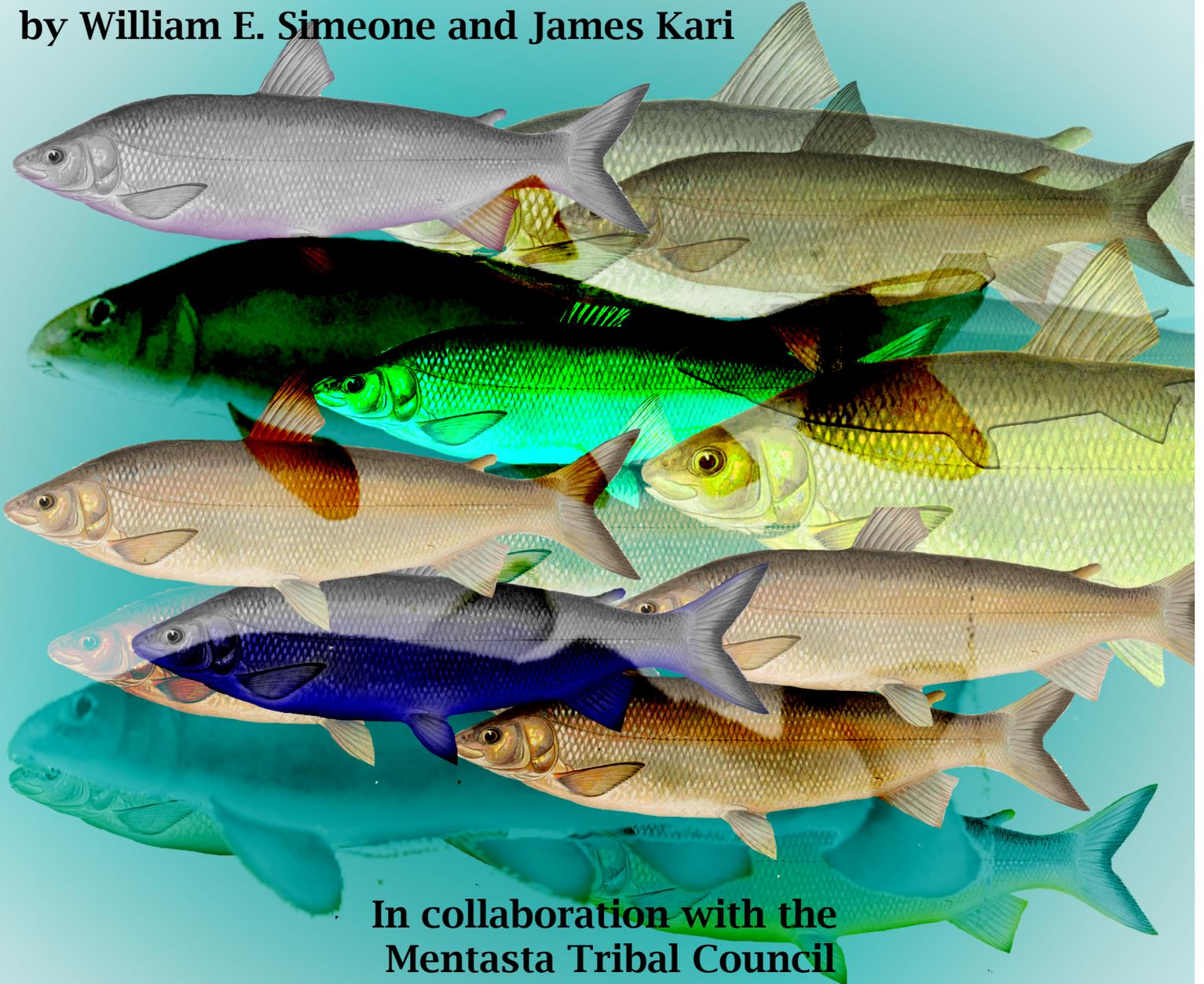


The Harvest and Use of Non-Salmon Fish Species in the Copper River Basin, Alaska

Technical Paper 292

by William E. Simeone and James Kari



In collaboration with the
Mentasta Tribal Council
Cheesh'Na Tribal Council
Copper River Native Association and
the Chitina Tribal Council

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ABSTRACT

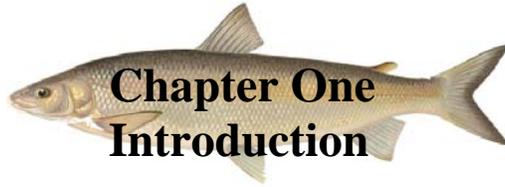
This report documents Ahtna traditional knowledge of non-salmon species fish and provides quantitative data on the current harvest of non-salmon species by residents of the Copper River Basin. Up until the middle of the 20th century non-salmon fish species played an important role in the traditional economy of the Copper Basin. The Ahtna elders interviewed for this project have considerable knowledge about non-salmon species and their comments reveal a keen understanding of ecosystem dynamics recognizing the connection between annual fish migrations, seasonal water fluctuations and hydrology. This information adds insight to the general scientific knowledge of non-salmon species the Copper Basin.

The harvest survey conducted in connection with this project documented the continued use of non-salmon fish by Basin residents. Species taken in greatest quantities, in terms of pounds harvested, were rainbow trout, grayling, whitefish, burbot, and Dolly Varden. Communities reporting the largest harvest of non-salmon species, over 1,000 pounds, were Copper Center/Silver Springs, Slana, Gakona, Tazlina/Copperville, Glennallen, Lake Louise, and Kenny Lake. The most frequent gear types used were rod and reel and jigging through the ice. Communities generally harvested non-salmon species that were locally available.

Key Wording Referencing: Copper River Basin, non-salmon resident species: whitefish, burbot, trout, steelhead, grayling, harvest survey, Ahtna traditional knowledge of non-salmon species.

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This report presents the findings of a study on the harvest and use of non-salmon fish species in the Copper River Basin of east central Alaska. The findings include traditional knowledge of non-salmon species collected in interviews with Ahtna elders that complements our earlier work on the Ahtna salmon fishery (Simeone and Kari 2002). Also included here are quantitative harvest data gathered through a household survey that updates information collected by the Division of Subsistence in the 1980s (Stratton and Georgette 1984; McMillan and Cuccarese 1988). The report is organized into seven chapters, including an introduction and conclusion. Chapter two introduces the Ahtna, who were the earliest residents of the Copper Basin, while chapters three, four, and five cover Ahtna traditional knowledge of non-salmon species, harvesting and processing techniques, and oral traditions about non-salmon fish. Current ethnographic literature provides little detail on the Ahtna's harvest and use of non-salmon species so this report helps to fill that void. Chapter six is a summary of results from a household survey on the current harvest and use of non-salmon species.

Research Objectives

The study had four primary objectives: 1) document Ahtna traditional knowledge of non-salmon species; 2) document current subsistence harvests and use of non-salmon resident species by residents of the Copper River Basin; 3) produce mapped data illustrating historic and current harvest locations, and 4) produce a final report that presents the findings of the research. Objectives for research on Ahtna knowledge of non-salmon species included documenting species harvested, life history, changes in abundance, traditional conservation measures, and mapping local knowledge of resident species habitat. Additional objectives included documenting patterns of seasonal movement in regards to the harvest of resident species, the extent of the harvest and relative dependence on non-salmon species, traditional harvest technology, and myths and stories related to non-salmon species. In a previous report (Simeone

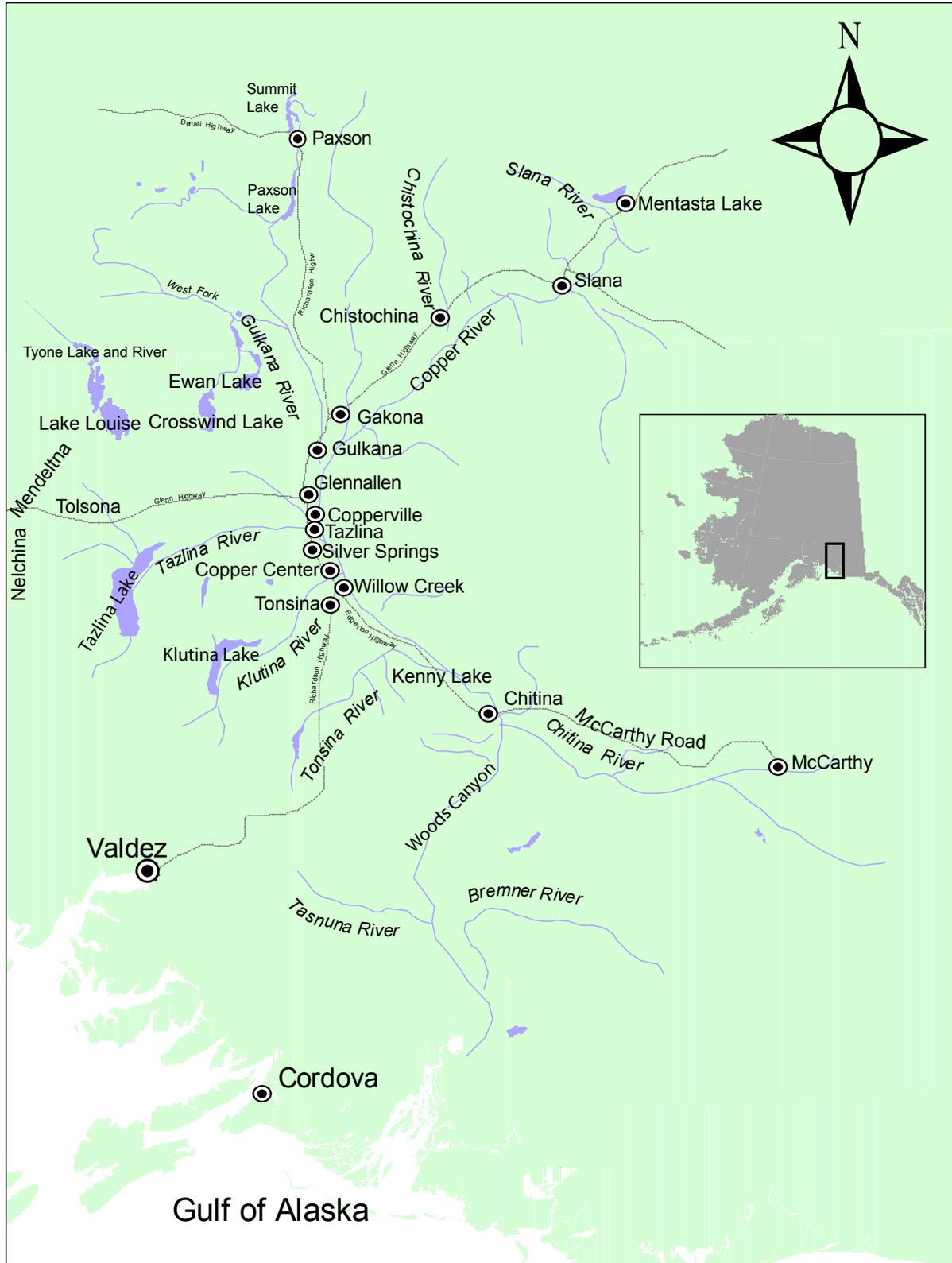
and Kari 2002) the authors documented traditional management practices that apply to both salmon and non-salmon species. Objectives for documenting the current harvest and use of resident species included identifying species harvested, estimating harvest quantities, assessing levels of effort, collecting harvest location data, collecting data on harvest methods and methods of preparation, and assessing how the harvest of resident species fits into contemporary subsistence patterns.

The Study Region

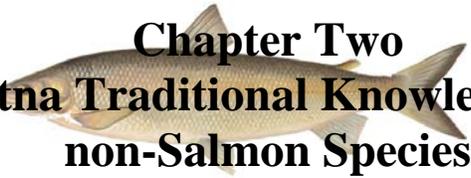
The Copper Basin as defined for the purposes of this project is depicted in Figure 1. The region is bounded by the Alaska Range to the north, the Chitina River valley to the south and the Talkeetna Mountains on the west. In 2000 the total population was approximately 3,100 people. The major population centers are Glennallen and the area between Glennallen and Copper Center that includes the communities of Copperville, Tazlina, and Silver Springs. There were eight Ahtna villages with a population of approximately 727 people (DCED Alaska Community Database). All of the communities within the Basin are classified as rural by the federal subsistence program for subsistence purposes. The region is bisected by the Glenn and Richardson highways and is accessible to the major population centers of Alaska.

There are several major lakes in the region: Paxson Lake, Crosswind Lake, Ewan Lake, Lake Louise, Tazlina Lake, Klutina Lake, Tonsina Lake, Mentasta Lake, Tanada Lake and Copper Lake. Major tributaries of the Copper River are the Chitina River, the Tonsina River, the Klutina and Tazlina rivers, the Gulkana and Gakona rivers, the Chistochina River, and Slana River. Non-salmon species found in the Copper Basin include: lake trout *Salvelinus namaycush*, rainbow/steelhead trout *Oncorhynchus mykiss*, Arctic grayling *Thymallus arcticus*, Dolly Varden *Salvelinus malma*, longnose sucker *Catostomus catostomus*, Round whitefish *Prosopium cylindraceum*, humpback or lake whitefish *Coregonus clupeaformis*, slimy sculpin *Cottus cognatus*, and burbot *Lota lota*.

Figure 1. Copper River Drainage



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Chapter Two **Ahtna Traditional Knowledge of** **non-Salmon Species**

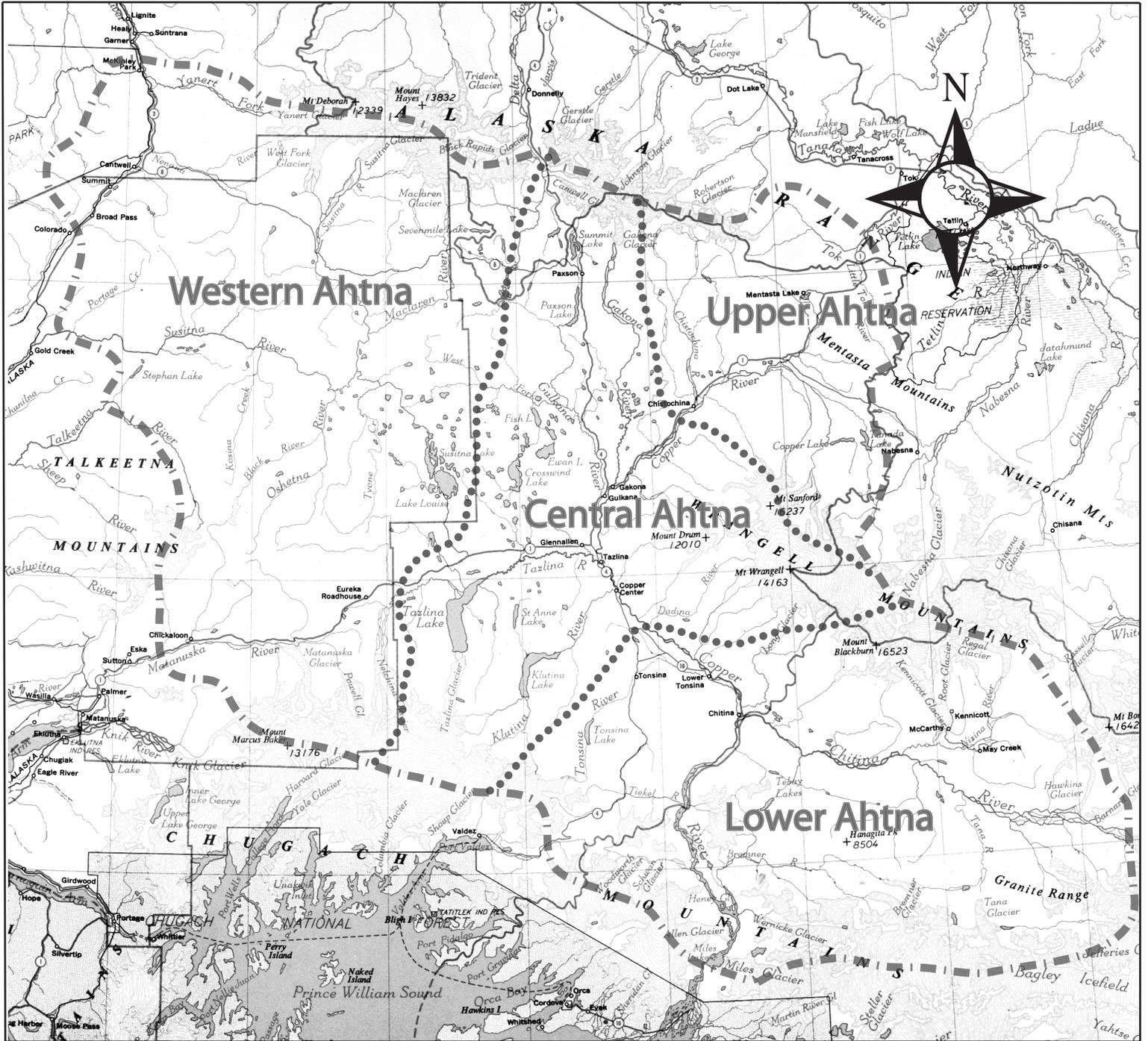
The Ahtna

Traditional Ahtna territory covered an area of 30,000 square miles including the entire Copper River drainage and the upper ends of the Matanuska, Talkeetna, and Susitna river drainages (Figure 2). Within that area are four groups corresponding to the four dialects of the Ahtna language and four geographical subregions (de Laguna and McClellan 1981: 641-642).

1. Lower Ahtna territory encompassed the entire Chitina River drainage and the lower Copper River from below Wood Canyon to above the mouth of the Tonsina River, including the modern community of Chitina.
2. Central Ahtna territory included the lake district of the Copper River lowlands and the modern villages of Copper Center, Tazlina, Glennallen, Gulkana, and Gakona, which are located on the Copper River from above the mouth of the Tonsina River to above the Gakona River.
3. Western Ahtna territory included the drainages of the upper Nenana, Susitna and Mantanuska rivers. Most Western Ahtna now live in the village of Cantwell.
4. Upper Ahtna territory included the upper Copper River, from below the mouth of the Chistochina River to the Tok River drainage and Tanada and Copper Lakes and the modern villages of Chistochina and Mentasta.

The Ahtna elders interviewed for this project represent this diversity of language. Robert and Mae Marshall, Henry and Etta Bell, and John Goodlataw were born on the lower Copper River at Chitina. Fred Ewan, Frank Stickwan, Ben Neeley, and Andy Tyone were all born and raised in the Crosswind Lake area and have knowledge about Central Ahtna territory while Jake Tansy is familiar with the territory of the Western Ahtna. Katie John, Bell Joe, and Gene Henry represent the Upper Ahtna region.

Figure 2. Ahtna Language Area



The Ahtna Language Area

language boundary



dialect boundary



Dialect name

Traditionally the most commonly harvested non-salmon species were humpback whitefish and Arctic grayling, followed by round whitefish, steelhead, Dolly Varden, lake trout, longnose sucker, burbot, and rainbow trout. This last species was almost thought of as a “pet,” because people enjoyed watching it, and was seldom eaten (Bell Joe Ahtna Tape 121). Table 1 provides the common, Linnaean, and Ahtna names for non-salmon fish found in the Copper Basin. Shown in boldface type in Table 1 is the generic term ***tsabaey*** used to designate ‘fish with white flesh, or fish other than salmon’ (locally “trout”). ***Tsabaey*** is also the term used for the class *Pisces*.

The Ahtna have terms for 19 species of fish in the overall language area and have recognized and named all 14 species of fish that are identified in the Alaska Department of Fish and Game species inventory and found in the Copper River Basin. One fish, pike, found in the Mentasta or Upper dialect, occurs in the Tok River drainage. Pink salmon, chum salmon, needlefish, and hooligan (eulachon) are known in the Matanuska River area or via trade. There is a small degree of lexical variation between Ahtna dialects for the 19 fish species. For example, Arctic grayling (*Thymallus arcticus*) has two terms; the Upper Ahtna term is ***segele***, while the Central and Lower Ahtna term is ***sde’ t’aeni***. There are three terms for Dolly Varden (*Salvelinus malma*) in the dialects, and sometimes the Central, Lower, and Upper dialects Ahtna term, ***ts’engastlaeggi***, is applied to rainbow trout.

Up until the end of World War II resident species fish played a much more significant role in the Ahtna diet than currently. Before the war the seasonal round was organized so that Ahtna families spent the fall, winter, and spring at lakes where they could harvest whitefish, grayling, burbot, and trout. These species were crucial to the traditional economy because they were a reliable resource of food that could be harvested practically anytime of the year and could be relied upon as an alternative to salmon if the salmon runs failed. The seasonal round described by many elders for the period circa 1900 to 1950 included fall fishing for grayling and whitefish and winter fishing for burbot and lake trout. But as the Ahtna became immersed in the wage economy they abandoned the old seasonal round and settled permanently in villages along the Richardson and Glenn highways. As a result, by the mid-1950s most Ahtna families no longer visited the old lakeside fishing sites and instead harvested non-salmon fish in streams and lakes

Table 1. Ahtna Classification of Non-salmon Fish Species

Ahtna dialects: U = upper Ahtna, C = central Ahtna, M = middle Ahtna, L = lower Ahtna, W = western Ahtna, MR = Matanuska River

COMMON NAME	LINNAEAN NAME	AHTNA NAME	LITERAL MEANING
Steelhead, "dogfish"	Oncorhynchus mykiss	dadzeli (CL)	?
Dolly Varden	Salvelinus malma	ts'engastlaeggi (CLM), dghalk'aazi (W) Its'eli, tsabaey (MR)	'one that is homely', 'red one'
rainbow trout	Oncorhynchus	t'aan'delik'esi (L), tsabaey (MR)	'leaf that is red'
lake trout	Salvelinus namaycush	baet	~ (root)
longnose sucker	Catostomus catostomus	dahts'adye (CLW), tahts'adiye (M), tats'ade(M)	'orifice+?'
Pacific lamprey "eel"	Entosphenus	tl'aghes	~
bullhead	Cottus cognatus	ts'es t'aaxi	'one beneath rocks'
burbot	Lota lota	ts'anyae (CLW), ts'aann (M)	
Arctic grayling	Thymallus arcticus	sde't'aeni (CLW), segele (M)	'one with a blanket'
humpback whitefish	Coregonus clupeaformis	luux	~
round whitefish	Prosopium cylindraceum	xasten'	'?+handle'
broad whitefish	Coregonus nasus	tsabaey ce'e M absent but known via Upper Tanana	'big fish'
least cisco	Coregonus sardinella	xaal ggaay (M) now absent but said to have been in Mentasta Lake	

Source: Someone and Kari 2002

located close to the highway. At the same time they also gave up the traditional harvest method of using weirs and traps, which were made illegal, for the rod and reel (Reckord 1983a: 53-54).

Traditional Knowledge and the Ahtna

The Ahtna people have inhabited the Copper River Basin for at least a millennium (Workman 1976) and have accumulated a great deal of knowledge about the animals, fish, and plants they depended on to make a living. Such knowledge has been variously labeled, but is usually referred to as traditional ecological knowledge (TEK). Inglis (1993:vi) defines traditional ecological knowledge as

...[the] knowledge base acquired by indigenous and local peoples over many hundreds of years through direct contact with the environment. It includes an intimate and detailed knowledge of plants, animals, and natural phenomena, the development and use of appropriate technologies for hunting, fishing and trapping, agriculture and forestry, and a holistic knowledge, or "world view" which parallels the scientific discipline of ecology.

Traditional knowledge, like scientific knowledge, is derived from a process of interpreting phenomenal experience that is both natural and profoundly cultural. All humans strive to create a coherent world out of their complex and novel experiences and it is only through the process of organizing this knowledge that human action and survival are made possible (Feit 1988:77-78). By means of culture humans order and condense their experiences into manageable categories to which relatively standardized understandings and rules can then be applied. Thus knowledge in both western and non-western cultures is produced through similar processes. But the knowledge of non-western cultures is not identical to that of the west because it is embedded within its own cultural system. Or to put it another way, it is interpreted in light of a different paradigm (Scott 1996:85).

The Ahtna view of nature is based on a line of continuity between the biophysical, human, and supernatural worlds. Humans and animals (including fish) share the same fundamental

organization in that each has a soul, a language and family life. Animals live like humans with all the same cultural accouterments but in different physical forms. Like humans, animals are sentient and volitional, that is they can act on their own values and choices (Langdon 2003:8). Humans and animals exist in a reciprocal relationship¹ in which animals give themselves freely to humans in order that humans can survive, but only on the condition that humans treat them correctly. It is incumbent on the humans to provide this correct treatment so that animals may return to be harvested again. Ahtna elder Pete Ewan put it this way,

If we don't treat the animal right that's been taught to us, we will not get so easy animals.... if you don't treat animal, anything right, the fishing, you will never get fish no more...(Ahtna Inc.1988: 3).

The reciprocal relationship between humans and animals is described in the story of *Bac'its'aadi* (“the one that is highly regarded”) (Simeone and Kari 2002:151).² In this story a young boy is saved from drowning by the salmon people. After a year he is returned to his parents as a small king salmon placed in their dip net. The boy is then transformed back into human form and explains to his parents that the salmon people are “human beings” and that they “live really well.” He then tell his parents that he is going to return to the salmon people and if his parents should catch him in the future they must not club him but instead cover him with bird down and lay him in the grass. The boy also explains that people should talk well to the salmon and show the proper love and respect to those fish that come to them to be harvested. If they do not the salmon will no longer run. Repeated in the story is the mystical phrase *dinac'iighiltaenen*, which literally translated means “the one whom someone has put back inside again.” In this case the “someone” are the salmon people who, by returning the son, demonstrate their good will towards humans and their willingness to be caught if they are treated with respect. Thus the story points to the value of reciprocal relations between humans and salmon and how humans are to act if they are to maintain that relationship.

¹ Fienup Riordan calls this collaborative reciprocity (2002).

² Langdon (2004) calls the salmon boy story a “mythic charter” which lays out the “logic of engagement” between human persons and non-human persons. The Tlingit have a story very similar to the Ahtna *Bac'its'aadi* story as do the Yup'ik, although the Yup'ik story revolves around the relationship between seals and humans (Fienup Riordan (1994).

The rules set out in the *Bac'its'aadi* story form the ethical basis for the traditional Ahtna management system (see Simeone and Kari 2002:pp37-60) for a description of the management system). In interviews Ahtna elders repeatedly made the point that there is a direct link between the fishing practices of human beings, the survival of humans, and the sustainability of the fishery. In the elders' view the sustainability of the fishery is predicated on how humans demonstrate respect for the fish. Three ways humans can demonstrate this respect are: 1) to take proper care of their fishing gear, including the construction of smoke houses and drying racks; 2) to treat the fish properly after they are caught, including harvesting only what you need, and 3) to behave properly while in fish camp. In her discussion of the *Bac'its'aadi* story Ahtna elder Martha Jackson (Ahtna Tape 32) stressed the direct relationship between Ahtna fishing practices and the annual return of the salmon. She says that the only reason salmon exist today is because of how humans treated them in the past. In her terms "[it] is because of the people who work on them (salmon) well, that the salmon still exist now."

Dae' luk'ae 'adii ugheldze' ba hghetnaa de yet yaen'.
/Thus now the salmon run well only for those who work on them carefully.

Yet yaen' 'ungget uyehts'e' telax.
/Only then do they swim to someone.

Yet koht'aene koht'aene ts'akut'edze' ba hghetnaa de, 'ele' ugheldze' ba hghestnah den,
/If the people work on them badly, if they do not work on them nicely,

koht'aene its'e' skudetniiyede, 'ele' its'e' tesdlaxe.
/or if a person is lazy towards them, then they (the fish) will not run to him.

Koht'aene ugheldze' yaatnaade yet yaen' anoxt'e' 'adii luk'ae luk'ae c'a yii 'adii c'a xu'a kot'aen.
/It is because of the people who work on them (the salmon) well, that the salmon still exist now.

Ugheldze' ba hghetnaade yet yaen' luk'ae c'ilaen.
/They work on them well, and that is the only reason that the salmon exist.

Kiits'e' skudetniige 'ele' udatahe ugheli ghileh de, yeldu' 'ele' k'adii kestlaxe,
/The ones who are lazy, or whose gear is not good, do not have fish running to them at this time.

Western science, and by extension scientific management, is based on the strict separation of society and nature. Nature is conceived of as a resource to be bought, sold, and consumed as a commodity (cf. Escobar 1996). Animals and fish are motivated or controlled by instinct. As such they are not considered actors or “co-participants” (Wolf 2002) who willingly give themselves to humans. Sustainability is not based on maintaining the proper relationship between salmon and humans but on producing a “maximum” or “optimum” number of fish (Acheson and Wilson 1996:580).

In salmon fisheries, resource managers focus on regulating the harvest and escapement (getting enough fish to the spawning grounds) to maintain adequate population levels and provide an optimum level of harvest. In non-salmon fisheries the focus is on limiting the harvest to sustain an adequate recruitment. The size of fish populations is related to the level of human exploitation, as well as a variety of environmental factors that are generally recognized as outside the control of management. If exploitation is high, fish populations will be low and their reproductive ability will be low as well. If the harvest exceeds the ability of a fish stock to reproduce itself then populations will further decline. To maintain population levels, and insure future additions to the population (i.e., recruitment) managers seek to reduce levels of exploitation. The objective is to limit harvest effort to the point that maximum sustained yield results, in other words, so that the harvest does not exceed recruitment. While there is increasing recognition within the biological sciences that ecosystems are dynamic, resources managers presuppose that ecological systems tend toward equilibrium and that for any given system there is a normal population size for any species of game or fish stock (Acheson and Wilson 1996:580).³ The goal is to conserve resources while at the same time produce an optimum number of fish of a certain species that have immediate commercial and cultural value.

While Ahtna traditional knowledge and scientific management interpret nature in light of different paradigms, the traditional knowledge provided in this report includes considerable detail about the life history and biology of non-salmon species. This detail is the result of years

³ The Alaska Department of Fish and Game acknowledges the importance of an “abundant and pristine habitat” in maintaining a sustainable salmon fishery. But the department’s focus is on managing the fishery by managing escapement and harvest levels (ADF&G 2003:25-33).

of personal experience on the land compounded by generations of information imparted through oral tradition. Hunters and fishers acquire extensive knowledge of their environment because of the wide variety of activities they undertake in all seasons of the year. Their dependence on animals, fish, and plants requires a detailed knowledge of when and where resources are available and the environmental processes that affect their availability. This breadth of knowledge is reflected in traditional classification systems or taxonomies, which are the basis for building extensive systems of knowledge about nature.

As a result traditional knowledge has a chronological depth that far surpasses that of the written record (cf. Cruikshank 1981:72; Haggan, Archibald and Salas 1998). In general, biological data on subarctic fisheries is “poor” or “non-existent” (Reist 1997:6). Records on non-salmon fisheries in the Copper Basin that predate 1960 are rare and confined to major lakes and streams. As a result managers have short chronologies on which to build predictions or management plans. In chapter three of this report we present information that refers to a time period from about 1870 to 1950 and provides information on the presence or absence of species, as well as their distribution, migration patterns, and productivity. The Ahtna oral traditions presented in chapter four extend this chronology even further back in time and help to create a baseline for monitoring purposes that managers can use to understand long-term changes in the local environment and the fishery and assist in planning and implementing future research projects.

Traditional knowledge also includes observations of the environment that are often more comprehensive, and in some cases more detailed, than those collected by managers. Collectively Ahtna elders have a more comprehensive knowledge of the vast array of streams and lakes within the Copper Basin than do managers, who by necessity focused their research on major lakes and streams where fishing pressure is most intense. In this report the elders provide information on streams and lakes that have never been sampled or assessed by managers, or that managers have only limited information on. Furthermore, because the Ahtna used certain locations over several generations they have detailed observations about species distribution and seasonal movements over an extended period.

Research Methods and Data Sources Used in Collecting Ahtna Traditional Knowledge

This project was a cooperative effort between the Alaska Department of Fish and Game (ADF&G) Division of Subsistence, the Copper River Native Association, Cheesh Na' Tribal Council, the Chitina Tribal Council, and the Mentasta Tribal Council. The US Fish and Wildlife Service, Fisheries Information Service (FIS) provided the funding for this project. To help in the documentation of Ahtna traditional knowledge the Division of Subsistence worked with Dr. James Kari, a noted expert on the Ahtna language. Together the principal investigator and Dr. Kari conducted ten key respondent interviews with Ahtna elders. Interviews were tape-recorded using a standard format cassette tape recorder. Most interviews were transcribed and the Ahtna portions translated by Dr. Kari. Expert Ahtna speakers Molly Galbreath and Virginia Pete, who have worked closely with Dr. Kari for the past 30 years, proofread the transcriptions. The interviews were then annotated. Later they were dissected and organized into topics that would be of interest to a large audience including biologists, resource managers, anthropologists, and the Ahtna themselves. Besides interviewing Ahtna elders, investigators held many informal conversations with ADF&G area biologist Tom Taube, who was also included in one of the interview sessions with elders in the village of Gulkana.

Ahtna elders always related their knowledge about fish in terms of their home territories and specific fishing sites designated by a place name. Territoriality is a significant feature of traditional Ahtna social organization and management. Historically there were eight Ahtna groups inhabiting bounded territories over which members of the band had use rights (de Laguna and McClellan 1981:642). These rights were held by common consent and could not be infringed upon with threat of violence (Reckord 1983b:78). The *nen'k'e hwdenae'* or "chief over a traditional territory" regulated access to resources within the band's territory by giving or denying permission for outsiders to use those resources. At the same time intermarriage between bands carried obligations to share resources so several bands might have access to a particular territory. Each band was closely identified with a core area that included salmon fishing sites along the Copper River as well as fishing sites used to harvest non-salmon species away from the main river corridor. The current generation of elders, who were born in the first decades of the

20th century, identify strongly with their traditional territory, which is where their most intimate, detailed knowledge lay. When asked about non-salmon species the elders responded by providing information about specific locations within their home territories and in many instances they refused to talk about places outside their home territories where they had no direct experience.

During several of the interviews the investigators used maps to locate fishing sites. The maps were USGS scale 1:6250. They were laminated and the information was written in erasable ink directly on the maps, a method Dr. Kari has used for the last two decades to collect place names. Dr. Kari maintains the original maps while Ahtna Incorporated keeps a copy.

All of the elders interviewed for this project were fluent Ahtna speakers but were also comfortable with the English language so that interviews were conducted in a mixture of Ahtna and English. Elders were chosen based on their experience on the land, all had grown up in a largely subsistence economy in which they had to fish, hunt and gather to make a living, and because of their knowledge of the Ahtna language. Investigators conducted both directed and semi-directed interviews but favored the latter because semi-directed interviews allowed for the collection of a wider range of information. In addition, semi-directed interviews enabled the interviewees to discuss their understanding of the topics and make connections between topics based on their own logic rather than on questions drawn up in advance (cf. Huntington 1998:241). Interviews ranged in length from one to three hours and respondents were offered an honorarium in recognition of their time.

One explanation for why it is so hard to make use of traditional knowledge in resource management is because TEK is too different from science in terms of content and expression. In writing this report one major concern was how to present the information so that it would be useful to resource managers while maintaining an Ahtna voice or perspective. A major difficulty in bridging the gap between TEK and science is appreciating different styles of communication. In Ahtna culture narrative plays a key role in the transmission of knowledge. Narratives usually range over a wide set of topics and do not always lend themselves to quick, easy, absorption. To write this report we dissected the narratives and organized them into discrete chapters on specific

topics, but we also wanted to maintain the integrity of each narrative as much as possible so that the reader could get a sense of the logic of communication. That is why there is extensive use of interview excerpts and interlinear translations (line by line translations) in order to support statements, illustrate key points, and let the elders have a significant voice. Additionally, we wanted to collect narratives in the Ahtna language that would reflect both a cultural perspective on the environment as well as technical knowledge. There are two reasons for providing a cultural perspective. First, it provides an alternative view of ecosystem and human environmental interrelations that may provide resource managers and research biologists with new insights into environmental conditions, problems, and concerns. Second, it provides a way for understanding what people value in their environment, which leads to better management overall.

A key to successful management is to have the users understand and accept the goals and objectives of the resource managers. For this to happen the users have to have a stake in management. Over time the Ahtna have become one of several user groups in the Copper Basin and they have participated in the management system by going to meetings and submitting proposals. But underlying these efforts is a feeling that biologists and resource managers are not really interested in what the Ahtna have to say, despite their long history in managing the environment. To overcome the silence we recommend the creation of venues in which local people and managers can share information. Such venues should be considered as equal exchanges of information, so that both managers and local people feel comfortable sharing information. Effective communication requires acknowledging that local people do have valuable information or insights, and that managers do have legitimate concerns. The objective is to build relationships with local people so that managers and locals can develop common goals.

