Title Page

Study Title: Capacity Development and Community Involvement in the Collection of Subsistence Fisheries Biological Data

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Abstract: This project addresses information gaps within the Yukon and Koyukuk subsistence fisheries harvest. It will provide training of local persons to work with biologists in the collection of meaningful information to be used to manage Yukon River salmon stocks. Scale samples were collected from up to 200 Chinook and 200 summer chum salmon from the Yukon and Koyukuk Rivers. Fin tissues were collected from 200 Chinook salmon from designated spawning tributaries. Heart tissues were collected from 30 Chinook salmon early in the run and 30 Chinook salmon late in the run for *Ichthyophonus* presence or absence. Data will be provided to management agencies for age determinations, stock identifications, and presence/absence of *Ichthyophonus*. Data will be stored in an Access database at TCC for future analysis.

Key Words: biological data, capacity, *Ichthyophonus*, subsistence

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Introduction

This project was developed based on the lack of community involvement in fisheries data collections. Community involvement and capacity development are important components in the collection of biological data from subsistence fisheries. The involvement of local community members in local projects concerning collection of subsistence harvest information to be used by state and federal biologists can potentially decrease problems and mistrust between local villagers and biologists and increase public support as well as resource stewardship. During the past five years of low salmon returns, subsistence harvests have been significantly larger than commercial harvests, yet information characterizing the subsistence harvest is sparse. Information gathered from this project will help to fill in much needed gaps in subsistence harvest information on the Yukon and Koyukuk Rivers.

Study Area

This project originally proposed working with 10 communities along the Yukon and Koyukuk Rivers. A total of seven of the 10 communities collected data and these include the following communities:

Holy Cross: N62 14.188” W159 52.509”
Nulato: N64 36.925” W158 16.371”
Koyukuk: N64 50.58605” W161 9.34205”
Galena: N64 42.45128” W156 56.4878”
Ruby: N64 45.953” W155 44.959”
Huslia: N65 41.48168” W156 24.10264”
Minto: N65 94.329” W149 201.127”

A map of the original study area is included with this report. These communities range from the lower Yukon River to the middle Yukon River and on the Koyukuk River.

Objectives

1.) To develop training materials to serve as transferable guides for individuals and organizations interested in the collection of biological data on salmon.

    - Manuals were developed for each technician in each community. The manuals served as guides while each technician was in the field. These manuals were developed in case questions arose regarding the collection of some of the data.

2.) To train, mentor, and foster up to 30 individuals in the collection of biological fisheries data from up to 10 communities along the Yukon and Koyukuk Rivers.

- A total of 21 individuals were trained in seven communities. Three communities ended up not participating due to technician illness, liability issues, and wildfire crews being deployed around the Interior.

3.) To provide biological data to management agencies on subsistence caught Chinook and summer chum salmon.

- Scale data was provided to ADF&G Commercial Fisheries for further analysis into age determination for Chinook and summer chum salmon. Fin tissues were collected from Chinook salmon in two designated areas and provided to the Conservation Genetics Laboratory for further analysis into stock identification. Heart tissues were provided to Chris Stark and were processed at the University of Alaska Fairbanks for *Ichthyophonus* presence/absence. All data collected from this project has been processed and archived for future analysis. Data is being stored on an Access database at TCC.

4.) To enhance the subsistence fisheries database.

- Age data has been compiled into the 2004 ADF&G Notebook series. Data has been compiled and entered into a subsistence fisheries Access database at TCC. This data will be used in future subsistence harvest analysis where applicable.

Methods

Communities were chosen to participate in this project based on a 2003 project that was initiated by TCC and funded thru TCC grant money. TCC chose 10 communities based on input from various agencies in regards to subsistence harvest data that was lacking from their databases. Personal services contracts were entered into with each tribal council and the tribal council chose the individuals they thought were best for the positions. TCC staff traveled to each community to train individuals to collect biological data from Chinook and summer chum salmon. TCC staff traveled to each community to conduct training according to the 2004 subsistence fishing schedule in each district. Technicians were trained using subsistence caught salmon.

Scales were collected according to the preferred scale area. This area is located on the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. According to the methods set forth in the proposal, four scales were to be removed per Chinook salmon and per summer chum salmon. Three scales were chosen per Chinook salmon and one scale was chosen per summer chum salmon according to ADF&G guidelines. The original proposal stated removing four scales per salmon because of the need to ensure at least one of the scales would be usable for age determination. Prior to training technicians, it was recommended that only three scales for Chinook salmon and one scale per chum salmon would be sufficient for age determination. Larry DuBois with the

ADF&G Commercial Fisheries Division aged the scale samples. Scales are pressed onto acetate cards and viewed under a Microfiche scale reader. ADF&G staff look for the presence or absence of a freshwater annulus and circuli spacing using dial calipers. The scale reader will first determine where the freshwater growth zone ends and where the first marine annulus occurs on an individual scale. A caliper parameter compares two measurements, the spacing of circuli in the first marine summer to those in the second marine summer.

Vertebrae and otoliths of 10 chinook salmon and 10 summer chum salmon were collected. A small section of the vertebral anterior centra were removed after cutting meat off the backbone with a knife and any remaining tissue was removed as needed. Vertebrae were placed in brown envelopes and sent to TCC. Vertebrae samples contained too much tissue which led to decreased quality of samples. Vertebrae were to be examined by TCC staff with the assistance of USFWS staff.

Otoliths were removed from 10 chinook salmon and 10 summer chum salmon. Otoliths were removed by cutting with a knife longitudinally through the top of the skull across the head. Otoliths were removed with forceps and placed in brown envelopes. Most technicians forgot to collect otoliths so we didn't have an adequate sample size to age the otoliths. Otoliths were to be examined by TCC staff with the assistance of USFWS staff.

