**What worked, and what didn’t: Lessons learned from the Indigenous Observation Network**

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Indigenous Observation Network (ION)

**ORGANIZATIONS:** Yukon River Inter-Tribal Watershed Council, U.S. Geological Survey Mission Area Program, Arctic Village, Anvik, Allakaket, Eagle, Gwichyaa Gwich'in Tribal Gov., Council of Athabascan Tribal Gov., Kotlik, Hooper Bay, St. Michaels, Emmonak, Alakunak, Tanacross, Nenana, Chuloonawick, Circle, Ohogamuit Traditional Council, Pilot Station, Ruby, Louden Traditional Council, Koyukuk, Iqurmiut Tribal Council, Yupiit of Andreafski, Stebbins, Nulto, Russion Mission, Tanana, Venetie, Carcross Tagish First Nation, Nacho Nyak Dun First Nation, Kwanlin Dun First Nation, Little Salmon/Carmacks First Nation, Ta'an First Nation, Taku River Tlingit First Nation, Teslin Tlingit Council First Nation, Tr'ondek Hwech'in First Nation

**DURATION:** 2006 **–** Ongoing, continuously seeking additional funding.

**OBJECTIVES:** The program’s main objectives are driven by the YRITWC organizational mission and vision to protect and preserve the Yukon River watershed. Through an international accord between Indigenous governments, the YRITWC and United States Geological Survey (USGS), the Indigenous Observation Network (ION) was formed. IOS is a large-scale monitoring program with the goal to address water quality and environmental change impacts on rural indigenous communities across the Yukon River Watershed. The communities living in this area are highly dependent on the landscape and environment for subsistence and drinking water resources to maintain their traditional way of life. YRITWC is using USGS-approved quality assurance and quality control (QA/QC) protocols to ensure high quality data collection, and consistency across the large watershed.

The YRITWC engages Indigenous communities directly. The ION monitors water quality and the active layer (permafrost) in the Yukon River Watershed by combining rigorous scientific training with the skills and knowledge of local community members. The community members collect environmental data that are verifiable and defensible. ION is guided by Indigenous Knowledge to advance the knowledge of environmental changes on hydrological processes and fluvial bio-geochemistry over a variety of temporal and spatial scales in the Arctic and Sub-Arctic environments.

The YRITWC is led by an Alaskan and a Yukon Executive Committee (EC). The ECs are composed of Indigenous leaders, appointed by each region of the Yukon River Watershed. The ECs meet regularly and determines the direction of the YRITWC, and the staff work to accomplish these goals. An Indigenous Research Protocol also guides the work. In this way the activities are guided by Indigenous Knowledge.

**STATUS:** The objectives have been partly achieved. In partnership with the USGS Mission Area Program we have built an extensive water quality dataset at 54 sites, collected more than 1,500 samples and trained more than 1,000 environmental technicians to collect water quality data. Furthermore, the ION has collected eight years of permafrost (Active Layer Network) data at 20 sites across the Yukon River Basin, and documented Indigenous Knowledge and environmental observations about landscape changes. IONs approach is holistic and includes the collection of traditional knowledge and western science information to address past and current observed impacts to landscape and water quality, seasonal variability as well as community responses to the changing hydrology and ecosystems in the watersheds. ION has enhanced our understanding of changes in environmental systems in the Arctic and Sub-Arctic regions. ION is managed by the Yukon Tribes and Frist Nations, and it is an on-going monitoring effort without an end date.

**DATA USE:** Data from the Indigenous Observation Network in Yukon River Basin have been used both by at local and the regional level. The communities have used the data at the local level for community planning. For instance, the data have been used for management of safe drinking water and wastewater, for solid waste management, and for advocacy to protect clean water and salmon stocks. The ION reports apply relevant water quality standards (Alaska) and guidelines (Canada) to determine whether water quality exceeds dangerous values for the use of specific areas for example as source of drinking water, or as a recreational area, or an aquatic habitat for wildlife.