Chapter Three

Resident Species Life Histories, Distribution, Seasonal Movement Spawning Activity and Diet



This chapter covers Ahtna knowledge of the life history of non-salmon species fish. It is organized around topics familiar to many biologists such as species distribution, the presence or absence of species, migration patterns, and spawning activity. When Ahtna elders talk about fish, or any animal, they usually discuss them in relation to the harvest, and when talking about the harvest they frequently confine their most detailed remarks to their own home ranges or territories and to specific areas and sites within those areas. These are locations that, up until relatively recently, Ahtna families utilized over succeeding generations. As a result the elders who talked about these places had comprehensive and intimate knowledge of that place and the animals and fish associated with that place. Besides describing specific harvest sites (which are identified by place name), Ahtna elders also talked about small streams and lakes, many of which have no English name. Note, as discussed earlier, in the late 1940s and early 1950s the Ahtna altered the traditional seasonal pattern and stopped fishing in lakes and streams away from the road system so the harvest sites identified in this chapter were used primarily before World War II.

Fishing sites for non-salmon species are located throughout much of the Copper Basin and upper Susitna Drainage. During this project the investigators flagged fishing sites identified by place names as F1= salmon harvest sites, F2 = non-salmon fish harvest sites (other than whitefish), F3 = whitefish harvest sites, F4 = salmon and non-salmon harvest sites, F5 salmon and whitefish sites, F6 = all species of non-salmon fish, and F7 = harvest sites for both non-salmon and salmon species. Numerous fishing sites can fall under the domain of one place name so that along a linear feature such as a stream there maybe several fishing sites under one place name. Of the 2000 place names on the Ahtna Place names list (Kari 2004, draft), 495, or nearly 25 percent, have fishing sites affiliated with them.

Table 2 summarizes the place names with fishing sites flagged in each of the Ahtna dialect areas. The table underscores the obvious regional facts; such as the absence of harvest sites in the upper

Table 2. Summary of Ahtna Fishing Sites in the Ahtna Place Names List

<i>site types</i>	<i>dialect areas</i>					<i>total</i>
	Lower	Central	Upper	Western (Mat River*) (UpSu.River*)		
All sites	99	218	78	25	75	495
F1 (salmon only)	48	51	31	4	0	134
F2 (non-salmon species but not whitefish)	42	130	52	16	48	288
F3 (whitefish only)	0	0	0	0	12	12
F4 (salmon & non-salmon species – excluding whitefish)	8	13	12	5	1	39
F5 (salmon & whitefish)	0	0	1	0	0	1
F6 (non-salmon species and whitefish)	0	24	3	0	14	41
F7 (salmon, non-salmon & whitefish)	1	0	5	0	0	6

*Matanuska River and Upper Susitna River

Susitna drainage devoted exclusively to salmon, and the near absence of whitefish harvest sites on the Lower Copper River. But other important facts also emerge. There are few F7 sites where the Ahtna could harvest both salmon and all non-salmon species of fish. All but one of these sites is located in the territory of the Upper Ahtna. The heaviest concentration of sites (F2 and F6) devoted solely to the harvest of non-salmon fish is located within the territory of the Central Ahtna. There are a total of 154 of these sites in that area, the majority of which were probably used to harvest grayling. The most productive of these sites were situated at Crosswind Lake and Ewan Lake. It is certain that that these sites, along with Mentasta Lake, were especially important habitation areas to aboriginal Ahtna. Interestingly there are no sites in

Central Ahtna territory dedicated solely to the harvest of whitefish (F3). By contrast there are 12 sites in the upper Susitna drainage where whitefish were the only species harvested. In Upper Ahtna Territory there were 55 sites (F2 and F6) where only non-salmon species could be harvested and no sites devoted exclusively to the harvest of whitefish.

Accompanying the text are four maps. The first provides an overview of non-salmon fishing sites within the larger Ahtna territory (Figure 3). Maps two and three show historic fishing sites in the territory of the Middle and Upper Ahtna, while a fourth map depicts historic sites in the upper Susitna drainage, which is in the territory of the Western Ahtna. There is no map for Lower Ahtna territory because there are only a few non-salmon fishing sites located on the lower Copper River. Most of the place names mentioned in the text are numbered and these same numbers are keyed to the map. Larger bodies of water such as Crosswind Lake and Lake Louise are not numbered. Note that the paucity of names for the Lower Ahtna reflects the depopulation of the lower Copper River within the last century. Ahtna no longer inhabit the Chitina River drainage.

Resident Species Distribution and Fishing Sites

Middle Copper River, Central Ahtna Territory

Figure 4 shows streams, lakes and fishing sites located in Central Ahtna territory discussed in the text (Table 3 lists streams, lakes, fishing sites and species harvested). There are 45 fishing sites listed for the middle Copper River indicating the comparative density and richness of non-salmon fish for this region as compared to the lower and upper Copper River. Of particular importance are the Crosswind Lake and Ewan Lake systems, and the Tyone River system.¹ Both are known throughout the entire Ahtna region for an abundance of non-salmon species, especially whitefish. Crosswind Lake is deep, does not freeze to the bottom, and the north outlet

¹ Note that Tyone Lake and Lake Louise are considered part of Western Ahtna territory but for convenience we have included them in the discussion of the Central or Middle Ahtna.

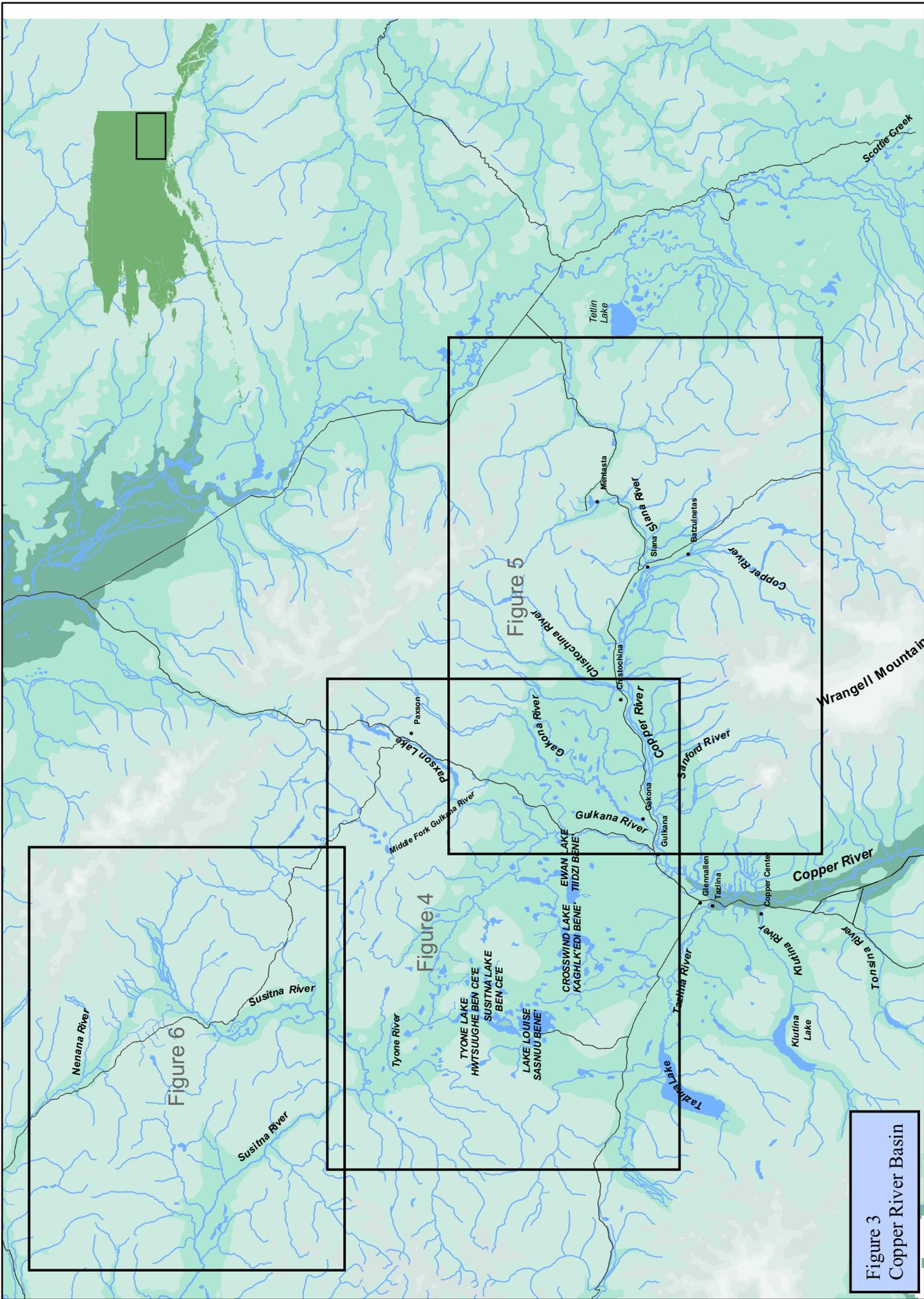


Figure 3
Copper River Basin



Place Names Accurate to < 2 Miles



1:1,500,000



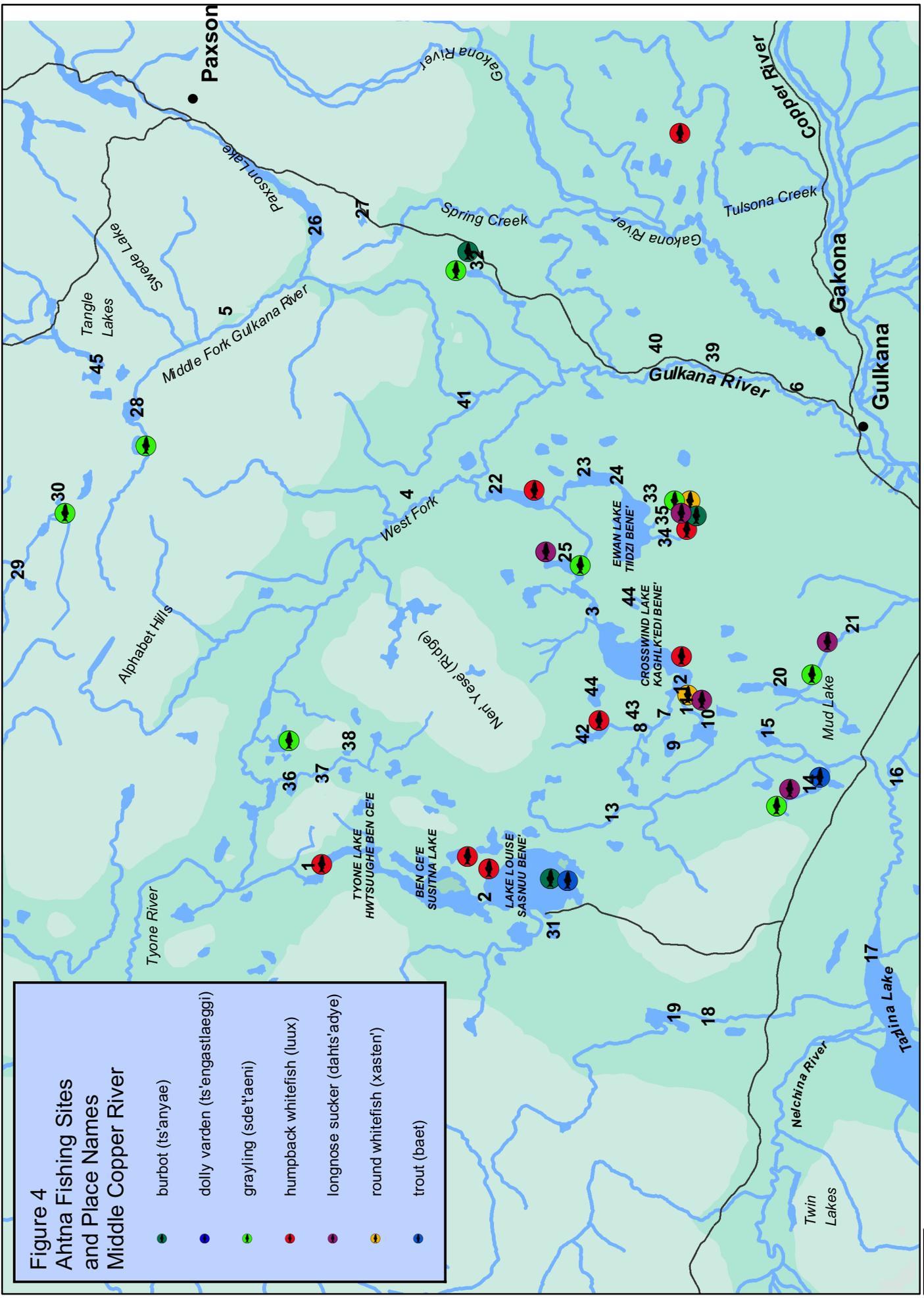


Figure 4
Ahtna Fishing Sites
and Place Names
Middle Copper River

- burbot (ts'anayae)
- dolly varden (ts'engastlaeggii)
- grayling (sde't'aeni)
- humpback whitefish (luux)
- longnose sucker (dahts'adye)
- round whitefish (xasten')
- trout (baet)



1:50,000



Place Names Accurate to < 2 Miles
 Source: Key Informant Interviews, FIS Report 110
 Map by Davin L. Holen, Division of Subsistence, ADF&G



Table 3. Ahtna Fishing Sites and Place Names, Middle Copper River

ID	AHTNA NAME	COMMON NAME	SPECIES PRESENT
	Kaghalk'edi Bene'	Crosswind Lake (also called Charley Lake)	humpback and round whitefish, sucker, lake and rainbow trout, grayling and burbot
	Łiidzi Bene' ("upper-water lake")	Ewan Lake	round whitefish, burbot, grayling and sucker
	Sasnuu Bene' ("sand-island lake")	Lake Louise	whitefish, sucker, lake and rainbow trout, grayling and burbot
	Hwstuuġhe Ben Ce'e ("lower big lake")	Tyone Lake	whitefish, grayling
1	Ben K'atgġe ("between the lakes")	Tyone Village	
2	Nekey'dghinic'et'den	isthmus on L. Louise	
3	K'estsiik'eden	"outlet place" at Crosswind L	
4	'Usts'eni Na' ("forward-side creek")	West Fork Gulkana River	
5	Bendziina' ("head-lake-creek")	Middle Fork Gulkana River	
6	C'uul C'ena ("tearing river")	Gulkana River	
7	Kutaghi'aa Na' ("where bay extends in")	stream into Crosswind L from W	humpback and round whitefish, sucker, lake and rainbow trout, grayling and burbot
8	Kutaghi'aa Bene'	lake off Crosswind L	
9	I'dzak'ehi Bene'	Salmon Berry Lake	
10	Nkaał Bene' ("tracks")	Game Trail Lake	
11	I'dzak'ehi Na' ("salmonberry lake")	Salmon Berry Creek	
12	Kanilen Na'	"flows through creek"	
13	Taltsogh Na'	Tolsona Creek	grayling that come up from the Tazlina
14	Sitelyaa Bene'	Moose Lake	grayling, sucker and rainbow trout
15	Ndez'aayi	Island Lake	no fish
16	Tezdlen Na'	Tazlina River	salmon, few whitefish
17	Bendilbene'	Tazlina Lake	
18	Bendilna'	Mendeltna Creek	sockeye salmon, grayling
19	Bendaes Bene'	Old Man Lake	sockeye salmon from the Tazlina River
20	Hwniindi Ndaa' Bene' & Hwdaandi Ndaa' Bene'	Twin Lakes	grayling and sucker
21	Ciisi K'ena	Moose Creek	humpback and round whitefish, grayling, sucker
22	Hwghi'aa Bene'	Fish Lake	
23	C'obeni ("off-lake")	Middle Lake	
24	C'obeni Na' ("off-lake creek")	Middle Lake Outlet	
25	Łi'ke Bene' ("dog's lake")	Dog Lake	
26	Tak'ats' Bene' ("spring-water L")	Paxson Lake	grayling and salmon, whitefish, lake trout
27	Hwdagguus Bene' ("celery-mouth lake")	Meiers Lake	grayling and some salmon
28	Bendzii Bene' ("head-lake-lake")	Dickey Lake	chinook salmon
29	Natazghot' Na' ("bent water stream")	stream into McLaren R	grayling
30	Cots' Bene' ("down feathers lake")	lake off McLaren R	grayling
31	Skosii'den	lake SW of L Louise	whitefish
32	K'ey Tsaay Bene' ("dwarf birch lake")	Hogan Hill Lake	grayling and sucker, few whitefish, burbot
33	K'ey Nuu Na' ("birch-island ck")	ck in S end of Ewan L	grayling, lingcod, sucker and whitefish
34	Taatgġey Na' ("upper-water ck")	ck in S end of Ewan L	grayling, little suckers, lingcod
35	Kuyxi Na'	"Whistler Creek"	grayling, little suckers, lingcod
36	Nac'etkasi Bene'	lake NE of Tyone L	sucker
37	Da'sc'elaes Na'	"Boat Creek"	whitefish
38	Niygġe Bene'	lake NE of Tyone L	grayling
39	T'ox Na' Ce'e Bene'	Poplar Grove Creek lake	grayling
40	Scent'aa Na'	ck at 142 mi. Richardson Hwy	grayling
41	Taltsogh Cae'e ("yellow water mouth")	Tom Neeley's camp on Gulkana R	grayling, lingcod and sucker
42	Hwggandi C'ezaeni Bene' ("downriver ? lake")	Second Hill Lake	humpback whitefish
43	C'ezaeni Na'	Creek from Second Hill Lake	humpback whitefish
44	Hwtsiindi C'ezaeni Bene' ("upriver ? lake")	First Hill Lake	
44	Nek'ey'aa Bene'	Horseshoe Lake	whitefish
45	Nitilbene'	Tangle Lakes, Upper Tangle L	lake Trout

can be kept open throughout most of the winter, so fishing can take place throughout much of the year. The prevailing south wind keeps the outlet at Ewan Lake open.

Historically, Ahtna had several permanent habitations at both ends of Crosswind Lake but most were abandoned in the 1950s after the Ahtna took up wage labor and settled permanently into villages located on the highway system. Today there is only one camp at the north outlet of the lake. In 1969 the State of Alaska closed Crosswind Lake to all subsistence fishing, ostensibly to protect the growing sports fishery. Fred Ewan (Ahtna Tape 135), who grew up around Crosswind Lake in the 1930s and 1940s at *K'estsiik'eden* (3) or 'outlet place' (also called *K'estsii'i*), and who still has a house at the north end of the lake, says that Crosswind Lake is good for fishing because whitefish are available throughout most of the year and relatively easy to catch compared to grayling, which leave the lake in the spring scattering into smaller streams and ponds to spawn.

It [whitefish are] living there [Crosswind Lake] all the time. It not like hard work [to catch whitefish] like the other fish.

Other tsabaey ldu' 'adii tatestlaexi gha 'ele' ugheli ghileh 'adii you know.
/The other kinds of fish, as they start to run in the water, are not very good.

Gaat datsuughe sde' t'aeni 'adii tedefi, si' k'ent'ae, si' k'ent'ae.
/Here below as the grayling start to run, they are like birch sap.

K'uun' nanlaesdze' you know. K'ey't'aen dze'.
/They are laying eggs, you know, as they are like this.
They laying eggs now you know.

Uk'uune' hwngelggaes dae' su de denek'uune' hwngelggaes su t'aen
/The eggs spread out, their eggs get scattered out as they do that.

Hwngalggas, 'adii [in May June, grayling lay eggs.]
/They spread over the area.

Not whitefish. Whitefish all summer [are available all summer].

Łuux 'ele' xu' st'aene. łuux ldu' one place k'a delts'ii 'utggu, deep lake,
Ben Ges yii, łi'ke Bene'.
/Whitefish are not like this. The whitefish stay in one place, in deep lakes, such as in Ben Ges (lake south of Dog Lake), or 'Dog Lake'.

You know, Fish Lake yii. Just little area.
Maybe twenty-mile area he live in there.

According to Fred (Ahtna Tape 135) the species of fish available in the lakes and streams around Crosswind Lake include round whitefish (*xasten'*), humpback whitefish (*luux*), sucker (*dahts'adye*), lake trout (*baet*), rainbow trout (*tsabaey*), grayling (*sde't'aeni*), and burbot (*ts'anyae*). He notes that the south end of Crosswind Lake has many longnose suckers and their roe is particularly desirable to the Ahtna. Ewan Lake, according to Fred, has no large whitefish, just small ones that are similar in size to grayling (probably round whitefish). Fred also thinks that the burbot in Ewan Lake are smaller than those in Crosswind Lake, which may indicate that Ewan Lake has less feed than the larger and deeper Crosswind.

The south end of Crosswind Lake is Frank Stickwan's (Ahtna Tape 131) home territory. Frank was born about 1900 and up until the mid-1950s maintained a trap line and several cabins at the south end of the lake. But Frank is also familiar with other systems that feed into Crosswind Lake from the north including the West Fork (*'Usts'eni Na'*) (4), and Middle Fork (*Bendziina'*) (5) of the Gulkana River (*C'uul C'ena*) (6). Frank's knowledge of the hydrology and fisheries of the area between the Gulkana and Tazlina rivers impressed both researchers for the project, as well as ADF&G area biologist Tom Taube.

The following is a synopsis of Frank's detailed description of the hydrology of the south end of Crosswind Lake north of Tolsona Creek (see map). The system most familiar to Frank includes a stream called *Kutaghil'aa Na'* (7) that flows into the south end of Crosswind Lake from a small lake called *Kutaghil'aa Bene'*(8). Frank had a fish camp in this area and he pointed out that this site had been used for many generations before him. Another system mentioned by Frank includes Salmon Berry Lake (*I'dzak'ehi Bene*) (9), which is connected to Game Trail Lake (*Nkaal Bene'*) (10) by Salmon Berry Creek (*I'dzak'ehi Na'*) (11). Game Trail Lake is connected to Crosswind Lake by *Kanilen Na'* (12) ('flows through creek'). Fish in this system include humpback or lake whitefish, round whitefish, sucker, burbot, and grayling.

Frank (Ahtna Tape 131) also describes the distribution of fish in lakes located south of Tolsona Creek (*Taltsogh Na'*) (13) that drain toward the Tazlina River. Moose Lake (*Sitelyaa Bene'*) (14) "has all kind of fish" (possibly round whitefish), as well as grayling, sucker and rainbow trout, which Frank thinks might live in the lake only during the summer. In contrast, Island Lake

(*Ndez'aayi*) (15) has no fish. Tolsona Creek itself has few fish. It flows into the Tazlina River (*Tezdlen Na'*) (16) and a few grayling come into Tolsona Creek via the Tazlina River and stay until August. There are a few whitefish in the Tazlina River that go all the way into Tazlina Lake (*Bendilbene'*) (17). There are salmon in Mendeltna Creek (*Bendilna'*) (18) and some grayling, but no whitefish. Old Man Lake (*Bendaes Bene'*) (19) has salmon that come in from Tazlina Lake. The Moose Creek -Twin Lakes system has only grayling and sucker, but no whitefish. In the spring the fish move downstream out of the Twin Lakes (*Hwdaandi Ndaa' Bene'* and *Hwniindi Ndaa' Bene'*) (20) into Moose Creek (*Ciisi K'ena*) (21) and in August they return upstream.

Frank also provided information about Ewan Lake. Several species of fish moving through the outlet of Ewan Lake (*Tatggat*) can be harvested throughout most of the winter. Ewan Lake is connected to Fish Lake (*Hwghil'aa Bene'*) (22) and Middle Lake (*C'obeni*) (23) through Middle Lake Outlet (*C'obeni Na'*) (24). Frank says there are whitefish running all winter long through this outlet. Because the water is fed by warm springs, grayling run in the small creeks as late as the month of October and Frank said that Ewan Lake is one of the few places where grayling could be caught during mid-winter. In January and February it is also possible to catch quantities of burbot that eat the grayling. Then in about February rainbow trout start to run. In addition Frank mentioned streams that flow into the south end of Ewan Lake, such as *Tatggy Na'* (34), *Kuyxi Na'* (35) (Whistler Creek), and *Key Nuu Na'* (33) (Bird Island Creek), which has grayling, some sucker, and lots of burbot.

In the system encompassing Fish Lake (22), Dog Lake (*Li'ke Bene'*) (25), Middle Lake (23) and the upper outlet of Crosswind Lake there are whitefish, grayling and sucker, which run until November. Frank added that round whitefish (*xasten'*) come into the system via the Gulkana River.

Frank noted that there are sites located in the vicinity of Hogan Hill Lake (*K'ey Tsaay Bene'*) (32) that have good grayling and burbot fisheries, but few if any whitefish. Paxson Lake (*Tak'ats' Bene'*) (26) has grayling and salmon, and Frank thought there might be some whitefish. Tangle Lakes (*Nitilbene'*) (45) has lake trout. Meires Lake (*Hwdagguus Bene'*) (27)

has grayling and some sockeye salmon. Dickey Lake (*Bendzii Bene'*) (28) has a run of Chinook salmon. The creek running west into McLaren River called *Natazghot' Na'* (29), is a grayling stream which people fish in September. And there is a small lake called 'down feathers lake' (*Cots' Bene'*) (30) that has grayling (Stickwan 2002).

Tyone Lake (*Hwtsuughe Ben Ce'e*) is also known as a productive fishery. According to Jimmy Secondchief (Irving 1957:40), who lived at Tyone Lake from the 1920s to 1940s, there was always a bridge and fish weir across the narrows at Tyone Village called *Ben K'atgge* (1) ('between the lakes') in the Ahtna language. According to deceased Ahtna elder Tenas Jack (Ahtna Tape 117; West 1973; also see Irving 1957; Reckord 1983a; de Laguna 1970b) the isthmus (called *Nekey'dghinic'et'den*) (2) between Lake Louise (*Sansnuu' Bene'*) and Susitna Lake (*Ben Ce'e*) was a good fishing site where "they fishing pretty hard for whitefish." The site is no longer inhabited but the lake is still used by non-Natives who reach it by boat from Lake Louise.

Andy Tyone (2002; 2003) was born on Crosswind Lake at *K'estsiik'eden* (3) in the 1930s, and spent much of his early life around Tyone and Crosswind lakes (see map). Andy said that at Crosswind Lake "they get good fish (whitefish) in July. About 5th of July it start. Springtime they go down the stream. Creek is wide as this (10 or 12 feet)." Whitefish are also available at *'Skosii'den* (31) (a lake and site at the south end of Lake Louise). Andy said,

that's another good place, good whitefish creek. Only one time I fish there with my uncle Johnny. They (whitefish) are greasy too, fat one (indicating that the fish are feeding). Crosswind Lake in July we get that kind. At *'Skosii'den* (31) early August we get em. First part of August.

Andy thought that the Gulkana River (*C'uul C'ena*) (6) does not have any whitefish,² only grayling, while Hogan Hill Lake (*K'ey Tsaay Bene'*) (32) has grayling and burbot, but no whitefish. Lake trout (*baet*) are available in the Crosswind Lake area, but are hard to catch. Andy said that they fished for lake trout in September at night using a bonfire on the bank to

² Whitefish are found in the Gulkana River but the Ahtna did not fish for them in the river preferring instead to fish in the clear lake outlet streams where there were good weir sites.

attract the fish. At the south end of Ewan Lake is a creek called *K'ey Nuu Na'* (33) where they catch grayling, burbot, long nose sucker and whitefish. Another creek called *Taatggye Na'* (34), that flows into the end of Ewan Lake has the same kind of fish, as does the creek call *Kuyxi Na'* (35) ('Whistler Creek'). That has "lots of grayling, lots of lingcod [burbot], little sucker, that big," Andy said.

The lake district north east of Tyone Lake has a variety of fish. Suckers are available at *Nac'etkasi* (36), a place located about ten miles from Tyone Lake, and there are whitefish in *Da'sc'elaes Na'* (37) or "Boat Creek," which drains into the West Fork of the Gulkana River. The area to the north and between Crosswind and Tyone lakes was once used in the late fall for grayling fishing. Andy also mentioned a creek flowing out of a lake called *Niygge* (38) that has very good grayling fishing.

Ben Neeley (2003), who now lives in Gulkana, calls himself *Hwtsaay Hwt'aene*, literally "Small Timber People", the western most band of Ahtna. Ben was born in about 1920 on the upper Gulkana River and lived for many years on his land at 142 mile on the Richardson Highway. He remembers fishing at *T'ox Na' Ce'e Bene'* (39) or Poplar Grove Creek Lake and *Scent'aa Na'* (40), the stream at 142.5 mile where his father used to have a fish trap for grayling.

Spring time right after break up, big grayling. Big grayling, black, used to come up, in springtime. That [the grayling] went by then, the sucker come up. Big sucker too. That's pretty good. But they don't last, only springtime. Only time, [May month].

Ben's father, Tom Neeley, also had a cabin and fishing site at *Taltsogh Cae'e* (41), a stream with grayling, sucker, and burbot, that flowed into the main stem of the Gulkana River from the west and about three miles above the mouth of the West Fork.

Upper Copper River, Upper Ahtna Territory

Katie John (2002) was born in the village of Batzulnetas (1) on the upper Copper River and later moved to Mentasta where she now resides (Figure 5, Table 4). Table 4 has a list of 20 fishing sites used by upper Ahtna to harvest non-salmon species. Mentasta Lake was the only place in the Copper Basin where sockeye salmon and whitefish could be harvested at the same time. According to Katie, the first person to fish at Mentasta was a woman named *Lactsen' Maan* or 'hawk owl's mother,' who used a dip net to catch small fish that are no longer present in the Slana River system. This fish may have been least cisco or *xaal ggaay* in Ahtna. Apparently this fish was available into the historic period because Katie says Mentasta Sam, the person who told Katie the story, had caught some in the past, but this fish is no longer found within the Copper River Basin. The question arises, were least cisco over harvested, or did they disappear because of some environmental change, or does the story refer to some other species? The question requires further research, but considering that least cisco can withstand higher exploitation rates than other species of whitefish it seems unlikely that they were over harvested. Katie mapped the three areas around Mentasta Lake that she heard were used as whitefish harvest sites in the past. None of these sites are used today, in part because the lake is silting up and also because people have simply reduced their harvest of whitefish. The sites are 1) the old village site just below the lake outlet, 2) a site called *Tacidi'aayi* (an old village site, heretofore undocumented) located at the north end of the lake where a stream flows into the lake from Mentasta Mountain, and 3) along the island just east of the mouth of Fish Creek. The latter may be two or three hundred years old, according to Katie, because there is evidence of a stone weir that was used to catch whitefish, as well as grayling and sucker.

Katie says that in Mentasta Creek (*Mendaes Na'*) (2) and the Slana River (*Stl'aa Na'*) (3) there are whitefish (*luux*). In Mentasta Lake there are whitefish, grayling (*segele*), and lingcod or burbot (*ts'aann*) that remain in the lake throughout the year. Dolly Varden (*ts'anghastlaegge*) are found only in Rufus Creek (*Tak'ats' Na'*) (4), and there are only grayling in Tanada Creek

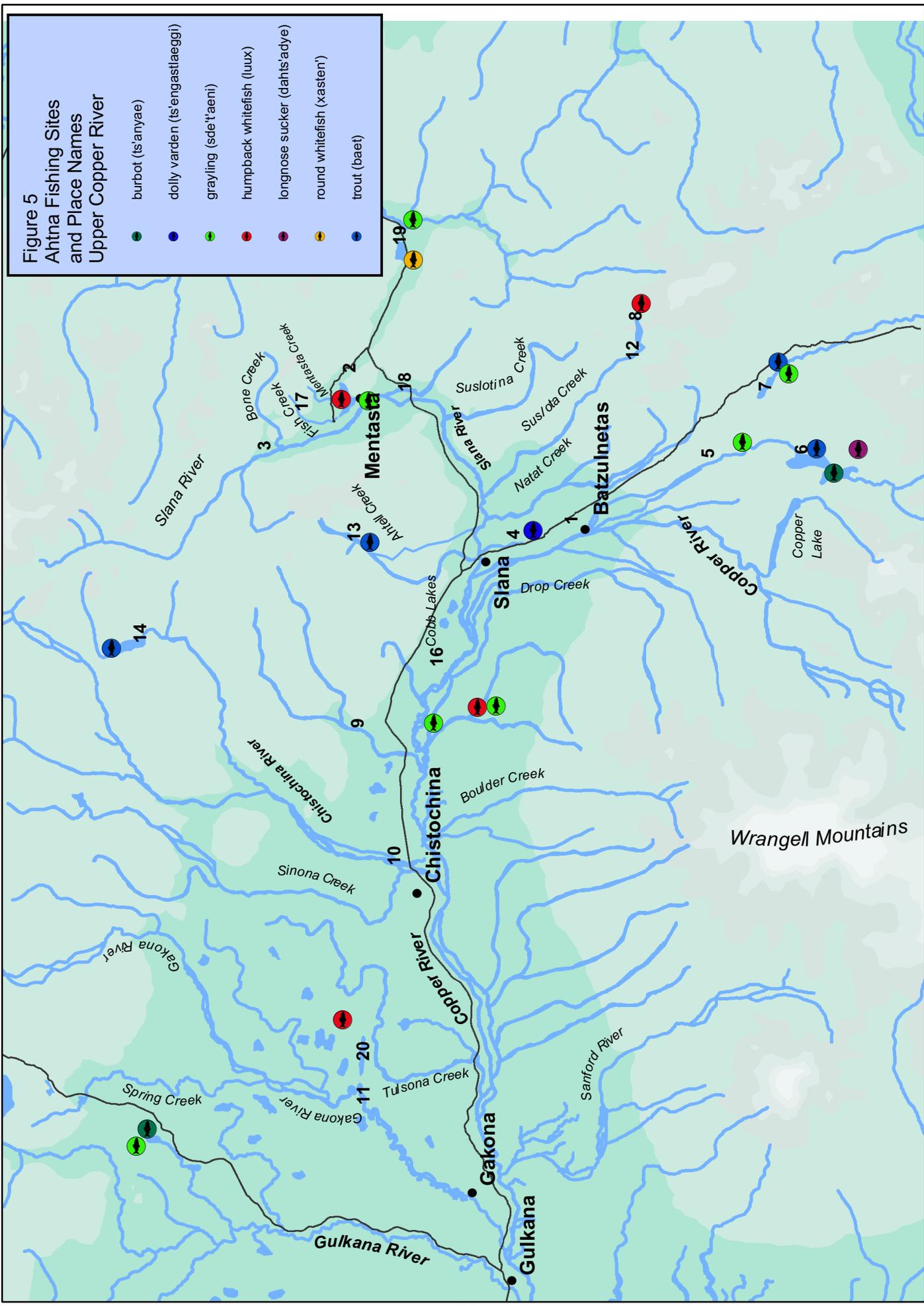


Figure 5
Ahtna Fishing Sites
and Place Names
Upper Copper River

- burbot (ts'anyae)
- dolly varden (ts'engastlaeggi)
- grayling (sde't'aeni)
- humpback whitefish (luux)
- longnose sucker (dahis'adye)
- round whitefish (xasten')
- trout (baet)



1:600,000



Place Names Accurate to < 2 Miles
 Source: Key Informant Interviews, FIS Report 110
 Map by Davin L. Holen, Division of Subsistence, ADF&G



Table 4. Ahtna Fishing Sites and Place Names, Upper Copper River

ID	AHTNA NAME	COMMON NAME	SPECIES PRESENT
1	Nataelde	Batzulnetas	
2	Mendaes Menn'	Mentasta Lake	sockeye salmon, humpback whitefish, historically least cisco, grayling, burbot
	Mendaes Na'	Mentasta Creek	
3	Stl'aa Na'	Slana River	humpback and round whitefish
4	Tak'ats Na'	Rufus Creek	Dolly Varden
5	Natael Na'	Tanada Creek	grayling and sockeye salmon
6	Tanaadi Menn'	Tanada Lake	sockeye salmon, lake trout, burbot, grayling
7	Tadiniits'aegge Menn'	Jack Lake	grayling, rainbow trout
8	Sasluuggu' Menn'	Suslota Lake	whitefish
9	Di'idaedl Na'	Indian River	chinook salmon
10	Tsiis Tl'edze' Na'	Chistochina River	sockeye and chinook salmon
11	Ggax Kuna'	Gakona River	sockeye salmon
12	Sasluuggu'	Suslota Village	
13	Men Tl'ets	Indian Pass Lake	lake trout
14	Tatgga Bene'	Mankomen Lake	lake trout
16	Tsabaey Na'	ck near Cobb Lake	grayling
17	Tsabaey Na'	Fish Creek	round and humpback whitefish, suckers, grayling
18	Tacdlaxa Na'	Mabel Creek	round and humpback whitefish, suckers, grayling
19	Men Tac'iltende	Mineral Lake	grayling, round whitefish, burbot.
20	Nedzighilen Bene'	"Gene Lake"	whitefish

(*Nataet Na'*) (5).³ No whitefish are found in Tanada Lake (*Tanaadi Menn'*) (6), and Katie thinks this is because of the giant lake trout or *baet* that live there. There are also sucker (*tahts'adiye*) and burbot (*ts'aann*), “[T]hat’s what they fishing for winter, through the ice,” Katie said. There are some big burbot in Tanada Lake, which is very deep at one end. The deep end is also home to the biggest grayling and lake trout. At Jack Lake (*Tadinilts'aegge Menn'*) (7), off the Nabesna Road, there are trout and grayling. Suslota Lake (*Sasluuggu' Mene'*) (8) has whitefish that were harvested in the past but according to Katie, they were small and of poor quality. Until the first decades of the 20th century there were two villages located on Suslota Creek, one where the creek enters the lake and another down stream from the lake. Today neither village is inhabited and there are no fishing sites on the creek.