A thumbnail size piece of tissue was collected from 200 Chinook salmon. Four sites were identified by the USFWS Conservation Genetics Laboratory to help build the Chinook salmon baseline. Fin tissues were to be collected from Chinook and summer chum salmon but it was determined by the USFWS Conservation Genetics Laboratory that only Chinook salmon fin tissue samples were needed for the baseline. Scissors were used to remove a thumbnail size piece of tissue. Tissue was removed from any fin except the adipose fin and placed into a vial of 90% ethanol. Tissues were collected from the lower Yukon River near Grayling and the Nulato River near Nulato. The other three sites (Kaltag, Alatna/Allakaket, and Minto) determined by USFWS Conservation Genetics Laboratory were not utilized because of a duplication of efforts in Kaltag, lack of people to fill the fisheries technician position in Alatna/Allakaket, and one of the Minto technicians became ill.

Blair Flannery with the USFWS Conservation Genetics Laboratory determined the two samples from Nulato and Grayling were from a mixed stock fishery. The lab needed specific spawning tributaries to help build the Chinook salmon baseline. Samples were archived for future analysis when mixed stock samples could be analyzed.

A piece of heart tissue was collected from 30 Chinook salmon early in the run and 30 Chinook salmon late in the run. According to the proposal, the whole heart was going to be removed and placed in whirlpak bag. It was determined by Chris Stark of BSFA that only a ¼ inch piece of the heart tissue was needed to perform a tissue culture test. Heart tissues were collected from seven sites. Heart tissues were cut with a knife and placed in a whirlpak bag. Hearts were kept in a cooler with ice packs and transported onto an airline within 48 hours of collection. Heart tissues were sent to Chris Stark at the UAF. A tissue culture test was attempted on several of the heart tissues but it was determined that many of the heart tissues started to produce fungus which caused inaccurate tissue culture results. A tissue culture test consists of placing tissue samples into culture medium to confirm *Ichthyophonus* and to evaluate subclinical infection percentages. One gram of heart muscle will be placed into tissue culture medium with 5% fetal bovine serum and 2% antibiotics. Cultures will be evaluated for presence of *Ichthyophonus* within seven days of sampling. Heart tissues were preserved in formalin and stored for future PCR analysis at UAF. Chris Stark with BSFA processed the heart tissues and preserved the tissues for future PCR analysis when this becomes available for use in determining *Ichthyophonus* presence or absence.

Results

Information collected during this project consisted of scales for age determinations, fin tissue for stock identification, and heart tissues for *Ichthyophonus* presence/absence in Chinook and summer chum salmon. This project succeeded in the capacity building component by working closely with seven communities to collect subsistence fisheries harvest data from Chinook and summer chum salmon. Technicians ranged in age from 14 to 60 years old. Technicians were provided with hands-on training in each of their communities. TCC staff conducted field work with each technician prior to starting the work. In some communities, we were able to get out on the river to show each technician how to collect biological data. In other communities, fish were sampled and brought into town to show technicians the data that needed to be collected. The best dataset collected consisted of gear type, mesh size, species, sex, length, and weight measurements. Ages were difficult to determine by ADF&G staff due to the majority of scales being inverted dirty, regenerated, having wax paper stuck to the gum cards, and data written on ASL forms didn't match with scale cards. Holy Cross collected the best quality scales and the most usable for ADF&G analysis.

