behind the dam reportedly feel the pull of the water and move through the notch where they are trapped in the basket:

> Sometimes we use wire traps to get the fish coming out behind the dams—you don't always have to cut the dam—sometimes there is a way around it and you put your trap there. Animal sign around the dam will tell you if there is fish in there—animals dig in it and you see it there—fox, lynx, thing like that. Mostly the fish behind those dams are small ones—young ones—fall time we get those and just fry them up. G021401

> I've seen it where they cut the dam and those fish feel where it is draining out and just go for the opening and they put gunnysack under that and it just fill up with those fish. First all those little sardines come out. Then when its getting lower and lower these kind (broad whitefish) come out. E021501.

> We were going to go out to the dam at 5-mile last fall and set (fish) trap there but we had tragedy in the village and didn't go. The fish back behind that one are young ones—little ones—the kids, I think, of these bigger ones. We just use screen trap—make like a deep basket, cut the dam open a little bit and catch them in that screen as the fish go through. Have to make it deep so they won't jump out. We know there is fish there—we could see the fish moving behind the dam making little waves and water doesn't do that by itself you know. We just make 6 inch cut in the dam—don't want to drain too much water out. I think the big ones (fish) get out some other way and those young ones stay there too long and get caught. B021601

The Use of Hook and Line

Several methods of hook-and-line fishing are used to take sheefish and some species of whitefish. Respondents reported that sheefish were sometimes caught with lures during summer and fall fishing trips in rivers and sloughs. These fishing trips were predominantly targeting northern pike. Lures, such as commercially manufactured "daredevils" are cast with a conventional rod and reel or a locally crafted "fishing can." Fishing cans typically consist of a coffee can wound with fishing line and fixed with a handle that allows the line to spool off the end of the can using a throwing motion, and retrieved by re-winding the line around the can.

Several respondents noted that humpback whitefish would also occasionally take a lure in clear-water streams. One respondent specifically noted that lures imitating "hellgrammites" and "white worms" were particularly attractive to humpbacks.

Ice fishing, or "hooking" fish through the ice is another hook-and-line method used to take sheefish during the late fall. According to one respondent, large numbers of sheefish can be taken using this method if the timing is just right:

> The fall run of sheefish out of the Flats is late—after freeze-up—and there are just one or two days they are going by and can be caught with hook under the ice. I've caught 200 in one day doing that at the mouth of the Grass River. L121200

Preparation, Preservation, and Uses of Whitefish

Whitefish are an important source of human food, a secondary source of food for sled dogs, and are occasionally used as trapping bait. Each of these uses and associated methods of preservation and preparation are discussed in more detail below.

Whitefish as Human Food

Whitefish are generally eaten fresh or frozen for future use. Summer-caught fish are frozen using electric freezers while fish caught in the fall after the onset of freezing temperatures might be allowed to freeze naturally outdoors. Historically, large harvests of summer-caught whitefish were split, hung on racks, and smoke-dried "just like

salmon." One respondent remembered that in the past, salting was another preservation method for whitefish. Some respondents indicated they still went to the effort "put up" smoke-dried whitefish. Others indicated this practice was more common in the past.

> now we mostly throw them in freezer. Before we have electricity we use to dry them—spring, summer, fall—dry them up. B021601

> Some of the big whitefish are dried just like salmon. Mostly freeze them whole. My father use to salt them if he caught lots and it was still warm. M111600

> (We) split and dry the meat and smoke it—late September—anything we process like that has energy to it. P021401

> We eat whitefish fresh or we dry them. If they are soft they go to the dogs. If we dry them then we smoke it—take the backbone off—cut just like salmon—gee they dry out real quick in July and even that time of year they have oil dripping out of them—rich even then. E021501

One elderly respondent specifically remembered drying and processing the large quantity of whitefish harvested using a traditional fishtrap during the first half of the twentieth century:

> In Chalkyitsik they make trap for them in old days—late when fish are coming back down from way up that way—Lake Ch'ihilii—fat fish in fall time. We cook this one (least cisco) all the time over campfire. Trap made out of willow—the men made it. I don't pay attention to how they made it but they catch thousand fish—enough for winter. That was about 54 years ago now (1947) that we did that. Then, all fall we cut them, dry them and smoke it. Hang it on the rack. Gee even those small ones taste good! Dry fish, and half-dry fish you could boil it a little bit before you eat it. Skinny ones and sheefish we might feed to dogs. Everything else we eat it ourselves. C021601

Whitefish caught after the onset of cold weather are generally allowed to freeze naturally and are preserved in this manner. This applies to fish caught in gillnets set under the ice as well as fish taken in the late fall using basket traps at beaver dams. Two respondents noted that fishing for whitefish with a basket trap at a beaver dam was carefully timed according to the weather—prior to beaver ponds freezing over but late enough so that the catch could be frozen on the spot. This was done by hanging harvested fish up by the gills in the willows around the harvest site and retrieving them after snow cover made traveling easier:

> Fish caught in fall at beaver dams would just be hung up in the willows around there and let them freeze. Go back later and sack them up—use them for people food and for the dogs. D021601

> We fill our trap up and then string them up in the willow—put them through their gills and hang 'em up. Later on we go out there with our dog team and pick them up. We catch them in fall time before snow—walk there up to 5-mile—and then go back there after snow with dog team. B021601

By all accounts, whitefish are thoroughly utilized, with the meat, eggs, and guts commonly eaten. Juvenile whitefish or "sardines"—often caught behind beaver dams--are reportedly rich in oil and are commonly fried and eaten whole "guts and all." With adult fish, fresh or frozen whitefish meat is prepared by baking or frying. Dried whitefish can be eaten as is (uncooked), dipped in rendered whitefish oil, or boiled. Whitefish guts are reportedly rich in oil and are prepared for cooking by cleaning out the contents of the stomach and intestines. After cleaning, the guts are pan fried in their own oil and eaten. Whitefish oil can also be rendered using this process and the oil "poured off" and saved for other uses. Some respondents mentioned traditional dishes that specifically utilize whitefish oil:

> My net is mostly going for this one (pointing to broad whitefish)—really rich, that one. Old days when they catch them in the fall they render the oil from them. Cook them and just pour the oil off. Use that oil for all kinds of things—make bannock with it--healthy! Sometimes we fry up knik-knik—those stone berries—in whitefish oil. That hard seed they have turns brown and mushy, then we stir in whitefish eggs and cook them just a little—like over easy—delicacy man! P021401

According to respondents, whitefish eggs are often eaten raw, boiled, fried, dried and powdered as a seasoning, or preserved by "jarring" or canning. Many respondents noted that whitefish eggs improved in taste and quality as summer progressed into fall. Some respondents were very specific about preferences relating to whitefish eggs:

> We eat the eggs from these (Bering cisco) raw. The eggs are real bitter in the springtime. Then as the season progress, like August, the eggs are real good. I'm not big on sheefish but I save the guts and eggs from those for later use—freeze it up for later. H021501

> Eggs are eaten raw, fresh, July and August the eggs are getting tasty—maybe a little salt on them and just scarf 'em down. Sheefish—those eggs we cook, boil or fry little bit and then eat them that way. E011501

> Take the eggs out of those fall fish and save it—use it as a quick high-energy trail snack for winter travel. Never get hungry if you eat that. J021501

Respondents noted that the meat of Yukon Flats sheefish is generally not highly regarded as human food. Sheefish was variously described as "poor," "watery," or "mushy." Eggs taken from fall-caught sheefish, however, were described as very rich and favored by several respondents; the meat is sometimes cooked and served in conjunction with the eggs.

> Sheefish eggs are pretty good fresh or frozen. Big sheefish with eggs are sawn up into steaks with the eggs and all still in it—bake those up. G021401

Whitefish as Food for Sled Dogs

Chum salmon have long been recognized as the most common source of food for sled dogs along the upper Yukon River (Andersen 1992). Respondents speaking of "the dog team days" noted that whitefish also played an important role in feeding dogs prior to the advent of snowmobiles when all families struggled to provide year-round food for their dog teams. This was probably especially true for families living remote from the major salmon streams.

> Back when dog food was a big concern they use everything to feed dogs including whitefish. They even dry and smoke it for the dogs back then. Usually they cook it up to feed it to the dogs but sometimes they just feed it to them frozen. N021501

> We sometimes used whitefish as dog food back in the dog team days but mostly for human use. Small immature fish could be caught for dog food. At some times of the year they are very fat, full of oil, and we just freeze in big sacks and cut off chunks for dog food. A111600

> All the whitefish (species) were used for dog food in the old days. Before snogo everyone had a net in all fall and winter to feed dogs. For dog food, summer whitefish were split and dried without scoring and the guts were fed to dogs. Fall fish could be frozen whole—hung up by the tail. L121200

Fishtraps, described previously, were used to harvest the large quantities of whitefish required for both human and dog food. According to respondents, the use of fishtraps slowly declined with the advent of snowmobiles and reductions in the number of dogs kept by the average family.

> Snow machines deleted the need for fish traps because the pressure to get dog food declined. Snow machines came in around here in 1968. L121200

Notwithstanding, whitefish are still used as a source of dog food by some local residents. Some respondents indicated that only "skinny" or "low quality" fish were fed to dogs. Others indicated that whitefish had qualities that made them superior, in some respects, to salmon.

> Whitefish—all kinds are known for being good dog food because they hold water in the meat when you freeze them and your dogs can get moisture—better than salmon. L121200

One respondent, who still maintains a kennel of sled dogs, said that broad whitefish provided a preferred source of fresh food for his team all summer long.

> I feed my (twelve) dogs whitefish all summer—put net in as soon as the river goes out. Sheefish are no good for dog food—they don't do well on them. Broad whitefish are much better. I put net in at the mouth of Porcupine River as soon as the ice goes out and catch whitefish all summer long—maybe 15 or 20 a day—just enough to feed the dogs that day. H021501

While dry or frozen whitefish can be fed to dogs without cooking, most respondents report that fresh fish and most preserved fish are boiled prior to being fed to dogs:

> For the dogs we always cook them up. For people food, frozen fish could be fried, boil it up or bake it. Back when we dry the fish we save the guts for the dogs—throw them in the dog bucket and cook them up—back when we have lots of dogs. D021601

Cooking alleviates worries about parasites, provides additional moisture to hydrate the dogs, and allows the addition of other nutritional ingredients such as rice, tallow, or commercially manufactured dog foods.

