Aquatic Monitoring Workshops for Alaska Tribes

Elaine B. Major[1]

Environment and Natural Resources Institute, University of Alaska Anchorage
707 A Street, Suite 101
Anchorage, Alaska 99501
Phone: 907-257-2731 Email: anebg@uaa.alaska.edu

Biographical Sketch of Author
Elaine Major is a Research Associate with the Environment and Natural Resources Institute. She led development of the Biological Monitoring and Assessment Program for Alaska, which integrates biological, physical, and chemical information to evaluate clear, wadeable surface water quality. Standard methods for technical, volunteer, and educational level application have been developed to create a coordinated statewide approach for water quality assessments. She has a M.S. in Environmental Quality Science and a B.S. in Plant Science. Elaine was raised in LaFarge, Wisconsin and has been an Alaskan resident for 21 years. She has two adult sons; likes to travel, play piano, and paint; and enjoys working with people.

Abstract
The University of Alaska Anchorage's Environment and Natural Resources Institute (ENRI), has partnered with many organizations in the state to advance water quality monitoring efforts in a tiered approach. For this project, ENRI worked in cooperation with the Native American Fish and Wildlife Society (NAFWS) and U.S. Environmental Protection Agency (USEPA) to provide technical training workshops focused on water quality and aquatic monitoring for Alaskan Native village representatives. The training incorporates traditional knowledge with aquatic monitoring techniques to improve the collection and exchange of information and management techniques related to self-determination of Tribal fish and wildlife management. To date, more than 100 tribal members have been trained to use standard methods and monitor their local environments. More workshops are planned for 2002.

This network of tribal resource managers provides a valuable link for researchers and scientists to rural Alaska. Alaska has significant water resources: it provides more than 40% of the nation's surface water; 45% of its 375 million acres are wetlands; 45 million acres are native lands; there are more than 3,000,000 lakes and streams; and there are less financial resources to monitor than other states. Baseline information for most of the state's water bodies is lacking. As a result, it is even more critical that groups cooperate to evaluate, protect, and monitor the condition of our water resources. The format and description of the workshops, an overview of the objectives, topics covered, expected results, and future training opportunities will be discussed.

ENRI has worked closely with many organizations to advance water quality monitoring efforts statewide. The process to use standard methods to collect biological, chemical, and physical information in a systematic approach to assess water quality began in Alaska in 1996. Methods have been developed in a tiered approach for three levels of application (technical, volunteer, and educational).

Aquatic Monitoring Workshops for Alaska Tribes

Elaine B. Major[1]

Environment and Natural Resources Institute, University of Alaska Anchorage
707 A Street, Suite 101
Anchorage, Alaska 99501

The University of Alaska Anchorage's Environment and Natural Resources Institute (ENRI), has partnered with many organizations in the state to advance water quality monitoring efforts in a tiered approach. For this project, ENRI worked in cooperation with the Native American Fish and Wildlife Society (NAFWS) and U.S. Environmental Protection Agency (USEPA) to provide technical training workshops focused on water quality and aquatic monitoring for Alaskan Native village representatives. The training incorporates traditional knowledge with aquatic monitoring techniques to improve the collection and exchange of information and management techniques related to self-determination of Tribal fish and wildlife management. To date, more than 100 tribal members have been trained to use standard methods and monitor their local environments. More workshops are planned for 2002.

This informal network of tribal resource managers is a valuable link for researchers and scientists to rural Alaska. Alaska has significant water resources: it provides more than 40% of the nation's surface water resources; 45% of its 375 million acres are wetlands; 45 million acres are in native lands; there are more than 3,000,000 lakes and streams; and there are more water bodies to monitor with less resources than other states. Many varied issues water quality issues affect native lands. Baseline information for most of the state's water bodies is lacking. As a result, it is even more critical that groups cooperate to evaluate, protect, and monitor the condition of our water resources. The format and description of the workshops, an overview of the objectives, topics covered, expected results, and future training opportunities will be discussed.