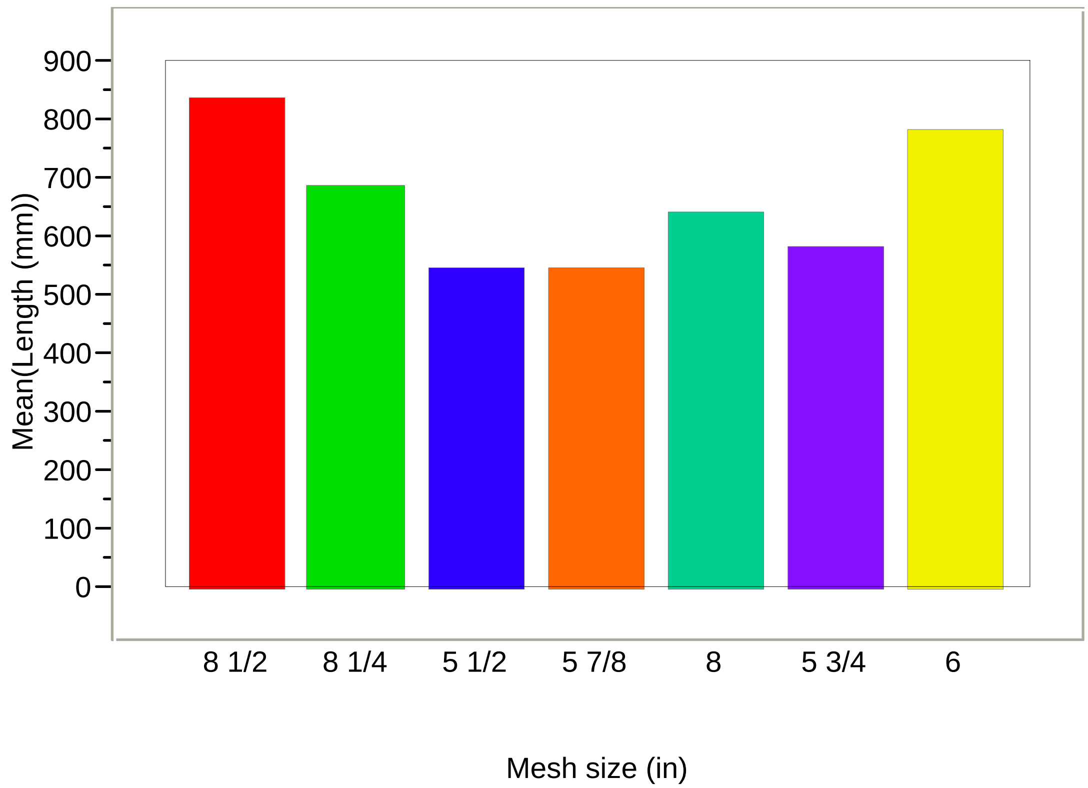
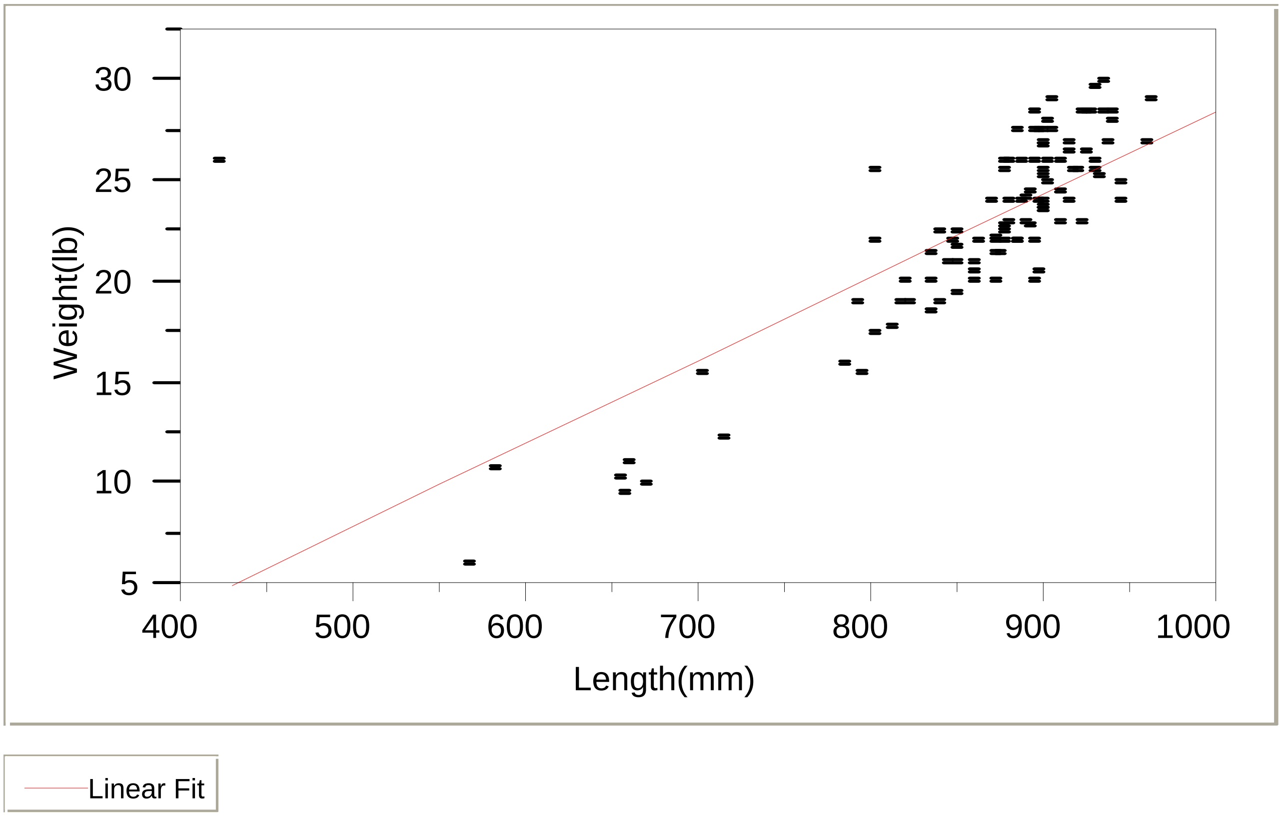


Figure 1. Mean length of Chinook and summer chum salmon in relation to mesh size from seven communities along the Yukon and Koyukuk Rivers, 2004.

Figure 1 shows that 8 ½ inch mesh captured the larger size fish at 840 mm fork length. Six inch mesh nets caught 770 mm fork length fish.

Male/female ratios were figured for three of the seven communities. The other four community's sex data couldn't be matched up with the scale cards. A sample size of 131 Chinook salmon scales from Holy Cross was of good quality for aging. The percentage of males in this sample was 48.1% and 51.9% females. The mean length for males from Holy Cross was 777 mm. The mean length for females from Holy Cross was 831 mm. The summer chum sample size for Huslia was 108 with 92.6% males and 7.4% females. The mean length for male chum from Huslia was 566 mm and 536 mm for female chum salmon. The Nulato Chinook salmon sample size was 170 with 51.8% males and 48.2% females. Mean length for males was 804 mm and 792 mm for females.