Whitefish as Trapping Bait

Fish of several kinds are commonly used by Yukon Flats trappers as trapping bait. Whitefish received somewhat mixed reviews in this regard from respondents who are trappers. Among those who favored whitefish as trapping bait the comments were as follows:

> Whitefish make good marten bait if you hang them up in September for about ten days and let them spoil. L121200
>
> Whitefish makes good trapping bait too—hang 'em up whole—guts and all and let it spoil little bit—then mix it with spruce needles which helps it carry the scent farther—good marten bait. K121200
>
> Bering Cisco—the ones we catch in the fishwheel make good fox bait—I use it where I spread whole bunch of bait out like an open set and you spread it around to attract them in. H021501
>
> Oh yeah, best bait in the world for trapping is these ones (ciscoes). They've got some kind of scent to them and the animal smell it. Some kind of oil or something. Good bait for anything. E021500

Two trappers, however, offered comments indicating that whitefish was not their preferred bait:

> People don't use whitefish for trapping bait too much because it falls apart too easy when it is frozen. Pike is used more for bait because it is more sturdy. N021501
>
> They don't have enough bone to be used for trapping bait—I prefer half rotten dog salmon or pike heads for bait. M111600

Beaver and Whitefish Interactions

The question of if and how beavers might be affecting whitefish populations on the Yukon Flats was the focus of this research effort. Toward that end respondents were steered toward the following questions:

- Do beavers affect or impact whitefish populations—and if so how?
- Are some species of whitefish affected more than others?
- Are there both negative and positive effects of beaver dams?
- Were there traditional ways of dealing with too many beavers/beaver dams?
- What is different now?

It is interesting to note that as the interviews shifted from questions about fish to questions about beavers, most respondents quickly sensed that they were being asked about the workings of a larger "natural system" and offered certain basic information about which we had failed to ask. For example, the interview guide contained no questions about the status of beaver populations, or about the role of floods in providing fish access around beaver dams. However, in the course of our interviews these topics

were almost invariably raised. As might be expected, in the wide-ranging discussions regarding the impacts of beavers and beaver dams on whitefish, there were areas of broad agreement and some areas of where respondents had differing views. Information regarding beaver-whitefish interactions on the Yukon Flats are summarized below.

Yukon Flats Beaver Populations

Many respondents began with comments to the effect that beaver populations on the Flats were currently at very high levels. Most respondents attributed high beaver numbers to low fur prices in recent decades that has discouraged trapping activity. Additionally, a decline in the use of dog teams has resulted in less demand for beaver meat to feed dogs.

> There used to be more trapping of beaver and that kept them from expanding. Now people rely on welfare. Laziness and low fur prices keeps people from trapping. L121200

> Lots of beavers now. People used to trap them more back when they need dog food—fewer dog teams now and not as many people out trying to catch beaver for dog food. Less trapping and more beavers nowadays. E021501

> We used to take more beaver—left the dams alone but used to shoot the beavers. Now there are lots of beaver around. Nobody kill it. We use to keep beavers out of the soughs by killing them and everything with the fish was good. Now they (beavers) are all over. F111600

In sum, by most accounts, beaver on the Yukon Flats appear to be at historically high levels.

The Observed Effects of Beaver Dams on Fish

According to some respondents, increases in the beaver population have resulted in the presence of more beaver dams. Respondents generally agreed that beaver dams represent obstacles to fish movement, especially during periods of low water. A few interviewees expressed concerns that beaver dams were now preventing fish--whitefish as well as other species--from entering certain streams or lake systems. Others said that spring high water might allow fish to maneuver around beaver dams during their upstream movement, but fish could be trapped behind dams in the fall and prevented from moving downstream as water levels dropped. Respondents reported that whitefish trapped behind

dams in areas unsuitable for overwintering would eventually die. Some reported observing this first hand.

> Sometimes beaver dams keep the fish from coming out of the lakes and sloughs in the fall before the water drops. Then they are caught all winter and can die from winter-kill. Beaver dams are starting to impact the whitefish—lots of winter-kill. Not enough water they (whitefish) will die off—depend on how deep water is but those fish have got to get out in the fall time to get back to the main river. It would be better I think if there was not so many beaver dams. F111600

> There is no doubt that the beaver dams interfere with fish movements in the small streams. Not just whitefish but pike too. Fish trapped behind them dams may not survive the winter. M111600

> Fish get blocked in behind the beaver dams. Elders say if beavers block off a lake or slough too long the fish caught behind it get smaller and smaller. K121200

> I think they (beavers) are trapping a lot of fish back in the creeks, I'll tell you that. They (whitefish) go up in the high water and can't get back out. If there is too many stuck in there they start dying off—not enough oxygen, too crowded for them. E021501

> I think the beavers are hurting the fish now because they are not being controlled and they prevent them from getting into the lakes. Then sometimes it floods, you know, and they can get past the dams, but then they can't get back out when the water goes down. Fish can't all live back in there with all those other things that are using the lakes like muskrat, pike--it really depend on how much water is in there, but they could die if they were trapped in there just one winter I think. J021501

> I can believe they (beavers) disrupt the movement of fish. I know that is going on over in Marten Creek and up in the Chandalar River country. Beavers are blocking the fish I hear. I'm familiar with a place up the Porcupine River where at one time there was fish in that lake but now there's not because of big beaver dam and no flood for awhile. This is a place we call Four-Mile Lake below Canyon Village. H021501

> Beavers interrupt the movement of fish by blocking off the streams. Fish caught behind dams die out—I've see it before, with fish floating. I think they run out of air or something because they are over the capacity. P021401

Traditional Stream Management Practices

In addition to a larger harvest of beaver for meat and fur across the entire Yukon Flats in previous decades, certain streams and fishing locations were traditionally managed to promote the unrestricted passage of whitefish into key habitats. In a discussion of

traditional beaver management systems, Linkous (1995) describes this practice as "management of beaver for whitefish" differentiating it from strategies that trappers used to maintain viable beaver populations in their trapping areas. But controlling beavers was only part of the stream management practices described by informants during this project. According to respondents, these practices consisted of clearing overhanging brush from streams, shooting beaver, dismantling beaver dams, and burning dead vegetation around the margins of lakes and meadows. Work parties were apparently organized by local leaders to undertake these tasks. Key fishing locations near Chalkyitsik and Alexander Village were specifically mentioned as areas where this had been practiced within the lifetime of several informants and is now no longer done.

> Beaver activity has affected water flowing through the Yukon Flats and some areas have almost dried up. Beaver dams can help concentrate fish for fishing but they can also dry up areas and cause winter-kill of fish. There use to be more of an effort to shoot all the beaver in an area and clear out dams at critical fish passage points—like around Chalkyitsik. People would go up, shoot all the beaver for food and pull out the dams using rakes, shovels, ax, saw—cut brush, pick berries—make a trip out of it. Nowadays they don't do this. A111600

> See, you have to take care of these lakes out there. There has to be quiet around these lakes that are producing. Fish hear things and get disturbed. The new generation knows the traditional rules but they are kind of breaking them nowadays. To be productive you have to do lots of things like clear the brush out of the creeks. Fish are backing up now because this has not been done. Beaver are blocking things up too. Up above Sho (Shovun Lake) in several places they have things all blocked off. For 20 years at least this has been an issue. The last time I remember clearing out the creeks was when I was 6 or 7 years old (early 1940s) following behind my uncles and the rest of the gang walking along the creeks cutting out the brush that overhang into the water. We also shot the beaver while we were at it—just shoot them as we went along because they interfere with food (fish) production. We can't do these things now. The fear was instilled in Native people that whatever they do was a crime, whether we were helping out the nature or keeping the nature from taking control or whatever. We used to burn those big meadows too—every year—just burn off all the dead vegetation. Now all those are getting smaller and smaller and covered over. P021401

Respondents implied that government regulations, contemporary land use and land ownership policies now make these traditional practices illegal. Local residents have largely abandoned these traditional practices to the detriment of the fish populations in these areas.

Beavers, Floods, and Climate Change

Comments from respondents about area lakes "drying up" were common. While beaver dams were thought to contribute to this in some areas, several implied this was part of a larger environmental change or climate change on the Yukon Flats.

> There are less lakes and warmer weather now than when I was growing up. Must be part of God's plan. B021601.

> Lot of meadows are now growed-in and lakes have shrink down from when I was small. Things are drying up in some areas and getting brushy. D021601

> The whole Yukon Flats is changing. The lakes are drying up and filling in. Vegetation is changing. Bushes grow faster now. F111600

Forest fires have also contributed to changes in both the vegetation and hydrology of the Yukon Flats according to one respondent:

> Fires have played a role in drying up the Flats too—not just beavers. Fires remove vegetation that is protecting (insulating) permafrost and the frost melts out and drains the lakes. M111600

Another respondent pointed out that beavers themselves had been affected by a lack of water in some areas, indicating that they could not be solely responsible for these hydrologic changes.

> I know there are places that are drying up but there are no beavers around there. It was not due to beavers that they dried up. I see beaver houses sometimes in dry lakes between here and Chalkyitsik. They dried up in the last 10 years or so and them beavers couldn't do nothing about it. G021401

In some cases respondents noted the positive effects of beaver dams in creating or maintaining fish habitat.

> Lakes, however, will go dry in some areas if the beaver doesn't dam it up so in that case the dam is a good thing. Fish might be trapped over winter but they usually get out in the spring with the high water. M111600

The important and beneficial role of floods was emphasized, both to the Yukon Flats environment in general, and to the interactions of beavers and whitefish specifically. According to respondents these benefits include: 1) natural removal or temporary

dismantling of beaver dams, 2) providing fish access over or around the dams, and 3) recharging lakes and other fish habitats with fresh water in areas that have dried up or where water has become stagnant. Respondents observed that floods, particularly spring floods, have been less common on the Yukon Flats in the last decade, contributing to areas drying up and the impoundment of fish.

> Beaver dams will sometimes go out with spring floods on their own. Dams can hurt the fish if they are stranded in water too shallow to over-winter—winter kill. Some areas have just dried up in recent years because of no spring floods and maybe beaver activity. The current problem is maybe a combination of too many beavers and no spring floods to counteract their blocking affects. Floods are considered a good, healthy thing round here. Last good spring flood was 1991. A111600

> Beavers create habitat but it is habitat that fish can't get into or get out of—they interrupt the natural movement of fish. When beavers flood new areas it makes the whole area dead. Trees and brush die out and the water is not drinkable—gets a pitch smell to it—I think all that sap leech out into the water and nothing can live in it for a while. Need flood or something to flush it out of there. P021401

> The floods have not been coming on any kind of regular basis now. You go back in these places where your map shows lakes, all these places, its just grass now. J021501

Comments Indicating No Negative Impacts to Fish

Not all respondents agreed that Yukon Flats beaver populations are at historic highs or that beaver dams are negatively impacting fish populations. Some individuals were more philosophical about the interactions between beavers and whitefish and expressed the feeling that it was all part of a natural cycle that had gone on for eons and it did not necessarily represent a problem for fish.