Katie also added information about fish populations in areas further down the Copper River. She said there are no whitefish in Indian River (*Di'idaedl Na'*) (9), or in the Chistochina River (*Tsiis Tl'edze' Na'*) (10), but whitefish are found in the numerous lakes at the head of the Gakona River (*Ggax Kuna'*) (11).

Bell Joe (Ahtna Tape 110) was born in the village of Suslota (*Sasluuggu'*)(12) on the upper Copper River, but now lives in Chistochina. According to Bell there are lake trout (*baet*) in Crosswind Lake and in *Men Tl'ets* (13) the lake in Indian Pass. “They got some *baet* at Mankomen Lake (14) and Tanada Lake (6) too.” He added that there are grayling in a creek called *Tsabaey Na'* (‘Fish Creek’) (16) at 42 mile on the Tok Cutoff. The Slana River has both humpback whitefish (*luux*), and round whitefish (*xasten'*). On Fish Creek (*Tsabaey Na'*) (17), which flows into Mentasta Lake, Bell said he put in a fish trap to catch round whitefish, suckers, grayling, and humpback whitefish, all at the same time. According to Bell the same holds true for Mabel Creek (*Tacdlaxa Na'*) (18), which flows into the Slana River. Bell also reflected on whitefish found off the lower Gakona River at “Gene Lake” or *Nedzighilen Bene'* (20). This is the only reported whitefish-harvest site in between the two main Ahtna whitefish districts of the Slana River area and the Middle Fork of the Gulkana River. Bell said:

³ In addition to grayling, Tanada Creek has sockeye salmon (*luk'ae*), but there are no chinook (*luk'ece'e*) or coho (*xay luugge'*) (John 1988, Simeone and Kari 2002).

Just like my trapline country [on the upper Gakona River] I got some big whitefish too. Really fat. He stay in there all the time. He don't go no place, some time you get one, **Nedzighilen Bene'** (20). Off Gakona River. That's down mouth of creek, water make noise too much, **nedzii** 'our hearing' 'flowing', **Nedzighilen Bene'** (20).

Bell also described the kinds of fish available in the Tok River drainage at Mineral Lake (**Ben Tac'iltende**) (19), located north of Mentasta. Bell said, "About 5, 6 miles from Mentasta, right in that little creek there, grayling, and **xasten'** (round whitefish). There are lots of lingcod [burbot] too." He explained that the burbot were caught through the ice in winter. "When the ice is about two inch thick ice you can see, lingcod. Just open top and you kill it. He use his liver, he cook his liver." In the Tok River drainage there are **'ulgaadzi** or northern pike and Bell supplied the following information about pike.

Q: Did you go for pike?

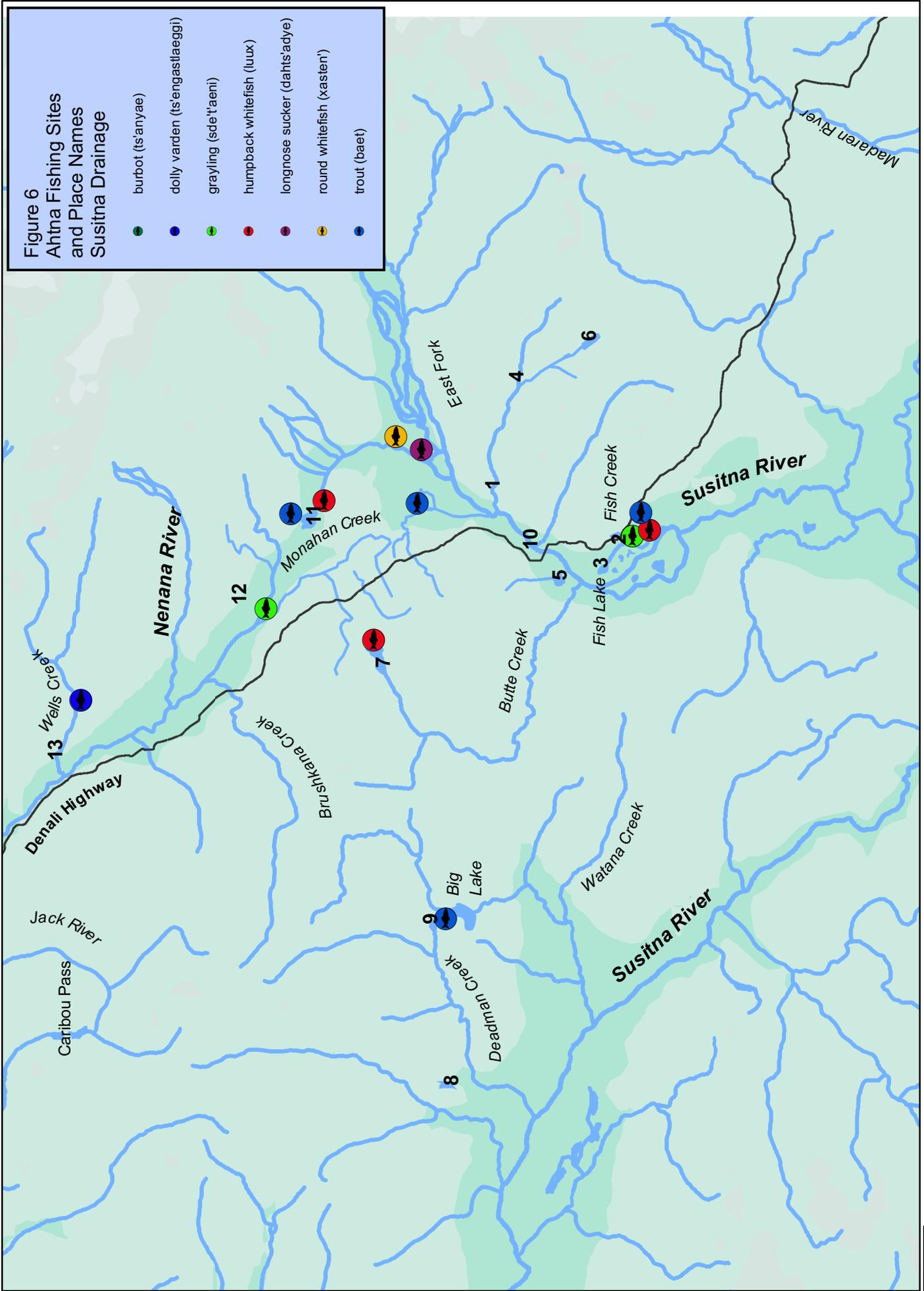
Bell: Miller Point [on Tok River] some. This side of Little Tok, one time we blast out beaver dam, me and Hector Ewan, we blast it out, water went down, just white with pike. But you can get them up in Tok River. You know. And Little Tok River (**T'aghes Yits'edinilen Na'**). Up there. Jack John, he say some pike in Pickerel Lake [in the upper Nabesna area]. That's what Jack John says. Big, he says.

Q: Did they used to dry those pike in his country?

Bell: Yeah, I think he dry, I don't know, I never asked Jack see. Used to eat it fresh though.

Upper Susitna River, Western Ahtna Territory

Jake Tansy (Ahtna Tape 127) was born and raised in the Valdez Creek (**C'ilaan Na'**) (1) area on the upper Susitna River, but moved to Cantwell in the 1940s (Figure 6, Table 5). Throughout his life Jake traveled widely in the upper Susitna drainage and his knowledge of the area is extensive. When he was a young man living at Valdez Creek he and his relatives fished for



1:500,000



Place Names Accurate to < 2 Miles
 Source: Key Informant Interviews, FIS Report 110
 Map by Davin L. Holen, Division of Subsistence, ADF&G



Table 5. Ahtna Fishing Sites and Place Names, Upper Susitna Drainage

ID	ATNA NAME	COMMON NAME	SPECIES PRESENT
1	C'ilaan Na'	Valdez Creek	
2	Xanc'eltl'aes Na'	"Fish Creek"	round and humpback whitefish
3	Xanc'eltl'aes Bene'	"Peter's Lake" or "Fish Lake"	
4	Ben Datgge' Na'	"upper lake creek"	round whitefish
5	Ben'sdełtsiini	Snodgrass Lake	round whitefish
6	Bedlaexi Bene'	Roosevelt Lake	Dolly varden and lake trout
7	Hwniidi Ben	Butte Lake	whitefish and burbot
8	Nts'ezi Bene'	Tsusena Lake	lake trout
9	Kacaagh Bene'	Deadman Lake	lake trout
10	Benhwđil'aade	lake W of Susitna R	whitefish
11	Taben'aa Bene'	lake of West Fork of Susitna R	whitefish
12	Cetakolyaes Cene'	Monahan Flat	grayling
13	Bes Ggeze Na'	Wells Creek	bullhead

humpback whitefish in *Xanc'eltl' aes Na'* or “Fish Creek,” (2) a system of sloughs that flows out of *Xanc'eltl' aes Bene'* (aka “Peter’s Lake”) (3) into the Susitna River just south of the Denali Highway near Susitna Lodge and about one mile west of Swampbuggy Lake. This was an important fishing site that archaeological evidence suggests has been used since prehistoric times (cf. Betts 1985). James Sinyon (West Tapes 1973) also described *Xanc'eltl' aes Na'* (3) as a rich fishing site located right on the flat where there were no trees or brush. According to Jake round whitefish are found on the Upper Susitna at Fish Creek, at *Ben Datgge' Na'* (‘upper lake creek’) (4), at *Xanc'eltl' aes Bene'* (“Peter’s Lake”) (3), and at *Ben'sdeltsiini* (Snodgrass Lake) (5). Jake said that some burbot were in the Susitna River as well. Dolly Varden and lake trout are found in Roosevelt Lake (*Bedlaexi Bene'*) (6). Some whitefish and burbot are found in Butte Lake (*Hwniidi Ben*), (7) but only lake trout are found in Tsusena Lake (*Nts'ezl*) (8) and Deadman Lake (*Kacaagh Bene'*) (9). There are no pike in the upper Susitna River. According to Jake whitefish are found in *Benhwdil'aade* (10), located west of the Susitna River across from Valdez Creek; and in the drainage coming from *Ben Datgge' Na'*(4); the lakes west of the West Fork of the Susitna River and opposite Valdez Creek, and *Taben'aa Bene'*(11) the large lake west of the West Fork of the Susitna River. In creeks running through Monahan Flat (*Cetakolyaes Cene'*) (12) there are only grayling. Longnose sucker are found in a slough off the West Fork of the Susitna as well as in local lakes. Bullhead, or slimy sculpin, is rare. Some are seen in Wells Creek (13), and Jake does not think there are any eels in the upper Susitna drainage.

Lower Copper River, Lower Ahtna Territory

In contrast to other regions of Ahtna territory, the Copper River below Copper Center has fewer resident species fish (Map 2). Henry and Etta Bell (2000), who live in Kenny Lake, said there are a few round whitefish in the lower Copper River and a few humpback whitefish in the Tonsina River (*Kentsii Na'*). But, they added, in the past these fish were never dried for food. In the spring, before the salmon arrived, people harvested burbot and grayling in the Tonsina River.

Wallya Hobson (West 1979) who was also born and raised in the lower Copper River area said that there were grayling in the Tonsina River drainage but she made the point that if the salmon runs failed and game populations were down people moved temporarily to Lake Louise to harvest non-salmon fish. Wallya explained:

And another thing they used to go up, when hard time, no game, nothing, salmon some times not much. Some times Indian didn't get much salmon. Some summer, everything like game gone. So people all go up Lake Louise. My Grandpa Billum used to go up to Lake Louise. He used to go up there for lake trout and lingcod. A lot of ling cod [burbot] go up there. And winter he stay in there, and [fish for] whitefish. That is how they used to survive. In springtime that start to come back down, before the snow melt. They come back here. Start fishing for salmon, springtime for grayling.

Wallya's comment highlights the importance of the non-salmon fish resources in the traditional Ahtna economy. Unlike salmon harvests, which varied from year to year, the harvest of non-salmon species was more reliable as well as being easier to harvest. Whitefish, for example, could almost always be harvested in large quantities as they migrated through small lake outlets in the spring and fall, and they could be consistently harvested in lesser quantities at other times of the year. Large quantities of grayling could also be easily harvested in the spring and fall as they migrated from lake to stream, and lake trout and burbot were available during the winter when other types of game were hard to find.

When asked about the presence of non-salmon species on the lower Copper River, Robert Marshall (2003), who was born and raised near the town of Chitina, said people used to fish for steelhead (which he called *xay luugge'*) late into the fall, until their fish wheels became clogged with ice. According to Robert there are grayling, burbot, whitefish, and rainbow trout in the Tonsina River but no steelhead. Rainbow trout are "very scarce fish" and hard to get. Suckers are not too common and in the past people did not eat them unless they had nothing else. Grayling are also available at First, Second, and Third lakes (along the road outside of Chitina), as well as streams around Chitina. Mae Marshall said when she was young grayling were caught in spring using a hook and line or a snare made out of thin snare wire. The only place to catch

lake trout is Tebay Lake, caught in the winter through the ice, and Tebay Lake (*Xay Luugge' Bene'*) also has big burbot and whitefish. Robert heard there are fish in Hanagita Lake, but he did not know what kind. There are also burbot and grayling in "Swan Lake" on the east bank of the Copper River.

Seasonal Movement and Spawning Activity

Overall, Ahtna elders' observations of the seasonal movement of whitefish are comparable to some of the current biological research on whitefish (Brown 2003) as well as to that of knowledgeable Gwich'in elders on the Yukon Flats (Andersen and Fleener 2001). The Ahtna elders interviewed for this project agreed that the whitefish migration begins in the spring and ends in the fall. They also agreed that whitefish spawn in the fall, although none of the people interviewed had observed spawning activities. Fred Ewan (Ahtna Tape 135) believes whitefish in the Crosswind Lake area spawn in lakes to the west of Crosswind Lake while Katie John (2002) says that whitefish in the Slana River Drainage spawn in the upper Slana River. Several of the elders also talked about how beaver dams hinder the migration of fish, especially whitefish.

Middle Copper River

Fred Ewan (Ahtna Tape 135) points out that fish are always available at *K'estsiik'eden* (3) (outlet at north end of Crosswind) because Crosswind Lake is connected to such a large system of lakes (see Figure 4). Regarding the seasonal movement of whitefish, Fred thinks that during the winter the fish stay in the deeper lakes (such as Crosswind) that do not freeze to the bottom and in the spring migrate upstream into upland lakes and streams. He notes that whitefish are very fat in the summer (indicating that they are feeding). In August they return to Crosswind Lake. Fred says that humpback whitefish live in lakes within a 20-mile radius around Fish Lake (*Hwghil'aa Bene'*) (22) and spawn in the lakes during the fall, though he is not certain since he has never seen the fish while spawning. But he notes that in the fall the whitefish come back and

there are “lota big eggs” meaning that the females are full of mature eggs. Fred also says there are so many fish when they migrate that they make noise moving through the water. The following passage describes this in more detail:

Q: How long were they fishing for that luux?

Fred: All winter c'a xu' t'iix. Xona March lu' 'ehwdetset you know.
/They would occur all winter. Then in March they would stop.

Hwdetset. All open, all the time open ts'e'iix si cu.
/They would cease (fishing). We would keep it (the weir) open.

Hwtsiit bakudaan, tez'aani k'ae 'udel.
/The fish pass through the openings in the weir, the fish trap cavities.

Open nt'ae all the time you know. K'estsii'i. Even in January.
/It (the water) is open all the time at K'estsii'i (outlet of Crosswind Lake) you know.

Dansedze' natedel you know.
/They [whitefish] go on out (into the uplands) you know,

K'aa yii ben yihwdze'. Ye'uughe 'uniit tatelyaesi c'a su.
/They are in the lakes. The ones out there and upstream.

Luux 'ele' xu' sde't'aeni. Luux ldu' one place k'a delts'ii 'utggu, deep lake, Ben Ges yii, Łi'ke Bene'.
/Whitefish are not like this (grayling). The whitefish stay in one place, in deep lakes, such as in Ben Ges (Deep Lake), or Dog Lake.

You know, Fish Lake, just little area. Maybe twenty-mile area he live in there.

Q: Where do whitefish spawn?

Fred: I am pretty sure 'unae' ben tah you know,
/in the upstream lakes
Fish Lake and every place there you know. There's a big area, big lakes there you know.

Xu' su k'uun' na'enlaes you know.
/They lay their eggs there.

Q: Do you see their eggs?

No I never see them laying eggs. But we don't care to see that time. Long as we got the fish, that's all we count. We don't looking for eggs. In the fall time he come back. Lota big eggs. About that big wide.⁴

⁴ Brown (2003) states that whitefish spawn in flowing freshwater during the fall. According to Douglas Fleming of Alaska Department of Fish and Game, whitefish are also ‘broadcast spawners’ and female whitefish will often jump out of the water in an attempt to loosen and spread their eggs (Fleming, personal communication 2003).

Xona ghe ye ben yiic'a I guess naynelaes fall time you know.
/So then they lay their eggs in the lakes in fall time.

Tsabaey su kalax su just nen' c'a' 'edahwdełniis ts'etnii.
/The fish swim up and in the country they make a noise, we say.

Just like thunder you know.

łteni nandeli gha yet.
/There is thunder striking right there.

So many fish in there. Just wooo you know. When he scare away you know
(that is, when something disturbs them).

When talking about fishing for burbot (*ts'anyae*), Fred (2002) said he was told that they spawn in rocky places. He also noticed that when setting out muskrat traps the burbot tried to bite the traps (meaning that they were feeding in the spring).

We fishing, I fishing ts'anyae easy, Indian way. With hook, different, we have to put bait on. Sand in there, I put **ts'anyae** bait on there with hook, I couldn't get it, why?

Some Indian told me, only rock place it is easy to get **ts'anyae**. That is where it lays its eggs, they just go around there, in rocky place. I trap for muskrat on lake shore, rocky place, at Crosswind Lake. Everytime I see big ling cod in there. He try to bite that muskrat trap. We get it with hooks where we see lots of em, snag em. With flashlight [during the night]. That's a big fish ts'anyae.

Where I got cabin, I make **hwtsiil** bridge across, that where we get it.

Frank Stickwan (Ahtna Tape 131) also describes the movement of grayling (*sde' t'aeni*), humpback whitefish (*tuux*), round whitefish (*xasten'*), and long nose suckers (*dahts'adyeh*) in the area around Crosswind Lake. According to Frank, fish generally migrate in the spring from large, deep lakes into the adjacent smaller lakes to the south and west. Grayling move in May as soon as the ice leaves (between May 1 and 20) and return in September. Humpback whitefish and sucker also migrate in the spring, after the grayling, and return to the deep lakes sometime in mid-summer. Specifically, Frank stated that in the spring grayling, sucker and some humpback whitefish migrate out of Crosswind Lake through *Kanilen Na'* (12) ('Flows Through Creek') and into Game Trial Lake where they spend the summer. In September they migrate back to

Crosswind Lake, and Frank thinks their movements in the fall are triggered by snow on the water. He also notes there are some “pretty big” humpback whitefish in that system. Other Crosswind Lake whitefish migrate to Second Hill Lake (*Xwggandi C’ezaeni Bene’*) (42) via the creek called *C’ezaeni Na’* (43). These fish seem to return to Crosswind Lake in October. According to Frank in the wintertime grayling “rest” and do not “move much.”

Frank also commented on Ewan Lake and the movement of rainbow and lake trout. He said that when he was at Ewan Lake outlet in May he would see humpback whitefish and grayling migrating in one direction and burbot migrating in the opposite direction. He also said that in February rainbow trout run through the Ewan Lake outlet but that lake trout do not run in the creeks.

He [lake trout] don’t run in the creek. He lay in the lake all the time. Rainbow trout he run in creek. Some time he get that in fish trap. He [lake trout] big like salmon. He just stay in lake all the time, he never run in creek. Smart them thing. He see something he go back to deep place.

Andy Tyone (2002) said that people used certain indicators that signaled the seasonal movement of different species of fish. For example, in the autumn, as people moved from one whitefish stream to another on the south and west sides of Crosswind Lake, they watched for signs indicating that the whitefish had started to migrate through these streams. In the following passage Andy Tyone explains that people watched the growth of grasses, foxtail and fireweed.

Those old people long time ago. They watch everything that grow out there. Grass, foxtail, fireweed. By that plant grow they know which creek to go fishing. “That creek got fishing now,” they say. Good fish there. They usually go there. Leaves turn yellow, that creek got good fish now. They start running. That’s the last one from Crosswind Lake, **Niygge. Niygge du’** (lake located NE of Tyone Lake) when leaves all go down they go up there. They know which one got fish.

Upper Copper River

In an interview recorded in 2000, Katie John provided some general comments about the seasonal movement and spawning of whitefish in the upper Copper River. She stated that when a lake has an outlet stream that goes into a river, whitefish move into the river during the summer. However, if there is no river whitefish follow creeks leading into lakes. Whitefish follow streams and might spawn in the stream if a river is unavailable. Katie (Ahtna Tape 120) also indicated that whitefish were feeding heavily in June. In May the fish were “poor, not good to keep” but in June they were getting fat. Katie noted that the “best time for *tsabaey*” (whitefish) was “pretty near last of June into up to July. That time fish get fat and got eggs same time.”

In the Slana River drainage, Katie said that whitefish leave Mentasta Lake in May and go down Mentasta Creek into the Slana River. They continue to migrate until the middle of June, spending the summer in small lakes and side streams. Then in October they move out of the lakes and head to the upper Slana River where they spawn.

Katie: Daan'tah tsabaey na'aay' kalax.

/In springtime they [whitefish] swim down during “fish month” [May].

T'ae' lk'aax, Ines.

/They are really fat and tasty.

Q: Which way are they going then?

Katie: They are going down the creek then. End of May until middle of June.

When we stay at old village [at the lake outlet], all summer from May all the way down to October we get whitefish. October he start to grow and laying eggs, then he head to Slana River. That's where he spawn, up the Slana River. That's why October he all fishing at Slana River at night, nighttime. From this way they have a road all the way through. Where old bridge cross that one wash out but right there, they always fishing.

Q: Which way are they going when they spawn?

They are going up, they always going up, up to upper Slana River. He come from creek and lake and going down creek and up the Slana.

Katie explained that as the whitefish migrate the males come first followed by the females. Humpback whitefish are followed by *xasten'* (round whitefish), and according to Katie they eat the humpback whitefish's eggs (cf. McPhail and Lindsey 1970:113 on the feeding habits of round whitefish). Whitefish begin to spawn in November, when the ice starts to form.⁵ In the following passage Katie explains that she does not know whether whitefish go into the Copper River, she just knows the 'story' about when they spawn.

We know when they gonna start spawn you know. When they got eggs inside coming, when she going [to spawn], we know those other fish coming behind. Then we get no more, *xasten'* (round whitefish). We call. They eat their eggs. That's the last, he follow those eggs. [Round whitefish eats the humpback whitefish's eggs.] Then first start male. We just catch male all the time then after [the females] start [developing] eggs, then after that *xasten'* [round whitefish] stop. So we know that's the end of it.

Regarding the spawning of whitefish Katie says:

He go up. From this [Mentasta] lake he go down the creek, and then he head to Slana River, he go up Slana River. And that where we fish in wintertime [fall time]. We never see in daytime though. Just only night time. They use lamp light, and they catch it...When the ice start moving, and the water got first ice you know. That's the time he start to spawn.

Summertime when [s]he start having eggs, the female is kinda poor and we get the male. When we take it out, we know which one male, so take that and throw back them female. That's kinda poor when [s]he got the eggs.

Q: They spawn many times, they don't die?

Yeah salmon does that [dies], but not whitefish. Whitefish got eggs every year.

⁵ Biologists have also noted that whitefish spawn in very cold water.

Katie John (2002) also thinks that whitefish (*luux*) prefer to over winter in lakes with algae and muck on the bottom:

Mentasta Lake you don't see sand around. But just only halfway this way. They got some rock and sand around and other way nothing. Banaznaeta (Tanada) Lake all just like a river along side, all sand and rock and no whitefish there that kind of lake. And Jack Lake same way. And this one from Fish Creek one side. But we still got no whitefish. And I think about where there is no sand in the water I think that is only place where he can be. Where there is **tahtlok** [mucky algae], anything **neyaexi**, **yii tah** [that is growing in there] maybe he got food there.

According to Katie whitefish hibernate in Mentasta Lake by burying themselves in the mud/slime (*tahtlok*) at the bottom of the lake. The fish hibernate for one month. Katie said that the month of March is known as *Unen Tic'elaxa* [Lit. 'month they swim out'] referring to the fact fish have ended their "hibernation." The month of May is known among all Ahtna as *Tsabaey Na'aaye'* [lit. 'fish month'] "you know all the fish come out and spawn, fish come out of every little creek." She also notes that the reason there are no whitefish in Tanada Lake is because of the population of lake trout that would eat the whitefish. She also points to the wide distribution of grayling, which are found almost everywhere.

You know tsabaey men yii tsabaey delts'ii naxu nilk'eze ghaltsiit dze'
/The fish that stay in [Mentasta Lake], are of different varieties.

Tsabaey segele, ts'aann, di'e tsabaey men yii delts'ii ninatdax.
/Whitefish, grayling, lingcod are the fish that stay in the lake. They hibernate.

Just like bear went in [den] in the fall. Just like that.

Tuu yii den
/in the water is a den there

I don't know nts'e keyuzii tahtlok naene ts'ene.
/How do they call it, we say algae/slime [on lake bottom]

Like ground kind of slimy kinda color, we call tahtlok.

Yii xuyt'aax tah ninatdax.
/They [the fish] stay in there.

And for one month he do that. That's the one he used to call **unen tic'elaxa**.

I couldn't find which one they talk about, February or March.

Unen tic'elaxa and all fish keep still, no more moving for one month.
'Month they swim out'

They just stay there, just like bear go in a hole. They stay still. Like in cold weather. In Mentasta Lake. Same for Tanada Lake. Tanada Lake don't have **tsabaey** [whitefish].

Q: Why not?

Baet [lake trout in there]. Lake with **baet** in there the whitefish can't stay in there. Probably they eat em.

Q: Any other lakes with whitefish?

No. **Segele** [grayling], every lake he use it.

Upper Susitna River

Jake Tansy (Ahtna Tape 127) has provided some fine grained descriptions of whitefish behavior in the Ahtna language. He notes that both round and humpback whitefish are found in brackish water, which is an observation also made by fisheries biologists (Brown 2003:7). In **Ben'sdeltsiini**, Snodgrass Lake, in the upper Susitna drainage, for example, whitefish swim into the willows at the edge of the lake. When the fish strike their tails against the willows they turn around and head down stream. Jake's comment may indicate that the whitefish are looking for a place to spawn, and striking their tails against the willows is a signal to the whitefish that they have reached the upper limit of their spawning area.

Tandzaeye' dae' Ben'sdeltsiini k'ay' itneft'os uyindez'aa kut'ae tanatelax 'et
'At an island at Ben'sdeltsiini [Snodgrass Lake], thick patches of willows extend into it, and they (whitefish) swim among them (willows) there.

Yeł 'utgga deyiilax xu 'utgge 'eli' dadestlaxe xwna
'They swim up there and when they can't swim up above there,

backwards going down yede naodeli c'a backwards going down again.
'they turn back there and go back down again.

Yede yet c'a k'ay' delzaghi yii decela' ikay du'xu c'a duugh itat'ax xu'et xu yaen' nidax.
'There when they go into the thick willows, they strike their tails and stop there among them.

Down backwards going down that's all yet de tez'aani yiit yitayłdiil.
/As they (the whitefish) are going back downstream, that is the only time that they put the fish trap into the water.

In the following section Jake Tansy (Ahtna Tape 127) describes the movement and behavior of whitefish in various situations. According to Jake whitefish do not go in a downstream direction when there is too much current. They can “float” only when their head is facing into the current. A fish facing downstream has less control over the water flowing through its gills and can drown.

Diniłeni c'edaa'a li'i tiye łosdele.
/They do not go in a downstream direction when there is too much current.

Dae' tanaa cu utse', utse' tanaz'aan dze' yaene' natayteyes.
/With his head against the current, [facing upstream] that is the only way that it can float.

Ucela' tle dae' dae' c'a xona yehwk'e dadaa'a ts'e' fast going down too.
/His tail (it flips) and goes down stream fast.

Dae' tuu k'e daa' tsighel'aan de' li gaa duughe du' duughe open nt'ae,
/Thus on the water if the (fish's) head is downstream, it is open.

Duu xuhwts'en ts'es tuu k'e daa' tsighel'aan de li'i ugheldze' sts'ese 'udetnii.
/On that side in the water he is breathing, but if the head is downstream it cannot breathe well, it is said.

Yet tanaa gaa unannitnighilen dze' yaen' ugheldze' ts'es
/There when the current is flowing against them can they breath well.

K'adii spring time tanaa talet tadeł,
/Now in springtime they will go against the current of the melting water.

In the fall go back to the ts'itu' ts'inatedełde.
/In the fall time they come back out to the main river.

Cit'aadze'xu c'a natayteyes.
/Then they are moving as a group (i.e. in a school) the opposite way.

Dae' su t'iix.
/That is what they do.

Diigha tez'aani yidełi c'a cit'aa'a dze' su dataydiłdeł.
/That is why as they go into the fish trap, they are moving the opposite way.

Hwdahdułdiłdeł su hwnihwdeltiix.
/They are passing going down at this time.

Dae' from there ain't no place to breath you know. (As they swim down stream).

Yet tanaa duughe unitnighilen dze' yaene' ugheldze' ts'es udetnii.
/There as the current strikes it, only then can it breathe well, it is said.

Daa'adze' su hwdatadiideł datggedze' uts'e'e lutnghezdlaa.
/As they move from downstream from above, they congregate.

C'a c'edahwdestnes, cu fast going back you know.
/There is a sound as they are going down fast.

Ye c'a k'edze' c'a tiye xantaeye natayteldiif.
/As they are going back they move really fast.

K'adii gha tez'aani tikezdlaa xu not water around just like a ben c'a su ndeł a xunt'ae.
/Now when they put the fish traps in water, there is no strong current flowing, it is like a lake.

That level kut'aedze' tehwdiset xu nilts'endeł'aa tay'ne'aa.
/If the level is deep, and it is flowing evenly (both sides).

[Xanc'eltl'aes Na'] Fish Creek tehwdi'aa.
/Fish Creek has still water.

Not water running fast you know. Just like a lake you know.

Natsiit yet Jack River gaa fish bunch of fish that lake all everything tanaa yaen' didalzs'et.
/Down below at Jack River here a school of fish will be gathered against the current.

C'a yu' c'enghil'aen. Tanaa dae' ninet'ots xut'aex. They can't ts'itu' k'edaa'a dults'e'i.
/You can see that. Against the current, they are all bunched up. They can't stay down on the main river.

Influence of Beaver Dams on the Seasonal Movement of Fish

All the elders agreed that beaver dams obstruct the seasonal movement of fish. In the following segment Fred Ewan discusses how Ahtna managed beaver and whitefish. According to Fred, Ahtna opened beaver dams in the fall when there was a chance that fish would be trapped in shallow lakes behind the dams and freeze to death. When a dam was found that blocked the fish

they opened the dam just enough to let the fish escape. When the beaver came around to repair the break the Ahtna chased the beaver away until the fish had escaped. Fred had never seen fish that had frozen to death behind a beaver dam because when the dam was opened the fish knew they had to escape. In very cold weather the beaver moved out of the lakes and into neighboring creeks. Fred pointed out that they managed the situation to benefit both the beaver and the whitefish and to make certain both survived. He remembered that hunters would break open beaver dams in the fall at Crosswind Lake and Horseshoe Lake (44) (Figure 4). Beaver dams were not opened in the spring; instead the Ahtna relied on high water to wash fish over the dam.

Q: How about beaver dams? Did the Natives take care of beaver dams?

Yeah, Di'sghalaes cu ts'e'l'iis, di'sghalyaa xu, fish de idahwdełtsiis dze'
/We open them up. We keep them open, they (beaver) can block off the fish.

Little lake yii all freeze to death you know. Not much deep lake he (fish) freeze to death.

In the lake 'ele' ubene' i'ghilae, he know that.
/It (beaver) does not (stay) in the lakes, [beaver prefer the creeks in cold weather]

Q: Where did they do that [open up the beaver dams]?

Crosswind Lake and this side, Horseshoe Lake, this side three miles, I got cabin there too.

Dats'ii c'a yet hwnax l'aan. Lotsa [muskrats] rats there. Dzen dzaxdze' c'ilaen.
Nek'eyl'aay Bene' ('birch extends around lake').
/I still have a house there. There are lots of muskrats, [at] 'birch extends around lake.'

Nek'eyl'aay Lota birch tree you know.
/'Birch extends around lake'

Q: You see the beaver cut off the creek and block the fish?

Oh yea.

Q: So what did they try to do?

They [beaver] make a dam you know. Not fall time, [we] give em time, pull it out of there and give it time. You don't want to kill beaver.

Den ldu' titnaxdze ldu' fish na'udełde ldu' we close it [the dam] back up.
/When they (beaver) tire [we open the dam], then the fish pass by, then we close them back up.

Just little bit. Ites deldel t'et'aen you know.
/They pass over it.

Q: When would they like to do that?

About first of September cu sday'tiis you know, beaver du'.
/they close it off, the beavers [block streams with dams]. Beaver builds his dam in September.

Beaver du', yet su sday'tiis. A lot of work. Big contract. Take them two months I guess.
/Beavers build the dams.

Building a dam. He looking for good place you know.

Ugheli kulaen de yaen' 'uka lutsitelyaes.
/He goes around looking for a good place.

Q: When would the Natives pull out the dam?

In the fall, fish na'udlaexi gha su cu.
/In the fall when the fish pass by.

Beyond there they don't care, spring time water washing out. You know.

Fall time, give it chance, maybe little bit, maybe six inches deep you open. Just enough for fish to go by.

Fish go by fast. We keep on watching them. T'ae' ts'en'iix
/we keep watching it

Beaver don't work, we chase em away.

We camp, you know how Indian is, we camp any place. Just keep on watching. Maybe we camp maybe four five days. We pick berries and eat fish. Then we let it go and move away. Next time we see everything closed up (by the beavers).

Water never go down, just average. Just make a hole you know. So he (beaver) don't have trouble. We can't freeze the beaver.

So we try to take care of everything. We try to take care.

My daddy you know, moose, he kill moose.

That's all one at a time. One we get. If I try to get another one he say "you don't need it."

Yedi gha da? That's enough one.
/What for?

Q: Have you ever see dead fish, frozen up behind beaver dams?

No I never see that. He [the fish] knows he have to go back into deep water. When we open, he knows. Pretty fast you know, he comes out night and day.

Fred does not recall that floods or high water ever caused problems at Crosswind Lake. The upper outlet never froze, according to Fred, and fish could go back and forth all winter. Fred said that nothing ever interfered with fishing, but if they did have trouble they could harvest fish from other lakes, such as “Three Mile Lake” (located east of Ewan Lake). They could either build a weir or open up a beaver dam to create a sluice or shoot (*uk'e day'stlaexi*) so that fish behind the dam are caught in the rush of water and flushed down stream. This was done in the fall.

Shallow water, and sometimes the lack of water, could also prevent fish from migrating. Frank Stickwan (Ahtna Tape 131) described how in the spring of 1924 he was hunting muskrats and saw that *Kanilen Na'* '(12) Flow Through Creek' had no water and the fish had died (Figure 4). Frank also said that beaver dams also blocked streams causing fish to be trapped in shallow lakes where they froze. Beaver also stopped the flow of water in creeks so that fish could not move. If people needed fish to eat they chopped a hole in the beaver dam to let the fish escape. On most occasions they let rising water flowing over the dam wash the fish into the creek. Smaller fish are more apt to be stopped by beaver dams.