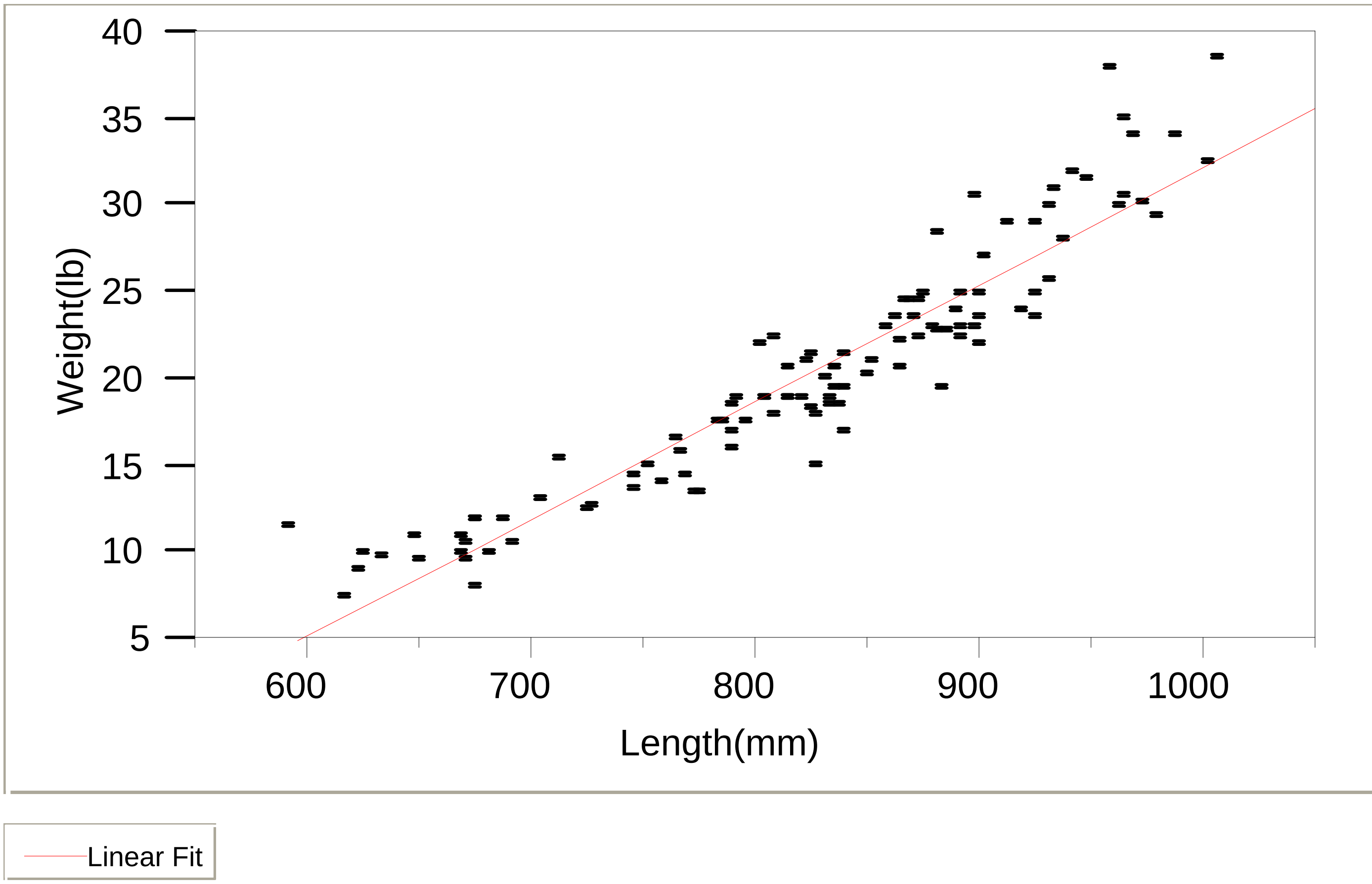


Linear Fit

Weight(lb) = -12.85988 + 0.0413834 Length(mm)

Figure 2. Female Chinook salmon length vs. weight for Galena, Alaska, 2004.

The r^2 value for females was 0.56 with an average length of Chinook salmon of 864 mm. A one-way anova showed $p < 0.0001$. Sample size of 105 females.



Linear Fit

Weight(lb) = -35.34679 + 0.0675362 Length(mm)

Figure 3. Male Chinook salmon length vs. weight for Galena, Alaska, 2004.

The male Chinook salmon r^2 value was 0.88 with an average length of 826 mm. A one-way ANOVA showed $p < 0.0001$. Sample size of 108 males.