> I don't know if it impact the fish but there is a lot of beaver houses and beaver dam now. Wherever I go I see them. When I go back there in the spring it don't smell fishy—I never see dead fish. I think if they were dying off it would smell like dead fish. People don't get out there to get those beaver now like they did when it was a dollar and inch so I guess that's why they build up. People know where the beaver dams are and where the fish are behind it and they go to those places to get fish. D021601

> There are lots of dams in the Sho area but it is no problem. Fish find ways around them in high water. Fish sometimes get caught in shallow

ponds behind dams and die off but this provides food for all the other animals—bears, eagles, mink, marten, hawks, fox, lynx. This cycle has happened forever and is not a problem. People still go after the beaver. Nobody bothers the dams. High water usually tears it apart long enough to let fish through. N021501

Most all the beaver dams have fish behind it. But it doesn't seem to be bothering the fish too much. I've seen times when there were even more beavers than now. It never occurred to me that they (beavers) might affect the fish. Whitefish seem to always be around. There were more and better beaver trappers around years ago. But people don't mess with the dams. G021401

There are more beaver around but I don't think it hurt anything. Most those beaver houses have been there for long time—my dad trap those houses and always left a few beaver in each house—never trap them out. We always had beaver around. The only thing that clean out the fish is when the otter move in. Beavers don't bother the fish. B021601.

DISCUSSION

The fifteen local experts interviewed as part of this research offered substantial insights on area whitefish populations and their interactions with beaver on the Yukon Flats. This information came in the form of oral traditions, personal observations, and considered analysis made over lifetimes. Because individuals are commonly exposed to different oral histories, experiences, and interpretations, there was a range of responses to many interview questions. But there also were areas of agreement as well.

Key respondents describe a complex and dynamic natural system involving the flow and movement of water through the Yukon Flats. Beavers have the ability to create or maintain habitats that are useful to whitefish at certain life stages. Beavers dams can also represent obstacles to the movement of fish and prevent access to seasonal habitats. They can trap whitefish in areas where they can not survive during the winter. The semi-regular occurrence of floods and high water events plays an important role in this system by preventing beaver dams from becoming permanent obstacles and, in most years, allowing fish passage at critical times of the year. Whitefish are said to be keenly sensitive to changes in water level and flow—an adaptation that would allow them to quickly take advantage of high water periods and move accordingly. In research

conducted concurrent with this study, Brown and Fleener (2001) found that several high water events during the summer of 2000 were sufficient to allow fish passage over beaver dams at study sites near the Black River. According to respondents, however, this passage between seasonal habitats is a fairly risky proposition for whitefish. Water levels do not always allow fish passage and fish are frequently impounded behind dams.

The most direct involvement of humans in the ecological system described above has been as harvesters. Indigenous inhabitants developed harvest methods that allowed them to selectively exploit both the beaver and whitefish resources on the Yukon Flats. At a few key whitefish passage points, traditional stream management practices were used to more intensively control beaver populations and remove in-stream obstacles to promote the movement of whitefish into particular habitats and harvest areas. Over the whole of the Yukon Flats, however, it seems likely that the regular occurrence of high-water events allowing to fish pass over or around beaver dams has been the major factor allowing the free movement of whitefish, not the control of beavers or the systematic removal of beaver dams.

Several changes occurring over the lifetime of respondents have been part of the dynamic system described above above. The combination of declining fur prices and less demand for beaver meat to feed dogs has removed incentives to trap beaver. A majority of respondents thought beavers and the number of beaver dams on the Yukon Flats were at historically high levels. In addition, traditional stream management practices at key whitefish passage points have not been applied since the 1940s. These factors may have made some lake systems and whitefish habitats less accessible to whitefish. In addition to these factors, respondents remarked about a broad and gradual drying of the Yukon Flats environment over the last 50 or 60 years. Warmer temperatures and less precipitation have reportedly caused changes in vegetation and the disappearance of some area lakes and wetlands. Floods and high water events have also been notably less frequent on the Yukon Flats since 1991, making beaver dams more permanent obstacles to fish movements in the last decade. Such changes have the potential of adversely impacting whitefish.

By all accounts, harvest effort directed at whitefish is much lower today on the Yukon Flats than it was 30 or 40 years ago. Fewer people live in remote camps. There has been a curtailment of the use of traditional fishtraps to take large harvests of whitefish at key locations. There has been less demand for whitefish used as dog food as snowmobiles replaced many family dog teams.

During this period of declining whitefish harvest on the Yukon Flats, no respondent thought whitefish populations had increased. Some respondents who were active fishers reported that whitefish populations appeared to be stable or "same as always" in their fishing areas. A larger number of respondents reported lower harvests of whitefish at fishing locations used by their families for generations. Some also reported declines in the quality and condition of harvested fish in certain locations.

Whitefish still appear to be broadly distributed across the Yukon Flats. But declining whitefish numbers is a concern among users of the resource. Beaver dams have probably contributed to localized declines in whitefish populations in some drainages. Whether high beaver populations are the primary cause for the more generalized decline in the whitefish resource over the entire Yukon Flats is less clear given the other factors advanced by respondents. These local experts suggest that larger scale changes in Yukon Flats weather patterns and hydrology also play prominent roles.

Clearly additional research is needed to more fully understand these dynamic relationships on the Yukon Flats. Specific recommendations for research include the following: 1) Identification of critical whitefish passage points or bottlenecks on the Yukon Flats that represent key access points to lake systems or other important whitefish habitats. Two such points were identified in the course of this work. Additional TEK work may be able to identify others. 2) Documentation of climate and habitat changes on the Yukon Flats mentioned by respondents. Examination of Twentieth Century weather and hydrologic records from the Yukon Flats could perhaps confirm and quantify the changes in climate noted by respondents. It may also be possible to use historic

photographs taken at known Yukon Flats locations to document habitat and vegetation changes over time that could be affecting whitefish populations (i.e. the drying-up of area lakes or areas blocked by beaver dams). 3) Build upon the recent biological work conducted by Brown and Fleener (2001) with multiple-year monitoring of whitefish movements at Yukon Flats beaver dam sites to document timing, restrictions to fish movement, and incidents of fish impoundment and winterkill.

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APPENDIX A. Key Respondent Interview Guide

TAXONOMY
There are several species of whitefish in the Yukon Flats—what kinds do you know about and what are the local/Native names for them?

POPULATION TRENDS
Do you think whitefish populations are increasing, decreasing, or about the same as they were in the past?

LIFE HISTORY
What can you tell me about the seasonal movements of the different whitefish? (timing of "runs" into lakes, out of lakes etc.)

Do you know what they eat?

Do you know where and when they spawn?

Where do they spend winters?

Where do they spend summers?

WHITEFISH USE AND USE AREAS
Are there specific areas (lake/creek systems) that are/were known as good whitefish fishing areas? (Map these and collect place names.)

What do you look for in selecting an area to fish for whitefish?

Are some species of whitefish preferred over others?

Are some areas known for producing one kind of whitefish or is it always a mix?

What kinds of fishing gear are/were used?

How is the catch normally preserved? (freezing, drying, smoking, canning)

How are whitefish prepared?

Differences in quality of spring vs fall fish?

Use of fish as trapping bait or dog food?

BEAVER INTERACTIONS
Do beavers affect or impact whitefish populations-- and if so, how?

Are some species of whitefish affected more than others?

Are there both negative and positive affects of beaver dams?

Were there traditional ways of dealing with too many beavers/beaver dams?

What is different now?

Discuss the use of beaver dams as natural weirs to trap fish.

Appendix B. Interview Excerpt Database

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Native Names]
Statement[(In Gwich'in language using phonetic spelling) Sheefish we call "Sha" or cony. Broad whitefish is "chi-sho". Humpback is "nia-hun". Round whitefish is "hult-ite" which means sled handle. Bering cisco is "trey-look". And least cisco.....I don't know, I just call that one "little whitefish" in English. (off tape—in later conversation respondent added) We refer to all of them as "Luke-Dagai" our word for Whitefish.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[Numbers of these species (whitefish) are doing okay. Some of the lakes don't seem to have the number of fish they used to, but the rivers seem to have good healthy populations. Some of the larger lakes, sloughs, and oxbows are still good fishing areas if connected to the main river.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements, Beaver Dams]
Statement[Bering ciscoes come with the king salmon. After breakup the fish run into or get flooded into back-water areas. They summer in slow water areas and lakes. Spawn in early summer I think and in October run out of lakes into deep river holes or the deep lakes. In fall, young fish come out of the lakes—first whitefish, followed by pike trying to get in the main river—this is in late September, early October. In late fall, bunches of fish (mostly young whitefish) school-up behind the beaver dams and actually keep the water from freezing due to their "schooling movements"—that's how you can tell there is fish there. People rely on the fall movement of fish out of the lakes to set nets in the exit areas and catch fish. Movement continues into the early winter under the ice. Exit areas can be created by cutting holes in the dams and this is commonly done.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[They eat plants and bugs in lakes and rivers. Soon after break-up the river bottoms grow moss and algae. The fish eat that, and bugs too. In winter they don't eat much and get skinny.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning Areas, Floods, Seasonal Movements]
Statement[Spring floods play a role in getting whitefish into lakes and spawning areas. When fish come out of the lakes in the fall whitefish are the first to come out.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Winter Habitat]
Statement[They winter in deep lakes or deep holes in the main river. I think they stop

moving in December.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Summer Habitat]
Statement[Well I guess they spend the summer in the places we catch them, maybe in warmer/shallow water where they can spawn, eat, raise young.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing locations, Arctic Village]
Statement[People know where the deep holes are in the main river where they can find these fish when they are needed and where they can be caught almost year-round. I remember round whitefish being more plentiful in the Arctic Village area. Some people say they can actually hear fish in deep holes under the ice—hear them moving. When I am looking for good whitefish place to put my net I look for slow moving water in sloughs—maybe where there is a little eddy. People who are keyed in to fishing know where they can catch fish year-round. People try to catch enough fish before Christmas to last until spring time because the ice gets too thick after Christmas.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference]
Statement[Usually the whitefish species occur all mixed together. It's a mixed bag. Lake fish are generally fatter than river fish because there is food all winter in lakes. River fish don't have as much to eat until spring when food appears and grows on the river bottom. I don't really have a preference on species. Late fall fish are the best and fattest. Also they are good and fat late in spring, right before the kings come.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods, Fish Traps, Beaver Dams, Fish Use, Dog Food]
Statement[Usually use small nets, two-inch mesh usually, but that size will miss the broad whitefish—bounce right off it. The mesh size of your net determines what kind of whitefish you get. Sheefish and broad whitefish are caught in salmon wheels lots of times. My whitefish nets are mostly sixty feet long. Years ago we made fish traps out of a particular kind of willow. We used willow sticks fastened with roots. These were six or six and one-half feet long, maybe twenty inches wide. They were open on the top like this (drawing) with an entry ramp that the fish went up and dropped over. Last one made like that was about thirty years ago I think. Small (immature whitefish) can be caught by the sack-full by cutting the beaver dams out and letting them through in one small place. These immature fish could be frozen and used for dog food and the big ones used for human use.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]

Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[Mostly we just let them freeze naturally when we catch them in the late fall. Long time ago when they use them more year-round they gutted them and dried them like salmon. I hear some people over in Canada still dry their whitefish over there.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food]
Statement[We sometimes used whitefish as dog food back in the dog team days but mostly for human use. Small immature fish could be caught for dog food. At some times of the year they are very fat, full of oil, and we just freeze in big sacks and cut off chunks for dog food. I've never used whitefish for trapping bait.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams, Floods]
Statement[Beaver activity has affected water flowing through the Yukon flats and some areas have almost dried up. Beaver dams can help concentrate fish for fishing but they can also dry up areas and cause winter-kill of fish. There used to be more of an effort to shoot all the beaver in an area and clear out dams at critical fish passage points—like around Chalkyitsik. People would go up, shoot all the beaver for food and pull out the dams using rakes, shovels, ax, saw—cut brush, pick berries—make a trip out of it. Nowadays they don't do this. We used to shoot beaver in springtime too—25 limit. Now regulations limit beaver shooting and messing with dams. You need permit to even clear streams of brush and jams. Beaver dams will sometimes go out with spring floods on their own. Dams can hurt the fish if they are stranded in water too shallow to over-winter—winter kill. Some areas have just dried up in recent years because of no spring floods and maybe beaver activity. The current problem is maybe a combination of too many beavers and no spring floods to counteract their blocking affects. Floods are considered a good, healthy thing round here. Last good spring flood was 1991. Floods rejuvenate the Flats.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish]
Statement[Fish are important but they are only part of the whole picture of what people use for food. Whitefish are important to some groups of people that live off of the main salmon streams. Not everyone fishes for king salmon. Some people live off whitefish—people around Arctic Village, Birch Creek—places like that. Lot of lakes up in Arctic Village have fish in them that people use—pike, grayling, Whitefish, Arctic Village is located where it is because of fishing opportunities. Some people get a good feeling--spiritual maybe—catching their own food. Whitefish is good for that because it is easy to get and always there.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Customary Trade]
Statement[In ancient times North Slope people came across the Brooks Range and

traded things like sea salt for tree pitch, certain rock for arrow tips, sinew—things like that.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Chalkyitsik, Salmon Village, Trapping, Dogs]
Statement[Chalkyitsik was the place that Salmon Village people spent the summer. I remember salmon village as a winter settlement mostly for trapping. That's where I was raised up. Use to come out of Salmon Village in the spring in boats made out of canvas, spruce poles, and pitch. This was back in the 1940s. Use to keep 9 to 11 dogs for use on the trapline.]
Code[A111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Native Names]
Statement[(using phonetic spelling of Gwich'in terms and looking at species photos) Sheefish we call "coonies" or "Sha". Broad whitefish are what we call "lake whitefish' or "Chi-sho". Humpacks we call them "Nea-Hun". This one (round whitefish) is "Hult-tite". Bering cisco is "trey-look". That one there (least cisco) is "lay-coot" I think, eh?]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements]
Statement[Pretty sure they (whitefish) move upstream in the spring when the water is high--stay in the lakes in summer time and move out when the water gets cold--move out in August. These ones (bering cisco) run in the main river with the king salmon. Least cisco are only found in certain lakes.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[In the deep lakes they eat all kind of bugs—them black bugs—You seen em' -- and plants—they got different kind of plants way down under the lake—That's what they eat. Sheefish will eat other fish—the smaller ones like sardines. Lake whitefish have a special weed they eat all winter.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[Whitefish go into the lakes and spawn in springtime where they have their little ones and stay all summer.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Winter Habitat, Summer Habitat]
Statement[(the whitefish) know the lakes and which ones are deep enough to spend the

winter in. You can catch them almost year-round in good lakes like 20-mile lake (Sho-Vun)—we could catch these up there right now (November) if we really want to. Mostly broad whitefish there.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations, Species Preference]
Statement[You find broad whitefish in the lakes and mostly the humpbacks in the sloughs. I fish mostly at 20-mile lake. I like broad whitefish caught this time of year (November) under the ice. There are humbacks at 20-mile too. You can catch a mix of species anywhere but you use different gear to target certain ones. We catch sheefish mostly in salmon gear.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[Whitefish nets are usually two inch mesh—maybe even one and one-half inch. Whitefish also get caught in the fishwheel. Sheefish will take a lure. Sometimes we use the beaver dams to help catch the fish—cut a hole in the dam, put a net there and catch a whole mix of kinds.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish preservation]
Statement[We freeze them whole. Sometimes dry 'em up—cut like salmon and smoke it.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation]
Statement[Just cut 'em up frozen with a saw and fry them up whole. Cook the guts up too—best part. Dry ones we just eat it like that.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[Fish are fat in July, skinny in early springtime. They fatten up real quick in the warm water—a week or two and they are fat. Fat in fall too. Lake whitefish stay fat all the time 'cause they got special food down there to eat. River whitefish are skinny in winter.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Trapping, Dog Food]
Statement[Whitefish are sometimes used for dog food and are good for marten and mink bait. For trapping bait you split them in half and let them rot a bit.]

Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[Sometimes beaver dams keep the fish from coming out of the lakes and sloughs in the fall before the water drops. Then they are caught all winter and can die from winter-kill. Beaver dams are starting to impact the witefish--lots of winter-kill. Not enough water they (whitefish) will die off--depend on how deep water is but those fish have got to get out in the fall time to get back to the main river. It would be better I think if there was not so many beaver dams. The affects of beavers on the fish are mostly bad. We used to take more beaver—left the dams alone but used to shoot the beavers. Now there are lots of beaver around. Nobody kill it. We used to keep beavers out of the sloughs by killing them and everything with the fish was good. Now they (beavers) are all over. Sometimes we use the beaver dams to help catch the fish—cut a hole in the dam, put a net there and catch a whole mix of kinds.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[Whitefish spoil quickly in the net because of too much fat. You need to check your net all the time or the fish will spoil.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Environmental Change]
Statement[The whole Yukon Flats is changing. The lakes are drying up and filling in. Vegetation is changing. Bushes grow faster now—more moose around now since food stamps came in. Mild winters these days compared to old days.]
Code[F111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Native Names]
Statement[(Looking and species photos)These two here (broad and humpback) are the lake whitefish—the speckled one (pointing to broad whitefish) is "Chi-sho". Round whitefish is "Hull-tite"—the word for handle bar on sled. I don't know the names of them others.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends, Beaver Dams]
Statement[I don't know whether there's more or less of 'em (whitefish) but I do know some places are drying up due to beaver dams and you have to go find new places to put your net in.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]

Keyword[Yukon Flats, Whitefish, Seasonal Movements, Life History]
Statement[In spring they (whitefish) move upstream They get locked into lakes off the main river after high water in spring. Seem to come down river in fall time. Suckers come down river in August followed by little whitefish, then the big whitefish come later.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[They eat bugs and little plants. Mostly water bugs of various sizes—what we call "Chet-si".]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[I don't know too much about their spawning but I have seen them with eggs in them both fall and spring. I have always wondered if they lay eggs twice a year maybe. I've heard that sheefish go upriver, spawn, and then go back down to the ocean but I've also seen ones that stay around and over-winter locally.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Winter Habitat]
Statement[I think they mostly winter in deep holes in the main river.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[(spoke mostly about areas on Sucker River, eight-mile Slough, and Rose lake.)]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference]
Statement[I go for the broad whitefish and the least cisco but we usually get a mix of species and different sizes and ages in our net. I never did eat sheefish very much.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[I used to use three to four inch mesh nets for Whitefish, Dog salmon nets can be used to take the bigger lake Whitefish, Humpback whitefish will take a small lure sometimes—hellgrammites and white worms. We used to use chicken wire traps sometimes in the late fall. I just caught fish this fall using the beaver dam at 8-mile slough. It seemed like the real little fish were getting over the dam but we made a bigger hole and then the whitefish started making it through. Caught them with a wire-mesh basket—set the basket there for two days and had a basket full of fish.]

Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[Some of the big whitefish are dried just like salmon. Mostly freeze them whole. My father used to salt them if he caught lots and it was still warm.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation]
Statement[The dried ones are boiled. Sometimes the guts and eggs are eaten too.
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[Whitefish are generally mushy in the spring and are fattest in the fall.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Trapping Bait]
Statement[They don't have enough bone to be used for trapping bait—I prefer half rotten dog salmon or pike heads for bait.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[There is no doubt that the beaver dams interfere with fish movements in the small streams. Not just whitefish but pike too. Fish trapped behind them dams may not survive the winter. Beaver dams in streams keep fish from moving up and that is not good. Lakes, however, will go dry in some areas if the beaver doesn't dam it up so in that case the dam is a good thing. Fish might be trapped over winter but they usually get out in the spring with the high water. There are more beaver around now because people are not trapping them. We never bother the beaver dams. I just caught fish this fall using the beaver dam at 8-mile slough. It seemed like the real little fish were getting over the dam but we made a bigger hole and then the whitefish started making it through. Caught them with a wire-mesh basket—set the basket there for two days and had a basket full of fish.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Beaver Trapping]
Statement[I caught 15 beaver this fall the first week of November on Sucker River. Eleven of them were yearlings. There was a big flood up Black River this year (2000) after freeze-up—must have been a late rain in the headwaters of the Black. I saw a "water ouzel" (American dipper) up there in November.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Sheefish]
Statement[I've caught sheefish sometimes in Hospital Lake or even way up the Black River coming out of the lakes—they are everywhere—seem to be very widespread. I've heard that sheefish go upriver, spawn, and then go back down to the ocean but I've also seen ones that stay around and over-winter locally.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Environmental Change, Forest Fires]
Statement[Fires have played a role in drying up the Flats too—not just beavers. Fires remove vegetation that is protecting (insulating) permafrost and the frost melts out and drains the lakes.]
Code[M111600]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Local Names]
Statement[(Respondent was not an Athabaskan speaker). Sheefish we mostly just call them sheefish or coonies. Broad whitefish I call "lake fish". Humpbacks I just call "whitefish". Bering cisco are the ones we call "herring".]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements, Spawning]
Statement[Sheefish are moving up the main river in late fall headed up to spawn.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[The small fish eat bugs. Sheefish eat other fish.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Trapping]
Statement[Some of the old-time trapline trails around here were layed out according to certain stars—they line it up to keep going in certain direction.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[Sheefish go up the Yukon in late fall to spawn—probably after September.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]

