EXCHANGE NETWORK TRIBAL CASE-STUDY

Data-Driven Solutions: Enhancing the Skokomish Tribe's Water Quality Analysis and Reporting with R

Skokomish River, WA. Skokomish Drone Program

CHALLENGE

The Skokomish Tribe's Water Quality Monitoring Program (SWQM) operates under a unique challenge, common in Tribal environmental programs: limited personnel resources. With a single dedicated staff member responsible for data collection, field sampling, database management, and reporting, the program faces significant demands. To effectively manage these responsibilities and ensure the continued protection of the Tribe's water resources, the SWQM recognized the need for external support and turned to the Tribal Exchange Network Group (TXG) for assistance to bridge the gap.

LESSONS LEARNED

1. Programs like R can provide critical efficiencies

With programs like R, a wide variety of tasks can be automated to increase capacity and data quality, especially tasks that take large amounts of time if performed manually. Additionally, Tribal staff can collaborate on templates for tasks and reports that commonly occur for staff across national Tribal environmental offices. In this case, using existing R code to free time for staff to ultimately improve SWQM's Tribal Water Quality Assessment Reports.

2. Collaboration is essential

The relationship built between TXG's Tribal environmental professionals and the SWQM Program's staff allowed for ongoing, open communications and trust in TXG's members to support staff and handle SWQM's WQ data discretely and securely.

3. Individualized support is key to the learning process

It has become apparent that working one-on-one is critical to long-term retention and skill building during the learning process. Learners can ask questions and express concerns as they come up. A sense of comfort and understanding can be developed, allowing open communication and trust to support staff as they juggle multiple projects and objectives.

OBJECTIVES

Initially, the SWQM collaborated with TXG to build capacity to employ the statistical software R for data entry and analysis. The primary objectives were:

1. **Skill Development:** Equip SWQM staff with R skills for data entry, analysis, and management through hands-on training and custom scripts.
2. **Quality Enhancement:** Standardize data analysis methods to build comparable and repeatable quality assurance and quality control measures.
3. **Efficiency Improvement:** Streamline data management processes to reduce time spent on data entry, management, and reporting, allowing staff to focus on higher-priority tasks.
4. **Timely Reporting:** Provide more timely and accurate water quality information to the Tribal community.
5. **Capacity Building:** Create reusable templates and systems for sustainable data management across various projects.

> *Through using this software (R), the program has been able to increase quality, efficiency, comparability, and reduce time needed to complete reporting.*

- Seth Book,
Skokomish Environmental Programs Manager

EFFECTIVE SOLUTIONS AND EMERGING OPPORTUNITIES

SOLUTIONS

SWQM staff requested assistance from Angie Reed through TXG's Tribal Assistance program for more specific training in R. Through virtual calls with Angie, clear goals were established and consistently revisited. These one-on-one sessions allowed for focused progress and flexibility to adapt to participants' needs.

Extra time was dedicated to mastering the R program, ensuring that the SWQM could lay the foundation for use of this program in a variety of projects. SWQM used their own data throughout the learning process, which allowed for consistent practice and data sovereignty. This hands-on approach not only enhanced understanding but also made the training immediately applicable to their work. Supportive management played a crucial role, providing the necessary resources and encouragement to stay on track.

Equally important were the fun and informal discussions woven into the process. These interactions fostered a positive learning environment, reducing stress and promoting intuition and creativity. Together, these elements created a successful and sustainable approach to building the capacity of the SWQM.

"I understand how much more effort it takes to do this work with one person at a time, but I have come to believe that it is more critical to long-term retention and skill building than I would have guessed."

-Angie Reed, Water Resources Planner, Penobscot Indian Nation, TXG Vice-Chair

OUTCOMES

- Post-TXG Tribal Assistance, Skokomish's WQ program **developed their first annual Water Quality Assessment Report** using R Markdown.

- Newly developed skills in R have enabled SWQM staff to **more efficiently manage their various data sources and streamline bacteria data analysis**.

- Critical data on bacterial levels in adjacent and on-reservation waters is now able to be communicated and shared with the Tribal community, **improving public health.**

- SWQM is now able to **effectively share available water quality data,** saving countless hours.

"Fun might be the most underestimated ingredient (for success) ... you will be able to think more critically, have more RAM speed and brain power. You'll also be able to access creative flow more easily, which allows many more connections to be made to the material and your past experience, one of the cornerstones to learning and retention."

–Alena Reynolds, Skokomish Tribe Environmental Programs Biologist