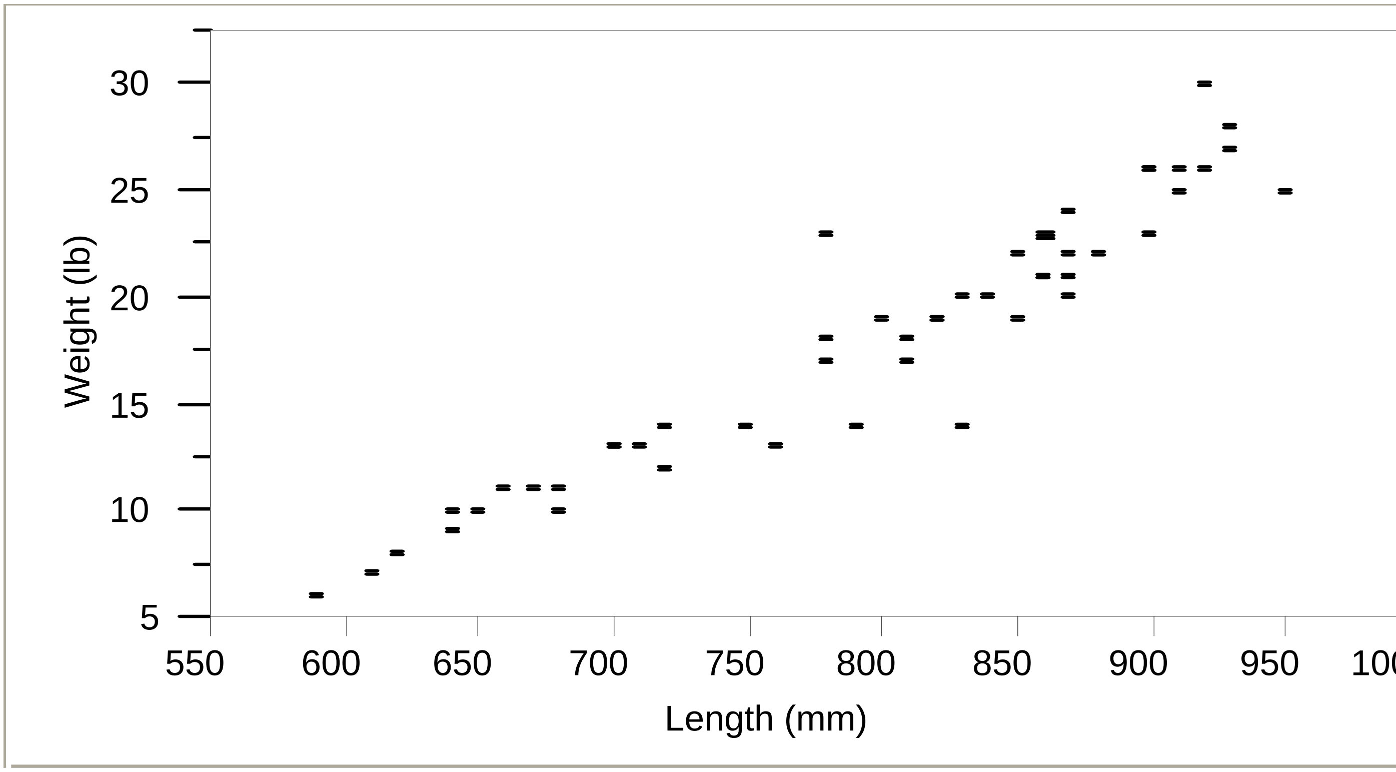


Figure 4. Female Chinook salmon length by weight in Nulato, Alaska, 2004.

The r^2 value was 0.91 with a mean weight of 18 lbs. A one-way ANOVA showed $p < 0.0001$. Sample size of 49 females

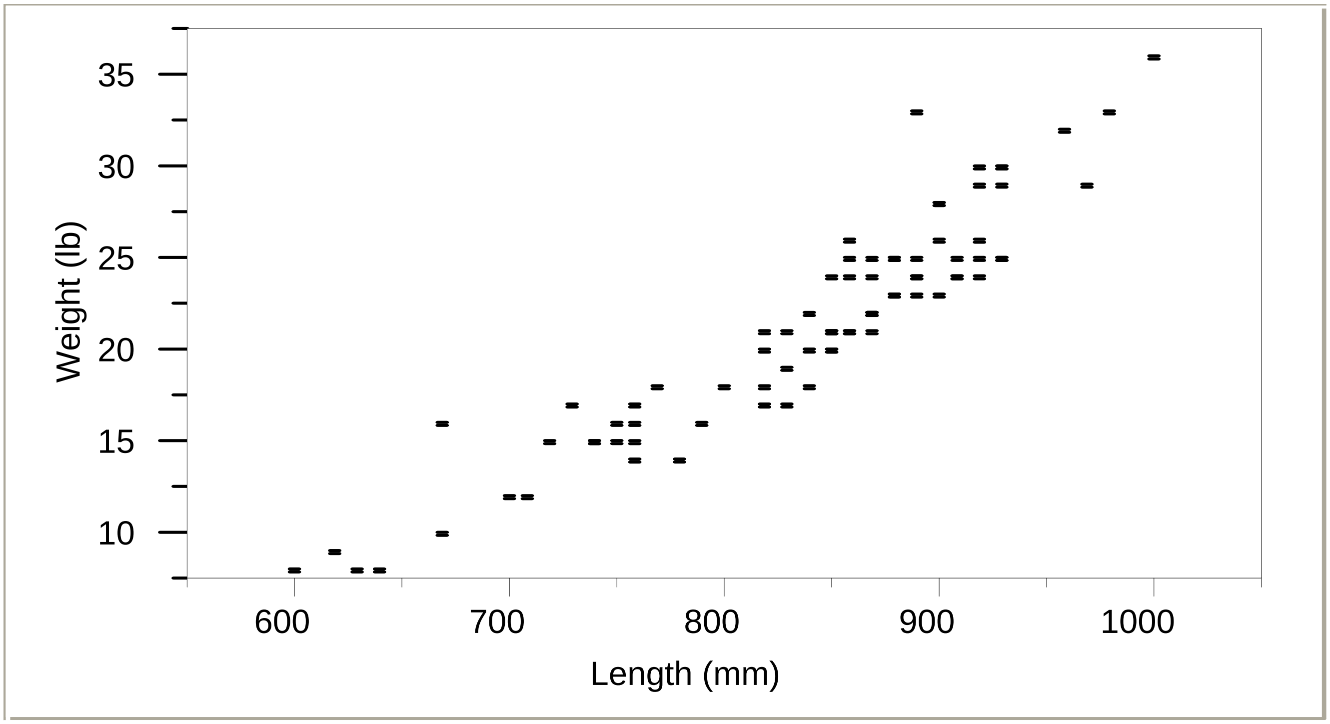


Figure 5. Male Chinook salmon length vs. weight in Nulato, Alaska 2004.

The r^2 value was 0.87 with a mean weight of 21 lbs. A one-way ANOVA showed $p < 0.0001$. Sample size of 80 males.