Keyword[Yukon Flats, Whitefish, Winter Habitat]
Statement[I think they winter in deep holes.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Summer Habitat, Spawning, Salmon]
Statement[Sheefish and whitefish—I think they spend the whole summer coming up the main river to spawn maybe. I know a spawning hole in a slough near my cabin (5 miles above Fort Yukon) that is 27 feet deep—I measured it. Salmon spawn in there.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods, Seasonal Movements, Sheefish]
Statement[I don't fish much with nets—mostly fish wheel for salmon and in the salmon wheel I get broad whitefish and sheefish which I like mostly for the eggs. I know a place where I can catch only sheefish in the fish wheel—up to 90 a day. Late fall after the chums and ice is running it is good for sheefish.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Sheefish, Fish Preservation, Fish Preparation]
Statement[Some people jar-up the eggs of sheefish. My wife likes to dry and smoke the whitefish—cut them and dry them just like salmon. Broad whitefish are usually eaten fresh. Dry fish are eaten uncooked. Eggs are eaten fresh right out of the fish or jarred up for later. Sometimes whitefish guts are fried over the fire. Whitefish eggs are best in September.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food, Trapping Bait]
Statement[Whitefish—all kinds are known for being good dog food because they hold water in the meat when you freeze them and your dogs can get moisture—better than salmon. Whitefish makes good trapping bait too—hang 'em up whole—guts and all and let it spoil little bit—then mix it with spruce needles which helps it carry the scent farther—good marten bait.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[Fish get blocked in behind beaver dams. Elders say if beavers block off a lake or slough too long the fish caught behind it get smaller and smaller. There are more beaver now and less trapping of them. Long time ago people used those fish locked in behind beaver dams as emergency food. Beavers on the river get use to hearing boat and human noise and are hard to catch. Lake beavers are easier to get.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Dogs, Dog Food]
Statement[I used to have 59 sled dogs I used for sprint racing. Lot of work fishing to feed those dogs and I had all kind of tricks to help out. Always looking for ways to be able to go moose hunting for a few days in the fall instead of fishing to feed those dogs. I made a moose call one time attached to my fishwheel—rigged up contraption that made scraping horn sound as the wheel turned so I could call the moose to fish camp while I was fishing. Another trick was to keep a fire going under the fish rack—I use that cone debris from around squirrel nest site—gather it up in gunny sacks and build fire under the fish with that. That cone chips smoulder for days unattended—lets me go hunt for a few days. On the lower Yukon they have lots of eels they use for dog food. Every once in awhile I'll find an eel up here in my fishwheel.]Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Salmon]
Statement[Fort Yukon old timers used to say every 4 years king salmon run heavy on the south bank of the Yukon. It just happen to match election years so they say every election year to put wheel on south bank. I tried this and it works.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements, Fishing Methods]
Statement[I've heard about people chopping out beaver dams to let fish out and then catching them but I've never done it. Sometimes after freeze-up the ice level on the main river drops and side streams will flow out on the top of the ice. In these places you can sometimes find whitefish laying frozen on top of the ice—in late fall they are still trying to move down out of those smaller streams.]
Code[K121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Native Names]
Statement[Sheefish= "Sha" or "coonies". Broad whitefish= "Chi-sho". Humpback whitefish= "Ney-run". Round whitefish="Hult-tite". Bering cisco and least cisco have same name I think because they look the same—the name is "choo-sik" or "chul-sik"—some people call these "herring".]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[The spring is the only time I fish for them. Late May, early June I put net in for fresh fish and get them—mostly these ones (broad whitefish) and that population seems to be doing fine.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements, Fishing Methods]
Statement[Sheefish don't go in the lakes. They stay in the main river. The movement on

these whitefish is hard to figure out. They seem to go up and down river at all times. Bering ciscoes come with the kings in July. After ice goes out in spring we set nets for broad whitefish because they are the first ones to get fat. You don't catch sheefish in the spring-—they must come from somewhere long ways away—we see them in July. The fall run of sheefish out of the Flats is late—after freeze-up—and there are just one or two days they are going by and can be caught with hook under the ice. I've caught 200 in one day doing that at the mouth of the Grass River. Sheefish in the fall run about 2 pounds. Summer sheefish—the ones we catch in wheels can go eight to ten pounds.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[I think they eat clams, beetles, snails, bugs. Sheefish eat other fish.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[Broad whitefish must spawn in the fall. They are full of eggs in August and in late September there is no eggs. Bering ciscos—some people call them herring—always seem to be full of eggs—all year. I think all these must spawn in the lakes because we see young ones in there. Bering cisco and broad whitefish have white eggs. The others have orange eggs, but the meat of all of them is white.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Salmon Fishing]
Statement[I think this whole salmon disaster is a government conspiracy to make us stop fishing and get more fish up-river for the commercial fishermen. There is no disaster with the salmons.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Winter Habitat]
Statement[Don't know for sure where they winter—deep water probably.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Summer Habitat]
Statement[They must spend the summer getting fat in lakes and sloughs—I think they are heading to clear water areas where they can feed.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[Good whitefish areas have long been identified by elders and people know where these are—you learn about these growing up. You can't just put a net in anywhere

and find these fish. The species you get depend on gear size. They all mix together but the harvest you get is based on net size.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference]
Statement[I go for the broad Whitefish, Lots of people go for those. Good roe—big roe—eggs are best in August.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods, Seasonal Movements]
Statement[I use rod and reel for sheefish in summer and fall time on the main Yukon. In the lakes you have to use nets. After ice goes out in spring we set nets for broad whitefish because they are the first ones to get fat. You don't catch sheefish in the spring—they must come from somewhere long ways away—we see them in July. Dipnets can be used to catch ciscoes in the spring time. You look for eddies along a cut bank and put your dipnet in and you will catch those. You need to do this late at night—eleven PM to mayby two o'clock AM. They rest in those eddies at night. Round whitefish seems to be a river fish. At Chalkyitsik in the back sloughs we used to put basket trap in the water and catch a mix of whitefish and cisco—but not round Whitefish, The traps were baskets maybe seven feet long with open top--made of willow. Put these in shallow water with an entry chute. We used these summer through fall—best when leaves are hitting the water in the fall—that's when the fish are moving—In the creeks, whitefish start running downstream when the fall leaves start hitting the water. The last time we use fishtrap was probably 1960s.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[We dry them. You scale them, cut them, dry them. Fall fish are usually frozen.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation]
Statement[Broad whitefish eggs are eaten right out of the fish. Whitefish guts can be fried to collect the grease. Grease is saved to dip dry fish in. Sheefish eggs need to be cooked (fried) before eating.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[Fall time the fish are all fat. Broad whitefish—chi sho—fatten up quick—by June they are already fat.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog food, Trapping bait]
Statement[Whitefish make good marten bait if you hang them up in September for about ten days and let them spoil. All the whitefish were used for dog food in the old days. Before snogo everyone had a net in all fall and winter to feed dogs. For dog food, summer whitefish were split and dried without scoring and the guts were fed to dogs. Fall fish could be frozen whole--hung up by the tail. Snowmachines deleted the need for fish traps because the pressure to get food declined. Snowmachines came in around here in 1968.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[The beavers can trap the fish back in the lakes and interfere with their movements—I think broad whitefish are maybe most affected by this because they spend the most time back in the lakes. There used to be more trapping of beaver and that kept them from expanding. Now people rely on welfare. Laziness and low fur prices keeps people from trapping.]
Code[L121200]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Native Names]
Statement[Bering cisco is "herring" or "trey-look". Least Cisco is "choat-sik". Young ones of all kinds we call sardines and cook them up guts and all.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements]
Statement[Bering cisco are "river fish" and least ciscoes are "lake fish"/ Whitefish run back into the lakes as soon as spring run-off is flowing good—about the time we are out there going for muskrat and what-have-you. Fall time they go back out the other way. These fish travel according to the weather. Fall time, when it start getting cold and the water start receeding, they know when to get out and make a mad rush. These fish are sensitive to the movement of water and the way water goes up and down. They pay attention to it and move accordingly—thats their survival. Just when the ice is starting to run—late fall—when the water is cold there are lots of sheefish moving up the Yukon—those big ones, three or four feet long. They are moving up the south side of the Yukon. In Springtime, when the ice is going out in the main river the fish move out of the way of the ice back into the back sloughs and side creeks. They might just go in there for a few days and check it out back in the lakes and then come back out to the main river. Some people net them at this time just to have a taste of it, but they are not quite fat yet. It takes fish until the last week of June to fatten up because it takes a few weeks of gorging on crustaceans. Then there is also a run of whitefish that comes between the salmon runs. I know people who get 200 whitefish a day in their fish wheel at mouth of porcupine (river)—this happens between the king and chum run. Some of these whitefish live 15, even 30 years.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[Broad whitefish eat crustaceans like miniature snail, miniature clams—little bitty ones, almost clear, there's lots of them out there—piles of them. I've seen them eat gravel too—I don't know what they are doing with it but it works through their system. They eat the crustaceans when they first come into the lakes and everything start growing again.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[They spawn pretty late I think—late October maybe—just about that time. I know we see the baby ones, little tiny ones, all summer long along the river banks so the young ones are around that time of year.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Winter Habitat]
Statement[Not all these do the same thing. There are some whitefish that live year-round in Sho (Shovun Lake) and there are others that are coming and going—same species but doing different things. The ones that leave go to the main river (Yukon) to winter over. Those are the ones that rush back in the creeks in spring time. I think some are coming all the way from the ocean. The ones on the south side of the Yukon I think are ocean fish.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[At Alexander Village there was a place they put traditional trap in the stream to catch them going out. At Sho (Shovun Lake) we get at least three species—least cisco, broad whitefish, and humpback—not too much humpback—they are kind of river oriented. I only caught one sheefish there on that lake one time. I heard that happened on other time. (Respondent implied that odd occurrences such as this were traditionally taken as a sign of bad luck but that he was not superstitious). In rivers the first thing you need to find is a good eddy—fish only go near the banks at certain places to rest—otherwise they stay away from the bank. On main Yukon, for some odd reason, south bank fish are better, fatter than north bank fish. I'm talking about these (broad whitefish)—I know because I try fishing both sides one year and check it out. Alexander Village was known as a whitefish fishing place. They settle there because of the reliability of that resource. Jackfish too—whitefish and pike mostly—no salmon up that way. It was a fall activity there—big caches of smoke-dry whitefish when I was young.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[I only use net, always use net. I figure you increase the size of net, the less fish you get. The smaller the mesh, the more fish you get. I use 4 and ¾ mesh stretch.