At the regional level, the data have been used to inform the Yukon River Water Quality Plan. This Water Quality Plan was adopted by the YRITWC signatory Alaska Native Tribe and Canadian First Nation representatives at a summit in May 2013. The goal of the Plan is to protect Indigenous water rights by ensuring the Yukon River and its tributaries ‘substantially unaltered from natural conditions’. One of the plan’s visions is to generate sufficient data through ION to assess river water quality and quantity, which then will allow Tribes and First Nations to set measurable and specific water quality guidelines. Furthermore, the ION data have also been utilized by scientists to better understand large scale environmental and climate associated changes occurring within the watershed.

**ACHIEVEMENTS:** The most important achievements have been:

* Built a cohesive network of people and organizations across the Yukon River Watershed with shared goals and activities
* Made the data available to community members in acceptable forms through the creation of plain language community reports for each partner community
* Built capacity of Alaska Native Tribes and First Nations to conduct their own water quality monitoring program to address community needs
* Contributed to long term dataset of water quality while also addressing specific data gaps on the Yukon River
* Build strong relationships between Alaska Native Tribes and First Nations to form monitoring programs ownership and trust in their data collection
* Strengthen Alaska Native Tribes and First Nations environmental awareness
* Data use in decision-making for local water governance and education
* Publication of seven peer reviewed scientific articles, with more in review
* Publication of brochures and pamphlets, including training materials

**CHALLENGES AND SOLUTIONS:** The ION program was evaluated by Nicole J. Wilson in 2017. Challenges identified by YRITWC staff and Wilson are:

First, funding to maintaining a long-term and sustainable water quality monitoring program is a huge challenge and for instance affecting sampling frequency and timing. It is easier to get funding for new innovative projects, than to secure continued funding for monitoring that has existed over years. Moreover, it has been a challenge to obtain funding to focus on baseline parameters to address local contaminant concerns such as heavy metals and sediments from mining or leakage from local sewage lagoons and landfills as well as climate change indicators.

There are limited funding opportunities at the watershed scale. Limited transboundary funding has fragmented the ION. Yet, water quality and active layer monitoring has continued within Tribal or First Nations Environmental departments in communities who value ION, with limited support provided in kind from YRITWC and USGS. The YRITWC has secured funding for projects focused on community contaminant concerns but only limited support to maintain a watershed scale ION.

Second, traditional knowledge in ION monitoring program should incorporate traditional indicators for water quality, quantity and rate of flow. The platform for data visualization ‘Fieldscope’ that allows community members to enter their water quality data has not been used frequently by community members. It would have been good to have included more outreach about its utility and to have more fully appreciated the limited connectivity of rural communities.

Third, communication is a challenge when working across a large and remote watershed. Many communities don’t have reliable internet or phone connections. We have worked to make information available through mailing paper reports, and newsletters. We also take advantage of opportunities, such as Tribal Environmental conferences when many partners are already in town, to host luncheons, allowing ION partners to meet face-to-face whenever possible.

**FUTURE DEVELOPMENT:** Our strategic plans for the future of ION involve several ideas. We would like to continue the ION baseline monitoring program at established sites, as well as enhance the network by addressing more specific community contaminant concerns, protect water sources and address drinking water issues. Overall, we will maintain, build and strengthen partnerships with relevant entities and stakeholders.

We need to focus our effort in networking with stakeholders interested in the preservation and conservation of the Yukon River Watershed and engage in discussions to highlight the importance of ION. For example, we participate in many local Environmental Conferences. We also attend some International efforts. We currently have observer status at the UN, and we have applied for observer status at the Arctic Council in order to become more integrated in international efforts.

To continue and enhance the ION monitoring program, additional funding is needed. We have submitted proposals to seek funding from federal funders, in addition to pursuing smaller funding sources like Foundations and Charitable Trusts.

**OTHER POINTS:** For organizations interested in establishing their own water quality program, the YRITWC website offers publically available water quality training material, water quality equipment manuals, Quality Assurance Project Plan template and other useful resources. To select good water quality monitoring sites it is useful to ask the local community what waters are important to them and why.

We feel that documenting high quality environmental data can support Indigenous self-governance of important resources and we welcome others to use the materials provided. Don’t hesitate to contact us if you do use the materials. We would be interested to know how they are being used, and can answer any questions you may have about them.