

Traditional Stories and Western Science: Examining The Validity of Traditional Ecological Knowledge.

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Introduction

For generations our elders have passed down knowledge about our environment through stories and legends. This project is centered on both traditional stories and the bioassessment of local rivers examining the health of our local watersheds.

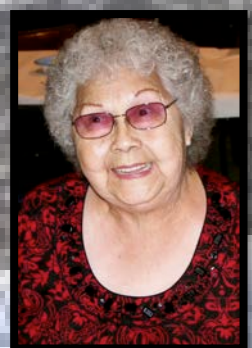
Hypothesis: Traditional Ecological Knowledge (TEK) provides information that can be tested using western science, indicating the validity of TEK.

Our hypothesis is tested by examining traditional stories told by our elders about our local watersheds, and then collecting, and identifying macroinvertebrates and salmon from local rivers. To test this hypothesis we reviewed and analyzed traditional Haida stories about our environment. We then selected local rivers from which to conduct water quality monitoring activities, such as water chemistry, bioassessments and physical characteristics of these rivers. Our goal was to compare TEK to results from our western science experiment and see if we could identify how they compared and contrasted with one another.

Methods

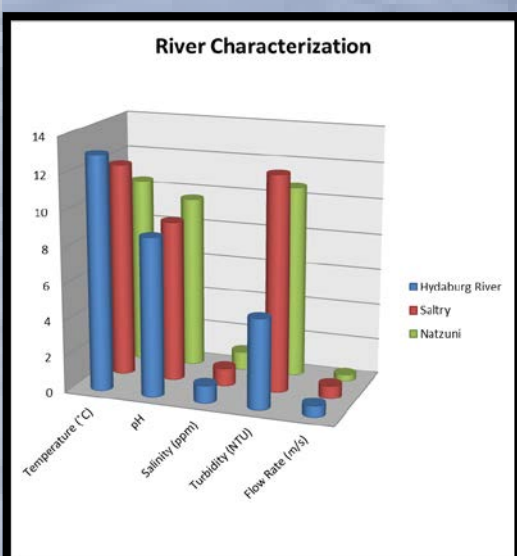
Western Science

1. **Kick:** Macroinvertebrates are collected from the river bed using D-loop nets.
2. **Collection:** River water is collected to rinse D-loops, dislodging collected macroinvertebrates.
3. **Sorting & keying:** of macroinvertebrates at collection into individual containers.
4. **Turbidity:** River water is tested to measure turbidity.

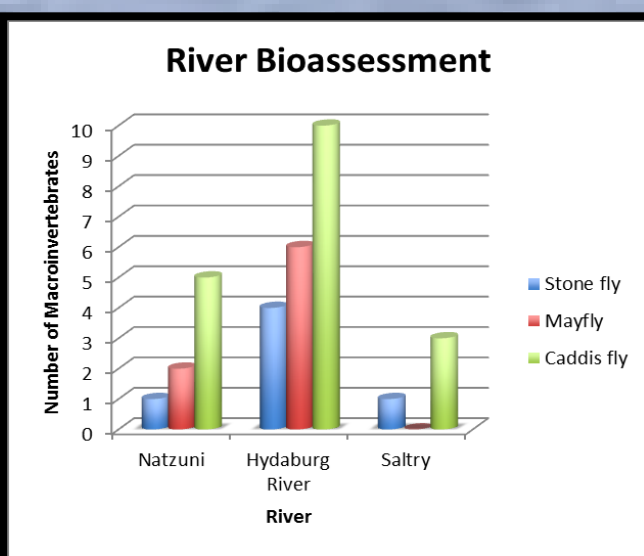


Traditional Ecological Knowledge

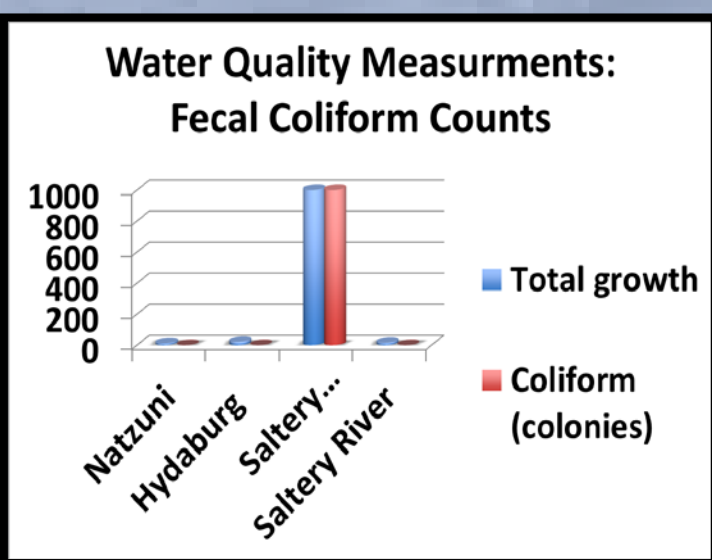
1. Interview elders to gain historical environmental data.
2. Interview fishermen to gain information about current and past salmon runs from local rivers.
3. Review traditional stories about salmon and rivers.
4. Compare traditional stores to current bioassessment data.