Table 1. Example of the type of data collected for 2004 subsistence salmon harvests from Holy Cross. (data represents only 19 of 405 fish samples in Holy Cross)

Community	Gear	Mesh size(in)	Species	Sex	Length(mm)	Weight(lb)
Holy Cross	Gill	8 1/2	Chum	Male	570	6
Holy Cross	Gill	8 1/2	Chum	Male	570	6
Holy Cross	Gill	8 1/2	Chinook	Male	630	9
Holy Cross	Gill	8 1/2	Chinook	Male	630	9
Holy Cross	Gill	8 1/2	Chum	Female	580	7
Holy Cross	Gill	8 1/2	Chum	Female	580	7
Holy Cross	Gill	8 1/2	Chinook	Male	730	18
Holy Cross	Gill	8 1/2	Chinook	Male	730	18
Holy Cross	Gill	8 1/2	Chum	Female	630	9.5
Holy Cross	Gill	8 1/2	Chum	Female	630	9.5
Holy Cross	Gill	8 1/2	Chum	Male	590	7
Holy Cross	Gill	8 1/2	Chum	Male	590	7
Holy Cross	Gill	8 1/2	Chinook	Female	680	17
Holy Cross	Gill	8 1/2	Chinook	Female	680	17
Holy Cross	Gill	8 1/2	Chum	Female	570	6
Holy Cross	Gill	8 1/2	Chum	Female	570	6
Holy Cross	Gill	8 1/2	Chum	Male	510	4
Holy Cross	Gill	8 1/2	Chum	Male	510	4
Holy Cross	Gill	8 1/2	Chum	Male	560	6

Table 1 shows type of gear and mesh size along with species captured and each of their sex, lengths, and weights.

Table 2. Summary of Age/Sex/Length data collected from seven communities along the Yukon and Koyukuk Rivers, 2004.

Community	Comments on quality of scale cards and ASL forms	# and % of good quality scales
Holy Cross	Cards 2-7 king and chum mixed, one unknown card; 70	Chinook: 36/41= 88%
	fish; ASL forms- fish data on forms, header data not filled	Chum: 26/29= 90%
	in; scales look ok; ASL data is usable	
Holy Cross	king: 10 cards, 100 king; ASL data is complete and	Chinook: 95/100= 95%
	usable; best set of ASL data from TCC	
Grayling	cards:1-19, 190 chum, no data;cards 1-21; up to 210	Chinook: 178/230=77%
	king; data for 160, doesn't match up	Chum: 182/200=91%
	some scales dirty,bloody; some data filled out on gum	
	cards	
Koyukuk	chum cards 1-2, 19 chum scales, data for 13	Chinook: 155/177=88%
(Bishop Mt)	king cards: 1-18, 180 scales, data for 120, doesn't match	Chum: 18/19:95%
	wax paper stuck to gum cards, some bloody, some	
	cleaner; scales are on numbers; only first few gum cards	
	filled out, rest with # only; date for 120 kings; may be able	
	to match some of the 120 ASL data to 18 king cards	
Galena	gum cards very poor, messy, dirty, bloody, sandy; some	Chinook: 83/139=60%
(Pilot slough)	scales appear inverted; wax paper stuck to gum cards	
	and scales come off on wax paper; gum cards with #	
	only, # sloppy, no other data; part of data usable; many	
	scales inverted, fell off when paper was wetted	
Ruby	king= 50; data shows 79 and chum=23; data shows 114	Chinook: 40/50=80%
	doesn't match up; data not on ASL forms; chum and king	chum: 19/23=83%
	data mixed on scale-fin-heart forms, 1-84, 97-144,157-174	
	no way to pair data with gum cards other than sequential	
	order for kings and chums; gum cards look ok, most	
	data filled out, scales on number, some wax paper	
	stuck; at 3 scales per fish, total 73 fish; data is recorded	
	for 148 fish	
Huslia	chum: ASL forms 1-16 and gum cards 1-21; up to 210	Chum: 108/160= 68%
	chums; ASL forms filled out ok; missing ASL forms for	
	cards 17-21; gum cards dirty, wax paper stuck, some	
	scales curled and may be inverted; many inverted scales	
	data for 210 fish, only 160 scales, data may not match up correctly	
Nulato	kings with few chums; ASL forms 1-14; 133 fish	Chinook: 72/133 or 54%

There were four objectives for this project. These objectives were the following:

1.) The first objective consisted of making training manuals to assist technicians in the biological data collection process. These manuals were also for those community members interested in the methods and types of data that was collected from Chinook and summer chum salmon subsistence harvests. Manuals were created and served as transferable guides in the collection of biological data. The manuals were found to be useful for technicians if they forgot what information needed to be collected or from what parts of the salmon the data should be collected from.

2.) The second objective was to train, mentor, and foster up to 30 individuals in the collection of biological fisheries data from up to 10 communities along the Yukon and Koyukuk Rivers. A total of 21 individuals were trained in seven communities along the Yukon and Koyukuk Rivers. The reason for fewer technicians being trained had to do with liability issues in one community, a heavy fire season leading to a shortage of workers in one community, and a duplication of collection efforts in another community.

3.) The third objective was to provide biological data to management agencies on subsistence caught Chinook and summer chum salmon. Scales were provided to ADF&G's Commercial Fisheries Division for age determinations. One of the seven village's data collections was considered usable for the ASL data notebook that ADF&G has compiled over the years. The six other communities that collected scales will not be utilized by ADF&G due to the poor quality of the scales. The poor quality resulted from dirt, inversion, regeneration, and wax paper sticking to the scales.

4.) The fourth objective was to enhance the subsistence fisheries database at TCC and ADF&G. Data has been compiled into an Access database and the data consists of two years of subsistence salmon fisheries harvest data. It has been the intent of the TCC Fisheries Program to collect and compile as much data as possible on subsistence fisheries harvests.