According to Katie John (2002), beaver dams in the vicinity of Mentasta Lake have, in recent years, obstructed the movement of fish and caused problems with erosion. Katie had the following to say about beaver and beaver dams:

That's what he did Mentasta Creek now. But [the dams have] all wash out. And beaver ruin it all that river. Mentasta Creek outlet. He make bridge [dam] and that water coming and tear all this side. And wash away. I don't know now how he doing that. And Fish Creek too he dam it up, up there. We got one beaver dam down by lake.

On the lower Copper River beaver dams have also obstructed the movement of fish. According to Robert Marshall (2003) grayling and sockeye used to migrate through Town Lake in the town of Chitina into First, Second and Third lakes. Robert said

In 1930-33-34 there was a lot of fish come up there, lots of grayling fish, even fish, **luk'ae** [sockeye salmon] comes up into them lakes in the fall. They got, beaver dammed it off further down, entrance of that lake. Beaver dammed it off and nobody has opened it up. Only time fish can come through is when the water's high, when the waters running over the dam. They jump over that dam. But when the waters low there's no more fish come up. Mostly Chitina now, mostly them fish in Chitina now is all planted fish. No more fish comes up through the river, nothing. All that fish they catching down there now, Fish and Game plant them fish back every year. They plant so many fish, that's all. Them people that moved in blocked all that creek off, and Fish and Game they didn't bother with no more. All they did was just dumped about, a whole bunch of fish in each lake every year.

Whitefish Diet

Elders provided information on whitefish diet based on their observations of stomach contents of harvested fish. Most of those interviewed consider whitefish stomachs the best part of the fish and they are frequently fried and eaten. Carl Charles (2002) of Dot Lake said they.... "eat them snails and water beetles. You open their stomach up they have snails and stuff like that." Fred Ewan (Ahtna Tape 135) noted that grayling and whitefish must eat different things because you do not have to wash out a whitefish stomach before cooking it, but you have to clean out the stomach of a grayling.⁶

Fred: Grayling you have to do it [wash the insides]. He [grayling] eat dirty stuff. Not dirty stuff but grass and things. But whitefish I don't know what he eat. Water he got. He eats some kinda food in the water.

Clean as can be, you don't have to clean it. Maybe grass in there or something. We fry up the guts for grease. We take the guts out first. That stomach in there.

⁶ When whitefish are spawning their stomachs are empty because they do not eat.

Katie John (2002) says that whitefish, like grayling, eat bugs that land on the water, and leeches.⁷

I think where [there is] beaver dam, I think it's where they run. Where there are bug, everything. Get there, fall in the water. They go close to beaver dam in the summertime. Just like grayling. They catch butterfly, anything that get in the water.

And they got lot a little water snake [leech] underwater. Little live one. They eat all those things. But **luk'ae** [sockeye salmon] I don't know what he eat. He eat something.

Summary

This chapter has provided basic information on the distribution, seasonal movement, and spawning activity of non-salmon species found in their particular home territories. Historically humpback whitefish and Arctic grayling were the two most important non-salmon species for the Central, Western, and Upper Ahtna. Quantities of humpback whitefish were harvested during the summer and fall using dip nets and basket traps. Whitefish were singularly important because they could be harvested throughout much of the year, were very nutritious, and could be easily stored. Grayling, while abundant, were widely disbursed during the summer and could only be harvested in quantity for a few days in the fall. Humpback whitefish are not evenly distributed throughout the Copper Basin. On the lower Copper River these fish are scarce so the Lower Ahtna made use of the substantial populations of steelhead, in addition to grayling. To a lesser extent the Ahtna also harvested Dolly Varden, rainbow trout, lake trout, longnose sucker, burbot and round whitefish. The only fish not eaten were bullhead or slimy sculpin. According to Ahtna oral tradition least cisco were once available in Mentasta Lake.

The heaviest concentration of non-salmon species fishing sites was in the territory of the Central

⁷ According to McPhail and Lindsey (1970:84) whitefish are bottom feeders that eat mollusks and larval insects while grayling are generalists and eat just about anything. However, some whitefish are not bottom feeders but do eat pelagic and surface foods.

Ahtna. The most productive of these sites were located at Crosswind Lake, Ewan Lake, Lake Louise and Tyone Lake. While several species of non-salmon fish could be harvested at these sites, they were best known for the quantities of humpback whitefish that which could be harvested from June until December. Lake Louise was so widely known for its abundance of resident species fish that even Ahtna from the lower Copper River went there to fish if the salmon runs in the Copper River failed. Compared to salmon harvest sites along the Copper River, which had to be frequently moved because of erosion, these lake fishing sites were stable and used over many generations. In the upper Susitna drainage there were 74 harvest sites used for the harvest of non-salmon species and 12 of these were used exclusively for harvesting whitefish. In upper Ahtna Territory there were a total of 55 sites that were used to harvest only non-salmon fish species. The only place in the Copper Basin where salmon and humpback whitefish could be harvested at the same time was in the territory of the Upper Ahtna, at Mentasta Lake. It is notable that most harvest sites for non-salmon species have probably been used continuously by the Ahtna for hundreds years (if not a thousand years) (Irving 1957) without a depletion of the runs.

When talking about non-salmon species Ahtna elders confined their most detailed remarks to their own home ranges or territories. This focus on home territories is common to many indigenous peoples (cf. Acheson and Wilson 1996: 581-582), and as we described in our report on salmon, territoriality was an important part of the traditional Ahtna management system (Simeone and Kari 2002 38-43, see also Reckord 1983b:76-77). By monitoring access to the most productive areas within their home ranges the Ahtna could regulate competition and manage the local harvest for their specific benefit. But home ranges also provided another advantage. By utilizing certain areas over many generations the Ahtna gained a comprehensive and intimate knowledge of a place and the animals and fish associated with that place. They learned in detail what resources were present and when they would be available and they developed a chronological knowledge that enabled them to effectively gauge changes in the status of land and resources.

Ahtna elders have very detailed knowledge about many facets of resident species life histories. They all agreed that whitefish and grayling migrate in the spring and fall, and over-wintered in

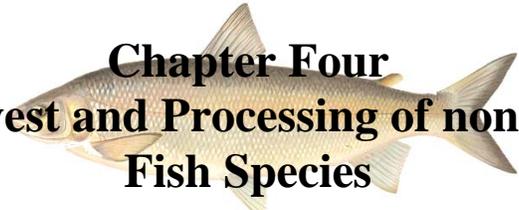
deep lakes. Katie John (2002) thinks that grayling, whitefish, and burbot over winter in Mentasta Lake which has a mucky on the bottom and that the fish bury themselves in the muck. Both Katie and Frank Stickwan observed that during the winter fish tend to be still and not move. Katie made the analogy to bears hibernating. Fisheries biologists know that whitefish probably spend most of the winter in deep water, but they are uncertain why or what they do there (Brown 2003). They have observed that whitefish in the Arctic fast during the winter and feed in the summer (Schmidt et al. 1989) and this fits with the elders observations that whitefish are thin in the spring and fatten up through the summer. There is no evidence that supports or contradicts Katie's view that fish bury themselves in the muck.

Elders said that the movement of whitefish and grayling was keyed to certain indicators. Lake ice conditions heralded the movement of fish in the spring while fall movements were keyed to changes in plants and snow falling on open water. Little is known about how temperature effects the movement of whitefish, but the elder's comments do indicate that changes in water temperature may have an effect on the movement of fish. The Ahtna also monitored other indicators that provided information on when to start and stop fishing. For example, Ahtna elders reported that they monitored the reproductive condition of the fish and their fat content in order to decide when to fish. In late spring and early summer both male and female whitefish were harvested but as the season progressed, and the female whitefish got closer to spawning the Ahtna selected male whitefish over female whitefish, which were considered too poor to keep. The observation that the females decline just prior to spawning agrees with the observations made by fisheries biologists.

The elders' observations that whitefish spawn in the fall and grayling in the spring also agree with those made by fisheries biologists (Brown 2003:7). However the elders did note differences in where whitefish spawned. Fred Ewan, who is familiar with the Crosswind Lake area, thought whitefish spawned in lakes while Katie John, who is from the upper Copper River, said that whitefish spawn in the upper Slana River or in small side streams. Katie's observations are in line with those of fisheries biologists that whitefish spawn in flowing water (Ibid.). Elders noted that their knowledge of the whitefish's diet is based largely on their observations of the stomach

contents of harvested fish, which means when fish are feeding in the summer. They said that whitefish eat snails, water beetles (or bugs that land on the water) and leeches.

Additionally, all the elders said that beaver dams could obstruct the movement of whitefish. To mitigate the obstruction, and to harvest fish, the Ahtna breached dams during the fall. The breach was just large enough to let the fish escape, but not drain the pond of water. The strategy was to protect both the beaver and the fish. In the spring Ahtna relied on high water to wash the fish over the dam. Two of the elders interviewed thought that the number of beaver dams today was at historically high levels. Frank Stickwan noted that beaver had dammed up Salmonberry and Moose creeks and Katie John noted that beaver had obstructed the movement of fish in the Slana River drainage. Their observations are in line with those of many other Ahtna who say that because so few people trap beaver there are many more beaver dams.



Chapter Four **The Harvest and Processing of non-Salmon** **Fish Species**

This chapter covers Ahtna harvest technology and processing methods of resident species fish. As noted in the introduction to this report, non-salmon fish played a much more significant role in the Ahtna culture and economy before 1950 than they do today. Following World War II many Ahtna settled permanently in communities along the highway system and stopped following the old seasonal patterns which took them to lakes and streams where they could harvest non-salmon species. As a result the Ahtna no longer use many of the harvesting devices, or methods of processing described in this chapter. Today most Ahtna who fish for non-salmon species use a rod and reel, though some still use a spear to harvest whitefish in the fall. The various devices for harvesting fish used by Ahtna are summarized in Table 6.

Historically, the Ahtna used several different methods to harvest non-salmon fish, depending on the species. Whitefish, grayling, and rainbow trout, for example, migrate in streams so could be caught using weirs in combination with traps, dip nets, or gill nets (Table 6). They could also be harvested with a spear. Lake trout, on the other hand, stay in deep lakes and could only be caught using a hook and line. Burbot were most easily harvested in the winter using a jig through lake ice. Most resident species were not processed for long-term storage but rather were eaten fresh; the exceptions included whitefish and grayling. In traditional Ahtna culture humpback whitefish were singularly important because they can be harvested throughout much of the year, are very nutritious, and are available in considerable numbers (McPhail and Lindsey 1970:84). During warm weather whitefish were dried and smoked or fermented in underground caches while in the fall they were frozen in large numbers. Grayling were occasionally dried, but most people thought they were too small to store well. Burbot were caught only for the oil content of the livers.

Table 6. Selected Ahtna Terms Mentioned in the Text

<u>Ahtna Term</u>	<u>Harvest Technology</u>
hwtsiit k'edze (M)	fish fence, perpendicular weir; bridge across stream angled weir or chute with platforms for dipnetting whitefish (as on Tanana R, only used as such in Mentasta area).
'es k'ae 'es (M) tsabaey ciise' (CLW)	whitefish dipnet location, weir and full platform) whitefish dip net
dudaay, dunax, dinax	barbed fish spear, multi-purpose spear fish spear with detachable head
tsabaey ggaat xay	fish snare spruce root used to make snares, lines, twine
uk'e da'sdlaexi ts'es kae nakultsiin	box trap used to catch grayling, suckers rock dam
ges (CLW) lox (M), nigets'i uyii c'ehwtantez'aayi gets' (W)	hook safety pin hook
saxi	gaff hook; also fish pew
	<u>Processing Technology</u>
k'ey ts'aac -k'ae i it'aasi k'ae	birch bark container for storing fish pit for holding fish rock fish bin (for various fish that are harvested and stored or eaten fresh)
	<u>Foods</u>
tsabaey ba' tsilalkay, nildzendalneni luux dzenax chaltaan luux ten, tsabaey ten nen' ten luugge' luux bet' luux k'uune' luux ghe', tsabaey ghe'	dried whitefish summer cut used for preparing whitefish fermented whitefish fermented whitefish with eggs left in belly (UT term) frozen whitefish frozen whitefish in fall time whitefish bellies whitefish roe whitefish grease

Fish Weirs, Basket Traps and Dip Nets

Of the resident species available in Ahtna territory, humpback or lake whitefish were the most important to the traditional economy. As is true today, they were available in large quantities and very nutritious with high oil content. In the spring and fall Ahtna harvested whitefish using a weir with either a conical basket trap or dip net.

Fishing for Whitefish at Crosswind Lake, Central Ahtna Territory

In the excerpts below Fred Ewan (Ahtna Tape 135) and Frank Stickwan (2002) discuss the construction and use of fish weirs and traps. They talk about the use of these devices in relation to monitoring the harvest and minimizing waste. Traps were carefully monitored and left in the water until full. After taking 300 or 400 fish, people either stopped fishing or reduced their effort, because they did not want to catch too many fish. Frank says that traps were built and beaver dams breached so that big fish were trapped and little fish could escape. Frank points out that the intent was to harvest only big fish which, he says, is the reason “why the lake is full of fish every year. Not today, there is nothing left in there.” Limiting the harvest to the number of fish that can be efficiently processed is part of the traditional management system that includes an imperative not to waste (Simeone and Kari 2002:48).

Fred describes the use of a fish weir in the outlet at the north end of Crosswind Lake. He explains that when whitefish left the lake in the spring, they were caught using a dip net or held in a weir, but in August, as the fish migrate back into the lake, they were harvested with a weir and basket traps. Fred notes that if they wanted to harvest lots of whitefish they set three traps into the weir. Weir construction began by placing a line of upright stakes across the creek. Tied to the stakes was wooden grating, and behind the grating, on the upstream side, were placed bundles of brush that stopped the fish from working their way underneath and through the weir. Several heavy logs were placed across the top of the stakes to form a bridge and to hold down the fish traps. Fishermen could walk on the logs and look into the traps from above.

Saen de łdu' dan'edze' xu natedlax,
/In summer they swim back upstream.

Daan'de. 'adii daan'de
/In spring, just as it is spring, [they swim up].

Du' kalax dze' yeldu' dipnet kae. We get what we want you know
/As they swim up we get them with a dipnet.

Yełdu' go thru ts'e łaes.
/They just pass through.

Saen de August kanats'edełde gaa duugh hwts'en łuk'ae gha ts'aatnaax de.
/In summer in August when we go back up from this side [Gulkana side], after working on salmon.

Yihwts'en tah 'utggu, hunt gha na'stedelde nanas'ghiltsiis K'estsii'i you know.
/At that time when we start to hunt again, we put the weir across again at 'outlet.'

'Udii c'a su cu hwtsiit nani'aa. Yi t'aax łdu' c'aeli nina'sdetsiy dze'.
/Always there is a weir extending across. We put the vertical stakes within it.

C'aeli nindez'aa xu' naane' yii t'aax łdu' te'sdlaesi.
/The vertical stakes stick in there. Across and beneath is the weir grating.

You know t'aan' dighaeli 'el tuu t'aa tina'sdelaes yaen'
/Then we put in bundled brush in the water in back.

Tsabaey tez'aane' we call it.
/That is a whitefish trap.

Yeah yii łdu' taak'e ut'aa tits'el'aax 'unaane'
/We would put three [traps] in it in the water across there.

If we want lotsa that (fish), taak'e ut'aa tits'el'aax.
/we put three (traps) in the water behind it.

You know saen de 'unsoghe natedełde really fat.
/You know in summer when they run out away (from the lakes) they are really fat.

Just like ba', łuk'e ba' ts'eghaani k'e du' ts'el'iis.
/We make them like ba' (flat dried fish), that is how we fix them.

All greasy you know.

Yełdu' xona through ts'el'iisi 'el [FE: ba k'ets'elnes] maybe how many 300-400 c'a su
ts'uniił.
/When we are finished with it, we might have 300 or 400 whitefish.

Yełdu' xona just one tez'aani that's all we use.
/Then we might use just one fish trap.

K'adii ldu' plug up nats'eliis [udahts'ehwdehtsiis]. We don't want too many you know.
/Then we would just plug it up.

Frank Stickwan (2002) emphasized that people caught just enough fish for their own use and he described how fish traps were built so that small fish could escape and only the large fish would be caught

Them little fish, they just go. And that way, make a little hole like that (in beaver dam). All the way around in there, and the little fish go out. Just big grayling is all they get. That's the way they fish. Fish trap they make a long time ago. They don't want to kill the little one, about that big around in there, so that fish (the smaller fish) go out, just the little fish. Water go right out of the fish trap. That brush all over like that trap. Just the big one. The little ones go out. We never kill them little one. Some people that's all they get. They kill them little fish. No, long time ago they don't do like that, them Native. That's why the lake is full of fish every year. Not today, there is nothing left in there.

Whitefish Weir at Tyone Lake, Western Ahtna Territory

According to Ahtna elder Jimmy Secondchief (Irving 1957:39), who lived at Tyone Lake up until the mid 1940s, the annual cycle at Tyone Lake was divided into two phases, depending upon the availability of fish. From midsummer through December, the principal activity was fishing. People gathered at locations suitable for using "V" shaped weirs and basket traps. They fished until midwinter, when shallow places in the lake would freeze to the bottom so that fishing would no longer be productive.

Reckord (1983a:33-34) describes two very large fish traps at Tyone Lake:

....perhaps 8 by 4 by 2 feet--set facing in opposite directions at a narrow stream-like place between two main bodies of water. As fish swam back and forth, they eventually were caught in one of the traps. Lingcod, grayling, lake trout and whitefish caught in this manner were dried in the summer and frozen in the fall. One informant estimated that a cube of fish 8 feet on each side was taken each year at Tyone Lake, and it provided much of the food for the Tyone Lake village located near this fish trap.

Fishing for Whitefish in the Upper Susitna River Drainage, Western Ahtna Territory

In the following passage Jake Tansy (Ahtna Tape 127) describes in masterful detail a fish weir in a small creek (*Xanc'eltl'aes Na'*) that flows into the upper Susitna River south of the Denali Highway near Susitna Lodge and west of Swampbuggy Lake. This was a short whitefish migration that occurred in early July and only for few days. What Jake describes is a smaller, and less elaborate (and possibly more temporary) weir than those described by Fred Ewan or Katie John. Although the device was not described in detail it was probably a typical basket trap with a reverse cone opening constructed of young willow with the ends burnt to harden them. The trap was placed over reflector sticks ('hewed green spruce') laid on the bottom of the stream. A log was laid on top of the trap to hold it in place and small spruce trees were pushed or pounded into the bottom of the creek on either side of the trap to form a fence. The fish ran during the night and as they approached the trap, 'something black' passed over the reflector sticks. Once the trap was filled it was pulled and the fish spilled into a crib made of green logs set up on the shore. As the trap was pushed back into the water the fish became agitated and swam upstream away from the trap. Jake said they fished throughout most of the night, catching 200 fish. In the morning they would make dry fish and then sleep. This brief run of whitefish was vital to the Ahtna living at Valdez Creek because it was the one annual opportunity to harvest a quantity of fish.

Saentah c'a xona tez'aani kae whitefish kekel'iix.
/In summer they would fish with fish traps for whitefish.

K'adii nez'ae K'a' K'ae you know yet hwghatsii ben deltaan.
Yet c'a my uncle Peter, yen fish camp kughil'aen'.
/Then our uncle had a fish camp at the lake that sits below "hunting blind"
(mountain north of the Denali Highway).

That is where my uncle Peter had a fish camp.

He's Peter, he's my uncle biy'ae sii sk'e'uniset dghit'ae.
/My uncle's son [Carl Peters] and I were the same age.

Yen 'el' uncle 'el' na'stedel. 'udaa' lu' tez'aani. C'ena' lu' about three feet c'a su
ts'inaane kudighiset.
/We would go there with him, with my uncle down to the fish trap. The creek
there was about three feet across.
Jake describes the fish trap and weir.

'Uygguh tetl'aagha delaeni uk'e k'e'i'ilkayi yii tez'aani yii tetl'aa ni'sdетиis.
/Down below on the bottom we put the fish trap on the bottom over the hewn green spruce.

Yii k'et 'unaane tcen nadini'aayi.
/Upon this a log went across.

Ts'abaeli ggaay hwtsicdze' t'ae' letnelt'ots.
/Small spruce were jammed across (partially blocking the stream).

Duhwk'e duhwk'e duu unu' hwdehcaax xu c'a xona.
/The spaces (between the spruce) were about this far apart (about 1"-2").

'Unaane lke lketsinitsaet den.
/He pounded these (stakes) in across the stream.

Gaa xona gaa tabaaghe utl'aa 'et delaeni duu tabaaghe nae' dini'aa.
/Here on the rear shore (of the stream) a green tree extended in the upstream direction.

Yii k'et, yii ghae ik'eghidaetl' xu tez'aani lu ik'eze duu sughitcaax.
/On this he put down in there (logs) along side the fish trap that were about this long (6 or 7 feet).

Yii 'utggu tetl'aa gge' dae' binaltset dze' ya dadaasts'en ba hwnintsi'neltsaet.
/These were put above the bottom there, and this was pounded in on the downstream side (to form a log bin)

Yii det'aa igge' 'eli ic'a' uts'itays'aage.
/The fish would not be able to get out from beneath this (log wall).

Yel'u' yii c'a t'el'aeni yii k'edyak yak'a kiigha tsitel'aax cu dae' tkil'iis
/When they had this in place here, they would keep waiting there, with it fixed like that

Naxelnilggot.
/It got dark.

'Uygguh tet l'aa 'et dghelkayi naxdini'aayi yii kae nexxdghedaax cu dae' dghit'e'.
/With the hewed wood they had extending across down on the bottom, they sat watching the place.

Tetl'aa delaeni lkayi 'unii cu utet'uuts'c'dildaetl'i,
/Something black (fish) upstream would pass by on the hewed green saplings on the bottom. [The saplings were placed on the bottom to reflect light.]

Utet'uuts'c'eldiil hwna xona k'edze' iyits'ematadeli k'ekultsiis hwna lu' tgge' yuŷyil
c'a kekiiltses.
/When some black objects passed by, and it appeared that they had come back inside (the trap), he would grab it and pull it out (the trap).

Danggu lu' delaeni dae' tabaaghe datggu dae' tuu c'a' nitnelghel xu' tkiisiix.
/They had fixed a green log crib up above on the beach. That was placed away from the water

Dangga yii tacaynebes, k'edze' li'i tanaosdaxi gha.
/They dump them (fish) upland and over this so that they were not able to get back in the water.

K'edze' tacaynebes hwna,
/Once they dump them back,

k'edze' igge' tez'aan igge' kiinałtset tanadelzes.
/they pushed the fish trap back down and put it back in the water.

Yak'a cu xu' tkiisiix cu dghit'e' eł tsoxe datgge' yulyeli dze' tsabaey lu nen' dan'e natadeł.
/As they fixed this, and as he first brought it (the trap) up, some of the whitefish would turn back upstream to the land.

Little duhwk'e łuxdit'aes hwna xona k'edze' nataytelaes.
/Then in a little while they would turn back and drift back (downstream).

'Uyahts'e' tghelkayi yik'e dat'uuts'diłdił, dat'uuts'diłdił.
/Below on the hewed saplings black spots would pass by, black spots would pass by.

K'a xona sudzendahwk'e uyii'ghidaetl' kenziix natgge' nahnułyił gha nacakiitnebes.
/When they thought enough had swum in, they pulled it up again and dumped it out.

Dae' su kec'alyaet dec'a.
/This is how they (quantities of fish) were obtained.

Xu c'a su nay'tedeł, xona natadłax de cu tsabaey, c'a łuux, ndaane c'a xelts'e', afternoon about three o'clock c'a start t'iis.
/As they (fish) start to return, as the fish, the whitefish swam back, they would start (to fish), sometime in the evening, and the next afternoon around three o'clock

'Ungge yide tsatez'aax.
/A large amount had then gone toward the uplands (to spawn).

Xu'a satggan 9 o'clock diic'a xuk'a u'el 'sdelts'iix, xuk'a 200 yet kakeltaes.
/Then in the morning by 9 o'clock we would keep staying with it (the trap), and they might have brought up 200 fish.

Xona yelu' xona cu start cutting [ts'et'aas].
/So then we would start cutting.

Hwtsicdze' xona ba' keghaax dze' 'utggu rack hwtsicdze' gha dadghilyaes.
/They were all making dry fish and everything was hung up in the rack.

Xona yet cu xona naat 'sdel'iix.
/Then finally we would sleep.

Jennie and Henry Peters (Betts 1985:16), who had lived at Valdez Creek in the upper Susitna drainage, said that in the summer they used a V shaped weir leading to a basket trap that was made out of willows which were lightly woven so the trap would not hold water, only fish. Jennie said that she never had salmon to eat when she was young because the Ahtna living at Valdez Creek did not trade with the Copper River Ahtna for salmon. She recollected cutting whitefish all day, scaling, slicing, drying and sometimes smoking them. In the winter, basket traps were placed under the ice on lakes. When the traps were full they were hoisted up with a rope and hook. Henry said that when the baskets were pulled to the surface hundreds of trout, burbot, whitefish, and grayling would sometimes be dumped out on the ice.

Whitefish Weir at Mentasta Creek, Upper Ahtna Territory

Katie John (Ahtna Tape 111) describes the *k'edze* or weir used to catch whitefish coming out of Mentasta Lake. She says that the weir was situated above the fast water coming from the lake and angled so that the fish were deflected into a dip net wedged into the opening of the weir (Plate 3-1). The dip net was operated from a platform attached to the weir. Katie then goes on to compare the dip net used to catch whitefish with the dip net used to catch salmon. She states that both were woven out of spruce roots but that the whitefish net had smaller holes than the salmon dip net. She also added that the net of the whitefish dip net is now made out of twine.

'Unaat Mendaesde k'edze kughile'i gha nahwgholnigi.
/I am telling about the k'edze [whitefish weir] that used to be across from Old Mentasta Village.

K'edze yenidan' hwts'en gha yiit k'edze kukughi'aen', kaniit men ts'en telende
/Since long ago they had the angled whitefish chute just upstream of the swift current coming from the lake.

yet ya k'edze kughile'.
/That is where the chute was.

Nankehdilaa dze' kadaa'tah nikehwni'aa.
/They put it across there and they put a section towards the downstream.

'Aadaa' yii tah k'edze kughile' de gha yet ts'edaghalts'e' dan'a naenn kesditt'e' gha yet.

/Down where the k'edze was we stayed during the time that we used it there.

'Es naxu ditl'uuy gha yi kughistle'e dan'a du' naxu ts'abael xay' kiilniiy yii kaen' 'es ghighaan'.

/The woven whitefish dipnet that became obsolete long ago was made with what they call spruce roots.

Ciisi kiidini' ciisi kii'edi'a' gha yet ts'abael ghay' 'et kiighighaann.

The one they call ciisi [salmon dipnet] was made with spruce root.

Ciisi bedi'a'.

/It is called ciisi.

K'adii du' k'adii ghaaghe tah xona naxu ts'aex 'et 'es ketl'uuy 'es dae' taxii'ecdini'aa.

/Now in modern times the whitefish dip net was woven with twine

'Es mean that it is knitted, just like tie up together make small hole. Just like little fishnet. The whitefish dip net was woven. They made it like that.

That what they call 'es right now.

Yii tseh dan'a du' ciisi yii du' ts'abael ghay' kaen' ghadghaann. they made it different way.

/And originally the salmon dipnet was made in a different way with spruce roots.

They had a hole though, water go through, that's where they made it, that's for salmon and they use for whitefish. 'Es k'ae they use it that way back long time ago.

The dip net used to catch whitefish was generally much larger than that used for salmon, which was designed for use in a strong current. The whitefish net was intended for slow moving water and the rim was large enough (between 91 and 121 cm (McKenna 1959:62) to fill the opening of the weir. When fishing, the whitefish dip net was wedged into the opening of the weir (Plate 3-2). In contrast the rim of the salmon dip net was about half the size (45 cm. de Laguna and McClellan 1981:647), and was held against the current by the fisher. Additionally the salmon dip net tapered toward the bottom to form a pouch so that when a salmon was caught its head became wedged in the end of the net.



Plate 1. A whitefish weir (*k'edze* in Mentasta language) used by the people of Tanacross at Mansfield Village. The openings and platforms are on the extreme left and right. The rim of a dipnet can be seen in the left opening. In between dips or when platform not occupied fish continue to move through the opening in the weir. Photo taken in 1971 by Bill Simeone.



Plate 2. A whitefish weir on the upper Tanana River similar to that described by Katie John. Note the size of the whitefish dip net (*'es* in Mentasta language) and the platform attached to the weir (called *'es k'ae* in the Mentasta language). Photo taken by Robert McKennan in 1930.

In the following passage Katie contrasts the *k'edze* (the weir used for whitefish) with the *hwtsiil* or bridge used to catch salmon. Unlike the salmon weir, which is built perpendicularly across the creek to form a bridge, the whitefish weir was built at angles to the stream (see photo 3-1). In addition, two platforms (*es k'ae*) were built on either side of the weir openings. A fisher stood on one of these platforms and inserted the dip net into the opening of the weir. When a fish was caught, it was either dumped on to the platform or into a pit (*Uk'ae*). As Katie notes these types of weirs and dip nets were also used at Tetlin, Northway, and Tanacross (McKenna 1959:62).

Hwtsiil is straight across the creek. **K'edze** you know they make square place, make big place, then when they take out fish they just spill it right there. They got room for fish to put it.

That's why **k'edze** they call it. Bridge **hwtsiil**, is right across.

Creek coming down this way, got all they put it down, like that, and they all close it this thing, this place open, this creek. When fish coming down he got two place open here this side, **es k'ae**, this side **es k'ae**. And they coming down, just down here they got pole this way.

And that's a walk on top, in here. And that's a big place they make. When they take out fish right here then they just dump it right here. **Uk'ae** [pit, hole] is where they dump it.

Q: Did they do that in Slana River?

No just the creek from the lake outlet, **Men Daes Na'** [Mentasta Creek], you know water is kinda slow you know. That's where they can do that. When water too fast he can wash away, you know ice and things like that float it down. And Mentasta Creek is not freezing wintertime too. That got ice along side. That is whitefish business, not salmon, and grayling. Tanacross, Mansfield they had like same way, they used to have **'es k'ae** like that,

Fishing at Taral, Lower Ahtna Territory

Ahtna living on the lower Copper River near Chitina built another type of weir that was used to catch grayling, trout, and Dolly Varden. This weir was constructed out of large bundles of brush set across a creek with a small fish trap made out of poles inserted into the opening. Such a weir was used in small creeks such as Taral Creek, which flows into the Copper River near the old village of Taral located across from the town of Chitina. In fact, the name Taral comes from the Ahtna word *Taghael* which, Ahtna elder Andy Brown (Kari field notes, 1976) said, is from the word *takalghael*, a term for bundled brush that is 6 to 8 feet long and covered with grease so that

moose will not eat it. Ahtna elder Frank Billum (Ahtna Tape 112) provided more detailed information. He said that at “Taral, *tay’delghael* they put brush in creek to make a weir with a small trap, only for trout and grayling.” The brush is piled up to block the creek creating a weir that is used with a little fish trap made out of poles.

Other Fishing Techniques

Box Traps

Ahtna used box traps to harvest grayling. Grayling migrate in the spring soon after the ice goes out, and in the fall about the time of the first snowfall. Ahtna harvested grayling both in the spring and fall and opportunistically throughout the rest of the year. In the fall grayling are available in large numbers but only for a very short time. J.P. Sinyon of Chistochina describes a box trap that was used to catch grayling in September (West 1973). If a creek was not too deep you could dam it up and place a “little box on top of the dam” [*uk’e da’sdlaexi*]. Below the box you placed poles slanted to form a ramp. The fish swam up the ramp trying to get over the dam but instead landed in the box. J.P. said that his father-in-law used this kind of trap at Fish Lake in September of 1927 and every day he caught 100 grayling. Fred Ewan (Ahtna Tape 135) described another method for catching grayling by opening up a beaver dam to create a sluice or chute for the box trap *uk’e da’sdlaexi*. Fish behind the dam were caught in the water flow and flushed down stream. This was done only in the fall.

Katie John describes a similar method for catching grayling and suckers in the following passage (Ahtna Tape 111). This method was not used by Katie but described to her by her mother-in-law. Katie said that the remains of a submerged rock bridge were still visible until the last five or ten years on *Tsabaey Na’* just before it enters Mentasta Creek. A stone bridge, called *ts’es kae nakultsiin*, was used to partially block a stream. An opening was left in the middle of this bridge and below the opening was placed a box trap called, in Katie John’s dialect, *uk’et dac’estlaexi* or ‘one that they swim up upon’ made from carved spruce poles. As the fish came

downstream they swam through the weir and fell into the box. This method was used to catch grayling and suckers, and occasionally Dolly Varden.

Uk'et dac'estlaexi nenatseh ts'en natsiit Tsabaey Na' kehdi'aa de gha yet.
/Before our time they had the 'one that they swim up upon' down below at Fish Creek.

Uk'et dac'estlaexi keghi'a'. 'Unaann keghi'a' Fred unaan ya s'eł nakalniisi gha.
/They had the box-trap. They had it across the way, so Fred's mom (Katie's mother in-law) told me.

Dats'ii 'utgguh k'ent'aei 'eł ngha'aen', k'adii du' xona 'utggu tuu yii naann' xa' ubiyahwdat'aen xudyaak.
/I still see something (line of rocks) sticking up, now it is visible going across in the water.

Yanidan'a netseh hdaghalts'e'i 'iinn tseh dan' tah, xon dedan'a yanidan'a ts'en gha yet xu c'a naghi'a' kiilnii.
/Long ago, before us those that lived then, from way back, that had that (rock dam) across there they say.

Maybe two or three hundred years that ts'e 'unaann' skeni'aayi. That many years I think. I just guess.
/(The rock barrier) it was extending across

Yii c'a Fred unaan ya s'eł nakalniis. Dii c'a sc'aen nlaenn 'eł xunaann' naghi'a'a.
/Fred John's mother told me this, that while she was a child it was (in use) across there.

I'ihw xuhdi' hwnec dasya' t'iine'.
/And so I am mentioning what she had said. (?)

Yii c'a saeł k'et naxu ts'abael ggaay tah desaesi saeł kiigha c'eghaann yii 'utggu kiit'aa delaax.
/They made for it a box of carved small spruce, and they put this up under the place (the gap in the rock dam).

Nduu about maybe big c'aet' time banił'aa xu kukusen dze'
/They fixed it to be just so big when they had the time.

Yii saeł du' ghat nduu ndaa tuu nandelende t'aax saeł kezdlaa.
/Where the water flows on through, they kept the box beneath there.

Yii du' 'uniidze tsabaey telaxa 'eł gha ye xu xutsen' ts'elts'et dze' dayii saeł yilts'et.
/As the fish swam downstream, they came out from that side and fell into the box.

Xuc'a gha yet tsabaey kughinesi.
/So this is how they obtained fish (grayling, suckers)

Yii c'a nen' c'a kughilcaaxa, k'alii badahwdest(nese).
/I have not heard of this anywhere else in the country.

Koht'aenn xu' tkut'aede k'alii hw'eł 'estnehe, k'alii badests'iil.
/The people may have done this, but I did not hear about it.

Ghat yet natsii yet yaen' xu' tkut'ae de, yet yaen' 'eł estnes.
/The one [rock dam] down there below (at Fish Creek before entering Mentasta Lake) is the only one I know of.

Gaa koht'aenn cu snaghał xu' gha nahwkolnigi, 'elii dests'iil.
/Here is the one the people told me about, I did not hear if they might use maybe springtime when fish first come out.

Probably you know they let fish get fat.

Tsabaey nalk'axde ugheldze' keyiyiixde,
/When fish get fat they like to eat them

I think that's the time they start, August. August month that's the time.

Segele iyii c'elax.
/The grayling swim into it.

Grayling and whitefish were also caught in the main stem of the Copper River. Tony Jackson of Copper Center (de Laguna 1960) said that his parents put a trap in the Copper River at *Nic'akuni'aaden*, a fish camp located down river from Copper Center. This technique was used only in the spring when the river was low. The trap was made out of chicken wire and had a reverse funnel opening. It was tied to wire and thrown into shallow water about 10 or 12 feet from shore in an eddy behind a rock.

Reflector Sticks

For fishing in the darkening evenings of fall and in winter the Ahtna used reflector sticks placed at the bottom of a stream so that they could see the fish passing into a trap or dipnet, or to spear fish. Earlier (pp. 61-62 above) Jake Tansy mentioned the use of reflector sticks and in the following passage Frank Stickwan (2001) describes reflector sticks [*taex na'itggeyi*] used with a fish trap set up to catch grayling.

FS: They going, they catching in creek and they throw it up all across the bridge.
They make bridge all and make cross. About that big around and about that

wide the lumber thick, he cut that lumber and make it white. And they take it down, way down like that. Both sides they tie with it, that brush on both sides, and you put fish trap right in there. Then grayling go run in. You can see that then lumber cross, nighttime you can see through the things, white.