ENRI has worked closely with many organizations to advance water quality monitoring efforts statewide. The process to use standard methods to collect biological, chemical, and physical information in a systematic approach to assess water quality began in Alaska in 1996. Since that time, methods have been developed in a tiered approach for three levels of application (technical, volunteer, and educational) and training is ongoing at each level as new people participate and others update their skills. Methods closely follow USEPA Rapid Bioassessment Protocols. There has been an overwhelming response requesting training in these methods and workshops are always full.

The aquatic monitoring workshops for Alaska tribes was organized and led by the Alaska Region of NAFWS. NAFWS goals include facilitating and coordinating intertribal communication; contributing to wise management of resources; providing education, support, expertise, and advice to tribal governments; serving as a clearinghouse for information; improving the general welfare of tribal people; and increasing tribal and public awareness of the Society.

The workshops were developed with several objectives in mind but first and foremost to meet needs identified by the tribes. The intent was for the participants to learn ways to support tribal resource management by combining the power of traditional knowledge with western science, providing skills and tools for tribes to conduct monitoring themselves, and expanding monitoring efforts statewide using standard methods. Tribes provided information about their needs as the concept for the workshop was developed and each step of the process placed these needs in highest priority. Each participant was required to have a letter of recommendation from their tribal leader to attend and it was considered an honor to be offered the opportunity to participate for their village or tribe. There is always a waiting list to attend each workshop!

In addition to meeting information needs of the tribes, workshops were strategically located based on comments from tribal participants. Locations were selected that were less urban and made the participants feel more comfortable. The workshops were developed so that greater than 50% of the time was spent in the field with hands-on activities. Participants practiced each testing method a minimum of three times to fully understand the approach and to ask questions of the trainers as they practiced. Teaching approaches were primarily visual and kinesthetic based. Each participant left the workshop with reference materials and the tools or testing kits to support monitoring upon their return home. If a tribe or community had more than one participant over the course of the year, they did not receive additional tool kits.

Monitoring on tribal lands is important for several reasons. Most of Alaska does not have adequate baseline information. The majority of the state is difficult to access and some of these areas are facing serious water quality problems from formerly used defense sites and inadequate wastewater and solid waste treatment facilities. It is especially important to collect baseline information to understand and characterize these conditions. There is an added need to collect information about contaminants in rural Alaska since subsistence food resources are heavily relied upon throughout the state. Tribes are welcoming new tools to monitor and evaluate their own environment that provide them with information to make natural resource decisions that make economic, social, and environmental sense.

Workshops are scheduled monthly through the open water months. The format includes classroom lecture followed by hands-on application. Class sizes are limited to no more than 20 participants and the trainers remain constant throughout each workshop. There is a lot of repetition, which emphasizes the importance of key concepts. General topics covered include watershed processes, biological, chemical, and physical parameters as they relate to water quality and fisheries management information. Training locations have been held in Anchorage at a Bureau of Land Management teaching facility that has a pristine stream near the facility. For practice and comparing results, the participants are also taken to two other streams. One stream is at a tribal village where the data collected is actually used to support their tribal monitoring program and another is at an urban stream that has been heavily impacted by man.

Each workshop begins with introductions that include brief descriptions of where people are from and what are some of their issues of concern. There are a minimum of three instructors in addition to the Native American Fish and Wildlife Society staff throughout the workshop. The workshop agenda is discussed so participants are aware of the activities planned over the week. Presentations are interspersed with hands-on activities to review concepts presented and then field sessions to apply what was learned in the classroom.
The presentations begin with basic watershed concepts such as what is a healthy watershed, how to define your watershed, and hydrologic influences on watersheds. Fisheries resources are discussed in detail and include life history information of common species, habitat requirements, water chemistry influences and state water quality criteria, sampling and identification techniques, and fish kill response and pathology.

The overview of biological monitoring in Alaska includes information such as techniques, sample timing, and relationship between physical, chemical, and biological characteristics. These assessments can be used to screen for impairment, identify improvements, prioritize streams for more intensive studies, identify trends, and supplement other monitoring strategies. This assessment process is fun for the participants and they are encouraged to take it home and share their knowledge with their children and schools in the local area. Diverse communities of macroinvertebrates are desirable to indicate healthy ecosystems. This concept is easily demonstrated, understood, and transferred. Basic metrics such as number of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa, number of total taxa, and estimated density are calculated from the samples. Examples are provided to stimulate ideas about how they might use and display their data.