Catch mostly big Whitefish, Its always a mix of fish but your net weeds them out. My net is mostly going for this one (pointing to Broad Whitefish)—really rich, that one. Old days when they catch them in the fall they render the oil from them. Cook them and just pour the oil off. Use that oil for all kinds of things—make bannock with it—healthy! Traditional traps were like huge basket with funnel shape inside. Nowadays we just make a chute with a screen basket at the end. You need to narrow-down the creek with willows when you put it in.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[Split and dry the meat and smoke it—late September—anything we process like that has energy to it.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation]
Statement[We eat the eggs too. Sometimes we fry up kniknik—stone berries—in whitefish oil. That hard seed they have turns brown and mushy, then we stir in whitefish eggs and cook them just a little—like over easy—delicacy man!]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[Fall time, September, whitefish are so rich it will rot on you quick. Can't get too much until the cold weather comes. Whitefish, like other wild food is healthy food because it eats and exists on local resources. The chickens you eat are fed chemicals and bleached wheat and what-have-you. When we eat these things that have been raised out here on the land it makes us more a part of our surroundings. Lake food—like these whitefish and muskrat, has melanin in it and keeps you healthy—makes you keep dark complexion.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food, Trapping Bait]
Statement[Sure you can use it for dog food if you need dog food. Mostly use the low quality or damaged ones for dogs and eat the good ones. Some people chunk them up for trapping bait—you can do that—I've heard of it but I'm not a trapper.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams, Traditional Management]
Statement[Beavers interrupt the movement of fish by blocking off the streams. Fish caught behind dams die out—I've seen it before, with fish floating. I think they run out of air or something because they are over the capacity. Beavers create habitat but it is habitat that fish can't get into or get out of—they interrupt the natural movement of fish. When beavers flood new areas it makes the whole area dead. Trees and brush die out

and the water is not drinkable—gets a pitch smell to it—I think all that sap leech out into the water and nothing can live in it for awhile. Need Flood or something to flush it out of there. You have to look at the big picture I'm telling you. Its not just one thing it's a whole bunch of things adding up. See, you have to take care of these lakes out there. There has to be quiet around these lakes that are producing. Fish hear things and get disturbed. The new generation knows the traditional rules but they are kind of breaking them nowadays. To be productive you have to do lots of things like clear the brush out of the creeks. Fish are backing up now because this has not been done. Beavers are blocking things up too. Up above Sho (Shovun lake) in several places they have things all blocked off. For 20 years at least this has been an issue. The last time I remember clearing out the creeks was when I was 6 or 7 years old (early 1940s) following behind my uncles and the rest of the gang walking along the creeks cutting out the brush that overhang into the water. We also shot the beaver while we were at it—just shoot them as we went along because they interfere with food (fish) production. We cant do these things now. The fear was instilled in native people that whatever they do was a crime, whether we were helping out the nature or keeping the nature from taking control or whatever. We used to burn those big meadows too—every year—just burn off all the dead vegetation. Now all those are getting smaller and smaller and covered over.
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver]
Statement[Whitefish have a long standing in the environment here. I think the beaver may be a more recent arrival. Maybe they didn't always co-exist—I don't know how long beaver have been around here.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver Dams, Fishing Methods]
Statement[I heard of people cutting out the dams to catch fish. I never did this but we've been talking more and more about doing it! This was a traditional method they use to get what they need for winter in a short time and then let the rest go. They never just catch them all.]
Code[P021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference]
Statement[I go mostly for the broad whitefish, some humpbacks sometimes. We don't see this round one (round whitefish) here too much that I know of. Bering cisco I get in the wheel when I am salmon fishing—maybe a dozen a day in the fall time. Sheefish are too poor quality around here but people like them for the eggs. Bering cisco are not the best when they get caught early in the wheels—kind of mushy—summer time. These least ciscoes are much richer when I catch them up the porcupine at Canyon (Village)—richer than the bering ciscoes.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]

Statement[I don't know if there is more or less but I know people don't go after them as much now because not too many people have dogs anymore. That's when they really used to go after them. Seems like the witefish they have over towards Christian River—over towards that way and back in them lakes is really poor. They get a mixture of all kinds back that way but they are really poor (quality)—not fat—not enough in them to make it worthwhile—so now I just fish at my spot on the main river.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements]
Statement[put net in at the mouth of porcupine River as soon as the ice goes out and catch whitefish all summer long—maybe 15 or 20 a day—just enough to feed the dogs that day. I take my tourists down there with me to check the net—thrill of a lifetime for them you know. There seems to be more humpacks at that spot in the springtime. Sheefish come late. I get them if I put my net in under the ice just after freeze-up—late fall, and if I keep my wheel going late I get them in there too—lots of them. But there are whitefish around in the main river all summer long. I can catch them all summer. These Bering ciscoes travel in the main river and get caught in fishwheels at certain locations. Fall Time, I notice if I move my net just a little bit more into Yukon water I get mostly Broad Whitefish and Salmon—even under the ice—but if I have the net more in the Porcupine current I get Sheefish. I don't like sheefish because they freeze like a block of ice. Whitefish feel the pull of the water pretty good. They go in and out of all the lakes they can and as soon as the current changes they're out of there. They detect the water current real good—as soon as they feel a draw, they go with it and they are heading out of everyplace.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Floods]
Statement[Flooding is healthy. When everything is flooding, fishing is good—means we get more fish for the next few years. Don't flood for awhile and we don't get no fish. They all get trapped and die off in the lakes.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[Not much feed in the main river (Yukon)—they go back into the lakes to feed. I cut them open and clean out the stomachs and most of it is digested but I see snail shells.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[Bering cisco must spawn some time in the fall—we catch them then and the eggs are just really mushy and almost falling out of them. But I thought some of them spawned in the spring. I think they go back to places in the grass lakes to spawn. On them sheefish I know that between here and Circle it is some of the best sheefish spawning in Alaska and sheefish is the reason 22-mile Village was there—and there are

no lakes between here and Circle so those ones (sheefish) must be spawning in the Yukon, maybe around freezeup—late September, October because I see them moving up and they have eggs in them.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[I only fish in one spot for the past 25 years. Right at the mouth of Porcupine River on a point. It is an eddy and it is convenient to town and it's known to produce fish so I use it.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[I use nets. When I first start fishing I use little tiny mesh and caught whole mix of fish—everything. Now I use 51/2 inch mesh and get mostly broad Whitefish, Up at Canyon Village one time we put a trap in a creek coming out of the lake and caught lots of least cisco—just a 2' x 2' chicken wire trap set in the creek. It was so shallow, that one, that we had to dig it out a little bit just to put the trap in.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[I mostly freeze them because I use it for dogs and drying takes too much time for dogs. So I feed them fresh cooked fish all summer from the net and when cold weather comes in fall time start letting them freeze.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation, Eggs]
Statement[For the dogs I usually cook up the whitefish—they seem to digest it better. We eat the eggs from these (Bering cisco) raw. The eggs are real bitter in the springtime. Then as the season progress, like August, the eggs are real good. I'm not big on sheefish but I save the guts and eggs from those for later use—freeze it up for later.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[In the spring the fish I get are not the best but are okay for dogs. They get progressively better throughout the summer and fall—oh boy, fall time nice fat, firm fish! In fall I eat them myself and give some away to people.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food, Trapping bait]

Statement[I feed my (twelve) dogs whitefish all summer—put net in as soon as the river goes out. Sheefish are no good for dog food—they don't do well on them. Broad whitefish are much better. Bering cisco—the ones we catch in the fishwheel make good fox bait—I use it where I spread whole bunch of bait out like an open set and you spread it around to attract them in.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[I can believe they (beavers) disrupt the movement of fish. I know that is going on over in Marten Creek and up in the Chandalar River country. Beavers are blocking the fish I hear. I'm familiar with a place up the Porcupine River where at one time there was fish in that lake but now there's not because of big beaver dam and no flood for awhile. This an place we call 4-mile lake below Canyon Village. Them Beavers are smart. I seen them build dams where there is no water and then in the spring time it flood and they capture that water and make a lake where there was nothing. They look for muddy place and dig it down—make a lake where there was nothing. Some of those beaver ponds are only 2 ½ feet deep and don't seem to freeze all the way for some reason. Others are pretty deep. I don't like fooling around those beaver dams—deep water around some of them. My uncle had a big lake they trapped back in the 40s and they told me whenever they really need dog food they knew they could go back there behind the beaver dam and chop a hole and find fish in there. Lots of beaver around these days—and they pollute the water too. I don't think many fish can live in the same water that beaver do. It kills them. I don't know why they die off but if you got fish in a lake somewhere and the beaver move in, the fish will all be dead. And what few fish I do see when there are beaver houses—are them little tiny ones—never bigger than about 8 inches long. This is in them smaller beaver lakes with no inlet creeks you know.]
Code[H021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Sheefish]
Statement[There seems to be at least two kinds of sheefish here—the big ones on the Yukon (up to 40 pounds) and the Black River ones which are more purple-ish and smaller.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[The number of ciscoes caught in the wheel seems down in the last few years.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements]
Statement[Ciscos come first—come in with the kings. Yukon Shee come in with the last part of the dog salmon. Some broad whitefish come in spring too. Summer they go back into lakes and come back out if the water drops. Ciscos are "river fish"—never catch them in the lakes. Well I guess some of these (least ciscoes) do go in the lakes

sometimes—but there are no sheefish in the lakes. They stick to the main river. Whitefish are sensitive to water movement and level. As water comes up they go up. When water come down they go out.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[They must eat larvae and things.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[I guess they go back in the lakes to spawn in the springtime, I'm not too sure. I'm not sure if they die when they go up and spawn.....I've never seen a dead one yet so maybe they don't die like salmon.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference, Fish Preparation, Fish Preservation]
Statement[Probably the humpback one is the best. Sheefish eggs are pretty good fresh or frozen. Big sheefish with eggs we saw up into steaks with the eggs and all still in it—bake those up—Little ciscoes and young ones are deep fried whole—guts and all. Most of these (whitefish) I just wrap in plastic or foil and freeze them. In summer sometimes we dry them—dry real quick .]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[I mostly use wheel. There are places you can move the wheel in the fall to get mostly sheefish. People use one-inch mesh nets in lakes or you can make a chicken wire trap like a square funnel trap, and use that in those little creeks.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[By fall time these (whitefish) are all fat. Bering ciscoes get fat the quickest. Broad whitefish are so fat in the fall they will spoil—just turn to mush in one day if you leave them in the net.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food, Trapping Bait]
Statement[All of them (whitefish) make good dog food. Ciscos make good trapping bait.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams, Fishing Methods]
Statement[Sometimes we use wire traps to get the fish coming out behind the dams—you don't always have to cut the dam—sometimes there is a way around it and you put your trap there. Animal sign around the dam will tell you if there is fish in there—animals dig in it and you see it there—fox, lynx, things like that. Mostly the fish behind those dams are small ones—young ones—fall time we get those and just fry them up. Most all the beaver dams have fish behind it. But it doesn't seem to be bothering the fish too much. I've seen times when there were even more beavers than now. It never occurred to me that they (beavers) might affect the fish. Whitefish seem to always be around. There were more and better beaver trappers around years ago. But people don't mess with the dams. I know there are places that are drying up but there are no beavers around there. It was not due to beavers that they dried up. I see beaver houses sometimes in dry lakes between here and Chalkyitsik. They dried up in last 10 years or so and them beavers couldn't do nothing about it.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[Humpbacks will take a lure sometimes in clear water streams.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[20-mile lake and twin Island lake are s'pose to be pretty good for whitefish.]
Code[G021401]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy]
Statement[This broad one is—Native word for it is "Chee-Sho".]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[I think they (whitefish) are all in decline because in the places I fish for them at least, we don't see as much in our net as before.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements]
Statement[Ciscos get caught in the wheels in fall time so I guess they are still running up river. Sheefish are available early spring to winter and you can catch them with a pole. There are these ones (broad whitefish) under the ice at Shovun Lake right now (February) if you want to put net under four feet of ice. The only time I see this round one (round whitefish) is in the fall time in fishwheel sometimes.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[I don't know what they eat but once the bottom ice thaws out and things start growing I think they eat that.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference, Seasonal Quality]
Statement[I go mostly for Broad Whitefish and those humpbacks—fall time the eggs of all of them are good. I would rather have these (whitefish) in the fall. And about June they start going in the bottom of lakes to eat and start to get fat. But eggs are best in fall time.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[All the species are in there mixed up but you use your net to get certain one. Four inch mesh is what I use. It lets those other ones (ciscoes) go through. Long time ago they make willow traps just like open chute and put them in the creeks—July, August maybe we do that. Last time they did that was maybe 30 or 40 years ago.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation, Fish Use, Dog Food, Trapping Bait]
Statement[We split, dry, and smoke them during the summer time. Big ones they score the meat like salmon if it was for eating fish (human use). Lot of it was used for dogs and trapping bait and those were just split and dry like that on sticks. Fall time we just let them pile up and freeze—take the eggs out of those fall fish and save it—use as a quick high-energy trail snack for winter travel. Never get hungry if you eat that. They used to feed all these to dogs. Those small ones they might use for bait.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[I think the beavers are hurting the fish now because they are not being controlled and they prevent them from getting into the lakes. Then sometimes it floods, you know, and they can get past the dams, but then they can't get back out when the water goes down. Fish can't all live back in there with all those other things that are using the lakes like muskrat, pike.....it really depend on how much water is in there, but they could die if they were trapped in there just one winter I think. I don't know what would be considered good about them (beavers)—Maybe if I had about a ton of dynamite I could begin to make a difference in some of those dams. We used to trap them more and kept them at a manageable level. They used to take out dams in some places too if they are interfering with fish. As far as catching fish using those dams.....They did that in winter time sometimes. Chop that beaver dam out and then the fish go through and they spear them. I've seen places where too many fish are caught behind the dam and they just come gushing up through a hole in the ice and they freeze there on top of the ice.]

Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Environmental Change, Floods]
Statement[The floods have not been coming on any kind of regular basis now. You go back in these places where your map shows lakes, all these places, its just grass now.]
Code[J021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Native Names, Taxonomy]
Statement["Chee Sho" is what we call these big ones (Broad whitefish and Humpback whitefish). All other small whitefish is "Luke Dalgai". Sardines is what we call the young ones that are not fully grown—small ones up to about maybe 8 inches long.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[I think maybe there is less of all these (whitefish) now—like salmon and everything else it seems to be in decline.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements]
Statement[I catch these mostly incidental to my summer salmon fishing using wheel and nets. I think they head into the lakes in spring highwater to feed and then what I've seen is that in late July when water starts dropping, broad whitefish and the humpbacks come back out of the lakes to the main River and they are all fattened up. Them little ones (ciscoes) I think mainly stay in the rivers. Sheefish, now those come very late. I get them in the nets in late September or even early October—the big ones are going by then. I don't think these (whitefish and sheefish) die off after they spawn like salmon do.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[I see eggs in all these (whitefish) all summer long. They must spawn in the fall, eh? Even August and September I see eggs in them and the eggs are turning kind of yellow or orange. Early in summer the eggs are white. But I've never actually seen where they do to spawn.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference]
Statement[I go for them broad ones (broad whitefish) because they are bigger and have good meat.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[I catch these mostly incidental to my summer salmon fishing using wheel and nets. Up around Chalkyitsik I seen where they put a chute-trap in them small creeks—fall time when the fish are back rushing down and they put that chute in there with a little board for a ramp and they drop over the edge and go into the trap area.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation, Fish Preparation]
Statement[We eat whitefish fresh or we dry them. If they are soft they go to the dogs. If we dry them then we smoke it—take the backbone off—cut just like salmon—gee they dry out real quick in July and even that time of year they have oil dripping out of them—rich even then. Whitefish guts are fried up in a pan—clean the stomachs out and then just fry them in their own oil. Eggs are eaten raw, fresh, July and august the eggs are getting tasty—maybe a little salt on them and just scarf 'em down. Sheefish—those eggs we cook, boil or fry little bit and then eat them that way. But those sardines I was telling you about (juvenile whitefish) we just fry them up—whole fish just fried up crispy.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food, Trapping Bait]
Statement[Oh yeah, best bait in the world for trapping is these ones (ciscoes). They've got some kind of scent to them and the animal smell it. Some kind of oil or something. Good bait for anything. We use them for dog food too.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams, Fishing Methods]
Statement[I think they (beavers) are trapping a lot of fish back in the creeks, I'll tell you that. They (whitefish) go up in the high water and can't get back out. If there is too many stuck in there they start dying off—not enough oxygen, too crowded for them. I've seen it where they cut the dam and those fish feel where it is draining out and just go for the opening and they put gunny sack under that and it just fill up with those fish. First all those little sardines come out. Then when its getting lower and lower these kind (broad whitefish) come out. Lots of beavers now. People used to trap them more back when they need dog food—fewer dog teams now and not as many people out trying to catch beaver for dog food. Less trapping and more beavers nowadays.]
Code[E021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy]
Statement[(Respondent was not familiar with Native terms for fish and generally recognized three categories: "big ones" meaning (broad and humpback whitefish), "little ones" (meaning the ciscoes) and "sheefish").]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[Seems like we get lots of pike now and less whitefish and the whitefish we get now don't seem as rich (fat). But I think there are too many pikes and maybe they are eating the whitefishes—lot of times we cut them open and see whitefish in their stomachs. Maybe that's reason there are not as many. I fish same place as my mother, with same kind of net and don't get as many as she used to.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements]
Statement[Springtime I usually see these litte ones (cisco). Sheefish we see all the time, all summer. Right after breakup we put net in Joe Gay Slough and get broad whitefish and least cisco. Sometimes you catch sheefish in the net under ice in November. Somebody gave me one of those.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[I know lot of times in falltime the eggs in this one (broad whitefish) are real ripe. Sheefish are full of eggs in fall too and we cook them up at potlatch in September. I see the little baby fish sometimes in springtime back in Joe Gay Slough. Go pike fishing in shallow places and we see the little ones of these (whitefish) spring and summer.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations, Species Preference]
Statement[Ah, I like this one (broad whitefish). Around here Joe Gay Slough is know for being a good place to set net and bet these (broad whitefish and least cisco) in spring time. My mother had a place she used to go right after breakup and put net in slough to get whitefsih. Then she would come back to town and wait for salmon season and go back out. I fish where my mother fish—same place.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[Mostly we use net but you can catch sheefish with hook. In lakes we use small mesh—maybe just 1 inch—but in slough we use maybe 2 inch. We use wire basket at beaver dams—maybe 18 inches wide. You have to check them morning and night because they will fill up with these little ones (least cisco). We do that fall time.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation]
Statement[My mom used to catch them and dry them in July by the hundreds and gee the fat used to just drip off them in the smokehouse. Fish caught in fall at beaver dams