JK: That's taex na'itggayi?

FS: Taex na'itggayi, yes. They gets lots of fish that way.

Grayling he get [catch] with fishtrap. Sometime they come down the creek, water run that way from lake you know. Nighttime sometime they run in there, bout that wide stick, make em white. They chop it inside and make like lumber way down the bottom. About like that. Nighttime they wait. Sit down there at fishtrap. Just (white) like this paper. On top it run, they see it nighttime going into fish trap. Four or five go in, they take it out. That's the way they get fish too.

Katie John (Ahtna Tape 120) provides another description of the reflector sticks.

Taex na'itggey
/White object under the water

'Uyggu naann' naxu ts'abaeli ggaay kii'el kakałkey, yii 'unaann' kehdelaes.
/Below across there they hewed some small spruce, and set it across (on the bottom).

'Uyggu ts'es tedelax ts'edi, ts'es 'el tedelax,
/Then below where they swim over rocks, as they swim into the rocks

Yii du' tsabaey xiik'e na'aen gha c'a.
/They can see them on it.

Tsabaey niidze tedel tah niik'et dediiti yikahwdeł'iix. Yii gha' c'a cu tkosiix.
/When the fish go in the middle they move back and forth and they are visible.
That is why it is fixed like this.

Spears

Spears were used to catch fish in clear water. One advantage of a spear is that the fisher does not need a platform but can stand on the shore or on the ice. The Ahtna used two kinds of spears: the *dudaay*, a multipurpose spear with a barbed head, and the *dunax* or *dinax*, with a toggle or detachable head that was inserted into a socket. This spear could be used to catch fish and water mammals. The *dudaay* can have barbs or serrations on one or both sides of the blade and is built with a tang that is attached to a pole about 12 feet long. Spears can be used in both summer and winter. Interviewees mentioned a number of locations used for spear fishing, including: Tonsina

Lake, St. Anne Lake, Mendeltna Creek, and Tyone Lake. At Tyone Lake there were five bridges built across a narrow channel and men could spear fish from each bridge (Reckord 1983a: 33-34). When spearing fish in the winter, the fisher made a hole in the ice and then covered himself with a skin or made a shelter with spruce boughs so he could see the fish. Spearing whitefish in Mentasta Creek in the fall is still popular and people from other Ahtna villages travel to Mentasta to fish. Commercially produced spears are used as well as flashlights and torches, which attract the fish (Reckord 1983a: 29).

Snares and Fishhooks

According to Jack John Justin (de Laguna 1960) fine willow snares were traditionally used to catch fish. The snare loop was floated downstream and when it hit the fish the fisherman pulled upwards. According to Jack, the fish did not back away but moved forward into the loop. All sorts of fish could be snared but Jack said they used wire snares to catch pike. Bell Joe of Chistochina (Ahtna Tape 121) said that fish snares, *tsabaey ggaal*, were made with fresh willow or spruce root called *xay*. He said,

You go out in woods you see lota fish, you make fish snare. They don't know that young people. One time tell me, "you get that fish," I went out get the brush I make the snare. "You catch that whitefish," he tell me. "You take that sucker." I just throw like that and I catch them. There's too many. Wherever he point, I get it, right in the Rufus Creek, Mabel Creek. Right by the bridge.

Jake Tansy referred to fishhooks made from safety pins, which he called *uyii c'ehwtantez'aayi gets'* that were used by the Cantwell people to catch grayling. In the following passage Frank Stickwan (2001) describes fishing with hooks [*ges'* or *lox*] in the wintertime for burbot and lake trout using a spruce shelter or *'el hwnax* on the ice at St. Anne Lake. Frank had heard about this but had never seen it first hand. He noted that St. Anne Lake was regarded as one of the only reliable fishing locations during the coldest winter weather because there use to be lots of fish there.

FS: In the winter time when lake froze, one lake up that way, the Tazlina Lake and down that ways, Saint Anne Lake they call it.

Q:That's *Ts' iisi Bene'*?

FS: Yes, *Ts' iisi Bene'*.

That's the place people were fishing. In the wintertime with the frost, when the fall frost beginning. Ice that thick then. Then they look around, and they walk on the ice like that. Right here a little bit it is not too deep [thick]. Then they put stick in that, stick up [to mark the place]. And the snow coming down and that stick is sticking out stick, you know. And the wintertime they come back again and they chop the ice. He chop the ice and they open up. Then put all of kinds of trees, trees and they all make it like that. Make it dark inside, then you can see way down. Make the thing all sewed up like that. **Eł hwnax** [spruce house].

FS: Then some kind of bone, that's bone, make it sharp. You have both sides and that is what they cut a little bit around here [to make barbs]. They can't come out [so the fish can't escape]. About that long, like a stick they use would they think. About that long like a stick they use I think. They tie with right in there. And he was waiting like that. And fish, what they call *ts'anyae* [ling cod], he come there and then he get it and. Oh lots of would get like that. There used to be lots up there, *Ts' iise Bene'* [St. Anne Lake] he said. Now I tell you there is no more fish much too.

Q: How many kinds of hooks did they used to make, did they make different kinds of hooks?

FS: Sometimes they get, they made that hook. No hooks them days. They made a stick just about like that, and they tie with just skin. Sharp that thing. And rainbow trout, he bite it. And he take it out, it's easy to get them. Lake trout too, they bite too I think. That's the way they get it he said.

Frank adds further comments on hooks and lake trout:

For them lake trout they get caribou horn and they make hook just like a hook they made, small little one they made it. They put in moose meat, they put string on, lake trout he bite it. He take it out. That's they way he get it.

Gill Nets

Fishnets (*tehbiił*) do not seem to have been used much by the Ahtna prior to contact with non-Natives. Historically the use of commercial and hand-made fishnets has been recorded in the Tyone Lake and the upper Susitna areas (Jake Tansy noted to Kari in 1981). In this narrative, Jake (Tansy 1981) talks about Peter Secondchief using dip nets and gillnets to catch whitefish. This was in the early 1900s when the Ahtna lived near the gold mine at Valdez Creek and Peter sold the fish to the miners in exchange for various commodities. Jake also describes how Dan Secondchief used a gillnet under the lake ice.

Secondchief udighi'aanen yen ciisi k'ae 'udii kughil'aen'.
/The one was called [Peter] Secondchief he always had a dipnetting location.

Ciisi k'ae ts'elk'ey ben yidadinilen na' ciisi k'ae tiz'aani teghil'a'.
/He kept a fish trap in the water at a dipnet hole at one stream coming into a lake.

Xona ya'aadi ben 'edadinileni yi lu' net una' teghila'.
/On the other side where it flows into a lake he had nets in the stream water.

Net 'udii diixa' ighitl'u', diixa' ighighaan.
/He always wove nets himself; he made them on his own.

Ye lu' 'unaane sometime nil'denta tsabaey tiye badidel.
/And sometimes across there lots of fish would go in to him.

'Unaane lu' whiteman lu' company dae' kudighi'a' kutah xdaghalts'e'.
/They stayed among them across the way of what they called the 'whiteman company'.

Fish tiye badidel de ldu' 'unaane lkanaydghaes dze' i'el 'unaane lu' yootket.
/When lots of fish went in it (the net/trap), he would pack them back across and across there they were purchased.

C'aan i'el na'uket.
/And he would buy food with that.

Ye l'edze' ye Ben Datgge' lkenaydghaes.
/And he would pack them (fish) back from 'lake above' [lake west of Susitna River opposite Valdez Creek].

Ye kaey tsaeye n'el hwtsecdze' saxaali 'el bayc'enac'elyaes.
/And with that he would exchange for tea and other things, and sugar.

Jake also noted that the Secondchief family had a location at *Ngge' Nazdleni Na'* (below Butte Creek mouth on the Susitna River).

Dan Secondchief 'udii deta' 'el k'a ghida'.
/Dan Secondchief always stayed with his father.

Xona dzaen hwna xona trapping gha 'stedel dze', trapping gha 'stedel dze' i'el net yic'a 'ele' c'a 'aede c'a i'dilggese.
/We went trapping during the day, and as we were trapping he never went without a net.

Yi Dan Secondchief nadghosi 'ilcet dze' c'a ben ldu' gaa su one foot c'a su detiis.
/Dan Secondchief would take a saw, and the lake here might have frozen one foot (thick).

Nadghosi 'i'cet dze' ndanaay c'a i'di'it'sat' aten'ide'. Net yete'at. Łuux duugh su n'caax ben bay'nu'ide'.

/He would take the saw and he would put the net in places he made cuts. He set the net. Whitefish just so big would get caught in the opening in the lake [ice].

Dae' tiye c'a yic'a good country kughile'.

/That was really good country.

And c'ughelet Łu' 'udii cenuu ena'sdalgges dze' 'utgga yehwdze' nic'anats'akaes.

/And when it melted [in the spring] we would always get into canoes and paddle out up above there.

Every night dzen 'e' 'steldiis dzen 'e' 'steldiis.

/Every night we would shoot muskrats, we would shoot muskrats.

Preparation, Preservation and Uses of Non-Salmon Fish

Whitefish

Historically, whitefish were either dried or frozen, depending on the time of year when they were caught. If caught in the fall whitefish were frozen and then stored in a cache pit. When thoroughly covered, frozen whitefish keep well and could be eaten all winter long. Whitefish caught in the summer were sometimes processed using a style of cutting Katie John (2002) calls *nildzendalneni* or “summertime cut,” and then dried. Humpback whitefish were either split or dried like sockeye salmon *ba'*, with the backbone attached, or dried with backbone detached. To keep dried whitefish from spoiling, the fish were sewn into birch bark containers and placed in underground caches. By May smoked-dried whitefish prepared the previous fall turned yellow and no longer tasted good. Dried whitefish were made into bales of fifty fish each, in contrast to bales of sockeye salmon which usually contained between forty and forty-two fish. Whitefish were also fermented in the ground and then stored in birch bark containers (*luux dzenax*). The advantage of fermented fish was that it did not freeze and could be kept through the winter and into the spring. There were two types of fermented fish. In the Ahtna language these are called *nelk'oli* (short-term fermented fish) and *dzenax* (long-term fermented fish). In the Copper basin humpback whitefish were not used to make short-term (*nelk'oli*) fermented fish, which was made only with salmon heads and fins. Instead humpback whitefish were used to make “moist

fish” which was fish hung up and slightly spoiled. Split whitefish, with the roe left inside, were also fermented. Both dried and fermented fish were kept through the winter in underground storage pits lined with birch bark. Ahtna had elaborate methods for covering the caches to protect the contents from spoilage, animals or people.

Katie John (2002) describes various methods for preserving whitefish in the following passage. In the fall whitefish were frozen and then covered over. These fish would last until spring. She also talks about drying whitefish in the summer using a special style of cutting called *tsilalkay* in which the fish is split into two parts and then hung up to dry.

Q: Were they putting up whitefish or just eating as they go?
Nikeyelcet.
/They store it.

Tsabaey ten xi'ediil'aan
/Frozen whitefish it is called.

k'ae'i kii'iix dze' nekenakiidelaes.
/They keep it in a pit and they bring it back out.

Outside freezing xay de uka
/They freeze it outside for the winter.

Nen' ten luugge'
/[These are] 'Frozen ground fish,' [i.e. whitefish frozen in the fall].

Q: How long were they good?

They good until maybe April. They just put it in the cache, and they cover up things and so they keep fresh that way all the time. If you just leave it out there hanging on a pole when it froze up, and they just put it inside. Something canvas or gunnysack or something. And they really cover it up good and they put it away for winter. Then all winter it's just fresh.

Tsilalkay that, just summertime [style of cutting fish].

Q: What does that word mean?

That's where they cut it. That is [also] the smallest whitefish. Tsilalkay is the little small one. Just young one. That's a whole fish. That's a head. And that's the tail here and they just split it up this way.

He open em up and he just hanging. They cut meat like that.
It's not like ba'.

Saen t'aats'; us, we call nildzendalneni
/The summer cut we call the one split apart.

Fred Ewan (Ahtna Tape 135) provides additional information about processing whitefish. He says that some whitefish were processed similar to salmon.

Q: How do you cut the whitefish?
All the same as salmon. Just like salmon we cut that.

Q: How about that nildzendalneni?

Niinaghat'aats'i we call it.
/The one cut apart

Niinaghal'k'ets' sunt'ae. One side different, one side skin on and the other side skin on.
/It is cut apart on the sides.

We call it.

A salmon, we cut it right in the middle in here up.
We cut this part from right in the middle. Right here, up and flap it over and then we turn around and we cut it this part, and the other side other way, and flap it over and make it just like that see. And we cut this part.

It make it wider. Duugh dennelbets su t'iis.
/Here they are made wider

I wish we work on it, and then you know more.

Salmon just as good as that, like whitefish. But different way we take guts off. Whitefish we cut the guts off first. And then stomach you pull it out whole thing you know. Everything inside. Eggs and everything in side you don't have to bother them. Just the stomach is what you pull out. Everything in there is clean as can be inside [in the whitefish stomach]

Grayling you have to do it [wash the insides]. He [grayling] eat dirty stuff. Not dirty stuff but grass and things. But whitefish I don't know what he eat. Water he got. He eats some kinda food in the water.
Clean as can be, you don't have to clean it. Maybe grass in there or something.

We fry up the guts for grease (**tsabaey ghe'**). We take the guts out first. That stomach in there.

Fred Ewan (Ahtna Tape 135) then goes on to describe how his father prepared fermented whitefish (*tuux dzenax*). During the winter the fermented fish are taken out of the cache, cleaned and cooked. Whitefish roe were also prepared, along with the intestines and stomach. These were fried together.

In your fish camp did they make łuux dzenax?
/fermented whitefish

Yeah my daddy make one time, but I don't. Around that area he put in there.
That's where old village used to be.

They put it in k'ey ts'aac just for the floor, like a dry wall.
/birch basket

K'ey everything nihghilaes. Xu' łdu'.
/They put in birch bark.

Four corners and maybe one hundred or two hundred whitefish they put in there.

In wintertime they took it out. Make a soup or something. It smells, but it tastes good. They gut it, and clean it up first when they put it in.

Łuux k'uune' are good eating I tell you. We take it out right there where we cut it.
/Whitefish eggs

Full frying pan. And the head in there. Just boiling away. That way you make fish oil.

Lotsa k'uun', tsabaey bet' no dirty. łuux bet' really clean.
/Lots of roe, and whitefish bellies are not dirty, whitefish bellies are clean.

Whitefish were also fermented on the upper Copper River. Here Katie John (2002) describes in more detail the process for fermenting whitefish.

Q: re. Łuux dzenax (fermented whitefish)

That one they must use k'ey (birchbark),

k'ey yintsikele'e, k'ey ts'aac kiighaaghe.
/They put them in birch bark; into birch bark baskets that they make.

They fix k'ey ts'aac (birch bark container), about this deep. And they clean it (the fish) up inside and they put cut side (of fish) down, and this side, side down and whole piece just they open on side. They don't open too much. But that meat they open and just the air come out. And they put it in that k'ey ts'aac. They just stack it up like that. Then they put basket in the ground [in underground caches.].

k'ey ts'aac yii kiilaesi igge' 'utggat uk'et du' tsabaey du' nildzic'et'aas dze' ba' k'et'iix.
/They put it in the birchbark baskets and stack the cut, that whitefish is cut, like flat dry fish (**ba'**).

Yii igge' delaes.
/They are covered up down below.
That's the top cover. Just like ba' they cut it open. And they just put on top.

Nen' yii xiigha xukelaes dze'. K'ey ts'aac xuhtah 'ekelaes
/They put these in the ground. They gather the birch bark containers together.

Q: How does it compare with salmon dzenax?

Same way. Dzenax. Sometime they use birch bark and some time if they don't have no birchbark they just use hay (grass). They put little brush on there. And salmon they put the same way. They clean it inside and on top his head one side. They cut meat like that and they open em up that way. And they cut like two cut. Both sides.

And that k'ay' k'ehdelaesi k'et. They put tl'ogh. Yii k'et and they just put it up.
/And they put in willows or they put dry grass. Like that.

And between they put tl'ogh [dry grass]. And they stack it up that way. And they put tl'ogh on top. That's dzenax for wintertime.

Katie also has noted that on Mentasta Creek, one of the few places that whitefish and sockeye could be harvested in the same location, separate fish racks were used for each catch.

KJ: There we used to stay in the spring, when there was a dip net location there.

Q: So tsabaey ba' was just made in June-July. How did they do both at once, the whitefish and the salmon? They have different camp?

No at Mentasta luk'ae dastaann' and another place tsabaey dastaann'.

/At Mentasta there was a sockeye rack and at another place a whitefish (non-salmon) rack.

Xu c'a sii du 'unaa ghasda' de luk'ae ghas'tiis. Cu ka'aat cu tsabaey 'est'iis dze' let yii 'elaes.

/I stayed across from it where I cut salmon. Then the next place over I would cut whitefish and put them in smoke.

Other Species of Fish

Grayling could be caught almost year around but were only available in quantity for a very short time in the spring and fall. When caught during the fall migration they were sometimes split, dried, and smoked. Throughout the Copper Basin Ahtna people ate longnose sucker, but only the front portion of the fish. The lower end had too many bones. Fred Ewan (Ahtna Tape 135) also said that people ate sucker roe. Katie John (Ahtna Tape 120) said suckers were used primarily for dog food. Burbot were harvested for their eggs and livers that were rendered for their oil. Fred Ewan said the meat was not eaten by humans but fed to the dogs. The livers were

boiled and then fried producing a “lot of clean grease.” The oil was kept in bottles and taken when people were ill.

Summary

In the past the Ahtna used different methods to harvest resident species fish, depending on the type of fish and environmental conditions. Since whitefish and grayling migrate in streams they could be easily harvested using basket traps or dip nets. Whitefish could also be speared. However, a species like lake trout could only be caught with hook and line or speared through the ice in winter. At certain times of the year burbot could be harvested in streams, but they are best caught in the winter using a jig through lake ice. Fish traps and dip nets were designed to take into account the traditional view that a sustainable fishery was predicated on how people fished. To this end traps and nets were designed to let little fish escape and Frank Stickwan makes the point that by harvesting only big fish and letting the little ones escape was “why the lake is full of fish every year.”

Of the resident species harvested by Ahtna most were eaten fresh and only whitefish were processed for long-term storage. Grayling were occasionally dried, but do not store well. Burbot were caught for their eggs and livers, called *ts'anyae zet'*, and rendered for the oil. Fred Ewan said that people did not eat burbot meat, which was fed to the dogs. Large quantities of suckers were harvested and used mainly as dog food, but humans also ate them. In the spring and summer whitefish were dried or fermented, and in the fall they were frozen. During the spring and summer the aim was to catch fish that were fat and large enough to be successfully processed and stored. To produce a good product the Ahtna targeted male rather than female whitefish because when females have eggs they are not as fat as males.

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Chapter Five

Ahtna Oral Traditions Related to Resident Species Fish



Introduction

In Chapter Two of this report we briefly described how the story of *Bac'its'aadi* was an assertion about the relatedness of humans and salmon (and by extension all animals) based on the idea of a shared “personhood” (Langdon 2003:2). The narratives presented in this chapter reflect that relational view of nature. For example, the story about the anatomy of the longnose sucker can be understood as an allegory of the interrelatedness of all things, since the sucker fish possesses not only the lost horns of the female moose but the fluted handled knife of the humans. The stories about the giant fish demonstrate this relatedness, but they also show that animals are powerful beings that if provoked can be dangerous and destructive. To avoid provoking the anger of these powerful beings the Ahtna followed a myriad of taboos and avoidances.

In this chapter we discuss several taboos and avoidances for people to follow regarding non-salmon fish and present several oral traditions that refer to these fish. In the Ahtna language there is a concept called **c'uniis** (Kari 1990: 308; Simeone and Kari 2002:45-46), which is an illness caused by mishandling animals as they are harvested. The word **c'uniis** means ‘an animal spirit that can cause sickness’ and is literally translated as ‘it takes something.’ The animals that can cause this illness are moose, brown bear, black bear, wolverine, lynx, and the other furbearers, but not fish. Salmon could cause another kind of sickness that was avoided through a ritual cleansing by humans immediately after they had caught the first salmon of the season (Simeone and Kari 2002: 45-46; 49).

In terms of everyday Ahtna beliefs, and the topics represented in Ahtna oral tradition, the animals of the natural world seem to be categorized into two groups. The most prominent role in Ahtna *yenida'a* (or legendary) stories is given to the animals such as raven, bear, wolverine, and

fox. The strongest sense of propriety and taboo is accorded those animals from which the *c'uniis* malady can be contracted, especially black bear and brown bear and furbearers that are not eaten. However, the major foods in the Ahtna fish diet (salmon, whitefish, and grayling), and the meat diet (caribou and moose) are not prominent in the oral tradition and also seem not to be marked by strict avoidance behavior. While these food animals cannot cause sickness they are considered by the Ahtna to be powerful beings that do control the hunt. If fish are not treated correctly, that is if humans abuse fish by swearing at them or playing with them, or make loud noises that disturb the fish, or do not eat what is caught then the fish will retaliate by making themselves unavailable (cf. Simeone and Kari 2002:46-47) on Ahtna and Berkes 1999 on Cree).

The only two fish that appear to be avoided and not eaten are lamprey eel and bullhead or slimy sculpin. The eels (*tl'aghes*) run with the salmon in the Copper River and are not considered edible by the Ahtna. If caught they are thrown back in the water. Master storyteller Jake Tansy noted that disturbing the bullhead or the Dolly Varden will result in bad weather.

Ts'es t'aaxi

/Bullhead, those ...

Wells Creek someplace we see sometime on the bottom you know.

Long time ago nggadze' kasu' hdghine', yii kets'eltaen dze' xona danadze' talciit.

/Long ago they said that if in the uplands the weather was nice, and if we catch that [bullhead], it will rain really hard.

Li'i you can't bother [the bullhead] you know.

Talciit. Yeah. Same thing that dghalk'aazi, baet ggaay lu.

/It will rain. The same as well for the Dolly Varden, that little lake trout.

Giant Fish Stories and Ahtna Oral Tradition

Fish that prompt the strongest sense of taboo are the lake trout and burbot, two species thought to live in a giant form in many of the large lakes of Ahtna country. These two fish have been minor sources of fresh food in the Ahtna diet but stories about their giant form are the most familiar genre of fish stories to the Ahtna. Over the years Ahtna elders have mentioned numerous first-hand and second-hand accounts of giant fish incidents. Table 7 lists the lakes for which there has

Table 7. Lakes that have Giant Fish in the Ahтна Oral Tradition

Ahtna Name	Location	Literal Translation	Source	Species
<i>Western Ahтна</i>				
Hwtsuughe Ben Ce'e	Tyone Lake	"toward the water big lake"	Andy Tyone	lake trout
Sasnuu Bene'	Lake Louise	"sand Island Lake"	Andy Tyone, Fred Ewan	lake trout
Hwiiindi Kacaagh Bene'	Deadman Lake	"upriver - large area - lake"	Jake Tansy	
Hwdaandi Kacaagh Bene'	Big Lake	downriver- large area - lake"	Jake Tansy	
Nits'ezi Bene'	Tsusena Lake	"protruding hill lake"	Jake Tansy	lake trout
<i>Central Ahтна</i>				
T'latibene'	Klutina Lake	"headwaters lake"	Jim McKinley	
C'obeni, C'abeni	Middle Lake	"off-lake"	Fred Ewan	lake trout
Nahwt'iidze' Bene'	Deep Lake	"blue lake"	Fred Ewan	
C'abeni	lake N of Crosswind L	"off lake"	Fred Ewan	botfly
Ben Ges	Lake S of Dog Lake	"nostril lake"	Fred Ewan	sucker
Łike' Bene'	Dog Lake	"dogs' lake"	Fred Ewan	lake trout
Kaghalk'edi Bene'	Crosswind Lake	?	Fred Ewan, Frank Stickwan	burbot
Łiidzi Bene'	Ewan Lake	"soil lake"	Fred Ewan, Frank Stickwan	burbot
Bendilbene'	Tazilina Lake	"lake current lake"	Jim McKinley, Mary Risley	burbot
<i>Lower Ahтна</i>				
Tsabaey Bene'	Town Lake			
Kentsii Bene'	Tonsina Lake	"spruce-bark-canoe lake"	Jim McKinley	lake trout
T'latna' Bene'	lake on upper fork of Dust Creek	"headwaters stream lake"	Bob Marshall	
<i>Upper Ahтна</i>				
Dzah Nii Menn'	Copper Lake, "Billy Lake"	"rarely-said lake"	Katie John	lake trout
Tanaadi Menn'	Tanada Lake	"moving-water lake"	Katie John	lake trout

been mention of a giant fish story. Giant fish are called *ben yiidi* ‘the one in the lake’ or *tuu yii ltaeni* ‘the one living in the water,’ or *ben ’eltaeni* ‘the living thing in the lake.’ The term *gguux*, the general term for insect, can be used to mean a giant land creature in the Ahtna language, but this term is not used for these giant lake creatures. One theme in these giant fish stories is that loud noises can disturb the monsters with dire consequences for humans.¹

Ahtna people consider stories that take place at specific locations as true events or nonfiction. On the other hand, the *yenida’a* stories do not take place at specific geographic locations and are considered as stories from another time when the world was configured differently and animals and humans could communicate through language. What follows is a selection of accounts about giant fish, all of which take place at specific locations within Ahtna territory.

Middle Copper River, Central Ahtna Territory

Fred Ewan talked about giant fish in several of the large lakes of the middle Copper River. Fred said that Ewan Lake had giant *ts’anyae* (burbot), and Crosswind Lake, Tyone Lake, Dog Lake and Middle Lake had giant lake trout. According to Fred these were as big as a whale.

My uncle say he see it. Down other side of that Ewan Lake. North of Ewan Lake, **C’abeni** [Middle Lake] way over there something sticking out of the lake. Way over there just fin or something. After a while he coming back there he looking for it, there was nothing there. He couldn’t find it. It sink right down, hot weather he comes out. Somebody say he kills a lot of people on Ewan Lake though. Old timer when they get right in the middle crossing, just smash everything up I hear.

Ben Yiidi [‘the one in the lake’]. Do you believe that? That’s what whiteman says too. What kind a fish is in the lake. Not salmon. He not living there. Only like Dog Lake, it has a sucker, a **ben yiidi** has sucker. Ewan lake is **ts’anyae**.

¹ According to J.J. Rafferty (1900:619), who entered the Copper Basin during the gold rush of 1898, the Ahtna believed the rivers to be sacred and they refrained from making loud noises or disturbances near the water for fear of “making the water god angry.”

And Crosswind Lake is trout, **baet**. Tazlina Lake I think **ts'anyae** too. **Ben yiidi** all right. Big they say. **Like' Na'**, [Dog Creek]. My uncle he see. He says. 'un'e the whole length lake pretty near, just like a **dlaa leł** [floating algae]. Floating algae you know, **un'e kankeltsuuk dze' yaen' xut'ae**. [upstream the algae pushed up]. He just watch, pretty soon 'eł **unakudlaele** [it disappeared]. Too hot upstream **dze' u'eł nic'uuk dze' ben** [and the lake warmed up with it]. Pretty near bigger than the lake they say.

At Crosswind Lake they say, there was a big trout they say. In there. But he [the fish] went down. This white guy had to row. Boy pretty soon he got caught in that whirlpool water you know. And boy he try to get out. Pretty hard to get out he say. But some more Indian story there. A family of caribou went across, about ten of them. They say right in the middle it went like a whale. Only one calf come out. Summertime. **Ben yiidi** is this wide. He open his mouth everything water come down. Like a whale. That's the only way he can catch like a caribou. He get it that way. Only caribou I heard about like that. Tony Jackson, Nick Jackson he see. At Crosswind Lake he stay. And next morning they left for Copper Center. Right in the middle of the lake he see not **ben yiidi**, but trout. 'ele' **sesde c'a den'ilcaaghe**. [It was huge]. 'Utgahdze' **ten edeł**, dog team. [He was going above on the ice with a dog team]. He ride. He want to get him. He fly right down. Someone see Indian **Bes Cene ts'en, tacene** you [from Liebestag village]. Someone saw him from **Tacene** [bay on Crosswind L] you know. 'Utggu **tail usts'en kennel'aa**. [The tail was extending off.]

So 60 feet, 30 feet they say. You know sunshine 'use [out there] the tail sticking out was 60 feet or 30 feet sticking out with sun shining on it. **Kennel'aa** [it stuck out]. They never go **ben baaghe 'ele' stedeli** old timer, bad **ku'utanesi gha** something. [They never went far from the lake shore, the old timers, something might get them]. They real smart with it I hear.

Ben Ges iygge katikudaan xu tkut'ae you know 'uyggu. [that 'nostril lake' [lake S of Dog Lake] is deep, down there it hide there. Some whiteman say fish 'utnes **dae' kenii ghayet**. Net kae. [A white man said he got a fish there, with a net.]

That guy fishing catch whitefish. You crazy we tell em **ts'ehwni'iniic dze' dinii dze'**. Then he bring, next day he get with a net. Yet xu **delt'sii. Nahwtl'iidze' gha kadeł, Nahwtl'iidzi yii c'a yii tadighiten**, [They stay there (the whitefish) and it flows into 'blue water' [Deep Lake] down there.] All kinds of fish. Whitefish just living.

Yii yii c'a 'sdaghalts'e'. [We used to stay there.] **Ben yiidi cu yizdaa dae' kilnii. Kanii gha yet Ben Ges du'**. [The one that is the lake (giant fish) stays in there upstream in 'nostril lake'. (The name 'Nostril Lake' seems to be a pun.)

You know caribou bug coming out in the spring? **Ghanaay ggu'**. [Caribou botfly.]

Ben Ges tah ggu' [the botfly of nostril lake] it blow (its nose) and fall in the lake and **yinezyaan dze', dae' kenii** [and it grew in there, they say]. Deep lake.

Łi'ke Bene', yii c'a another one there too. [And upstream at 'dogs lake']. That one there is **dahts'adyeh**, it has giant sucker. Dog Lake **Łi'ke Bene'**. **Ben Ges c'enges tah ggu'** . ['nostril lake' has a botfly']

Andy Tyone also described giant fish and told how his grandfather had killed one by throwing hot rocks from the steam bath into the fish's mouth.

Nobody wanted to bother it. You can see that summertime. We used to walk by the lake and look across the lake [Crosswind Lake]. You can't see other side hill, water too big. It do that, that big trout in there. My grandpa used to say. He used to tell story somebody kill that kind one time. He build a fire by the lake. Steambath hot rocks, he was taking steambath. Trout, big trout come out. Open his mouth, come up to that fire. He don't know what to do. He throw that hot rock in his mouth. He just kill that trout he say, in fall time. Lake freeze up, they find it under the ice. They don't bother with it though. Ewan Lake got big ling cod they say. Susitna Lake or Lake Louise got **baet** in there.

Lower Copper River, Lower Ahtna Territory

Robert earlier noted that Chitina Lake had a giant fish. Bob heard from Joe Goodlataw that in 1914 three oil tanks fell into lake during a landslide. The lake was all covered with oil. The Ahtna say that this killed the giant fish in Chitina Lake. The fish was in the lake at the time.

Upper Copper River, Upper Ahtna Territory

Katie John (2002) discussed giant fish in Tanada Lake. This particular story has interesting details, such as the violent movement of the water and lightning that may signify a volcanic eruption of Mt. Wrangell.

Q: What about Tanada Lake?

KJ: Lots grayling and trout and ling cod. Some time they're big ones [ling cod]. Half way [the lake is] not too deep, 4, 5, 6, 7 feet deep. But other way that's a way back story, that's a really deep. Some people wintertime, they put hook down. And somebody put rock in there. And it never touch bottom he say. Long time ago people had different story. I don't think anybody know that. Where deepest place there are biggest fish in there. Where salmon coming, I hear there big salmon there. And grayling, ling cod, lake trout, all those big ones.

One time come out Banzaneta Lake [Tanada Lake] that big fish. Big fish come out. When he come out his head down to the creek and they can't catch fish. So smart. They had dip net. He coming, turn around and go back. His head coming this way, that big head. And some man fishing all night, they are hungry and fish coming down and turn around and go back. He got mad and he start a cuss that fish. And you know 'engii [forbidden] everything we say. If we get mad that's a bad luck. **Baet** [lake trout] was there. And probably ling cod. I never hear about big [giant] grayling. And next day that lake starta move. Water just start moving and head way up hillside, and they all run. They got hill that

other side. They go other side and they go farther than that. And lightning, when raining those lightning? That kinda lightning on top that lake I hear. Just like a thunder. And they all run away. Next day they go back close they listen, nothing just quiet. They went back to that lake. And that lake is nice and quiet. Not even moving. So they went down back. Probably about three or four hundred feet high up the hillside, those grayling and whatever little fish in there just dead. All around. They tell him “you cuss fish but you got enough fish.” **Tuu yii ltaen** they used to call em. Those big fish I don't know how big they are. I heard two stories, one way back, **ts'utsaedi**, [anciently] and one just a short time ago. Two time fish come out and kill people....

Katie said that when she was a child her mother told the children not to make noise around Tanada Lake. Even a dog barking could cause a disturbance on the lake. Now however, airplanes land on the lake and nothing happens and Katie speculates that the giant fish have left the lake.

Ghayii gha Tanaade sdelts'iix tah, Snaan, “Ene! Snakaey son'o ghutsagha.
/When we stay at Tanada Lake mother would say, “Don't do that! The children should not cry.”

When we stay there sometime dog barking. Little noise, that lake starta moving. Really kind scary. I don't know now, last time I went up probably about eight nine years ago. We went up with plane. We landed there. They got a motor boat and everything. How come they don't come out? Maybe he gone.

Tuu yii xu' t'aexi sometime nin' nu' xu' some other place tah he go, dae' kiitnii.
/It is in the water in a hole in the ground someplace, and he goes to another place. That is what they said.
Maybe xu' dyaak..
/That may have happened.

That's why nothing is wrong.

Yii hwk'e yaen' kedadelnes.
/That is all that is known.

Upper Susitna River, Western Ahtna Territory

In March of 1983 Jake Tansy recorded two giant fish stories.² Both have to do with a giant fish in *Nts'ezi Bene'* or Tsusena Lake on the north side of the Susitna River. As noted above Ahtna people consider stories that take place at specific places as true or nonfiction. Jake has a sense of the relative historicity of the two incidents related in these stories, and he tells this with his distinctive flair for detail and suspense. For contrast we present a **yenida'a** story about burbot and lake trout that takes place in the legendary past.

Nts'ezi Bene' Ben 'Eltaeni, The Creature in Tsusena Lake

This story was told by Jake Tansy and recorded by James Kari 1983 (Ahtna Tape 40) and reviewed with Jane Nicholas, April 2002

First incident at *Nts'zi Bene'*

Tihda'a tah koht'aene deghedze' kae luxathnilaa.
/Long ago the people used to pull sleds with their shoulders.

Yet Kacaagh idadiniłeni 'utsiit ts'abael tah diniłende dadaadze ts'en,
Nts'ezi Bene' udi'aani.
/There at 'wide area' [Deadman Lake], where current flows out to the lowland among spruce, where the current flows from the downstream side is 'Nts'ezi lake' [Tsusena Lake].

Ben bey' bec'eltaeni lu kii'eł ts'etniigi dze'.
/They did not know that there was a living creature in that lake.

Niikudaghalzet 'udaa' kiixaldilaa.
/Equi-distant [between the lakes] and downstream they pulled the sleds.

'Udaa' k'a k'es, 'udaa' k'a k'es kiik'e taxaltezdlaa 'eł.
/Downstream at the outlet they started to bring the sleds downstream at the outlet out on it (the lake ice).

² Jake Tansy told one of these stories in 1985 to archaeologist Robert Betts. "While at the site [at Butte Lake] Jake told us a long story which was related to him by Jimmy Secondchief, his cousin, about a giant fish that lived in one of the lakes in the region. The fish ate a woman and her baby who had stopped beside the lakeshore while the other band members had moved on. They crying of the baby disturbed the fish, which came to the surface and then up on land and ate the two people. The band waited awhile and then went back looking for the woman and her baby. They say something had come up out of the water at the place where they had stopped. Jake was taught as a child to be very quiet when in the vicinity of this lake for fear of disturbing this giant fish" (Betts 1985).

Ts'itghan Native woman, sc'enggaay ba tsagh, sk'es k'e xałghelcuut dze'.
/One Native woman, a baby was crying for her, and she pulled the sled to the side.

Baa izaadilghaets, baa ł'ot.
/She was breast-feeding it, it was suckling milk.

Hwtsicdze' c'eldaan' hwtsicdze', ben k'e tahdelggeze,
/All the others had gone out onto the lake

es 'udaa' nakngilaayi nihdalggeze.
/They stopped at the hills that were extending downstream there.

Daa'a ts'en lu ina' gha kulaen.
/On the downstream side is its [the lake's] creek.

