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Natural Resource Internship Program

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ABSTRACT

The Kuskokwim Native Association and the Alaska Department of Fish and Game have offered fisheries internships to about 15 high school students a year since 1999. The purpose of the program is to encourage community involvement in Kuskokwim River fisheries research and management through engaging youth (ages 14-19) in research projects. The internships last one to two weeks and take place at fisheries research camps. Interns gain fisheries field work experience by counting salmon passage through weirs, sampling salmon for age-sex-length analysis, collecting salmon fin tissue for genetic analysis, recording stream physical conditions, tagging salmon, and living in remote camp environments. Interns also learn fisheries research, management, and ecological concepts through a curriculum of readings and activities. Eight high school interns have been later hired by either the Alaska Department of Fish and Game or Kuskokwim Native Association as fisheries technicians. In 2005, 17 interns from six different villages along the Kuskokwim River participated in the program. The internship program has been an excellent opportunity for communities to participate in fisheries research and for students to explore career opportunities in the natural resources field.

Key Words: Capacity building, Chinook salmon, intern, salmon, subsistence, traditional ecological knowledge, weir, western science, Kuskokwim River

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INTRODUCTION

The Kuskokwim River drainage provides important fisheries resources that have supported a subsistence lifestyle for thousands of years. Salmon contribute as much as 53 percent of the total pounds of fish and wildlife harvested annually in a Kuskokwim area community, and as much as 650 pounds per capita in some communities (Coffin 1991). Subsistence fish harvest is an essential cornerstone of the Kuskokwim cultural heritage.

There are many competing demands and pressures on the Kuskokwim River fisheries resources (e.g. commercial fishing, sports fishing, and resource development). There is a strong need for fisheries research and monitoring in the Kuskokwim River drainage to ensure sustainability of fish populations and subsistence fisheries. Local involvement in this research and monitoring process is crucial. However, local residents have historically felt left out in the fisheries research and monitoring process and research projects have been characterized by misunderstanding and only intermittent local support.

Kuskokwim Native Association has become involved in several fisheries projects in an attempt to foster relationships among local residents and management agencies. The goal of the Natural Resource Internship program is to help foster these relationships through engaging youth and thus communities in fisheries research projects. The internship program was started in 1998 and has evolved to offer about 15 internships a year at fish weirs operated jointly by KNA and Alaska Department of Fish and Game (ADF&G) Commercial Fisheries Division. Eight interns of this program have been later hired as technicians by either KNA or ADF&G. However, more importantly this program has generated interest and understanding of fisheries research and management within local communities. Student interns see how western science works in conjunction with traditional knowledge to protect their fisheries resources and share their experiences with community and family. Researches gain community trust and understanding. Fisheries research projects are no longer a place where government agencies perform esoteric operations with questionable goals but become places where their children work to ensure healthy fisheries resources. This internship program builds community trust and ownership of fisheries projects.

There are four objectives to this program: 1) foster a greater understanding among regional youth about aquatic natural resource management issues and data collection methods by involving students directly in area fisheries projects; 2) teach interns basic salmon management and conservation concepts; 3) diversify the employment opportunities for area residents and develop a skilled pool of future technicians to work on local cooperative fisheries projects; and 4) encourage participants to pursue higher education and full-time careers in natural resource management.

STUDY SITES

The 2005 host projects were the George and Tatlawiksuk River Weirs, and Kalskag Fish Wheel study. The George and Tatlawiksuk River Weirs are salmon escapement monitoring projects operated by KNA and ADF&G Commercial Fisheries Division that use floating resistance board weirs. The George and Tatlawiksuk Rivers are tributaries to the middle Kuskokwim River that support runs of Chinook salmon Oncorhynchus tshawytscha, chum salmon O. keta, and coho salmon O. kisutch and have smaller numbers of sockeye O. Nerka and pink salmon O. gorbuscha. The George River joins the Kuskokwim River at the Georgetown community and the Tatlawiksuk River joins the Kuskokwim River 16 miles upriver from the Stony River community.

Kalskag Fish Wheel study is a salmon capture and tagging project operated by KNA and ADF&G Commercial Fisheries Division to determine Kuskokwim River chum, sockeye, and coho salmon specific stock run timing and to radio tag chinook and sockeye salmon as part of additional basin wide radio telemetry studies. The Kalskag Fish Wheel camp is located approximately 4 miles upriver of Upper Kalskag.

METHODS

High school students (14-19 years old) were recruited from February through April from the KNA region by visiting village schools and contacting teachers and traditional councils. Applicants submitted a short application form, parental consent form, and a one page essay. Applicants were judged for sincerity and interests based on their essays.

Interns were transported from their village to the fish weirs or fish wheels by commercial plane to Aniak and by float plane from Aniak to the field camps. First year interns stayed at the camp for one week and consecutive year interns stayed for either one or two weeks.

Interns learned fish monitoring techniques through participation in weir installation and maintenance, counting fish passage through the weirs, tagging salmon caught in the fish wheels, collecting salmon biological data (age-sex-length), and recording stream habitat variables. Interns learned camp living skills through sharing camp maintenance duties such as cleaning, cooking, maintenance, and wood cutting.