Discussion

Successful management of the Yukon River fishery depends upon accurate estimates of subsistence harvests (Holder and Hamner 1998). The majority of households in the Yukon River drainage reside in villages in which there are no regulatory requirements concerning reporting of their subsistence salmon harvest (Holder and Hamner 1998). The Alaska Department of Fish and Game has implemented a survey program to estimate the salmon harvest from areas no requiring a permit (Holder and Hamner 1998). This project implemented a program to collect biological data from subsistence salmon harvests. Biological data collected from Yukon and Koyukuk River subsistence salmon harvests is minimal. Information concerning subsistence fishery harvests within the Alaska portion of the drainage has been collected by the department since 1961 and is recorded in the Yukon Area Annual management reports (Holder and Hamner 1998). Subsistence salmon catch data has been collected through the use of personal interviews, catch calendars, and mailed questionnaires (Holder and Hamner 1998). All components of the methods implemented by ADF&G are designed to generate an accurate and precise estimate of the number of salmon harvested by subsistence fishing households in surveyed villages (Holder and Hamner 1998). These methodologies allow for estimates on the subsistence salmon harvests in each of the villages but don't provide much needed biological data from the subsistence catches. Age related data is important for accessing the composition of the salmon run and for determining the portion of the salmon run that consists of that certain age class.

Data compiled from the department's survey project, permit program, department test fishery, and fish tickets (commercial-related salmon) are the primary sources used to estimate the number of salmon harvested and used in subsistence activities in the Alaska portion of the Yukon River drainage (Holder and Hamner 1998).

Participation by subsistence fishing households in the subsistence survey program is completely voluntary (Holder and Hamner 1998). No regulation or statute exists that requires subsistence fishermen to record or report their subsistence salmon harvest (Holder and Hamner 1998). In general, the cooperation of fishermen has been good, but approximately one fishermen per village typically declines participate in the survey (Holder and Hamner 1998). The department if responsible for managing salmon runs to provide for a sustained yield of the species, the greater the error in the estimate of the subsistence harvest, the more difficult it becomes to manage the fisheries for sustained yield (Holder and Hamner 1998). Only 82% of the households to be sampled were actually contacted (Holder and Hamner 1998).

In 2001, the primary components of the survey program were postseason interviews and follow-up telephone or postal surveys (Brase and Hamner 2002).

One of the survey instruments implemented by ADF&G is a subsistence harvest calendar. This calendar is sent out to households and fishermen are supposed to record the daily number of salmon harvested for their household. This calendar is supposed to include salmon caught by their household and given to other households. A project designed to collect biological data from subsistence harvests would give additional information needed to assess the stock and age composition as well as the health of Chinook and summer chum salmon.

Subsistence fishers, hunters, and gatherers presently harvest over 40 million pounds of wild foods annually in rural Alaska, with subsistence fisheries accounting for about 62% of the total, or 230 pounds of food per person per year (ADF&G 2001) (Buklis 2002).

Even though harvest calendars gather subsistence salmon harvest data and this project gathered biological data from subsistence salmon harvests, these two methods can be useful in answering larger questions relating to the health and status of Yukon and Koyukuk River salmon stocks. According to Caroline Brown (personal communication) of ADF&G Subsistence, harvest calendars are not an effective method because it doesn't provide an adequate representation of subsistence harvests because many people do not complete their catch calendars. It is important in biological research to ensure sample sizes are large enough to provide for adequate information needed to assess the status of salmon stocks in terms of health, stock identification, and age.

This project has great potential to provide useful biological information on salmon subsistence harvests. Involving communities fosters a greater understanding of the importance in gathering biological data from subsistence harvests to ensure proper management of Yukon and Koyukuk salmon resources. Age related data collected from this project could have been of higher quality but to remedy the problem would require more training with the technicians. TCC staff was limited to working with technicians for two days in each community prior to the start of the subsistence season in each district. Training dates were correlated with the 2004 subsistence fishing schedule. In the future, two to three communities should be focused on for biological data collection and each of the technicians should receive week long trainings. This project has the potential to enhance knowledge of fisheries management decisions on the Yukon and Koyukuk Rivers. This method of collecting biological data would be the easiest way to collect data from subsistence salmon harvests. In the majority of the Yukon area, no regulatory requirement exists for fishermen to report their subsistence salmon harvests (Alaska Department of Fish and Game, 1999). ADF&G utilizes a voluntary survey program to estimate the total subsistence salmon harvest (Alaska Department of Fish and Game, 2003). A combination of subsistence harvest calendar is mailed out prior to fishing activities, post-season household interviews, postseason household telephone interviews, and postcards (Alaska Department of Fish and Game, 2003). According to Mike Smith (personal communication) of TCC, subsistence harvest calendars, phone interviews, household interviews, and postcards are not the most accurate methods for collecting information on subsistence salmon harvests. He feels that utilizing people at a community level in the biological data collection process is the best way to collect biological subsistence harvest data from salmon. The program that collects subsistence harvest data currently by ADF&G is voluntary which could lead to less accurate biological information collected on Yukon and Koyukuk River subsistence salmon harvests. Currently, test fishing, sonar, aerial and ground surveys of spawning streams, tagging, counting towers, weirs, and a voluntary survey program to collect subsistence and personal use fishery harvests are the current methods being used.

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Deliverables

Two semi-annual progress reports have been submitted to BSFA. Scales, fin tissues, and heart tissues have been processed and archived at the respective agencies identified previously in this report. A data set exists at TCC within a Microsoft Access database at TCC. A poster was created and displayed at the 2004 Annual meeting of the Alaska Chapter of the American Fisheries Society in Sitka. Project results will be analyzed by TCC staff and may be used in future analysis of mesh size in relation to lengths of Chinook salmon.