would just be hung up in the willows around there and let them freeze. Go back later and sack them up—use them for people food and for the dogs.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preparation, Dog Food, Fish Use, Trapping Bait]
Statement[For the dogs we always cook them up. For people food, frozen fish could be fried, boil it up or bake it. Back when we dry the fish we save the guts for the dogs—throw them in the dog bucket and cook them up—back when we have lots of dogs.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality]
Statement[Spring fish are kind of lean—summer fish get better and best in fall.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams, Floods, Fishing Methods, Fish Use]
Statement[I don't know if it impact the fish but there is a lot of beaver houses and beaver dam now. Wherever I go I see them. When I go back there in the spring it don't smell fishy—I never see dead fish. I think if they were dying off it would smell like dead fish. People don't get out there to get those beaver now like they did when it was a dollar an inch so I guess that's why they build up. People know where the beaver dams are and where the fish are behind it and they go to those places to get fish. Lot of little pikes are back there behind the dam. I use the pike for trapping bait but not the whitefish because we can eat those. When there was spring flood it push the fish back into the lakes and over the beaver dams. We used to catch lots of them little ciscoes back in the lakes—go to where the flood water was pouring out and put net in there to get them—or take a basket with the wire and make it like a trap. Just cut a little hole in that dam—put that basket there and they (fish) just fall right into it. We do that in fall time—last part of September.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Environmental Change]
Statement[Lot of meadows are now growed-in and lakes have shrink down from when I was small. Things are drying up in some area and getting brushy.]
Code[D021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Native Names, Taxonomy]
Statement[Oh this sheefish is "coonie" or some people say "Shaa". Broad Whitefish here is "Chee Sho" or just "Luke Dagai". This one (least Cisco) is "choat sik" and this (bering cisco) I think is "Tray Look", that one there.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Life History, Seasonal Movements, Diet, Winter Habitat]
Statement[Spring time after the ice goes we start seeing them—sheefish, broad whitefish, going up. I think around June 10 or 15 something grow on the bottom of the river—that's what they live on—make them fat. We can't maybe talk about what they eat but the one that made them—up in Heaven—he got food for them, that what the Bible say. And these (whitefish) can't live without water moving over them. Fall time, late, some people still get them so I think they go for deep water and hang around long time—deep eddy. Some of those lake freeze to the bottom you know and those fish know that and get out of there in fall time.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[They just let their eggs go whenever they are ready, but not in strong water—not in main river but back in smaller creeks. The way it work is that some of their eggs gets eaten by other fish, but some turn to fish-- the eggs that go under a rock or under the mud—those turn to fish but some get eaten.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Species Preference, Seasonal Quality]
Statement[I like broad whitefish and least cisco—but I go for any of these. Sheefish are good in spring but get skinny over summer and fall time—no fat on them.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods, Fish Preservation, Fish Preparation]
Statement[Well, we use net, but we get them in fishwheel too—August, we get them in the wheel. In Chalkyitsik they make trap for them in old days—late when fish are coming back down from way up that way—Lake Ch'ihilii—fat fish in fall time. We cook this one (least cisco) all the time over campfire. Trap made out of willow—the men made it. I don't pay attention to how they made it but they catch thousand fish—enough for winter. That was about 54 years ago now that we did that. Then, all fall we cut them, dry them and smoke it. Hang it on the rack. Gee even those small ones taste good. Dry fish, and half-dry fish you could boil it a little bit before you eat it. Skinny ones and sheefish we might feed to dogs. Everything else we eat it ourselves.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[I hear there are lots of beaver now. If that was me I would get my gun and shoot them, clean them out so we could get more fish in the fall time. The beavers keep them fish from getting out. But these fish got no business with beaver. The beaver leave them alone and they leave beaver alone. My brother try to chop hole in beaver dam once and the beaver was right there to fix it—just get right back on it.]
Code[C021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Taxonomy, Seasonal Movements]
Statement[I don't know Native names. What I see around here is mostly this one (broad whitefish) and this (sheefish). When my dad used to have fishwheel they get this one (bering cisco) because they come with the king salmon. Don't hardly see this round one (round whitefish) except back in Hodzana sometimes but we never did fish for them. But those (bering cisco) come with the king salmon and we use them—good eating—you get kind of tired of king salmon after while so we eat those for a change of taste. And then back behind my dads camp back in the lakes we get these (broad whitefish).]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Population Trends]
Statement[I think it's the same as always on these (whitefish) they are doing okay. I don't see no problem with decrease or anything.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Spawning]
Statement[Well, I don't really know where they lay their egg, But I know they all have good eggs in them—broad, sheefish, cisco, humpback—When we first move to fishcamp in spring the eggs in all these whitefish are little tiny eggs. Then later we go back out after the king salmon to catch whitefish—August, maybe, and their eggs are good. Maybe that's when they are getting close to spawn?]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Locations]
Statement[We just know the places that are good, you know, but you need place like where slough go back to a lake and then another slough go to another lake, and on back like that. That's where they are. The different kind are all mixed up in there I think but some places are better to fish than other places.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[We get them with net—fishwheel sometime. Sheefish you can get with hook.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Preservation, Fish Preparation]
Statement[Now we mostly throw them in freezer. Before we have electricity we used to dry them—spring, summer, fall—dry them up. Eggs can be eaten raw or cooked—fried or boiled.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver]
Statement[There are more beaver around but I don't think it hurt anything. Most those beaver houses have been there for long time—my dad trap those houses and always left a few beaver in each house—never trap them out. We always had beaver around. The only thing that clean out the fish is when the otter move in. Beavers don't bother the fish.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver Dams, Fishing Methods, Fish Preservation]
Statement[We were going to go out to the dam at 5-mile last fall and set (fish) trap there but we had tragedy in the village and didn't go. The fish back behind that one are young ones—little ones—the kids, I think, of these bigger ones. We just use screen trap—make like a deep basket, cut the dam open a little bit and catch them in that screen as the fish go through. Have to make it deep so they wont jump out. We know there is fish there--we could see the fish moving behind the dam making little waves and water doesn't do that by itself you know. We just make 6 inch cut in the dam—don't want to drain too much water out. I think the big ones (fish) get out some other way and those young ones stay there too long and get caught. We fill our trap up and then string them up in the willow—put them through their gills and hang em up. Later on we go out there with our dog team and pick them up. We catch them in falltime before snow—walk there up to 5-mile—and then go back there after snow with dog team.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Floods]
Statement[Floods help these fish out you know—high water lets them move around wherever they want to go—they know there they are going. There's flood and then there's high water. Last summer it was not flood but it was high water all summer. Fish can move around those (beaver) dams and go where they want.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Environmental Change]
Statement[here are less lakes and warmer weather now than when I was growing up. Must be part of God's plan.]
Code[B021601]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Native Names, Taxonomy]
Statement[Humpback whitefish= "Nea Run". Broad Whitefish = "Chee sho". Least cisco = "Choat sik" and is regarded as a "lake fish". Bering cisco and round whitefish are regarded as "river fish" and no native names were given. Sheefish is also regarded as a "river fish".]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Movements, Spawning, Winter Habitat]
Statement[Sheefish go up the Yukon as far as 17-mile (location above Fort Yukon), lay their eggs and go back down river. They do this in late September. During late fall salmon fishing, most of the sheefish caught seem to be males—very few have eggs—maybe the females go back into the lakes and the males stay in the river and travel late. Bering cisco come upriver with the kings. Other whitefish are heading up the porcupine in August and September. Not all the females seem to have eggs. They travel up until late in October. When they come back downriver they have nothing in their stomachs. Broad whitefish have yellowish eggs. They are the most abundant whitefish in 20-mile Lake (Sho) but humpbacks are there too. Some spawn and some overwinter in the lake as well. You can catch them there even in December with net under the ice—big ones—and they are good even then. In December there is a movement of fish from the deep center of the Lake to the shore area to feed. They come toward shore looking for light. You usually cant catch them after January because they stay too deep and in February they turn red colored and are not as good. As the days grow longer they go back to the middle of the lake and stay on the bottom. Then in springtime they leave to go to their "summer places". Thinks broad whitefish may spawn twice a year in April and September because he sometimes sees 2 sets of eggs. Humpbacks don't seem to have eggs in late fall and must only spawn once in the fall. Sometimes sees tiny juvenile fish traveling inside the gills of bigger fish. When current flows into the lakes they swim against it on the top of the water. When the current stops they move back into the lakes.]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Diet]
Statement[Sees them eating snails, red/orange shrimp, and flys. In winter they eat "bottom stuff".]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Areas]
Statement[Sho (20-mile lake) has always produced an abundance of whitefish. Sho is 60 feet deep in places and connected to 14 other nearby lakes with sloughs—that's what makes it a good whitefish area. His grandfather fished there for whitefish before whitemen came and Alexander Village is located there in part because of the good whitefish fishing.]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Seasonal Quality, Fish Preparation, Fish Preservation]
Statement[Whitefish from Sho are always good. Lake whitefish remain fat all year because they have food to eat while "river whitefish" get soft and skinny in winter. Lake whitefish taste different from river whitefish because what they eat makes them almost sweet. The whole fish is eaten. Guts are removed and fried up for eating after cleaning out the stomachs. Meat is smoked and dried. Fish eggs are boiled and eaten or dried up

and powdered and used like a seasoning.]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fishing Methods]
Statement[Nets from 4 inch mesh to 8 inch mesh are used. The larger nets are mostly used to catch big pike in the fall. Traditional fish traps for whitefish were made of willow sticks—3 feet wide and 6 feet long—a chute that caught the fish as they moved downstream in the fall. These needed to be checked frequently or they got discovered and destroyed by bears. They were placed below beaver dams that were then notched out to let water and fish pass through into the trap.]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Beaver, Beaver Dams]
Statement[There are lots of dams in the Sho area but it is no problem. Fish find ways around them in high water. Fish sometimes get caught in shallow ponds behind dams and die off but this provides food for all the other animals—bears, eagles, mink, marten, hawks, fox, lynx. This cycle has happened forever and is not a problem. People still go after the beaver. Nobody bothers the dams. High water usually tears it apart long enough to let fish through.]
Code[N021501]

Project[Yukon Flats Beaver-Whitefish TEK]
Keyword[Yukon Flats, Whitefish, Fish Use, Dog Food]
Statement[Back when dog food was a big concern they use everything to feed dogs including Whitefish, They even dry and smoke it for the dogs back then. Usually they cook it up to feed it to the dogs but sometimes they just feed it to them frozen. People don't use whitefish for trapping bait too much because it fall apart too easy when it is frozen. Pike is used more for bait because it is more sturdy.]
Code[N021501]

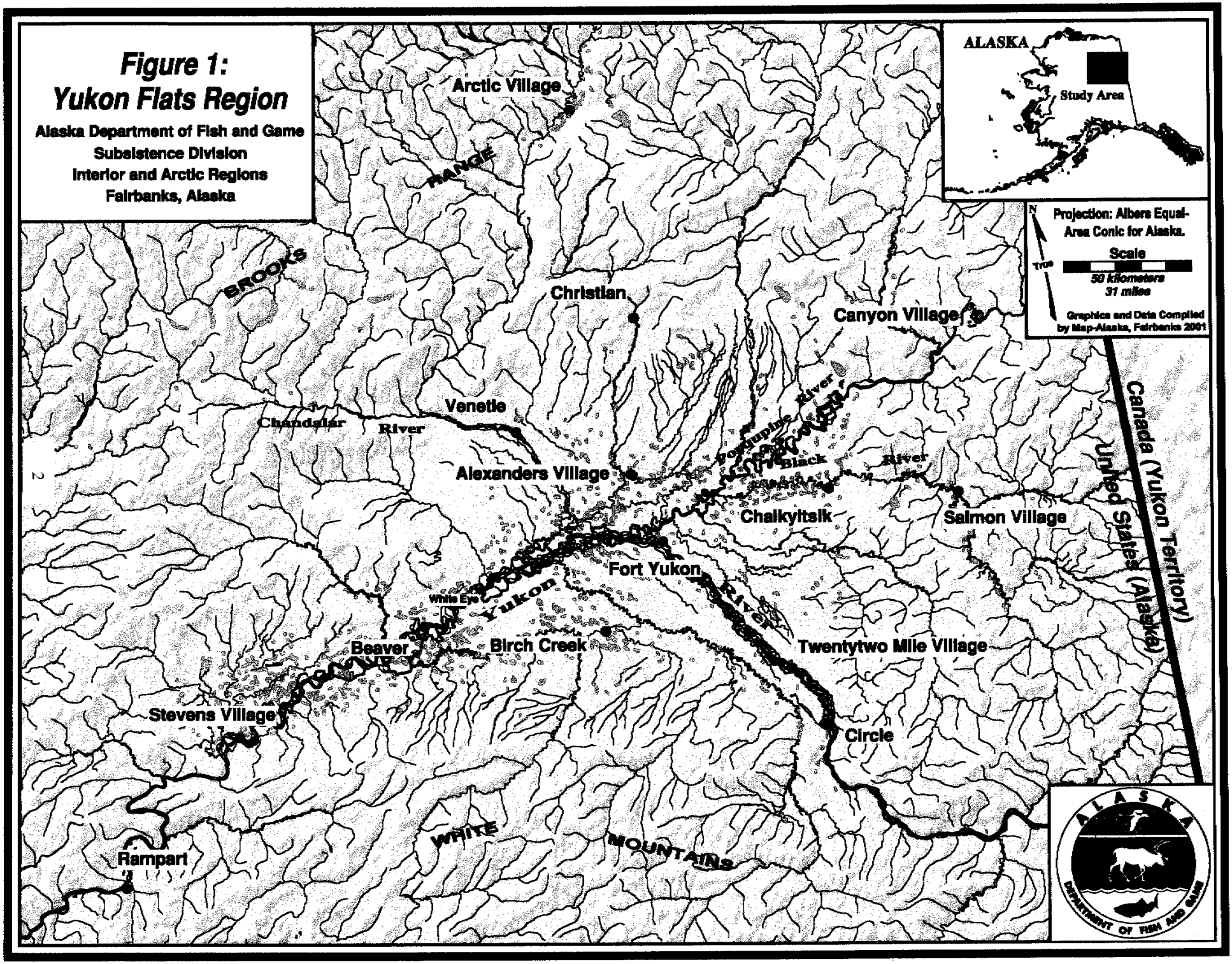
Figure 1:
Yukon Flats Region
Alaska Department of Fish and Game
Subsistence Division
Interior and Arctic Regions
Fairbanks, Alaska
ALASKA
Study Area
Projection: Albers Equal-Area Conic for Alaska.
Scale
50 kilometers
31 miles
Graphics and Data Compiled by Map-Alaska, Fairbanks 2001
Arctic Village
RANGE
BROOKS
Christian
Canyon Village
Venetie
Chandalar River
Alexanders Village
Porcupine River
Black River
Canada (Yukon Territory)
United States (Alaska)
Chalkyitsik
Salmon Village
Fort Yukon
Yukon River
White Eye
Beaver
Birch Creek
Twentytwo Mile Village
Stevens Village
Circle
Rampart
WHITE MOUNTAINS
ALASKA
DEPARTMENT OF FISH AND GAME