Interns were given a reading list and completed daily worksheets about the readings (Appendix A). Interns also recorded daily fish passage results and completed worksheets that asked a serious of questions that compared current data to historical data using graphs. Interns also completed daily hands on education activities (Appendix A). Interns were given a disposable camera to take pictures to include into their daily written journals. Weir crews were available to mentor the interns during these activities.

Interns who completed a second week focused more intensely on day-to-day weir work such as counting fish passage and collecting age-sex-length data. However, there was an additional curriculum of reading and activities that focused on broad concepts such as

watersheds, human impacts to aquatic ecosystems, subsistence use, and the salmon life cycle (Appendix B).

Each intern's curriculum work was compiled and sent to his or her science teacher or lead teacher (some schools do not have science teachers). Most students received high school credit or equivalent (Kuspuk School District does not use credits) for their internship experience. Interns who successfully completed the internship including the required readings, worksheets, and activities also received $250 stipend.

RESULTS

Seventeen interns from six villages successfully completed the program in 2005. Since the programs inception 109 interns have successfully completed the internship. All interns were taught basic aquatic resource management principles and data collection techniques through field work, readings, exercises, and direct mentorship. Interns were taught about salmon management and conservation through readings and hand on educational exercises.

The experiences that the interns gained from their internships gave them an understanding of fisheries work and made them more desirable as potential future employees. To date, eight interns have been later hired by either KNA or ADF&G as college interns and fisheries technicians. As part of the mentoring process, the weirs field crew explained future employment and education opportunities and interns were encouraged to apply for KNA scholarships.

DISCUSSION

The internship program has many tangible benefits such as providing fisheries experience and education to approximately 15 students annually and providing future employees for fisheries research projects (eight to date). Based on these tangible benefits alone, the internship program contributes significantly to the effectiveness of Kuskokwim River fisheries research and management. However, the internship program provides many less tangible benefits that are even more important such as educating community members about and gaining community project support and ownership.

Interns clearly learn about fisheries research, management, and biology; however, interns also teach their fellow students. During KNA Fisheries staff visits to Crooked Creek and Chuathbaluk schools, students were able to describe weir fish passage monitoring techniques and identified reasons that ADF&G and KNA conduct weir projects. Students identified fellow interns, Mark Vanfleteren (Crooked Creek) and Veronica Alexie (Chuathbaluk) as the source of their knowledge.

Interns take curriculum materials and pictures home and teach their family, teachers, and other community members about their experiences. KNA Fisheries observes the results of this through the variety of detailed questions that we receive from our members.

The internship program has created better community support and ownership for the fisheries research and management processes. The internship program provides an intimate connection between fisheries research projects and communities. Community members of all ages see how the fisheries research projects work and the value of fisheries research and management.

FUTURE OUTLOOK

KNA Fisheries will continue the internship program in a similar capacity in 2006. The written curriculum will be more closely melded to and meet more State of Alaska math and science standards. Flexibility will be added to the second week curriculum to allow individual student to pursue special interests. After 2006, the internship project will be incorporated directly into the George and Tatlawiksuk River weirs grants proposals.

LITERATURE CITED AND CURRICULUM SOURCES

Armstrong, R. H. 1996. Alaska's Fish: A Guide to Selected Species. Alaska Northwest Books. Seattle, Washington

Coffing, M. 1991. Kwethluk Subsistence: Contemporary Land Use Patterns, Wild Resource Harvest Use, and the Subsistence Economy of a Lower Kuskokwim River Area Community. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 157, Juneau.

Lyman, J. 2002. Alaska's Wild Salmon. Alaska Department of Fish and Game. Juneau, Alaska

Murdoch, T., C. Martha, and K. O'Laughlin. 1999. Streamkeeper's Field Guide. The Adopt-a-Stream Foundation, Everett, Washington.

National Research Council. 1996. Upstream: Salmon and Society in the Pacific Northwest. National Academy Press, Washington, D.C.

Pollard, W.R., Hartman, G.F, Groot, C., Edgell, Phil. 1997. Field Identification of Coastal Juvenile Salmonids. Harbour Publishing, Madeira Park, B.C. Canada.

Yates, S. 1988. Adopting a Stream: A Northwest Handbook. Univ. of Washington Press, Seattle, Washington.

APPENDIX A—WEEK ONE INTERN SCHEDULE

Day 1 (Travel Day!)

Travel to site
Read handout on "Weirs" and fill out worksheet prior to leaving for camp
Begin work and camp chores as directed by tech. or mentor
Fill out "**Day 1 Worksheet."** (Must sit down with a Tech. at end of each day or next morning to calculate total fish counts) Must gather this information for end of week graph!

Day 2 (Salmon Species Day!)

Continue work and camp chores as directed by tech. or mentor
Read Chapters 1 & 2 of your text, "Introduction/How Salmon Evolved and Adapted Pacific Salmon Biology, Alaska's Wild Salmon"
Start the "Construct a fish Project"
Complete "**Identify Species Worksheet**"
Fill out "**Day 2 worksheet**"
Watch "Alaska's Harvest" video and answer questions.