Project Data

The data is compiled into relational data tables in a database format. The archive is a backup process that has been stored in Microsoft Access. The custodian of the data is Keith Bowman at:

Tanana Chiefs Conference, 122 First Avenue, Suite 600, Fairbanks, Alaska 99701.
907-452-8251 ext 3072; keith.bowman@tananachiefs.org

As far as access limitations, this data is limited to Fisheries Program staff within the Natural and Cultural Resources Department. Access of the data by other agencies or the public is granted by Fisheries Program staff.

Acknowledgements

I would like to thank all of the communities involved in this project including: Holy Cross, Grayling, Nulato, Koyukuk, Huslia, Ruby, Galena, and Minto. Each tribe provided the guidance necessary to implement the work that needed to be accomplished in each of their communities. I would like to thank ADF&G Commercial Fisheries, particularly Larry DuBois, for aging some scales. I would like to thank Blair Flannery for assistance in identifying spawning streams that needed Chinook salmon genetics stock identification data. I would like to thank Chris Stark

and (need assistant's name) for processing the heart tissues and storing the tissues for future analysis at UAF.

Press Release

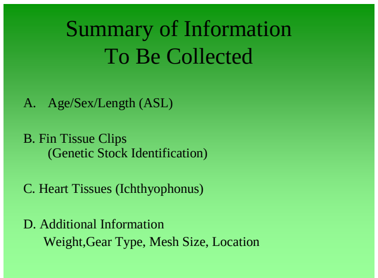
Biological information is minimal from subsistence salmon harvests on the Yukon and Koyukuk Rivers. Involving local communities in the data collection process would provide much needed information to AYK fishery managers. This project is a good example to work from so that future projects incorporate collecting biological data from salmon subsistence harvests.

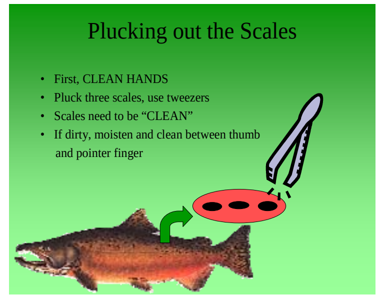
Appendices

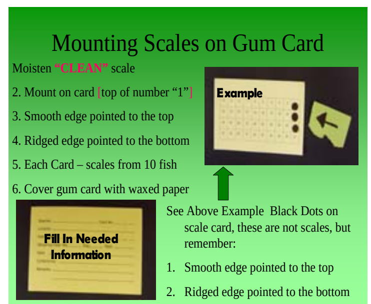
Appendix 1. Communities involved with AYKSSI project and each technicians name.

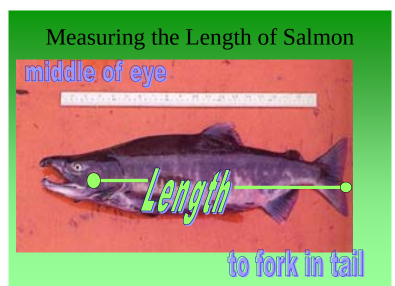
Community	**Supervisor**	**Technician 1**	**Technician 2**
Holy Cross	Randall Dimientieff	Christine Edwards	Harry Turner
Grayling	Sam Brukette	Jeanette Deacon	Kevin Nicholi
Galena	Ragine Attla	Andrew Attla	Robert Pilot
Koyukuk	Lisa Kangas	Louise Kangas	Stephanie Dayton
Nulato	Edward George	Bernard Madros	Walter Stickman
Ruby	Emmitt Peters	William Dozette	Ellis Wright
Huslia	Jana Sam	Darren Lasack	Shawn Jackson

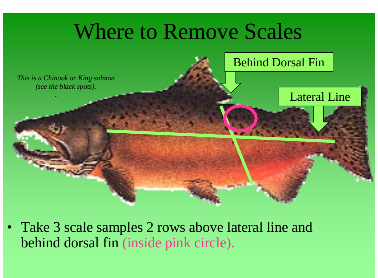
Appendix 2. 2004 Training manual developed for technicians. (hard copy provided as part of final project report)

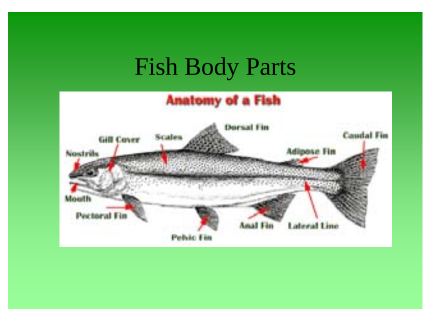












Appendix 2. continued

Collecting Fin Tissues
[*Genetic Stock Identification*]

1. Clip a thumbnail size of tissue from any fin except adipose
2. Place fin tissue into plastic vial with isopropyl alcohol
3. Top off vials with isopropyl alcohol as needed
4. Label the species on top of the plastic boxes with vials

Specific Spawning Tributaries For Collecting Genetic Samples

- **Only** the following villages need to collect genetic samples:
  1. Nulato- Nulato River
  2. Alatna/Allakaket- South Fork Koyukuk
  3. Minto- Chatanika River
  4. Grayling – local spawning grounds

Ichthyophonus hoferi – ICH disease

Do You See "White Spots"?

Check these places:
- ❑ Fish Meat
- ❑ Heart
- ❑ Kidney
- ❑ Liver

If so, the fish may have, *ICH*!

Contact Information

- Kimberly Elkin, Tanana Chiefs Conference
  1800-478-6822, ext. 3489
- Valli Peterson, Tanana Chiefs Conference
  1800-478-6822, ext 3484
- Chris Stark, Bering Sea Fishermen's Association, 907-474-6292 (PERSON YOU SEND HEARTS TO) or 907-474-7066

Send hearts to the following address:
Attention: Chris Stark
Fisheries and Ocean Sciences School
University of Alaska Fairbanks
Fairbanks, AK 99775

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