A web-based database has recently been developed to store, share, and view the biological and basic chemical data and it is described to encourage participants to use it. The need for a more efficient way to handle the data collected, expand the program, and provide technical support to a larger audience prompted development of the database. The online database was developed with support from Alaska Departments of Natural Resources and

Environmental Conservation. The database will allow groups from around the state to readily access and share their information.

The data is easy to input, understand, and use and is meant to support, sustain, and encourage water monitoring efforts statewide. The data entry form closely resembles the field datasheets included in the standard operating procedures. The database website is expected to result in an increase in environmental awareness on a statewide level related to water quality and fisheries issues. The long-term goal is to improve coordination of efforts and increase partnerships to reach mutual goals for watershed protection. The database can be accessed from the ENRI website at http://www.uaa.alaska.edu/enri/bmap/index.html or the Cooperatively Implemented Information Management System (CIIMMS) website at http://info.dec.state.ak.us/ciimms/.

Habitat inventory procedures discussed include channel form, aspect (flow direction), substrate characterization, habitat units and types, riparian vegetation type, slope, shade, channel width, bank stability, and woody debris. Tools used to facilitate collecting these measurements include a clinometer, a compass, measuring tape, and datasheets with detailed descriptions and codes to complete the inventory for an entire watershed if possible. All of these parameters are reviewed extensively in the field and data collected at each study site.

Water chemistry covers an extensive list of parameters. The importance of each parameter is discussed as well as chemical interactions, what they mean, and how they can influence fisheries and other biological resources. Tests used include dissolved oxygen, pH, conductivity, turbidity, salinity, nitrates, phosphates, cyanide, lead, and total coliform. Two laboratory tests are also provided for each community for either heavy metals, pesticides, or oil and gas related chemicals (BTEX). The chemical test kits used are primarily from Chemetrics and participants practice these as they are discussed in the classroom and then again at each of the 3 study sites over the course of the workshop.

The program is unique in that the participants are provided a tool kit to take home with them at the conclusion of the workshop. They can choose either (1) all of the water chemistry test kits and bioassessment equipment or (2) a turbidity meter and lead, cyanide, and coliform test kits. Most participants select the first option and are able to start monitoring as soon as they get home. In addition, they receive a manual full of all of the procedures or methods used over the week, reference materials, and contact information for additional resources. Written materials provided include a *Streamkeepers Field Guide*, the *Alaska Stream Team Educational Level Methods*, a color *Guide to Pacific Northwest Aquatic Invertebrates*, fisheries information from the Alaska Department of Fish and Game, a color key to *Field Identification of Coastal Juvenile Salmonids*, state and federal water quality regulations, a USEPA stream walk guide, and Cooperative Extension Service drinking water information.

The importance of developing a monitoring plan is discussed at the conclusion of the workshop. It is recommended that groups identify local partners with similar interests, other ongoing watershed efforts, and historical information and data if available to reduce duplication of effort. Participants are encouraged to think carefully before monitoring about why, what, how, and where to monitor in addition to when and who will conduct the monitoring. By taking the time to answer these questions, a basic monitoring plan can be developed that is well thought out and attainable.

Six beginning level workshops have been completed to date with 111 participants trained to monitor water quality from 78 villages or cities across Alaska. Some groups have already developed basic monitoring plans and have started monitoring. Coordination with local teachers has been encouraged. Evaluations were completed for every workshop and most have been very positive. Some highlights noted in the participants evaluations include they:

- Liked the hands-on easy to understand format,
- Liked learning about water quality and biological assessments,
- Were comfortable with non-native trainers,
- Liked using the new tools to compare impaired vs. unimpaired sites,
- Requested longer training sessions, and
- Wanted more information about macroinvertebrates, lake and marine ecosystems.

In 2002, four more workshops will be offered: one beginning level and three intermediate level. The intermediate level workshops will focus on a review of biological, chemical, and physical monitoring procedures; how to develop a quality assurance project plan; procedures for lake monitoring; and conducting assessments using the more advanced volunteer level biological monitoring methods.