Day 3 (Dissection Day!)

Continue work and camp chores as directed by tech. or mentor
If you have been involved in any ASL sampling start differentiating between physical characteristics of fish species (Example: How does a sockeye differ from a chum?) and look at some scales through the microscope and attempt some age predictions.
If there were any washed up or drift salmon throughout the day/week use one of those fish to dissect. Identify parts and complete "**anatomy of fish**" worksheet.
Read Chapter 3 in your text "Alaska Salmon Habitats- The Delicate Balance, Alaska's Wild Salmon"
Begin drawing out the 5 stages of the salmon life cycle (be creative, use color, construction paper etc.)
Fill out "**Day 3** worksheet" and complete **"Healthy Habitat Activity**"

Day 4 (Weather conditions)

Continue work and camp chores as directed by tech. or mentor
Go out with a Tech. and help take water characteristics: observe color, clarity, temperature, current and flow, pH and acidity, presence of pollutants.
Complete **worksheet on water characteristics** (must use water observations handout in back of binder to compare)
Play the board-game "The Great Salmon Life Cycle Race" page 8 out of your Salmon Homecoming Activity book with the other intern, or anyone interested.
Read Chapter 4 in your text Alaska's Wild Salmon
Fill out "**Day 4 worksheet**"

Day 5 (Treasure Hunt Day)

Continue work and camp chores as directed by tech. or mentor
Treasure Hunt Day: Look at End of Day 5 worksheet for details
Fill out **worksheet on aquatic insects**
Complete your "Construct a fish project"
Read Chapter 5 in text Alaska's Wild Salmon
Fill out "**Day 5 worksheet**"

Day 6 (Snorkeling in the George or Tatlawiksuk River!)

Continue work and camp chores as directed by tech. or mentor
Have the crew help you out with using the dry-suits and snorkeling equipment
- See what you can see in the river

Complete your drawing of the life cycle of a salmon (make sure it is accurate, colorful, and creative)
Complete **"Where Have all the Salmon Gone"** worksheet
* **Must** complete this worksheet along with the graphs!

Read Chapter 6 in your text Alaska's Wild Salmon
Start writing your essay on what you've learned from this experience

Day 7

Continue work and camp chores as directed by tech. or mentor
Complete all your work and neatly organize it by day into your binder
Finish writing your essay on what you have learned from this experience

Day 8 - Return Home 

Travel Home
Compile all your work and neatly organize it by day into your binder
Finish writing your essay on what you've learned from this experience

APPENDIX B—WEEK TWO INTERN SCHEDULE

Day 1: Work as directed by crew

- Water Cycle Activity
- How many gallons of water am I?

Day 2: Edible Plants Project

- Field trip to identify local edible and non-edible plants
- Design a guide book for edible and non-edible plants

Day 3: Work as directed by crew

Day 4: Seining for Juvenile Salmon & Snorkeling

- Look at the young fry through the microscope
- Snorkel behind the weirs and identify salmon species/grouping
    - Watch short videos of Kanektok River salmon on Dana's Computer
    - Write a brief summary of what you did in your journal

Day 5: Work as directed by crew

- Talk about development in your area and how it might effect local watersheds:
    - Donlin Creek Mine near Crooked Creek
    - Any development in and around Aniak
    - Write all this down in your journal

Day 6: Blue Ribbon Niche Activity (Riparian Habitats)

- Read the "Blue Ribbon Niche" handout
    - Identify plants and animals in the riparian zone
    - Identify their niche, and habitat
    - Identify conditions for survival the riparian zone provides

Day 7: Travel Home Day ☺

- Compile all your work into your binder and send back with Dana

Thanks for all your hard work, now have a great remainder of the summer!!

APPENDIX C—PHOTOS

Figure 1: Intern Veronica Alexie inserting a floy tag into a chum salmon at the Kalskag Fish Wheels Project accompanied by ADF&G Fisheries Biologist, Jay Baumer and ONC Fisheries Technician, Sunny Demantle.

Figure 2: Interns Veronica Alexie and Randal Lang tagging a chum salmon at Kalskag Fish Wheels.

Figure 3: ADF&G Fisheries Biologist, Sara Gilk teaching Interns Veronica Alexie and Randal Lang about radio tagging sockeye salmon.

Figure 4: Partners College Intern, Dana Diehl teaches Intern, Johnny John the anatomy of a coho salmon during a dissection at the Tatlawiksuk River Weir.

Figure 5: Intern, Ida Nicolai places Chinook salmon scales on a scale card during Age-Sex-Length sampling at the Tatlawiksuk River Weir.

Figure 6: ADF&G Fisheries Biologist, Dan Costello teaches Interns, Ida Nicolai and Tomas Levi how to download a remote radio telemetry station.

Figure 7: Interns, Tomas Levi and Ida Nicolai learn to age fish by counting annuli on scales at the Tatlawiksuk River Weir.

Figure 8: Intern, Ida Nicolai counts fish passage at the Tatlawiksuk River Weir.