Ye lu nihwdinilaa. Kiidiłk'aan dze' hdihkudghelkay lu.
/They got ready. They built a fire and chopped a windbreak

Ci one ts'akae ughel li' c'a til'iili, 'eli' c'a 'iyaale.
/That one woman was not seen, she had not arrived.

"Nts'e dyaak?" kiłnii.
/What has happened?" they said.

'Un'e k'et ts'itghan uc'anatesdyaa.
/One guy started back upstream there.

Ben k'e hwdedaagh kanaadyaay 'el
/He came up to the lake at the timberline and

nts'e c'a tkut'ae de cu.
/something had happened.

Ten de li'i c'a ben kiłcaaghe 'utggu dghelaay hwnen niłk'aets nadest'aan.
/A piece of ice as big as the lake was laying up above folded over up above on the side of a mountain.

Benł yidi c'a betaghits'ii de saen de hwk'ent'ae.
/Wind was blowing over the water (of the lake) as if it were summer time.

Dyaak de c'a u'el skostniigi, that woman.
/He did not know what had happened to that woman.
The woman had disappeared.

The second incident at *Nts'ezi Bene'*

Then after that c'a su li'i c'a hwk'edze' c'a su
/So after that, much later, at another time

sii ts'ilghan lu c'e'aaxe natedaas.
/one guy was going outdoors (hunting).

Saen tah ghanaay ka natedaas.
/He was going for caribou during the summer.

Su yet ts'en datsii dats'en hwngilaayi k'aa daghayaati.
/From there on the downland side he was coming down a series of hills.

'Unaa yanaasts'en gaahwts'e taak'i dilt'aeyi gheyaat.
/Across from the other side, here three bull caribou were walking.

Xuk'a inat'aende xu c'a ta'asi de yutnii.
/He kept looking at them to see where they would move.

Yidi 'el' unaa ben baaghe ts'inil'aats' 'el'
/Across the lake they [caribou] came out to the lake shore and

niikudaghalzetde c'a ben niidaghalcaaxde 'unaats'e yetaghil'aa.
/halfway along the distance of the lake there is an arm (of the lake) extending
across the way.

'Unaats'e nic'a'il'aetl' ghanc'a 'usoghe natedaas uhwts'e.
/They were swimming from across there, and he was going out there on the
peninsula.

Yehwna cu k'a hwnene idacaex c'etnel'iin.
/He was sneaking to intercept them on the hillside.

K'a xona k'a niikudaghalzet de ni'il'aetl'i
/Then halfway across just then they stopped swimming.

Nasendze' c'a ide' u'el' nic'a'o'tezyaayi c'a,
/Out in the distance bubbles started whirling around their antlers.

'Usu de' ye' 'utggu nic'ehwtxatas, nic'ehwtatas.
/Out there their antlers were spinning about on the surface, they were spinning
around.

All taak'i nlaen ts'e de' uk'e u'el' ta'otnii.
/All three of them were pulled into the water in a whirlpool.

Naa! Yidi c'a c'ul'aetl'. Yii daaghe su k'a'ax.
/What! Nothing was swimming there! For some reason this is true.

Yii c'a xona tsabaey itelnak'i.
/A fish had swallowed them.

Dae' su xona su tk'et kat'aen.
/That is what had happened.

Yet k'adii lu cu s'airplane tanakendel.
/At this time airplanes land on it [on Tsusena Lake],

C'a nts'e c'a t'edyak xu c'a 'eli c'a kiigha nenlyaa' k'adii 'et.
/And now they don't believe us that this happened there.

Ts'anyae Baet 'El, Ling Cod and Lake Trout

Jake Tansy told this Lingcod and Lake Trout Story in 1983 right after telling the previous story. Jake classifies this as a **Yenida'a** story, and unlike the previous story it does not take place at any particular place in the Ahtna landscape. Note, as in the giant fish story told by Andy Tyone, the giant fish in this story are killed with hot rocks thrown into their mouths. The story gives an explanation for why the burbot's liver is so tasty. It suggests that the burbot was cleaner than the giant *baet* or lake trout that had eaten the humans.

This story was told by Jake Tansy in 1983 and recorded by James Kari (Ahtna Tape 40) and reviewed with Jane Nicholas in April 2002.

Long time ago stories, [are called] yenida'a.

Ts'iiden k'a dae' one family 'alden ben baaghe hwtsicdze' tah hdelts'ii.
/One time a family was staying in one place at a lake shore.

Ben baaghe key'kughelniic, hdelts'ii.
/They had a tent pitched on the lake shore and were staying there.

One, one girl lu utse'e lu kultsaen, ba'aa hwtesdaa hwts'en tah.
/One girl, a daughter who was in puberty and she started to stay off at a distance.³

Xutah, kehwninitsiin de xuta zdaa kae.
/She was staying at a shelter they had built.

³ At puberty young women were isolated from the rest of the community until they passed their first menstrual cycle and as a result the young woman in the story is not living with her family.

Xu' uk'enaey ldu' every night gha uk'enaey tets tah 'udii 'utsii ben baaghe
hdelts'iit niitanahdelghaas.
/Her siblings were always making noise every night down below on the lake
shore where they were staying.

K'e xodze' 'et xodze' iit, ta xefts'e' tah xona nakudlaex dze' c'a hdelghuus,
hdelghuus.
/Then every evening this would happen again, they would make noise and make noise.

Xona dae' saggan lde' dadezghaet'.
/In the morning it was quiet.

Cu xu'k'a cu nahnesdaat, cu xu'k'a k'a eli' yidi c'a dits'iige.
/And another night passed, and she didn't hear anything else.

Dae' dadighaet' dze' c'a.
/Then it got quiet.

"Nts'et kut'e'dze' da?" nizen dze'?
/She thought, "What is going on?"

'Utsiit hwt'ae' tesde kanadyaa.
/She went up the hill in the lowland.

'Utsiit c'a hwnax, beletga' 'et, kenc'ughehniic.
/Down below where there was a shelter, a tent had been pitched.

Yidi c'a 'eli' ditniige dae' hwtsicdze' hwtazyaa.
/But there was nothing there, everything had washed out with high water.

'Utsii yahwdedyaa' 'et nothing, dae' yidi c'a 'eli' ditniie.
/She went down below, but somehow nothing was the same.

C'a ben 'ae ghayet ben 'ehdelyaayi,
/And things that had been there in the lake,

Ben 'eltaeni yii xu kugha tabaaghe kezdlaex de.
/A creature [a giant fish] in the lake had swam to them at the shore.

Hwtsicdze' yii kutelna'.
/It had swallowed up everything.

Beletga' ts'iide yii si cu ts'es tsicdze' ts'es niñadghilaes de.
/By the tent on one side she gathered together all kinds of rocks.

Ts'es t'ae'dze' hwtsicdze' nitnini'tots.
/She piled up all the rocks.

Lu t'aedze' gheli tsets t'en tiye tsi'nelt'aeyi nadelyaa.
/She gathered a whole lot of good dry wood and logs

Tsets cu tsicdze' nitninił'ots.
/She piled up all kinds of dry wood.

Cu idiłk'aan c'ecene' kede'aay k'eze idiłk'aan.
/And she built a fire, and a stump was sticking up beside the fire she had built.

Ts'es hwtsicdze' sitnił'ots.
/She put all the rocks on the fire.

Hwtsicdze' dae' ts'es siit' ht'idyilaak dze'.
/All the rocks became red hot.

Xu' k'a xelts'e' de natełghaetli de
/Then toward evening and it started to get dark.

Dzaen yidi iłdu ben lu xu nahwluude kuzdlaen dze',
/The days (daylight) at the lake had become as in fall time and,

xa'tle dests'etl'.
/it was slightly frozen.

C'isnatse du' dae' ben 'edelts'iits', beda... ben 'edahwdestnii.
/All of a sudden a rustling noise was heard from the lake.

Niłk'etl'uuł ts'e tı'uuł yenezdlaa.
/She had ropes that were tied together.

Tı'uuł kae nduu c'a duu dedesdyaats'i c'a c'ecene' c'ecene' yizyas.
/She tied a rope onto herself and she tied it onto the stump.

C'ecene' iy'ngeltı'uun.
/She tied it to a stump.

Hwngeltı'uun xu hwdelyaak.
/She had it tied there.

'Eli hwdist'aege xona 'utsiit kedahwdetnes k'et konii.
/In a little while then down below a sound was heard.

Gaa datsii ben ben 'aet ben tadel'aade gaat,
/Here down below in the lake where the water extends there,

Kadaghiyel hwna uzaa hwts'e' kelts'idiłts'aex.
/It [giant fish] raised its snout up, and the wind blew into its open mouth

(The giant fish had its mouth held open.)

Uzaahwts'e kelts'idiłts'aex hwna,
/As the wind blew into its mouth that it kept open.

Tsedi i'lagets' yidi tsedi lagets' yidelniic.
/Copper gloves, she put on copper gloves.

Du si gaa ts'es siit' k'ent'aeyi yi'yetl' izaa dze' say'del'aa.
/Here she grabbed some of those red-hot rocks and she put them in its mouth.

Yii dix'a' a c'a uzaa lts'idildaetl'.
/The wind blew those rocks into its mouth.

Xona half c'eghaan' dze' cu ts'es hwtsicdze' izaadghilaay.
/Half of them went into its mouth.

'Et cisanatse dae' datsene u'etl' niikenahwdestniic
/And all of a sudden down by the shore was a noise that moved in a circle.

Ht'ae' nadadidghaetl'.
/It got very quiet again.

'Eli c'a dahwdist'aeye cu coxe nahw ben 'ae nadahwdestnes
/Not much later there was another noise in the lake.

Yidi 'etl' cu coxe xodze' yehwna cu xodze' gha tsoxe gha nts'e dghat'aen' xu.
/The same thing again happened, just like it had happened the first time.
Another fish came to the surface and opened its mouth.

Xu su ts'es 'use' lyetl' di uzaa ye dzaxts'e' say'del'aa hwna
/She grabbed some of those rocks from the fire and she put lots of them in its mouth.

Xodze' dixak'a uzaa lts'ideldaetl'.
/The wind carried those rocks right into its mouth.

Xodze' c'a k'adii ndahwk'e ts'es c'a izaa dghilaa,
/So many rocks had gone into its mouth,

xuk'e ts'es izaa dghilaayi cu yii cu datsene 'etl' niikenahwdestnii.
/as the rocks were leaving in its mouth, down below (at the lake) there was a noise that moved in a circle.

Dadighaetl' tets
/It got calm at night.

Saggan kakal'aeni 'etl' 'utsene ben dze' ni'ghatsene nadaeggi nts'e c'a tes
hwnez'aani k'ent'ae
/In the morning it got daylight and down at the lake there was something that looked like two hills.

Uzaegge' kenc'utnghelts'etl'
/Their [two giant fish] throats had been scorched.

'Eli c'a ben 'etanasdaele hwna.
/They could not get back into the water of the lake.

Ye' kughidaax.
/They had collapsed.

Yii si cu tsay'tsiy yats'iniltaan dze'
/So she took out a knife.

Gaa baet ts'elk'ey baet, ts'elk'ey ts'enyae, nadaeggi nlaen xu
/Here was one lake trout; and here was one lingcod, two of them.

Ts'elk'ey baet, ts'elk'ey ts'enyae
/One lake trout and one ling cod.

Baet yet gaa itsaadle' k'edze' gaa it'aas, it'aas
/She cut the lake trout here on its belly, she cut it.

K'adii cu naxu whale yak'a cu skadeghit'e'
/Now it was built just like a whale.

Ndanak'e ghit'aats'i 'el xona icaan' nit'aats.
/She was cutting it for a while and she cut into its stomach.

Izet' icaan ts'e'u'aali gha
/She took the liver out of its stomach.

Łcaan yet'aats' ibet' dghay'nit'aats'i 'el hwtsicdze' uk'enaey tsigha' utsigha'
tsicdze' ubet' yidezdlaa.
/As she cut into its stomach all of her siblings' hair, was all over in its stomach.

Cu inadghitset dze'.
/Then she quit (cutting the lake trout).

C'eghadi ts'elk'ey yii cu t'aas, xona ts'enyae yit'aas.
/She cut the other one, she cut into the ling cod.

Ndanaay c'a yay'nit'aats' icaan'nit'aats' ibet' ghanany'nit'aats' ibet' cu hwnal'aeni 'el.
/She cut on it for a while, she cut into its stomach, as she cut through its stomach
and she looked inside.

Yi'el yidi c'a 'eli' c'a ubet' c'a ditniige.
/There was nothing was inside its stomach.

Hwtsicdze' dae' dii ufood ye yaen' ubet' c'izdlaa.
/Just all of its normal food was in its stomach.

Xona yet izet' ts'i'nit'aats', izet' i'ghiyaan'
/So then she took out its liver and ate the liver.

Yii daaghe ba dii ling cod uzet' good, cod liver oil 'el c'a nlaen.
/And this is the reason why the lingcod's liver is good, it is like cod liver oil.

C'a cod liver oil gaa ling cod zet' uzet' dghalnes c'a udetnii ling cod.
/So the ling cold liver tastes like cod liver oil, it is said of the ling cod.

Yii izet' ghiyaan'i yii daaghe uzet' ugheli c'ilaen.
/She ate that liver and due to this its liver is good.

The Longnose Sucker

The longnose sucker (*Castomos castomos*) has some importance to the Ahtna as a reliable secondary food source. They occur in large numbers in many small streams throughout Ahtna territory and are easily caught in fish traps and box traps. In November of 2000 Jake Tansy told this story about the sucker's elaborate bone structure. Stories about the bones of the sucker are told in other Northern Athabascan languages, such as Koyukon and Dena'ina, and in other North America Indian languages. For example, Hunn (1980:155-158) mentions a similar Sahaptin story about the sucker. This is another example of a *Yenida'a* story that takes place in the legendary past when people and animals could speak to one another.

This story was told by Jake Tansy in 2000 and recorded by James Kari (Ahtna Tape 106).

Tsabaey k'a nlaen xu, tsabaey k'a nlaen xu su.
/There are fish, and there are [various] fish.

Yenida'a koht'aene yedi c'a xu hwlakołdeł.
/Long ago people would give things away.

No, k'ali'i nle' natdzałgheli, hwt'ae' 'itaalceł," kenii.
/"I won't give that back to you, I will just keep it," they would say.

Xuc'a ut'e' one ts'elk'ey luk'ece'e ts'enyae c'a su yidi c'a dghine'de.
/There is one [fish], a king salmon or a ling cod that said this.

Yii si gaa k'adii c'a yeden hwniyaldeł, 'eli' koht'aene 'ele' k'edze' 'eli'i nayıłdeł.
/That one that time he took some things, and he did not return them to the people.

Koht'aene 'iie yilcetdze'.

/He kept taking the people's belongings.
K'alii ule' natdzałdele, "Hwt'ae' 'oostnak k'ae."
/He would not give them back, "I'll just keep them." [He would say]

Yen lu' kiilaaghe nahyulaeł kiinadetnes.
/They try to take them back, but they failed.

K'adii c'a deniigi, deyaazi deyaazi dae' su 'unii daydghi'aan, deyaazi 'et.
/Now he [the sucker fish's skeleton] has that moose, the cow moose hanging up
back in there.

K'adii c'a yen ya'ootnak.
/Now he took that [the horns] from her (cow moose).

Xona unadadghelniic.
/Now I remember that.

Dahts'adyeh du', dahts'adyeh su tsicdze' hwnic'aldełi.
/The sucker, the sucker had taken everything for himself

Dahts'adyeh u'eł 'itnes?
/Do you know the sucker?

Dahts'adyeh hwtsicdze' koht'aene gaa tsay'tsiy, niłdzaghts'aghi yii c'a ilaagh
i'ghitsesdze'
/The sucker has everything, a man's knife, and a knife with fluted handles⁴ that
he also had taken away from them (forcefully).

Gha 'eli' ele' nayitghele.
/And he did not give them back.

Łu k'adii gaa desnii deyaazi dae' yii c'a, deyaazi Łu unii'dany'daydghi'aani, udae'.
/And as I just said, the cow moose horns it has hanging back in there, are its
horns.

Ya'utnak dze' k'ali' ile' natdzhaghełi 'et.
/He took it from her (from the cow moose), and he won't give them back to her.

K'adii su gaa dahts'adyeh Łu gaa utsits'ene' gaani utse' gaani hwtsicdze' ts'en
nlaen.
/Now here in the sucker's skull, its head has every kind of bone.

Tsay'tsiy, hwtsicdze' yii nlaen.
/A knife, everything is in there.

⁴The fluted knife handle is quintessentially Athabascan.

Niidzaats'aghi, gaa lyeda'a uyiyiltaan.
/He has a coiled handled knife inside there.

Deyaazi de' gaa c'a uyi yiz'aan.
/A cow moose's horns are in there.

Yi gha su deyaazi c'a ude' kole.
/That is why the cow moose has no horns.

C'eyiidze' lu udae' c'ilaen.
/The bull moose has the horns.

K'adii ndaane c'a dahts'adyeh tse' nghu'aen'i xu,
/Now whenever you see the sucker's head,

k'al'aa c'a tkonii de.
/it is true what is said.

Dahts'adyeh tse' c'a gaani 'use naz'aay' 'etadghitset dze' tnelghots.
/When you put the sucker head in water a pot on the fire and it boils.

C'etiye dghilcaaxi dahts'adyeh duu ghilcaax.
/It should be a big one, a sucker of this size.

Dghiltsigi lu hard to see you know.
/Small ones are hard to see (the bones) you know.

Utse' ts'ezdlaets xu tnelghots xu, tiye stlo', utsen' uts'edax xu
/We cook its head, and it is boiled and it gets soft and the meat comes off of it.

Uts'ene' yen uyits'exiighadax.
/Its bones from its insides are exposed.

Deyaazi de' utsits'ene' gaa uyits'es'dini'aan.
/The cow moose's horns are here like a stone placed in its skull.

T'ae gheli k'ali' deyaazi k'adii gha c'eyiidze' dae' yii nts'e nt'ae xu c'a
/Now really it is so, the cow moose used to have horns like the bull moose's horns.

You believe it, you know.

Utse' gaa hwk'e Itset, dze' uts'itighit'aats' dze' 'uset naz'aayi 'etghilaets dae' stlo' 'eł.
/Its head is sliced and cut open out there it is put in boiling kettle and it gets soft.

Uts'ene utats'i'ilaes dze'
/Its bones come off of it.

Pretty near all kinds a bone, you know.

Yii su deniigi deyaazi de' c'a uyiz'aa
/It has a cow moose's horns inside.

Duughe utsic'uus k'ae nani'aa xu c'a su nt'ae.
/It is here going across at its 'hat's place' [behind the sucker's head].

Summary

The narratives presented in this chapter provide a window into the Ahtna's relational view of nature. The story about the anatomy of the longnose sucker is an example of the detail of Ahtna traditional knowledge. The story can also be understood as an allegory of the interrelatedness of all things, since the sucker fish possesses not only the lost horns of the female moose but the fluted handled knife of the humans.

The giant fish stories can also be viewed from several perspectives. Since Ahtna classify the stories regarding these fish as true there is the distinct possibility that giant fish once inhabited the larger lakes in the Copper Basin, and if this is the case, that may have implications for understanding changes in the environment of the Copper Basin. For example, fish populations in unfished or lightly fished subarctic lakes are usually bimodal with large numbers of small fish, a few of intermediate size, and many large fish (Powers 1977; Berkes 1999:118). The disappearance of exceptionally large fish could mean that the population dynamics within big and intermediate sized lakes within the Copper Basin has changed either because the environment has changed, or because of over harvesting (see Chapter 6). Lake trout and burbot, the species most frequently mentioned in Ahtna oral traditions, are known not to be able to stand high rates of exploitation (Berkes 1999:119). Traditionally only a few were taken, and mostly in the winter when food was scarce. The fact that these fish were considered dangerous indicates that the Ahtna knew that burbot and grayling needed to be treated carefully.

In this regard, giant fish could also be understood as a symbol of an unpredictable, and sometime

violent nature. As such, the stories demonstrate how precarious the relationship between humans and nature is. To maintain this relationship humans followed a series of rules that included respecting the fish, minimizing waste (i.e. not over harvesting) and maintaining a clean environment (Simeone 2002:49-50; 77-78). In addition children were expected to remain quiet and not make disturbance when around the harvest site (ibid). If left undisturbed giant fish remained tranquil, but when needlessly disturbed by humans became incredibly dangerous. At the same time the giant fish could also be viewed as symbols of nature in its purest, undisturbed state. Both Bob Marshall and Katie John remark that the giant fish are now gone. Bob says the giant fish at Chitina was destroyed by oil pollution. Katie wonders why, with all the noise from machines on Tanada Lake, that the giant fish have not appeared, and she speculated that they might have been offended and gone some place else.

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Chapter Six

Results of a Survey on the Contemporary Harvest and Use of Non-Salmon Species in the Copper River Basin

Introduction

The objective of the survey was to update data on the harvest and use of resident species of fish collected by the Division of Subsistence in 1982 and 1988. This included identifying species harvested, estimating harvest quantities, assessing levels of harvest effort, collecting harvest location data, collecting data on harvest methods and methods of preparation, and assessing how the harvest of resident species fits into contemporary subsistence patterns.

A standardized harvest survey was used to collect harvest and use data on non-salmon fish species (Appendix A). Survey data are presented in a series of tables in the body of the report.

Additional tables representing data for each community can be found in Appendix B.

Respondents were asked to recall their harvest of non-salmon species for a one year period from October 1, 2000 to September 30, 2001. The survey included questions on the quantities of fish harvested and used, types of fishing gear, methods of transportation to fishing sites, sharing practices, and household size and composition. Of the 1,193 households in the Basin, 42 percent, or 496 households, were interviewed, which compares favorably with the target in the investigation plan and co-incidentally is about the same percentage (472 households or 38 percent) of households interviewed in 1988 (McMillan and Cuccarese 1988:9-10).

Methodology

The study was conducted in cooperation with the Copper River Native Association (CRNA), Cheesh'Na Tribal Council, Mentasta Tribal Council, and the Chitina Tribal Council. With

funding provided by the U.S. Fish and Wildlife Service, Fisheries Information Service, all of the tribal collaborators hired local assistants to administer the survey in their respective areas. CRNA hired Julie Bator, the Cheesh'Na Tribal Council hired Chantelle Pence, the Mentasta Tribal Council hired Eva John, and the Chitina Tribal Council hired Linda Lohse and Loni Lohse to conduct surveys. In addition, the Subsistence Division hired three seasonal employees of ADF&G Division of Sport Fish: Lin Perry-Plake, Mark Stadtmiller, and Steve Donalson.

A list of the 18 sample communities and estimated populations is provided in Table 8. The boundaries of each community were established using County Block Map PL 94-171 from the 2000 US census. All the communities in which the survey took place were census-designated places (CDP); however, because the communities of Copper Center/Silver Springs and Tazlina/Copperville are in such close proximity, we combined them into single samples. In addition to using the census data we asked local people to develop lists of households. Households were identified through the telephone directory, from maps provided by local community associations, from maps used by the US Census Bureau to conduct the 2000 census, and from tribal lists provided by the collaborating tribal governments. The initial listing of households was based on housing units, but only those households establishing their primary, year-round residence in the study area were included in the sample selection. Counting only year-round residents is one reason why the division's population estimates differ from those of the U.S. census.

Another reason that the division's estimates differ from those of the census is because it may have included or excluded households from different census-designated areas. For example, the Chitina sample inadvertently included only households in the town of Chitina. The Chitina CDP, however, incorporates households at the western end of the McCarthy Road. The division includes these households in our McCarthy/McCarthy Road sample. Likewise the McCarthy CDP includes the town of McCarthy and leaves out households located along the eastern portion of the McCarthy Road. Those were included in the division's McCarthy/McCarthy Road sample.

As shown in Table 9, some communities were sampled using a stratified random format and others were selected using a straight random format. Originally the research design called for

Table 8. Sample Copper Basin Communities and Estimated Populations
Copper River Basin Communities, 2001

Community	U.S. Census Estimated community population	ADF&G Estimated community population
Copper River Basin	2,926	3,094
Chistochina	93	78
Chitina	123	95
Copper Center/Silver Springs	492	557
Gakona	215	251
Glennallen	554	572
Gulkana	88	63
Kenny Lake	410	280
Lake Louise	88	86
McCarthy/McCarthy Road	42	117
Mendeltna	63	38
Mentasta	142	147
Nelchina	71	86
Paxson	43	38
Slana	124	122
Tazlina/Copperville	328	298
Tolsona	27	31
Tonsina	92	71
Willow Creek	201	167

SOURCES: Alaska Dept. of Community and Economic Development, AK. Community Database
Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Table 9. Number and Percentage of Sample Households by Sample and Strata, Copper Basin Communities, 2001

One Stratum Sample

Communities	Total No. of Households	Interview goal	Number interviewed	No. failed to contact	Number refused	Percent Interviewed
Copper Basin Totals	1193	717	495	226	21	42.0%
Chistochina	36	36	30	5	1	81.0%
Chitina	37	37	16	12	9	43.2%
Glennallen	204	61	62	0	8	30.4%
Gulkana	33	33	11	22	0	33.3%
Kenny Lake	143	29	22	7	0	15.4%
Lake Louise	41	41	11	30	0	26.8%
McCarthy Road	46	46	26	19	1	56.5%
Mentasta	54	54	32	22	0	59.3%
Paxson	21	21	10	11	0	47.6%
Slana	62	62	25	35	2	40.3%
Tonsina	34	34	26	8	0	76.5%
Nelchina	27	27	18	9	0	66.7%
Mendeltna	23	23	9	14	0	39.1%
Tolsona	15	15	15	0	0	100.0%
Willow Creek	80	16	24	0	0	30.0%

Two Strata Sample

Non-Native

Communities	Total No. of Households	Interview goal	Number interviewed	Number failed to contact	Number refused	Percent Interviewed
Tazlina/Copperville	87	26	34	0	0	72.5%
Gakona	74	24	24	0	0	32.4%
Copper Center/Silver Springs	113	23	34	0	0	63.5%
		73				

Alaska Native

Communities	Total No. of Households	Interview goal	Number interviewed	Number failed to contact	Number refused	Percent Interviewed
Tazlina/Copperville	33	33	33	0	0	100.0%
Gakona	3	3	2	0	0	66.6%
Copper Center/Silver Springs	65	65	31	34	0	63.5%

SOURCE: ADF&G, Division of Subsistence, Copper Basin Non-Salmon Harvest Assessment, 2002

interviewing all households in communities with 80 or less households. In larger communities the goal was to interview 20 percent of the households selected from a random sample. This procedure was used in a majority of the communities, including Glennallen. However CRNA staff said they were not comfortable interviewing non-Natives, and additionally CRNA wanted to interview 100 percent of Native households. To accommodate CRNA, the project investigator devised an alternative procedure for the four villages served by CRNA in the Copper Basin: Gakona, Gulkana, Tazlina/Copperville, and Copper Center. These communities were separated into two strata, one composed of Native and another of non-Native households. The objective was to interview 100 percent of the Native population and a random sample of the non-Native population. In reporting the data we have combined the Native and non-Native samples, treating each as a separate stratum.

In the investigation plan approved by the Fisheries Information Service it was estimated that 927 households resided in the Copper River Basin, but the final count was 1,193 households, 28 percent more than originally estimated. As noted above, the goal was to interview 100 percent of households in the small Native communities and to develop a sample for the larger communities for a total of 685 interviews. Four hundred and ninety six households were interviewed and sampling goals were achieved in Glennallen, Tolsona, Tazlina/Copperville, and Willow Creek. The refusal rate was low but winter weather and the distances between communities made it very difficult to contact people, thus reducing the overall contact and interview rate. Local assistants administered the survey in person. Each person contacted was informed that his or her participation in the survey was voluntary and that his or her identity would remain confidential. A household not contacted after three attempts was dropped and another was randomly selected and added to the sample.

According to the schedule in the investigation plan, preparations for the survey were to begin in September 2001 and the survey was to be completed by the end of November 2001. However preparations for the survey did not begin until mid-October 2001 and the last surveys were not completed until May of 2002. The Mentasta Tribal Council hired one person to conduct the surveys. This person quickly surveyed Mentasta Village, but because of transportation problems, she had difficulty surveying houses along the Tok Cutoff or Nabesna Road. Cheesh

Na' Tribal Council also hired one person who was able to complete interviews in Chistochina Village and along the Tok Cutoff. CRNA was able to hire only one person to conduct surveys in all of their respective communities. This person also had a full time job and was only able to work on the project during the evenings and on weekends. The Chitina Tribal Council hired two people but they did not begin work until February 2002 and one of technicians became ill during the survey and was unable to finish. As a result Chitina did not complete its portion of the survey until May 2002.

Species Harvested

Respondents reported harvesting all of the non-salmon fish species except for slimy sculpin. Respondents were not asked to differentiate between round and humpback whitefish. Grayling was the only non-salmon species reported harvested and used in every community surveyed (Table 10). Only four of the 18 communities surveyed did not report a harvest of either rainbow trout or lake trout (Chistochina, Gulkana, Mentasta and Willow Creek). Three of the 18 communities in the survey did not report a harvest of burbot (Chitina, McCarthy/McCarthy Road and Nelchina). Four communities: Gulkana, Lake Louise, Mendeltna and Tolsona, did not report harvesting Dolly Varden. Eight communities did not report a harvest of whitefish. Only three communities reported a harvest of suckers, while four reported a harvest of steelhead. To summarize, the most frequently reported harvested species were first grayling then burbot, rainbow trout, lake trout, Dolly Varden, and whitefish.

Harvest Quantities

In terms of total pounds harvested for all communities, whitefish was harvested in the greatest quantity (4570.5 pounds), followed by rainbow trout (3,959.8 pounds), grayling (3,758.2 pounds), burbot (2,852.8 pounds), Dolly Varden (1,907 pounds), and lake trout (1,885.7 pounds) (Table 11). Communities reporting the largest harvests of non-salmon species were Copper

Table 10. Percentage of Households Harvesting and Using Non-salmon Fish by Species, Copper Basin Communities, 2001

	Chistochina		Chitina		Copper Center		Gakona		Glennallen		Gulkana		Kenny Lake		Lake Louise		Mc/McCarthy Rd.	
	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use
Burbot	10.0%	10.0%	0.0%	0.0%	13.1%	15.4%	20.3%	20.3%	11.3%	12.9%	9.1%	18.2%	9.1%	18.2%	54.5%	63.6%	0.0%	0.0%
Dolly Varden	3.3%	6.7%	25.0%	37.5%	18.5%	19.7%	16.3%	16.3%	6.5%	6.5%	0.0%	0.0%	40.9%	40.9%	0.0%	0.0%	26.9%	26.9%
Lake Trout	20.0%	20.0%	18.8%	18.8%	16.6%	20.8%	12.2%	16.3%	12.9%	14.5%	0.0%	0.0%	4.5%	4.5%	54.5%	63.6%	15.4%	15.4%
Grayling	43.3%	43.3%	12.5%	18.8%	33.0%	35.4%	48.8%	48.8%	22.6%	22.6%	36.4%	45.5%	27.3%	31.8%	27.3%	27.3%	15.4%	15.4%
Pike	3.3%	3.3%	0.0%	0.0%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%	9.1%	3.8%	3.8%
Sucker	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	7.7%
Rainbow Trout	0.0%	0.0%	25.0%	31.3%	29.7%	29.7%	16.3%	16.3%	16.1%	17.7%	18.2%	18.2%	45.5%	45.5%	18.2%	18.2%	26.9%	30.8%
Steelhead	0.0%	0.0%	6.3%	6.3%	1.9%	3.1%	0.0%	0.0%	0.0%	0.0%	9.1%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Whitefish	13.3%	20.0%	0.0%	0.0%	13.6%	17.1%	9.3%	9.3%	4.8%	4.8%	0.0%	0.0%	0.0%	0.0%	54.5%	72.7%	0.0%	0.0%

	Mendeltna		Mentasta		Nelchina		Paxson		Slana		Tazlina		Tonsina		Tolsona		Willow Creek	
	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use	Harvest	Use
Burbot	22.2%	33.3%	3.1%	3.1%	0.0%	0.0%	10.0%	10.0%	40.0%	44.0%	11.0%	13.2%	7.7%	11.5%	6.7%	20.0%	8.3%	8.3%
Dolly Varden	0.0%	0.0%	6.3%	6.3%	16.7%	16.7%	40.0%	40.0%	32.0%	32.0%	13.2%	14.8%	30.8%	30.8%	0.0%	0.0%	33.3%	33.3%
Lake Trout	22.2%	33.3%	6.3%	6.3%	16.7%	16.7%	30.0%	40.0%	44.0%	44.0%	11.0%	11.9%	3.8%	3.8%	6.7%	13.3%	0.0%	4.2%
Grayling	11.1%	11.1%	46.9%	43.8%	44.4%	38.9%	40.0%	40.0%	76.0%	84.0%	29.3%	30.1%	26.9%	26.9%	20.0%	20.0%	25.0%	25.0%
Pike	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.0%	12.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sucker	0.0%	11.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rainbow Trout	22.2%	33.3%	0.0%	0.0%	50.0%	50.0%	10.0%	20.0%	4.0%	4.0%	8.9%	11.9%	38.5%	38.5%	26.7%	26.7%	37.5%	37.5%
Steelhead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.1%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Whitefish	0.0%	0.0%	62.5%	53.1%	0.0%	0.0%	20.0%	20.0%	32.0%	32.0%	6.4%	7.2%	3.8%	3.8%	0.0%	0.0%	0.0%	0.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Center/ Silver Springs (3,257 pounds), Lake Louise (2738.5 pounds), Slana (2,198.5 pounds), Gakona (2,038.9 pounds), Tazlina/Copperville (1,756.5 pounds), Glennallen (1,637.6 pounds), and Kenny Lake (1,415.8 pounds) (Figure 7). The other eleven communities reported total harvests of less than 1,000 pounds. Per capita harvests ranged from 2.5 pounds in Chitina to 31.9 pounds in Lake Louise. Mean household harvests varied widely from 66.8 pounds in Lake Louise to 5.6 pounds in Tolsona (Table 12). In terms of individual species, Tazlina/Copperville reported the largest harvest of burbot (508.3 pounds). Lake Louise reported the largest of harvest of whitefish (1,891.9 pounds) and Slana reported the largest harvests of lake trout (386.9 pounds), grayling (661.4 pounds), and pike (194.4 pounds). Kenny Lake reported the largest harvest of Dolly Varden (392 pounds), while Copper Center/Silver Springs reported the largest harvest of sucker (29.4 pounds), rainbow trout (1,177.6 pounds), and steelhead (97.7 pounds) (Table 11).

Harvest Methods

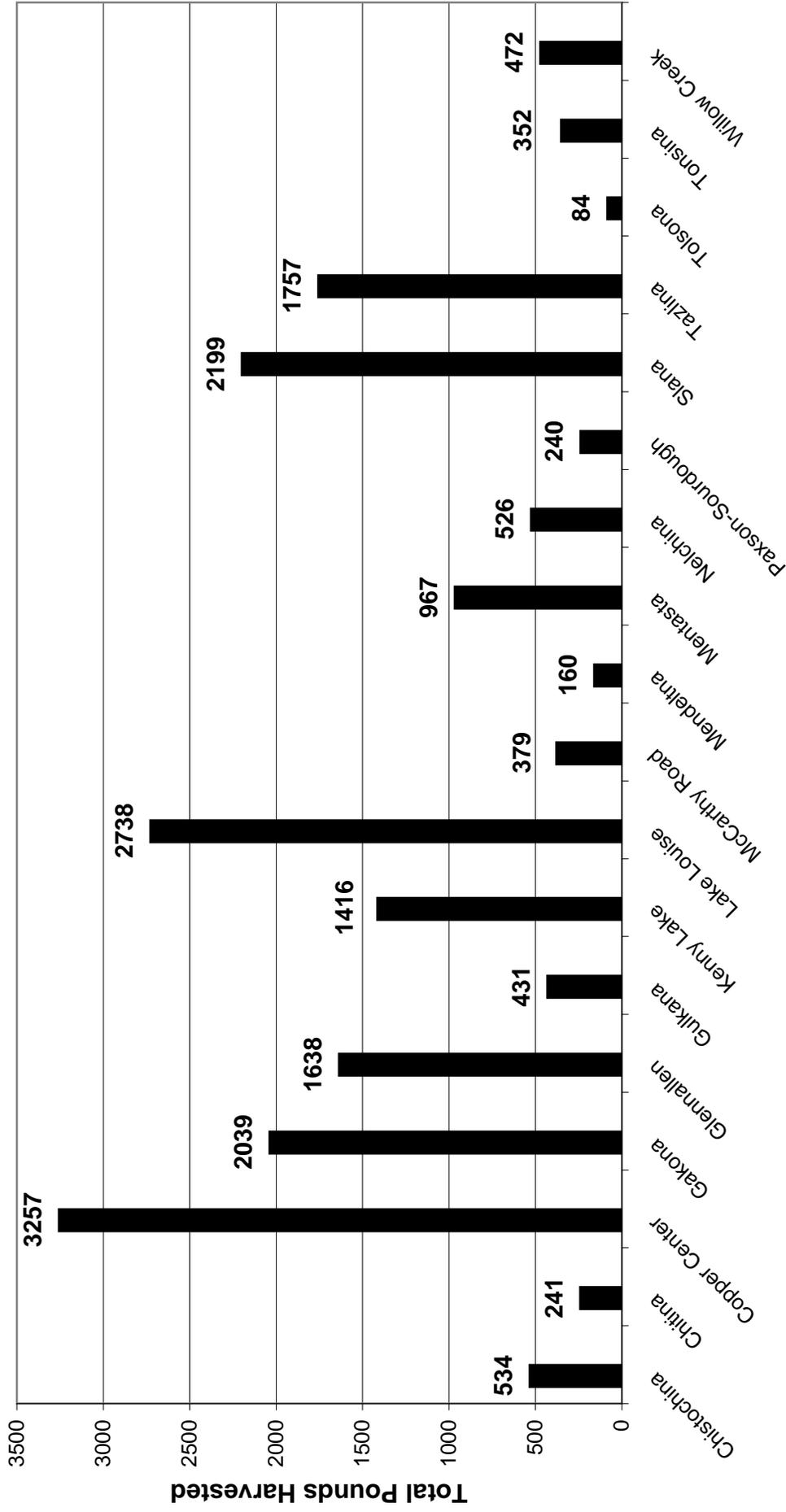
In the survey respondents were asked about a number of harvest methods including: gillnet, dip net, fish wheel, set hook or set line, fish spear, rod and reel, and ice fishing. Under current state regulations non-salmon species can only be harvested with a sport fishing license or with a subsistence permit issued by the ADF&G area biologist. Subsistence regulations allow for a wide variety of gear types, but do not allow the use of rod and reel, which is in contrast to federal subsistence regulations that do. It should be noted that both state and federal regulations allow for the retention of steelhead and rainbow trout if taken incidentally in a fish wheel, but if taken in a dip net these fish must be released immediately. All communities reported using rod and reel and ice fishing to catch non-salmon species (Table 13). Only four communities, Chistochina, Gakona, Lake Louise, and Mentasta, reported using gillnets to harvest whitefish. Respondents from Chitina and McCarthy/McCarthy Road reported harvesting steelhead and Dolly Varden with dip nets. Six communities including Chistochina, Copper Center/Silver Springs, Gulkana, Lake Louise, Slana, and Tazlina/Copperville reported harvesting Dolly Varden, whitefish, burbot, lake trout, sucker steelhead, and grayling in fish wheels. The use of

Table 11. Total Pounds Harvested by Non-salmon Fish Species, Copper Basin Communities, 2001

Community	Burbot	Arctic Char	Dolly Varden	Lake Trout	Grayling	Pike	Sucker	Rainbow Trout	Steelhead	Unknown Trout	Whitefish	Total
Chistochina	168.7	0.0	2.2	167.7	129.5	6.9	0.0	0.0	0.0	0.0	58.8	533.8
Chitina	0.0	0.0	41.6	60.1	48.6	0.0	0.0	80.9	9.7	0.0	0.0	240.9
Copper Center/SilverSprings	374.9	27.9	235.2	256.1	563.7	5.9	29.4	1177.6	97.7	0.0	488.6	3257.0
Gakona	319.8	0.0	126.0	129.8	349.1	0.0	0.0	133.9	0.0	0.0	980.3	2038.9
Glennallen	189.5	0.0	299.1	177.7	340.9	0.0	0.0	488.3	0.0	0.0	142.1	1637.6
Gulkana	108.0	0.0	0.0	0.0	252.0	0.0	0.0	58.8	12.6	0.0	0.0	431.4
Kenny Lake	46.8	0.0	392.0	26.0	286.7	0.0	0.0	664.3	0.0	0.0	0.0	1415.8
Lake Louise	500.9	0.0	0.0	126.7	161.7	20.8	0.0	36.5	0.0	0.0	1891.9	2738.5
McCarthy/McCarthy Road	0.0	0.0	60.5	113.2	17.3	5.0	5.0	161.0	0.0	17.0	0.0	379.0
Mendeltna	55.2	0.0	0.0	51.1	21.5	0.0	0.0	32.2	0.0	0.0	0.0	160.0
Mentasta	4.1	0.0	10.6	13.3	327.2	0.0	0.0	0.0	0.0	0.0	612.1	967.3
Nelchina	0.0	0.0	25.6	120.0	115.5	0.0	0.0	264.6	0.0	0.0	0.0	525.7
Paxson	40.3	0.0	47.3	33.6	92.6	0.0	0.0	5.9	0.0	0.0	20.8	240.5
Slana	482.1	0.0	229.9	386.9	661.4	194.4	17.4	3.5	0.0	19.8	203.1	2198.5
Tazlina/Copperville	508.3	0.0	220.9	196.6	237.8	0.0	0.0	396.8	25.7	0.0	170.4	1756.5
Tolsona	9.6	0.0	0.0	6.0	11.2	0.0	0.0	57.4	0.0	0.0	0.0	84.2
Tonsina	12.6	0.0	105.9	20.9	45.8	0.0	0.0	164.8	0.0	0.0	2.4	352.4
Willow Creek	32.0	0.0	111.0	0.0	95.7	0.0	0.0	233.3	0.0	0.0	0.0	472.0
Total Pounds	2852.8	27.9	1907.8	1885.7	3758.2	233.0	51.8	3959.8	145.7	36.8	4570.5	

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Figure 7. Copper Basin Community Harvests of Non-salmon Species in Pounds, 2001



SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Table 12. Harvest in Pounds, Non-salmon Fishery, Copper Basin Communities, 2001

	per capita harvest lbs/non-salmon	mean hh lbs/non-salmon	total harvest lbs/non-salmon
Chistochina	6.7	14.4	533.9
Chitina	2.5	6.5	240.9
Copper Center	5.8	18.3	3256.8
Gakona	8.1	24.2	2039.1
Glennallen	2.8	8.0	1637.5
Gulkana	6.8	13.0	431.4
Kenny Lake	5.0	9.9	1415.7
Lake Louise	31.9	66.8	2728.8
McCarthy/ Mc. Road	3.2	8.0	378.9
Mendeltna	4.1	6.9	159.9
Mentasta	6.5	17.9	967.4
Nelchina	19.4	6.1	525.7
Paxson/Sourdough	6.3	11.4	240.4
Slana	18.0	35.4	2198.5
Tazlina	5.8	14.6	1756.5
Tolsona	2.7	5.6	84.2
Tonsina	4.9	10.3	352.2
Willow Creek	2.8	5.9	472

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

set hooks or setlines was reported in Tazlina and Mentasta to harvest whitefish and burbot. Fish spears were reported used by respondents from Chistochina, Copper Center/Silver Springs, Gakona, Glennallen, McCarthy/McCarthy Road, Mentasta, Slana and Tazlina/Copperville to catch whitefish, pike, lake trout and sucker.

Harvest Locations

Table 14 lists all the locations where respondents said they harvested non-salmon species during the study year. Place names are listed in alphabetical order. Along with the name is information on the general location of each place, whether the body of water is stocked by ADF&G, and the type of transportation used. As shown on the map (Figure 8) many harvest sites are located on the road system, and the major lakes of the Basin. Only a few are located on federal land, including Tanada Lake, Nelson Lake, Silver Lake, and Strelna Lake. Sites located on Copper River are fish wheels that reported a harvest of non-salmon species. Fishermen traveling on snow machines in winter most frequently fish lakes off the road system.

Harvest Effort

Table 15 summarizes the percentage of households in each community that attempted to harvest, harvested, used, received or gave away non-salmon species of fish. The percentage of households reporting a harvest of non-salmon species varied from a high of 88 percent in Slana to a low of around 33 percent in Mendeltna. Lake Louise reported the highest percentages in all categories with 90 percent of households reporting using non-salmon fish, 72 percent reporting receiving fish and 36 percent reporting giving away fish. Comparing 2001 data with that collected in 1987 shows declines in the percentage of households harvesting and using non-salmon species (Table16, note that data from 2001 and 1987 are not comparable for some communities). For example, in Chitina the percentage of households reporting a harvest of non-salmon species declined from 61 percent in 1987 to 37 percent in 2001, while in Kenny Lake the

Table 14. Reported Harvest Locations for Non-salmon Fish Species, Copper Basin Communities, 2001

2 Mile Lake (135) (also Second Lake) - Chitina Road	Little Lake Louise
3 Mile Lake (135) (also Third Lk/Three Mile Lk) - Chitina Road	Little Tonsina River
First Lake 135 (also One Mile Lake) - Chitina Road	Little Woods Creek - M.P. 154 Glenn Highway
46.9 Mile Lake - Richardson Highway	Tonsina River - upper and lower
Ahtell Creek - Tok Cutoff	Mankomen Lake - upper Chistochina drainage
Arizona Lake - Glenn Highway	Meiers Lake - Richardson Highway
Buffalo Lake - M.P. 156 Glenn Highway	Mendeltna Creek - Glenn Highway
Cache Creek - Glenn Highway	Mentasta Creek
Caribou Lake - North of Glenn Highway	Mentasta Lake
Carlson Lake - Tok Cutoff	Mineral Lakes - Tok Cutoff
Chitina River	Moose Creek - West Fork of Gulkana River
Clarence Lake - N.W. of Lake Louise near the Sustina R.	Moose Creek - Glenn Highway, stocked
Coleman Creek	Old Road Lake
Copper Lake - fly or ATV	Paxson Lake
Copper River - Copper Center FW Fishery	Pippin Lake - Edgerton Cutoff
Crosswind Lake - stocked by ADF&G - fly or ATV	Poplar Grove Lake - Richardson Highway
Crosswind Lake Tributaries - fly or ATV	Pup Lake - south of outlet at Crosswind Lake
Dick Lake - east of Richardson Highway	Ranger Lake
Dog Lake (flows into Lake Louise)	Rock Creek - Denali Highway
Emerald Lake - Wrangell Mountains - fly	Rock Lake - east of Crosswind Lake
Ewan Lake - fly or ATV	Round Lake - east of Crosswind Lake
Fielding Lake - Richardson Highway, stocked	Rufus Creek - Nabesna Road
Fish Creek (tributary to Mentasta Lake)	Ryan Lake
Fish Creek - Tok Cutoff	Sculpin Lake (Nelson Lake) - McCarthy Road, stocked
Fish Lake	Silver Lake (Van Lake) - McCarthy Road, stocked
Gakona River	Slana River
George Lake - M.P. 155 Glenn Highway	Snowshoe Lake- Glenn Highway
Gravel Pit Lake (also Squirrel Creek Gravel Pit)	Sourdough Creek- Richardson Highway
Grizzly Creek	South Lake (N.E. of Palmer)
Grizzly Lake - Tok Cutoff	Strelna Lake - McCarthy Road
Gulkana River - Float (Sourdough to Highway)	Sucker Lake - south of Glenn Highway
Gulkana River	Summit Lake (near Paxson)
Gulkana River Float (Paxson to Sourdough)	Susitna Lake
Gulkana River Other Fishing (below Paxson Lk & Summit Lk)	Susitna River (upper portion)
Hanagita Lakes - fly	Tanada Creek
High Lake - east of Tazlina Lake, stocked	Tanada Lake
Hudson Lake - fly or ATV	Tangle Lakes - Denali Highway
Indian Pass Lake - fly or ATV	Tazlina Lake
Indian River - Tok Cutoff	Tex Smith Lake (Trappers Den Lake)- Glenn Highway, stocked
Jack Creek - Nabesna Road	Tiekle River - ATV
Jan Lake - southeast of Lake Louise	Tulsona Creek - stocked by ADF&G
Upper and Lower Kaina Creek/River - east of Tazlina Lake	Tonsina Lake
Kaina Lake- fly or ATV	Tonsina R. (also Lower Tonsina R.)
Klutina Lake - ATV	Town Lake - Chitina
Klutina River - boat or by foot	Tyone Creek
Lake Dinty- Lake Louise area	Tyone Lake
Lake Louise - stocked by ADF&G	Upper Kaina Creek (also Kaina Creek/River)
Lake Susitna - stocked by ADF&G, boat or fly	Upper Susitna River (also Susitna River)
Landmark Gap Lake - 25 miles north of Denali Highway	Willow Creek (23 mi NE Paxson)
Leila Lake - Glenn Highway, Tahenta Pass	Willow Creek (Richardson Hwy 13 mi N. Tonsina)
Little Tok River, Tok Cutoff	Woods Creek - Glenn Highway

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

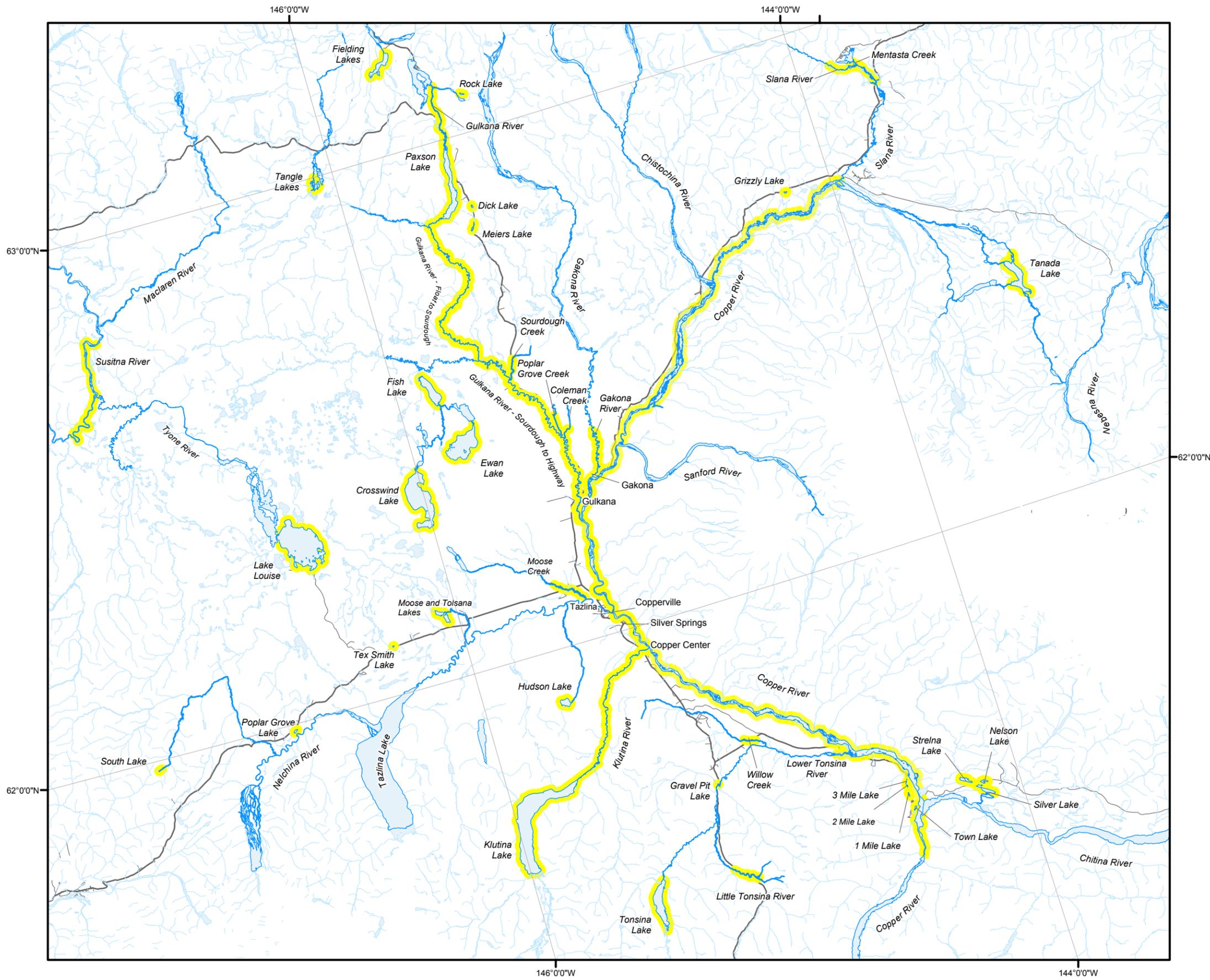
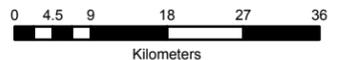


Figure Eight, Upper Copper River

Non-salmon Subsistence Catch Locations,
Map by LGL Alaska Research Associates

All Locations

- Main Road
- Secondary Road



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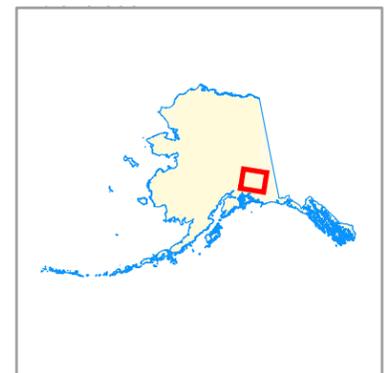


Table 15. Participation Rates, Non-salmon Fishery, Copper Basin Communities, 2001

Community	Use	Attempt	Harvest	Receive	Give
Chistochina	66.7%	56.7%	56.7%	20.0%	13.3%
Chitina	43.8%	50.0%	37.5%	12.5%	0.0%
Copper Center	47.7%	46.6%	45.4%	12.7%	11.5%
Gakona	58.1%	71.5%	58.1%	8.1%	16.3%
Glennallen	38.7%	45.2%	37.1%	6.5%	9.7%
Gulkana	54.5%	54.5%	45.5%	27.3%	9.1%
Kenny Lake	59.1%	68.2%	59.1%	13.6%	0.0%
Lake Louise	90.9%	90.9%	81.8%	72.7%	36.4%
Mc./McCarthy R.	53.8%	57.7%	53.8%	7.7%	19.2%
Mendeltna	44.4%	44.4%	33.3%	22.2%	0.0%
Mentasta	75.0%	68.8%	68.8%	40.6%	28.1%
Nelchina	66.7%	61.1%	61.1%	16.7%	0.0%
Paxson	60.0%	70.0%	60.0%	30.0%	20.0%
Slana	88.0%	88.0%	88.0%	36.0%	24.0%
Tazlina	38.7%	43.8%	37.8%	8.1%	8.9%
Tolsona	60.0%	60.0%	53.3%	26.7%	6.7%
Tonsina	38.5%	42.3%	38.5%	3.8%	15.4%
Willow Creek	38.5%	42.3%	38.5%	3.8%	15.4%

SOURCE: Alaska Department of Fish and Game
Division of Subsistence, Household Survey, 2002

Table 16. Comparison* of Some Participation Rates, Copper Basin Communities, 1987 and 2000

	Use		Harvest	
	2001	1987	2001	1987
Chistochina	66.7%	78.6%	56.7%	57.1%
Chitina	43.8%	83.3%	37.5%	61.1%
Copper Center	47.7%	78.1%	45.4%	57.8%
Gakona	58.1%	69.5%	58.1%	57.6%
Glennallen	38.7%	62.9%	37.1%	42.4%
Gulkana	54.5%	70.0%	45.5%	70.0%
Kenny Lake	59.1%	88.3%	59.1%	83.4%
Lake Louise	90.9%	100.0%	81.8%	100.0%
Mentasta	75.0%	83.3%	68.8%	62.5%
Paxson	60.0%	78.6%	60.0%	78.6%
Tazlina	38.7%	51.7%	37.8%	50.8%

SOURCE: Alaska Department of Fish and Game
Division of Subsistence, Household Survey, 2002 and Community Profile Database
*Data not comparable for some communities

percentage declined from 83 percent to 59 percent. In Lake Louise 100 percent of households reported a harvest in 1987 compared to 81 percent in 2001. In Mentasta the percentage of households reporting a harvest went up. Table 17 shows individual participation in non-salmon fishing. Slana, Mentasta, and Chitina reported the highest rates of individual participation in both fishing and processing non-salmon species.

Summary and Discussion

The survey documented the continued use of non-salmon fish by residents of the Copper Basin. Species taken in greatest quantities, in terms of pounds harvested, were whitefish, rainbow trout, grayling, burbot, Dolly Varden, and lake trout. Communities reporting the largest harvest of non-salmon species, over 1,000 pounds, were Copper Center/Silver Springs, Slana, Gakona, Tazlina/Copperville, Glennallen, Lake Louise, and Kenny Lake. Between communities the per-capita harvests ranged from 2.7 to 19.4 pounds. A majority of respondents reported catching non-salmon fish with rod and reel or ice fishing. Most harvests took place on state land in lakes and streams located on or near the highway system. Popular fishing spots located on federal land were situated in Wrangell St. Elias National Park and Preserve.

Before 1950 resident fish species played a greater role in the Basin economy than today. Fred Ewan estimated that before 1950 half the total harvest of fish for his extended family was made up of sockeye salmon while the other half was composed primarily of humpback whitefish and grayling. In addition his family harvested long nose suckers, primarily for dog food, some burbot, harvested mainly for their liver, and a few lake trout. The principal harvest of whitefish and grayling took place during the spring and fall migrations in lake outlets or streams where the Ahtna could deploy fish weirs, dip nets and fish traps. Most harvests of lake trout and burbot took place in the winter on lakes where the Ahtna could jig for them through the ice.

Fred thought an annual total harvest for whitefish and grayling was between 2,000 and 4,000 fish. He also said his family would harvest between 1,000 and 2,000 longnose suckers and a

Table 17. Percentage of Population Fishing or Processing Non-salmon Species
Copper Basin Communities 2001

Community	Percent Fishing	Percent Processing
Chistochina	26.6%	23.4%
Chitina	51.2%	43.9%
Copper Center	37.7%	21.9%
Gakona	53.8%	26.2%
Glennallen	30.5%	13.8%
Gulkana	42.9%	38.1%
Kenny Lake	53.5%	32.6%
Lake Louise	56.5%	34.8%
McCarthy/ Mc. Road	47.0%	50.0%
Mendeltna	46.7%	20.0%
Mentasta	63.2%	62.1%
Nelchina	38.6%	21.1%
Paxson	55.6%	27.8%
Slana	87.8%	87.8%
Tazlina	37.3%	19.0%
Tolsona	51.6%	25.8%
Tonsina	31.5%	24.1%
Willow Creek	24.0%	20.0%

SOURCE: Alaska Department of Fish and Game
Division of Subsistence, Household Survey, 2002

lesser number of rainbow trout and burbot. Fred estimated that only about 25 to 30 lake trout were harvested because they were difficult to catch. Frank Stickwan said that when the grayling were running in the fall his family might harvest about 200 fish, but the fall harvest of grayling was influenced by the amount of meat people had. The more meat they had, the fewer grayling they harvested. Katie John said that her family annually harvested about 3,200 sockeye and about 100 whitefish, though she later said that her family filled three or four 100 pound gunnysacks full of dried whitefish. They also harvested about 1,000 suckers that were used to feed the dogs. Note that today, very few people have dog teams and the harvest of suckers is negligible. Reckord (1983a: 33-34) recorded one Ahtna elder who estimated that the annual harvest of whitefish and other non-salmon fish at Tyone Lake resulted in a cube of fish 8 feet on each side, and it provided much of the food for the Tyone Lake village.

Averaging Fred Ewan's harvest estimates of whitefish and grayling amounts to an annual harvest of 1,500 fish for each species. Multiplying 1,500 by a conversion factor of 0.7 for grayling and 0.9 for whitefish, we arrive at 1,050 pounds of grayling and 1,350 pounds of whitefish, or 2,400 pounds for an extended family of approximately 10 people. This does not take into account the harvest of burbot, sucker, or trout. Surveys conducted by the Division of Subsistence in the 1980s indicated that Copper Basin families continued to harvest non-salmon fish species but at much lower levels than those reported by Fred Ewan. For example, in eight Basin communities (Chistochina, Copper Center, Gakona, Glennallen, Gulkana, Kenny Lake, Lake Louise, and Mentasta) the average household harvest for all non-salmon species was 58 pounds in 1982 and 52 pounds in 1987 (ADF&G Community Profile Data Base). In 2001 the average household harvest for those same eight communities was 22 pounds.

Changes in settlement patterns and subsequent developments in regulation have contributed to the decline in the harvest of non-salmon fish in the Basin. In the 1950s, truancy laws and the decline in fur prices, which stimulated the desire for employment, forced many Ahtna families to settle permanently in communities along the highway system and abandon the traditional seasonal round (Reckord 1983a: 54). As a result, by the mid 1950s few families made the annual trip to fish for whitefish and grayling at places like Crosswind Lake, Ewan Lake, Lake Louise, or

Tyone Lake. Resettlement along the road and subsequent change in traditional harvests patterns resulted in a general decline of non-salmon harvests among the Ahtna.

As the Ahtna settled in permanent communities along the road system the non-Native population of the Copper Basin began to grow. Between 1950 and 1960 the population increased from about 800 to 2,100 people, and the majority settled along the road system (Rollins 1978; Simeone and Fall 1996). In response, the state began to manage the harvest of non-salmon fish within the Basin, and in 1963 required a permit to harvest whitefish. No additional regulations were imposed until 1969 when the state closed Crosswind Lake to all subsistence fishing. A year earlier the lake had been closed to commercial fishing, apparently because it interfered with the growing sport fishery, and this was the same reason it was closed to subsistence fishing (Tom Taube personal communication). During the 1970s population growth in Anchorage and the Matanuska-Susitna Valley placed increasing demand on the resources of the Basin (Stratton 1984:24). Readily accessible stocks of fish in lakes along the highways soon began to reach their harvest capacities, and in response the state tightened regulations.

Under current state regulations any Alaska resident may harvest non-salmon fish with a subsistence permit, issued by the area biologists, or by obtaining a sport-fishing license.¹ State subsistence regulations do not stipulate seasons, bag limits, or gear type, which are set at the discretion of the area biologist, but few people apply for subsistence permits. In 2000, for example, only nine subsistence permits were issued in the Basin, and only eight of these were fished. Two of the permits were issued to a dog musher who wanted to harvest fish to feed his dogs. All the permits were issued for the harvest of whitefish with a total recorded harvest of 1,974 fish (ADF&G, Division of Sportfish data base). The area biologist has never had a request for a subsistence permit to harvest of burbot, grayling, or lake trout (Tom Taube, personal communication).

Before 1977 state sport fishing regulations for non-salmon species were fairly liberal. Burbot could be harvested using either a rod and reel or a setline with up to 15 hooks, and there was no bag limit for burbot. The daily limit on grayling and lake trout was ten fish and the season was

¹ Up until the year 2000 burbot could be harvested under personal use regulations.

open year around. After 1977 conservation concerns caused the state to tighten sport fishing regulations. Under current sport fishing regulations (2002-2003) unattended setlines for burbot are prohibited anywhere in the Basin except the main stem of the Copper River. Most burbot are harvested in the winter using setlines and in the past these could be left unattended during the night and checked in the morning. Now they must be attended. Because of conservation concerns both Tolosna Lake and Lake Louise, which are accessible by road, have been closed to all burbot fishing. Conservation concerns have also led to smaller bag limits for the harvest of lake trout, which are 1 or 2 fish depending on location.

Sport fishing regulations for the harvest of grayling and rainbow trout have also become more restrictive since 1977 in lakes that are not stocked by ADF&G. One reason for the restrictions on the harvest of wild rainbow trout is that the Copper River Basin is the edge of their natural range. In general regulation the daily limit is 2 fish per day, and only one of those may be over 20 inches long. For grayling the daily limit is five fish per day, but in lakes stocked by ADF&G the daily limit of rainbow trout and grayling is 10 per day for each species. There are no size limits on grayling, but only one rainbow 20 inches or longer may be kept. In state sport fishing regulations there is no restriction on the harvest of whitefish. They may be harvested using a spear and there is a fall spear fishery in the Slana River. Under current federal regulations any finfish, except for salmon and steelhead/rainbow trout, may be harvested without a permit.

As noted above, mean household harvests of non-salmon fish species for eight Basin communities declined from 58 pounds in 1982 to 22 pounds in 2001. Comparison of mean household harvests for five species of non-salmon fish in these same communities is illustrated in Table 18. It shows that average household harvests have fluctuated but generally trend downward.

The composition of the non-salmon harvest has changed since the 1950s. Before 1960 Ahtna harvests were composed primarily of whitefish and grayling, with suckers harvested primarily as dog food. Lake trout and burbot were of secondary importance. Current survey results show that whitefish were the predominant species harvested, followed closely by rainbow trout, grayling, and burbot. Rainbow trout and grayling are stocked by ADF&G in lakes easily

Table 18. Comparison of Mean Household Harvests, Copper Basin Communities, 1982-2001
1982

Community	Burbot	Grayling	Lake Trout	Rainbow Trout	Whitefish
	Mean Lbs per hh.				
Chistochina	<1	10	2	0	5
Copper Center	5	4	3	2	1
Gakona	37	18	2	4	8
Glennallen	4	2	2	<1	<1
Gulkana	2	6	1	2	3
Kenny Lake	0	4	0	3	<1
Lake Louise	50	16	31	9	80
Mentasta	3	6	0	4	5

1987

Community	Burbot	Grayling	Lake Trout	Rainbow Trout	Whitefish
	Mean Lbs per hh.				
Chistochina	4	11	7.8	0	13
Copper Center	2	7	2	<1	<1
Gakona	7	7	5	4	3
Glennallen	7	7	<1	9	7
Gulkana	7	7	<1	<1	7
Kenny Lake	0	8	18	3	1
Lake Louise	29	5	18	0	27
Mentasta	13	12	0	0	54

2001

Community	Burbot	Grayling	Lake Trout	Rainbow Trout	Whitefish
	Mean Lbs per hh.				
Chistochina	5	4	5	0	2
Copper Center	2	3	1	7	3
Gakona	4	4	2	2	12
Glennallen	<1	2	<1	2	<1
Gulkana	3	8	0	2	0
Kenny Lake	<1	2	2	5	0
Lake Louise	12	4	3	<1	46
Mentasta	< 1	6	<1	<1	11

Source: ADF&G Community profile data base, Division of Subsistence Household Survey 2002

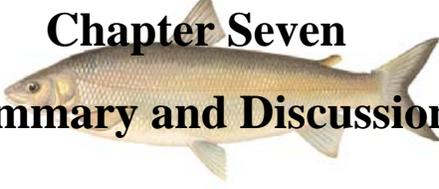
accessible by road, which explains the high harvest of these fish. Whitefish are considered subsistence fish used both for human consumption and dog food, but burbot is more popular among non-Natives because of their flavor, which is said to taste something like lobster (compare this Fred Ewan's statement that burbot meat was not eaten by humans but fed to the dogs). The popularity of burbot and lake trout in lakes located near the road system has caused populations of these fish to be over harvested and it is doubtful if the burbot population in Lake Louise can rebound (Tom Taube, personal communication).

In summary, the character of the non-salmon fishery in the Copper Basin has changed since the Ahtna were the principal users of the resource. Before 1960 the primary species harvested for human consumption were whitefish and grayling caught during the spring and fall with dip nets and basket traps placed in streams or lake outlets. Suckers were primarily harvested to feed dog teams. After 1960 a new fishing pattern emerged based on the use of rod and reel and setlines to catch trout, burbot, and grayling in lakes and streams situated close to the road system. Survey results show that this pattern continues. Whitefish are still harvested for human consumption, but more often for dog feed, and by only a small segment of the local population. More popular are rainbow trout and grayling caught in lakes stocked by ADF&G, and burbot and lake trout harvested during the winter in lakes that could be reached by snow machine.

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Chapter Seven

Summary and Discussion



Historically the harvest of whitefish, trout, grayling, and burbot was crucial to the subsistence economy of the Copper Basin. The seasonal round as described by Ahtna elders included fishing for grayling and whitefish in the spring and fall in lake outlets or small streams where they could deploy dip nets and fish traps. Burbot and lake trout were caught primarily during the winter by jigging through the ice. One Ahtna elder said that his family harvested up to 2,400 pounds of whitefish and grayling in one year. The construction of highways in the mid 1940s,¹ which substantially increased the availability of wage employment, along with a decrease in the price of fur that made it uneconomical to trap, and pressure to keep children in school, brought changes in the traditional seasonal round as the Ahtna settled permanently in villages close to the highway system. By the 1970s few Ahtna families went to traditional fishing sites located at places like Crosswind or Tyone lakes and the harvest of non- salmon species among the Ahtna began to decline.

As the Ahtna settled into permanent communities along the road system the state's non-Native population grew placing increasing demand on the resources of the Basin. By the mid-1970s readily accessible stocks of fish in lakes along the highways soon reached their harvest capacities. Currently under state regulation any Alaska resident can harvest non-salmon fish in the Copper Basin under a subsistence permit issued by the area biologist, who sets restrictions on bag limits, or gear type. However few people apply for subsistence permits but instead fish under sport fishing regulations. Since the mid 1970s conservation concerns for burbot and lake trout in lakes close to the road system have forced the state to severely tighten regulations for these species. Sport fishing regulations for the harvest of grayling and rainbow trout have also become more restrictive in lakes not stocked by ADF&G. In state sport fishing regulations there is no restriction on the harvest of whitefish. They may be harvested using a spear and there is a

¹ Wolfe and Walker (1987:66) show that two of the factors that influence subsistence productivity are roads and settlement entry by non-Natives. They write that as the percentage of the non-Native population increases in an area overall subsistence productivity decreases.

fall spear fishery in the Slana River. Under current federal regulations any finfish, except for salmon and steelhead/rainbow trout, may be harvested without a permit.

Today a majority of respondents to the survey reported catching non-salmon fish with rod and reel or ice fishing and most harvests took place in lakes and streams located on or near the highway system. In terms of total pounds harvested whitefish were first, but only four communities reported a harvest of whitefish using subsistence gear. The second and third largest harvests were reported for rainbow trout and grayling and the most frequently reported harvested species were grayling, burbot, rainbow trout, lake trout, Dolly Varden, and then whitefish. The popularity of rainbow trout and grayling can be attributed to the fact that these species are stocked by ADF&G in lakes easily accessible by road. Compared to surveys conducted in the 1980s by the Division of Subsistence, the overall harvest of non-salmon species has declined. Some of this decline can be attributed to conservation concerns over the local population of burbot and lake trout that have brought about stricter regulations on the harvest of these fish. In two previous surveys, for example, households at Lake Louise reported the largest harvests of burbot, lake trout and whitefish in the Basin. Recent data shows that in the case of burbot and lake trout this is no longer true.

In addition to gathering survey data we also interviewed Ahtna elders about their knowledge of non-salmon species. Local knowledge is recognized as an important source of observational data on long term and trends about wildlife resources and ecological processes (cf. Mauro and Hardison 2000: 1263; Freeman, Matsuda, and Ruddle 1991; Williams and Hunn 1982; Nakshima 1991, and Pitcher 1998). Some managers view traditional knowledge as unscientific and unquantifiable, and therefore outside the interests of management bureaucracies, or as a set of observations that could provide management with useful information (Van Daele 2003:144; Feit 1998:2; Freeman 1985; Usher 1986). However, there are managers who view traditional knowledge as another, equally important source of data. As one manager put it,

I don't think there are many managers that would want to manage with only one type of data or one view of nature. Most of us are data hungry, wishing we knew more about the various [fish] populations and had more money to gather information, so that we can better manage the fish populations we are

responsible for. Having a system that collects all available data into a single source would be a great benefit.

At some point, the TEK and scientific data needs to be placed into an easily accessible site. It is interesting to see the TEK and scientific data mesh together (distribution data, run timing) but by looking at all the available information, a better understanding of the users and resource can be achieved (Tom Taube, personal communication).

There are two ways that traditional knowledge can contribute to environmental research and resource management: 1) traditional knowledge can extend our knowledge of the history of specific ecosystems; and 2) traditional knowledge can add to the general knowledge of local ecosystem dynamics by providing observations that are generally more detailed and wide ranging than those obtained by managers

According to Reist (1997:6) biological data on subarctic fishers is “poor” or “non-existent.” Information on non-salmon fisheries in the Copper Basin goes back about 30 or 40 years and is confined to major lakes and streams. Managers have short chronologies on which to build predictions or management plans. In the third chapter of this report we presented information from about 1870 to 1950 that provides information on the presence or absence of species, as well as their distribution, migration patterns, and productivity. The oral traditions presented in chapter five extend this chronology even further back in time. One striking example of this is Katie John’s reference to least cisco in Mentasta Lake. Katie noted that these small fish, which she called *xaal ggaay*, were found in Mentasta Lake into the early 20th century, but fisheries biologists have never documented their presence in the Copper River Basin. This kind of information will help managers to create a baseline for monitoring purposes and assist in planning and implementing future research projects.

Up until the 1950s Ahtna elders spent considerable time on the land. To make a living they traveled on foot and by dog team over large territories, returning to places year after year. As a result their observations of the environment are frequently more comprehensive, and in some instances more detailed, than those collected by managers. Collectively Ahtna elders have a

more comprehensive knowledge of the vast array of streams and lakes within the Copper River Basin than do managers, who focused their research on major lakes and streams where fishing pressure is most intense. In this report the elders provided information on streams and lakes that have never been sampled or assessed by managers, or that managers have only limited information.

Observations offered by Ahtna elders not only expand our base of information in geographical and chronological senses, they provide valuable insights that can lead to future research. For example, fisheries biologists know that whitefish spend the winter in deep water but there is little information about what happens to the fish during the winter. For instance, some studies conducted in the Arctic indicate that whitefish do not feed in the winter (Schmidt et al. 1989). This fits with the observation made by Katie John that whitefish in May are “poor, not good to keep” but in June they are feeding heavily and fat. Katie noted that the best time for harvesting whitefish was near the end of June and early July, when the fish are fat and they have eggs. Katie also thinks that when whitefish, grayling, and burbot over winter in Mentasta Lake, they hibernate like a “bear go in a hole. They stay still.” Frank Stickwan, made a similar observation that in the winter grayling “rest” and do not “move much.” Fisheries biologists know that whitefish probably spend most of the winter in deep water, but they are uncertain why (Brown 2003) and there are no observations that support or contradict Katie’s’ view that fish bury themselves in the muck.

Little is known about the environmental cues that effect the movement of fish but the elders provide some clues. When Frank Stickwan discussed the area around the south end of Crosswind Lake he noted that the same species of fish may move at different times, depending on where they are going. He observed that generally fish migrate in the spring from large, deep lakes (which are probably cold) into smaller lakes (that may be warmer). According to Frank grayling move in May as soon as the ice leaves (between May 1 and 20) and return in September. Humpback whitefish and sucker follow the grayling in the spring, and return to the deep lakes sometime in mid-summer (where the water is probably cooler). Specifically, Frank stated that in the spring grayling, sucker and some humpback whitefish migrate out of Crosswind Lake into Game Trial Lake where they spend the summer. In September they migrate back to

Crosswind Lake, and Frank thinks their movements in the fall are triggered by snow on the water. Other Crosswind Lake whitefish migrate to Second Hill Lake and return to Crosswind Lake in October.

Note that Crosswind Lake is 100 feet deep and is deeper than neighboring lakes such as Ewan Lake (21 feet), Fish Lake (18 feet), and Dog Lake (10 feet). The varying depths of these lakes (with different temperatures) may explain the constant movement of whitefish in and out of Crosswind Lake. This also might explain Fred Ewan's statement that humpback whitefish live in lakes within a 20-mile radius around Fish Lake and spawn in the lakes during the fall. In other words, Fred is noting the migration pattern of whitefish in the system of lakes that include Crosswind Lake, Dog Lake, Deep Lake, Fish Lake, Middle Lake and Ewan Lake.

Katie John described the seasonal movement of whitefish in the Slana River drainage. According to Katie when a lake has an outlet stream that goes into a river, whitefish move into the river during the summer. However if there is no river, whitefish follow creeks leading into lakes. Whitefish follow streams and might spawn in the stream if a river is unavailable. In the Slana River drainage, Katie said that whitefish leave Mentasta Lake in May and go down Mentasta Creek into the Slana River. They continue to migrate until the middle of June, spending the summer in small lakes and side streams. Then in October they move out of the lakes and head to the upper Slana River where they spawn. Whitefish begin to spawn in November, when the ice starts to form.

Besides adding to the scientific base line of specific ecosystems there are several general advantages to involving local people more closely in management: 1) it is generally more cost effective because enforcement is less of an issue; 2) it broadens the knowledge base (through the use of traditional knowledge) on which decisions are made and thus improving management; 3) develops better communication with users; 4) creates opportunities for participatory research, which improves management research and the information on which decisions are made. Participatory research also improves harvesters' attitudes towards the decision making process; 5) the nature and complexity of ecosystems demand more attention to detail than can be mustered by a centralized management system (McCay and Jentoft 1996:247). Because both

subsistence economies and the ecosystems they depend upon are dynamic, research data should include all aspects of these systems, not merely harvest data. “Only in that way will predictive ability be developed, since harvest data alone, even when suggesting harvest trends, do not identify casual factors” (Kelso 1982: 8).

Recommendations

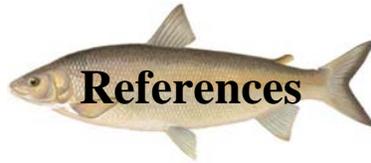
The creation of venues to enhance communication between local people and managers is recommendation of this report and of our previous report (Simeone and Kari 2002). Such venues should be considered as equal exchanges of information, so that both managers and local people feel comfortable sharing information. Effective communication requires acknowledging that local people do have valuable information or insights, and that managers do have legitimate concerns. The objective is to build relationships with local people so that managers and locals can develop common goals.

In the Copper Basin a venue has been created by Ahtna Incorporated and Copper River Native Association, which have formed an intertribal subsistence committee. Several meetings of the committee have already taken place and been attended by managers from ADF&G, National Park Service and the US Fish and Wildlife Office of Subsistence Management.

The response to a draft of this report by the ADF&G area biologist and the NPS biologist at Wrangell St. Elias National Park strongly suggest that continuing to document traditional knowledge is important. The current system of management relies on Regional Council members and anthropologists to supply traditional knowledge to the managers and the Federal Subsistence Board. Traditional knowledge cannot be learned within the context of a board meeting, a hearing, or by simply reading reports. Research on traditional knowledge needs to be expanded into collaborative projects that include the Native community, social scientists, and managers. Correlated with information from the natural and social sciences, traditional knowledge can become a powerful tool by providing resource managers with an extended

chronology of a fishery and a fuller understanding of ecological relationships. One example of this kind of collaborative research is the Back to the Future Program (BTF) of the University of British Columbia fisheries program. The BTF program seeks to evaluate present and past ecosystems by combining biological data with traditional knowledge, explorers' accounts, old maps, charts and photographs, historical catch data, and archaeological and anthropological information to build a quantitative ecosystem model using a computer program called Ecopath (Pitcher 1998:5). Such collaborative research has been proposed in project (FIS 04-553) submitted by the Division of Subsistence.

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- Acheson, James M. and James A. Wilson. 1996. Order out of Chaos: The Case for Parametric Fisheries Management. *American Anthropologists* 98(3):579-594.
- Ahtna Incorporated. 1988. Report on Investigation: Over-the-Horizon Backscatter Radar System at Gulkana, Alaska, Oral/Ethnohistoric Cultural Studies Program. Appendix Volume.
- Alaska Community Database. Alaska Department of Community and Economic Development.
- Alaska Department of Fish and Game. 2002. Subsistence and Personal Use Statewide Fisheries Regulations. Juneau, Alaska.
- Andersen, David B. and Craig L. Fleener 2001. Whitefish and Beaver Ecology of the Yukon Flats, Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 265. Juneau.
- Bell, Henry and Etta. 2000. Audiotape recorded in 2000 at Kenny Lake by Jim Kari.
- Betts, Robert C. 1985. Western Ahtna Ethnohistory of the Butte Lake Region. Ms.
- Berkes, Fikret, 1999. *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. Philadelphia: Taylor & Francis.
- Billum, Frank, Ahtna Tape 112. Audiotape recorded in 2000 at Willow by James Kari and Bill Simeone.
- Brown, Randy. 2003. Movement Patterns of Radio-Tagged Adult Humpback Whitefish in the Upper Tanana River Drainage. U.S. Fish and Wildlife Service.
- Charles, Carl. 2002. Audiotape recorded in 2002 at Dot Lake by James Kari.
- Cruikshank, Julie. 1981. Legend and landscape: Convergence of oral and scientific traditions in the Yukon Territory. *Arctic Anthropology* 18(2): pp.67-94.
- _____. 1990. *Life Lived Like A Story*. University of Nebraska Press.
- Ewan, Fred. Ahtna Tape 135. Audiotape recorded in 2002 at Gulkana by James Kari.
- _____. 2002. Ahtna Tape 137. Audiotape recorded in 2002 at Gulkana by James Kari.
- Feit, Harvey. 1988. Self-Management in the North American Arctic: The Case for Co-Management. In *Traditional Knowledge and Renewable Resource Management*. M.M.R. Freeman and L.N. Carbyn, eds. Pp. 72-91. Edmonton: The University of Alberta.
- _____. 1998. "Reflections on Local Knowledge and Institutionalized Resource Management: Differences, Dominance, Decentralization." In *Aboriginal Environmental Knowledge in the North*. Louis-Jacques Dorais, Murielle Nagy and Ludger Muller-Wille, eds. Québec: Université Laval, Gétic. Pp. 123-148.
- _____. n.d. James Bay Crees' Life Projects and Politics: Histories of Place, Animal Partners and Enduring Relationships. In Mario Blaser, Harvey A. Feit and Glenn McRae. Eds. In the Way of Development: Indigenous Peoples, Life Projects and Globalization. Zed Books, London.
- Fienup-Riordan, Ann. 1994. Boundaries and Passages: Rule and Ritual in Yup'ik Eskimo Oral Tradition. University of Oklahoma Press.

- Freeman, Milton. 1985. Appeal to tradition: different perspectives on arctic wildlife management. In *Native Power: The Quest for Autonomy and Nationhood in Indigenous Peoples*. Jens Brøsted et al. eds. Pp. 265-281. Bergen: Universitetsforlaget.
- Freeman, Milton, Y. Matsuda, and K. Ruddle, Eds. 1991. "Adaptive Marine Resource Management Systems in the Pacific. In *Resource Management and Utilization* Vol. 18. No. 3-4.
- Haggan, Nigel, Jon-Ann Archibald and Silvia Salas. 1998. Knowledge Gains Power When Shared. In *Back to the Future: Reconstructing the Strait of Georgia Ecosystem*. Fisheries Center, University of British Columbia, Vancouver, Canada.
- Henry, Gene. 2002. Audiotape recorded in 2002 at Dot Lake by James Kari.
- Huntington, Henry. 1998. Observations on the Utility of the Semi-directive Interview for Documenting Traditional Ecological Knowledge. *Arctic* 51(3):237-242.
- _____. 1999. Traditional Knowledge of the Ecology of Beluga Whales (*Delphinapterus leucas*) in the Eastern Chukchi and Northern Bering Seas, Alaska. *Arctic* 2(1):49-61.
- Hunn, Eugene 1980. Sahaptin Fish Classification. *Northwest Anthropological Research Notes* 14(1):1-18.
- _____. 1990. *Nich'iwana, Big River: Mid-Columbia Indians and Their Land*. Seattle: University of Washington Press.
- Hunn, Eugene, Darryll R. Johnson, Priscilla N. Russell, and Thomas F. Thornton. 2003. Huna Tlingit Environmental Knowledge, Conservation, and Management of a "Wilderness" Park. *Current Anthropology* 44 Supplement: pp. 79-103.
- Inglis, J.T., ed. 1993. *Traditional Ecological Knowledge: Concepts and Cases*. International Program on Traditional Ecological Knowledge and International Development Research Center. Ottawa, Canada.
- Irving, William N. 1957. An Archaeological Survey of the Susitna Valley. *Anthropological Papers of the University of Alaska* 6(1): pp. 37-52. College, Alaska.
- Jack, Tenas. 1973. Ahtna Tape 117.
- Joe, Bell. Ahtna Tape 110, no date.
- _____. Ahtna Tape 121. Audio tape recorded at Chisotchina by James Kari and Bill Simeone.
- John, Katie. Ahtna Tape 111. Audiotape recorded in 2000 at Mentasta by James Kari.
- _____. Ahtna Tape 120. Audiotape recorded in 1988 at Mentasta by John Alfonsi.
- _____. 2002. Audiotape recorded in 2002 at Mentasta by James Kari.
- John, Peter. 1996. The Gospel According to Peter John. Alaska Native Knowledge Network University of Alaska, Fairbanks.
- Kari, James. Unpublished field notes 1976, 1981.
- _____. 1990. *Ahtna Athabaskan Dictionary*. ANLC.
- _____. 2000 Contributions of the United States Geological Survey to the
- _____. 2004. Ahtna Place Names Lists. Draft ms.
- _____. and James A. Fall 2003. Shem Pete's Alaska: The Territory of the Upper Inlet Dena'ina. University of Alaska Press, Fairbanks.

- Kelso, Dennis. 1982. Subsistence Use of Fish and Game Resources in Alaska: Considerations in Formulating Effective Management Policies. Technical Paper No. 65. Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska.
- Krech, Shepard. 1999. *The Ecological Indian: Myth and History*. W.W. Norton. New York.
- Langdon, Steve J. n.d. Construing "Conservation": An Examination of Conceptual Construction and Application to Yup'ik Cultural Practice. Department of Anthropology, University of Alaska, Anchorage.
- _____. 2003. Relational Sustainability: Indigenous Northern North American Logic of Engagement. Paper Presented to the annual meeting of the American Anthropological Association, Chicago, Illinois, November 20, 2003.
- de Laguna, Frederica. 1960. Unpublished field notes.
- _____. 1970a. The Atna of Copper River, Alaska: The world of men and animals. *Folk* 11-12:17-26.
- _____. 1970b. Sites in Ahtna Territory. Ms. Typescript. 46 pp.
- de Laguna, Frederica and Catharine McClellan. 1981. Ahtna. In *Handbook of North American Indians*, Vol. 6, Subarctic. Edited by J. Helm. Washington: Smithsonian Institution. Pp. 641-64.
- McMillan, Patricia O. and Sal V. Cuccarese. 1988. Alaska Over-the-Horizon Backscatter Radar System: Characteristics of Contemporary Subsistence in the Copper River Basin and Upper Tanana Area. Volume One: Synthesis. Arctic Environmental Information and Data Center, University of Alaska Anchorage.
- MacNab, John. 1983. Wildlife Management as Scientific Experimentation. *Wildlife Society Bulletin* 11(4) pp.397-401.
- Marshall, Robert and Mae Marshall. 2003. Audiotape recorded in 2003 at Tazlina by James Kari.
- Mauro, Francesco, and Preston D. Hardison. 2000. Traditional Knowledge of Indigenous and Local Communities: International Debate and Policy Initiatives. *Ecological Applications* 10(5): 1263-1269.
- McCay, Bonnie J. and Svein Jentoft. 1996. From the Bottom Up: Participatory Issues in Fisheries Management. *Society & Natural Resources*. 9: pp. 237-250.
- McKenna, Robert. 1959. The Upper Tanana Indians. Yale University Press, New Haven Conn.
- McPhail, J. D., and C. C. Lindsey. 1970. Freshwater fishes of northwestern Canada and Alaska. Fisheries. Research Board of Canada, Bulletin 173, Ottawa.
- Nakashima, D.J. 1991. The Ecological Knowledge of Belchers Island Inuit: A Traditional Basis of Contemporary Wildlife Co-Management. Ph.D. Thesis, McGill University Geography Department.
- Neeley, Ben 2003. Audiotape recorded in 2003 at Gulkana by James Kari.
- Nelson, Richard. 1986. Make Prayers to the Raven: A Koyukon View of the Northern Forest. University of Chicago Press.
- Pinkerton, Evelyn W. 1990. Summary and Conclusions in *Folk Management in the World's Fisheries: People, Problems, and Policies*. C.L. Dyer and J.R.

- Pitcher, Tony J. 1998. "Back to the Future": A Novel Methodology and Policy Goal in Fisheries. In: *Back to the Future: Reconstructing the Strait of Georgia Ecosystem*. Fisheries Center Research Reports (6)5: pp. 4-7. Fisheries Center, University of British Columbia, Vancouver, Canada.
- Powers, G. 1977. Fish Population Structure in Arctic Lakes. *Journal Fish Research Board of Canada* (35): 53-59.
- Rafferty, C.H. 1900. From Port Valdez to Copper River, Down that River, Thence to Prince William Sound. In *Compilation of Narratives of the Exploration of Alaska*, pp. pp. 612-215. Washington: U.S. Government Printing Office.
- Reist, J.D. 1997. The Canadian Perspective on Issues in Arctic Fisheries Management and Research. In: *Fish Ecology in Arctic North America*, pp. 4-12. Edited by James B. Reynolds. American Fisheries Society Symposium 19. Bethesda, Maryland.
- Reckord, Holly. 1983a. *That's the Way We Live, Subsistence in the Wrangell-St. Elias National Park and Preserve*. Occasional Paper No. 34. Fairbanks: Cooperative Park Studies Unit.
- _____ 1983b *Where Raven Stood: Cultural Resources of the Ahtna Region*. Occasional Paper No. 35. Fairbanks: Cooperative Park Studies Unit.
- Rollins, Alden M. 1978. Census Alaska: Numbers of Inhabitants, 1792 - 1970. Anchorage: University of Alaska Anchorage Library.
- Schmidt, D.R., W.B. Griffiths and L.R. Martin. 1989. Over wintering biology of anadromous fish in the Sagavanirtok River Delta, Alaska. *Biological Papers of the University of Alaska*. 24 pp. 55-74.
- Scott, Colin. 1996. Science for the West, Myth for the Rest? The Case of James Bay Cree Knowledge Construction. In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*. Edited by Laura Nadar. Routledge, New York.
- Simeone, William E. and James Kari. 2002. Traditional Knowledge and Fishing Practices of the Ahtna of the Copper River, Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 270. Juneau.
- Stickwan, Frank. Ahtna Tape 131. Audiotape recorded in 2001 at Tazlina by James Kari and Bill Simeone.
- _____ 2002. Audiotape recorded in 2002 at Tazlina by James Kari.
- Stratton, Lee and Susan Georgette. 1983. Use of Fish and Game in Communities in the Copper River Basin, Alaska: A Report on a 1983 Household Survey. Technical Paper No. 107. Alaska Department of Fish and Game, Division of Subsistence, Anchorage, Alaska.
- Tansy, Jake. Ahtna Tape 127. Audiotape recorded in 2001 at Cantwell by James Kari and Jane Nicholas.
- _____ Ahtna Tape 106.
- Traditional Knowledge Working Group [established by the Government of Northwest Territories (GNWT) 1991. Report of the Traditional Knowledge Working Group.
- Tyone, Andy and Mary Tyone (2002-2003). Audiotapes recorded in 2002 and 2003 at Tazlina by James Kari.
- Usher, Peter. 1986. The devolution of wildlife management and the prospects of wildlife conservation in the Northwest Territories. Ottawa: Canadian Arctic Resources Committee, Policy Paper No. 3.

- Van Daele, Lawrence, John R. Morgart, Michael T. Hinkes, Steven D. Kovach, Jeffery W. Denton and Randall H. Kaycon. 2001. Grizzlies, Ekimos, and Biologists: Cross-Cultural Bear Management in Southwest Alaska. *Ursus* 12: 141-152.
- West, Constance. 1973. Audio Tapes on Ahtna trails and habitation sites.
- Williams, Nancy and Eugene Hunn, Eds. 1982. Resource Managers: North American and Australian Hunter-Gatherers. Washington: American Association for the Advancement of Science.
- Wolfe, R. J. and R. J. Walker. 1987. Subsistence Economies in Alaska: Productivity, Geography, and Development Impacts. *Arctic Anthropology* 24(2) pp. 56-81.
- Wolf, R.J. n.d. "Playing with Fish." Manuscript in possession of author.
- Workman, William. 1976. Ahtna Archaeology: A Preliminary Statement. Paper presented at the 9th Annual Conference of the University of Calgary Archaeology Association.

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APPENDIX A
SURVEY INSTRUMENT

COPPER RIVER BASIN SALMON AND NON-SALMON SUBSISTENCE FISHING SURVEY, 2001

Alaska Department of Fish and Game, Division of Subsistence, CRNA, CheeshNa Tribal Council, Chitina Village Council, Mentasta Tribal Council

HH ID: _____ START TIME: _____ INTERVIEWER: _____
 COMMUNITY: _____ STOP TIME: _____ DATE: _____
 ID # OF PERSON RESPONDING TO SURVEY: _____ FIELD SUPERVISOR: _____
 CODER: _____

HOUSEHOLD INFORMATION. WHO WERE MEMBERS OF THIS HOUSEHOLD BETWEEN OCTOBER 2000 AND OCTOBER 2001?

PERSON ID#	M/F	RELATION TO HH HEAD	BIRTHDATE (MM/DD/YYYY)	RESIDENCE OF PARENT WHEN BORN	TOTAL YEAR IN COMM.	ETHNICITY	SALMON		OTHER FIN FISH	
							FISH? Y/N	PROCESS? Y/N	FISH? Y/N	PROCESS? Y/N
HEAD 1										
1		1								
HEAD 2										
2		2								
3										
3										
4										
4										
5										
5										
6										
6										
7										
7										
8										
8										
9										
9										
10										
10										

COPPER RIVER BASIN SALMON AND NON-SALMON SUBSISTENCE FISHING SURVEY, 2001

Alaska Department of Fish and Game, Division of Subsistence, CRNA, CheeshNa Tribal Council, Chitina Tribal Council and Mentasta Tribal Council

NON-COMMERCIAL FISHING: NON-SALMON FINFISH.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FISH OTHER THAN SALMON BETWEEN OCTOBER 1 2000 AND SEPTEMBER 30 2001? YES: ____ NO: ____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	ROD & REEL #	DIP NET #	Gill NET #	ICE FISHING #	FISH WHEEL #	OTHER* GEAR #	SET LINE #	UNITS	RECVD Y/N	GAVE AWAY Y/N	LOCATION* OF HARVEST 1	LOCATION* OF HARVEST 2	METHOD* OF TRAVEL	NUMBER OF DAYS FISHING
DOLLY VARDEN 125006002										IND 1						
LAKE TROUT 125010002										IND 1						
RAINBOW TROUT 126204002										IND 1						
TROUT, UNKNOWN 126299002										IND 1						
GRAYLING 125200002										IND 1						
PIKE 125499002										IND 1						
WHITEFISH 126499002										IND 1						
BURBOT 124800002										IND 1						
STEELHEAD 126206000										IND 1						
SUCKER 126000000										IND 1						
										IND 1						

*Other Gear Type, write name of other gear type here _____

*Location of harvest, use numbers on list of water bodies provided

*Method of travel, write in primary type of transportation used, i.e. foot, automobile, ATV, snowmachine, dog team, horse, boat, etc.

COPPER RIVER SALMON AND NON-SALMON SUBSISTENCE FISHING SURVEY, 2001

Alaska Department of Fish and Game, Division of Subsistence, CRNA, CheeshNa Tribal Council, Chitina Tribal Council and Mentasta Tribal Council

QUESTIONS RELATING TO THE **HISTORICAL USE** OF NON-SALMON FIN FISH

These questions do not relate to the household but to the individual answering the questions.

SPECIES	THE LAST YEAR TRIED TO HARVEST	LOCATION* OF HARVEST # 1	LOCATION* OF HARVEST # 2	METHOD* OF TRAVEL
DOLLY VARDEN 125006002				
LAKE TROUT 125010002				
RAINBOW TROUT 126204002				
TROUT, UNKNOWN 126299002				
GRAYLING 125200002				
PIKE 125499002				
WHITEFISH 126499002				
BURBOT 124800002				
STEELHEAD 126206000				
SUCKER 126000000				

*LOCATION Use numbers from the list of water bodies provided.

*METHOD OF TRAVEL Write in primary type of transportation used, i.e., automobile, ATV, snowmachine, dog team, horse, boat, etc.

APPENDIX B
Estimated Harvest and Use of Non-Salmon Resources by Community, Copper
River Non-Salmon Fish Survey, 2001

Estimated Harvest and Use of Nonsalmon Resources, Copper Center, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	47.74	46.57	45.39	12.67	11.49	3256.87	18.3	5.84	2822.09	15.85	0.34
Burbot	15.43	16.8	13.07	2.36	4.91	374.89	2.11	0.67	156.21	0.88	0.71
Char	31.34	30.85	27.12	6.09	6.09	519.15	2.92	0.93	409.26	2.3	0.48
Arctic Char	1.87	1.87	1.87	0	0	27.92	0.16	0.05	19.94	0.11	1.67
Dolly Varden	19.65	20.34	18.47	1.18	2.36	235.16	1.32	0.42	261.29	1.47	0.54
Lake Trout	20.83	18.47	16.6	6.09	6.09	256.07	1.44	0.46	128.03	0.72	0.62
Grayling	35.36	34.19	33.01	4.71	5.89	563.73	3.17	1.01	805.33	4.52	0.5
Pike	1.18	1.18	1.18	0	0	5.87	0.03	0.01	2.1	0.01	1.44
Sucker	1.18	1.18	1.18	0	1.18	29.35	0.16	0.05	41.94	0.24	1.44
Trout	30.85	32.72	29.67	4.22	1.18	1275.28	7.16	2.29	864.39	4.86	0.52
Rainbow Trout	29.67	31.54	29.67	3.05	0	1177.57	6.62	2.11	841.12	4.73	0.52
Steelhead	3.05	1.87	1.87	1.18	1.18	97.71	0.55	0.18	23.26	0.13	1.67
Unknown Trout	0	1.18	0	0	0	0	0	0	0	0	0
Whitefish	17.09	16.6	13.56	7.27	3.05	488.59	2.74	0.88	542.87	3.05	0.76

Estimated Harvest and Use of Nonsalmon Resources, Chistochina, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	66.7	56.7	56.7	20	13.3	533.91	14.43	6.76	409.47	11.07	0.251
Burbot	10	10	10	0	0	168.72	4.56	2.14	70.3	1.9	0.541
Char	26.7	23.3	23.3	3.3	3.3	169.95	4.59	2.15	86.33	2.33	0.347
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	6.7	3.3	3.3	3.3	0	2.22	0.06	0.03	2.47	0.07	0.89
Lake Trout	20	20	20	0	3.3	167.73	4.53	2.12	83.87	2.27	0.358
Grayling	43.3	43.3	43.3	10	10	129.5	3.5	1.64	185	5	0.277
Pike	3.3	3.3	3.3	0	0	6.91	0.19	0.09	2.47	0.07	0.89
Sucker	0	0	0	0	0	0	0	0	0	0	0
Trout	0	0	0	0	0	0	0	0	0	0	0
Rainbow Trout	0	0	0	0	0	0	0	0	0	0	0
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	20	13.3	13.3	10	3.3	58.83	1.59	0.75	65.37	1.77	0.559

Estimated Harvest and Use of Nonsalmon Resources, Gakona, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	58.13	71.53	58.13	8.13	16.27	2039.15	24.28	8.12	2022	24.07	0.97
Burbot	20.34	20.34	20.34	4.07	0	319.8	3.81	1.27	133.25	1.59	0.95
Char	28.47	36.61	28.47	4.07	4.07	255.91	3.05	1.02	205	2.44	0.66
Arctic Char	0	0	0	0	0	0	0	0			0
Dolly Varden	16.27	20.34	16.27	4.07	4.07	126.08	1.5	0.5	140.08	1.67	0.88
Lake Trout	16.27	24.4	12.2	4.07	0	129.83	1.55	0.52	64.92	0.77	1.14
Grayling	48.81	58.13	48.81	4.07	12.2	349.18	4.16	1.39	498.83	5.94	0.5
Pike	0	0	0	0	0	0	0	0			0
Sucker	0	0	0	0	0	0	0	0			0
Trout	16.27	16.27	16.27	0	0	133.93	1.59	0.53	95.67	1.14	0.86
Rainbow Trout	16.27	16.27	16.27	0	0	133.93	1.59	0.53	95.67	1.14	0.86
Steelhead	0	0	0	0	0	0	0	0			0
Unknown Trout	0	0	0	0	0	0	0	0			0
Whitefish	9.33	9.33	9.33	0	4.07	980.33	11.67	3.91	1089.25	12.97	1.63

Estimated Harvest and Use of Nonsalmon Resources, Glennallen, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	38.7	45.2	37.1	6.5	9.7	1637.59	8.03	2.86	1493.81	7.32	0.359
Burbot	12.9	14.5	11.3	3.2	3.2	189.52	0.93	0.33	78.97	0.39	0.645
Char	16.1	22.6	16.1	1.6	1.6	476.77	2.34	0.83	421.16	2.06	0.805
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	6.5	9.7	6.5	0	1.6	299.09	1.47	0.52	332.32	1.63	0.987
Lake Trout	14.5	21	12.9	1.6	0	177.68	0.87	0.31	88.84	0.44	0.627
Grayling	22.6	30.6	22.6	0	1.6	340.88	1.67	0.6	486.97	2.39	0.474
Pike	0	0	0	0	0	0	0	0	0	0	0
Sucker	0	0	0	0	0	0	0	0	0	0	0
Trout	17.7	22.6	16.1	1.6	3.2	488.28	2.39	0.85	348.77	1.71	0.546
Rainbow Trout	17.7	22.6	16.1	1.6	3.2	488.28	2.39	0.85	348.77	1.71	0.546
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	4.8	4.8	4.8	0	4.8	142.14	0.7	0.25	157.94	0.77	1.16

Estimated Harvest and Use of Nonsalmon Resources, Lake Louise, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	90.9	90.9	81.8	72.7	36.4	1637.59	8.03	2.86	1493.81	7.32	0.359
Burbot	63.6	63.6	54.5	36.4	18.2	189.52	0.93	0.33	78.97	0.39	0.645
Char	63.6	72.7	54.5	27.3	0	476.77	2.34	0.83	421.16	2.06	0.805
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	0	0	0	0	0	299.09	1.47	0.52	332.32	1.63	0.987
Lake Trout	63.6	72.7	54.5	27.3	0	177.68	0.87	0.31	88.84	0.44	0.627
Grayling	27.3	45.5	27.3	0	0	340.88	1.67	0.6	486.97	2.39	0.474
Pike	9.1	9.1	9.1	0	0	0	0	0	0	0	0
Sucker	0	0	0	0	0	0	0	0	0	0	0
Trout	18.2	18.2	18.2	0	0	488.28	2.39	0.85	348.77	1.71	0.546
Rainbow Trout	18.2	18.2	18.2	0	0	488.28	2.39	0.85	348.77	1.71	0.546
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	72.7	63.6	54.5	36.4	27.3	142.14	0.7	0.25	157.94	0.77	1.16

Estimated Harvest and Use of Nonsalmon Resources, Mentasta, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	75	68.8	68.8	40.6	28.1	967.44	17.92	6.59	1167.75	21.63	0.37
Burbot	3.1	3.1	3.1	0	0	4.05	0.07	0.03	1.69	0.03	1.302
Char	9.4	9.4	9.4	0	3.1	24.13	0.45	0.16	18.56	0.34	0.844
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	6.3	6.3	6.3	0	0	10.63	0.2	0.07	11.81	0.22	0.915
Lake Trout	6.3	6.3	6.3	0	3.1	13.5	0.25	0.09	6.75	0.13	1.019
Grayling	46.9	43.8	43.8	21.9	15.6	327.21	6.06	2.23	467.44	8.66	0.526
Pike	0	0	0	0	0	0	0	0	0	0	0
Sucker	0	0	0	0	0	0	0	0	0	0	0
Trout	0	0	0	0	0	0	0	0	0	0	0
Rainbow Trout	0	0	0	0	0	0	0	0	0	0	0
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	62.5	56.3	53.1	40.6	18.8	612.06	11.33	4.17	680.06	12.59	0.438

Estimated Harvest and Use of Nonsalmon Resources, Paxson-Sourdough, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	Mean HH	Harvest
Non-Salmon Fish	60	70	60	30	20	240.45	11.45	6.36	245.7	11.7	0.628
Burbot	10	10	10	10	0	40.32	1.92	1.07	16.8	0.8	1.637
Char	50	60	50	10	10	80.85	3.85	2.14	69.3	3.3	0.601
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	40	40	40	10	10	47.25	2.25	1.25	52.5	2.5	0.699
Lake Trout	40	40	30	10	0	33.6	1.6	0.89	16.8	0.8	0.955
Grayling	40	40	40	0	20	92.61	4.41	2.45	132.3	6.3	0.781
Pike	0	0	0	0	0	0	0	0	0	0	0
Sucker	0	0	0	0	0	0	0	0	0	0	0
Trout	20	20	10	20	0	5.88	0.28	0.16	4.2	0.2	1.637
Rainbow Trout	20	20	10	20	0	5.88	0.28	0.16	4.2	0.2	1.637
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	20	20	20	0	0	20.79	0.99	0.55	23.1	1.1	1.479

Estimated Harvest and Use of Nonsalmon Resources, Slana, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	88	88	88	36	24	2198.52	35.46	18.09	1929.44	31.12	0.333
Burbot	44	44	40	16	8	482.11	7.78	3.97	200.88	3.24	0.662
Char	56	56	56	20	4	616.78	9.95	5.08	448.88	7.24	0.583
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	32	32	32	8	4	229.9	3.71	1.89	255.44	4.12	0.637
Lake Trout	44	44	44	16	0	386.88	6.24	3.18	193.44	3.12	0.584
Grayling	84	80	76	12	20	661.42	10.67	5.44	944.88	15.24	0.333
Pike	12	12	12	4	4	194.43	3.14	1.6	69.44	1.12	0.916
Sucker	4	4	4	0	0	17.36	0.28	0.14	24.8	0.4	1.594
Trout	8	8	8	0	4	23.31	0.38	0.19	14.88	0.24	1.344
Rainbow Trout	4	4	4	0	4	3.47	0.06	0.03	2.48	0.04	1.594
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	4	4	4	0	0	19.84	0.32	0.16	12.4	0.2	1.594
Whitefish	32	32	32	8	8	203.11	3.28	1.67	225.68	3.64	0.632

Estimated Harvest and Use of Nonsalmon Resources, Tazlina, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)	
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	
Non-Salmon Fish	38.65	43.75	37.82	8.06	8.9	1756.5	14.64	5.85	1374.15	1	11.45	0.42
Burbot	13.16	11.03	11.03	2.13	2.13	508.31	4.24	1.69	211.79	1	1.76	1
Char	19.93	24.66	18.26	3.8	2.5	417.51	3.48	1.39	343.76	1	2.86	0.48
Arctic Char	0	0	0	0	0	0	0	0		1		0
Dolly Varden	14.83	13.16	13.16	3.8	1.67	220.92	1.84	0.74	245.47	1	2.05	0.56
Lake Trout	11.86	18.26	11.03	0	1.67	196.59	1.64	0.65	98.29	1	0.82	0.54
Grayling	30.12	35.22	29.29	0.83	2.97	237.79	1.98	0.79	339.71	1	2.83	0.42
Pike	0	0	0	0	0	0	0	0		1		0
Sucker	0	0	0	0	0	0	0	0		1		0
Trout	16.13	17.79	13.16	2.13	5.1	422.47	3.52	1.41	289.53	1	2.41	0.87
Rainbow Trout	11.86	13.53	8.9	2.13	5.1	396.78	3.31	1.32	283.41	1	2.36	0.89
Steelhead	5.1	5.1	5.1	0	0	25.69	0.21	0.09	6.12	1	0.05	0.91
Unknown Trout	0.83	0.83	0	0	0	0	0	0	0	1	0	0
Whitefish	7.23	6.4	6.4	0.83	2.13	170.42	1.42	0.57	189.35	1	1.58	1.04

Estimated Harvest and Use of Nonsalmon Resources, Tonsina, 2001

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest
Non-Salmon Fish	38.5	42.3	38.5	3.8	15.4	352.29	10.36	4.99	319.08	9.38	0.366
Burbot	11.5	11.5	7.7	3.8	0	12.55	0.37	0.18	5.23	0.15	0.78
Char	30.8	30.8	30.8	0	15.4	126.85	3.73	1.8	128.15	3.77	0.503
Arctic Char	0	0	0	0	0	0	0	0	0	0	0
Dolly Varden	30.8	30.8	30.8	0	15.4	105.92	3.12	1.5	117.69	3.46	0.466
Lake Trout	3.8	3.8	3.8	0	3.8	20.92	0.62	0.3	10.46	0.31	0.999
Grayling	26.9	30.8	26.9	0	0	45.77	1.35	0.65	65.38	1.92	0.375
Pike	0	0	0	0	0	0	0	0	0	0	0
Sucker	0	3.8	0	0	0	0	0	0	0	0	0
Trout	38.5	42.3	38.5	0	0	164.77	4.85	2.33	117.69	3.46	0.315
Rainbow Trout	38.5	42.3	38.5	0	0	164.77	4.85	2.33	117.69	3.46	0.315
Steelhead	0	0	0	0	0	0	0	0	0	0	0
Unknown Trout	0	0	0	0	0	0	0	0	0	0	0
Whitefish	3.8	3.8	3.8	0	0	2.35	0.07	0.03	2.62	0.08	0.999