Graph 1: Illustrates the physical differences between each river; showing temperature, pH, salinity, turbidity and flow rate.



Graph 2: Illustrates the diversity and quantity of macroinvertebrates in each river. Macroinvertebrates are used as an indicator of environmental health.



Graph 3: Illustrates quantity of total microbial growth and growth of fecal coliform. It is clear that there is an abundance of fecal coliform in Sallery Estuary.

Elder Interviews

Soda Bay has historically been considered to have “*bad*” water due to the low abundance of salmon in the river and estuary. “*Salmon there act funny, they surface to breath. I’ve never seen that before but they do it there*”. “*It’s not a good place to fish, there aren’t many there.*”

“*Used to be a real good fish creek until they logged it and it had a huge land slide after it was logged it and it’s never came back, the fish runs never return.*”
“*Natzuni used to be a real good creek it was like the one in Hydaburg, it was real good until they had that big land slide after it was logged.*”
“*when they logged around the creek it had a few slides in the creek where the fish didn’t show so good for last couple of years but it seems to be building up a again. I think when you get a slide in there like that it kind of makes the stuff grow on the bottom of the creek and kills off the eggs so you don’t get that good of run with all the silt that’s in there. At the head of the bay its the same, it was a good Steelhead creek until they logged there and it died off*”

“*Sallery used to have a lot more fish but now that sorting yard and loading and everything plus the Hydaburg dump they must have a run off to Sallery creek*”.

“*Hydaburg River has always been a good river, there has always been lots of fish in there..*”

Results

Soda Bay River

Bioassessments using macroinvertebrates yielded pollution tolerant red water worms. Colorimetric oxygen and carbon dioxide tests indicated that the river was extremely low in dissolved oxygen and high in carbon dioxide. Salmon do not typically spawn in this river unless there are exceptionally wet summers resulting in high river discharge.

Natzuni River

Natzuni is typically a spawning site for Coho salmon. This watershed has been logged on two different occasions. Prior to the second logging event the diversity and quantity of macroinvertebrates was exceptionally high. Since logging occurred last winter, 2011, the diversity of macroinvertebrates has decreased and salmon runs have decreased due to warming of the waters. The water is slightly more turbid.

Sallery River

Sallery River has low diversity of macroinvertebrates. The estuary in which it flows has extremely high fecal coliform content, possibly due to improper disposal of sewage into ocean waters by local logging ships.

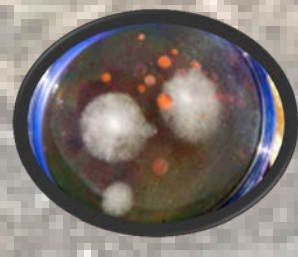
Hydaburg River

Hydaburg River maintains high diversity and quantity of macroinvertebrates hosting several salmon species for spawning. The river water is cold, clear and well oxygenated.

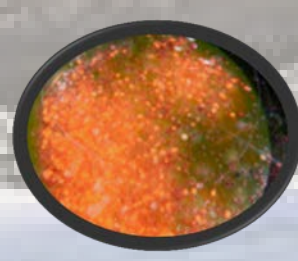
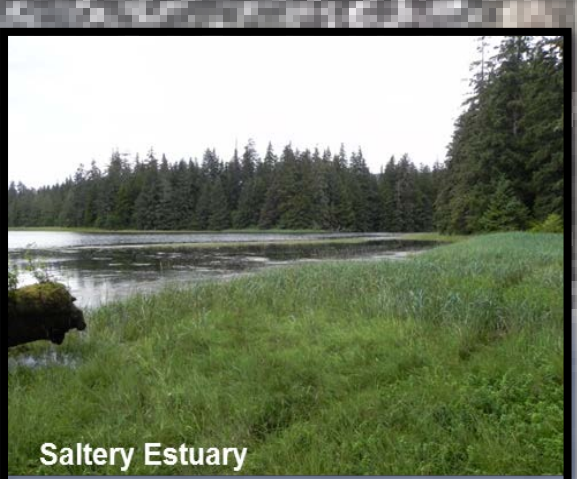
Field Sites



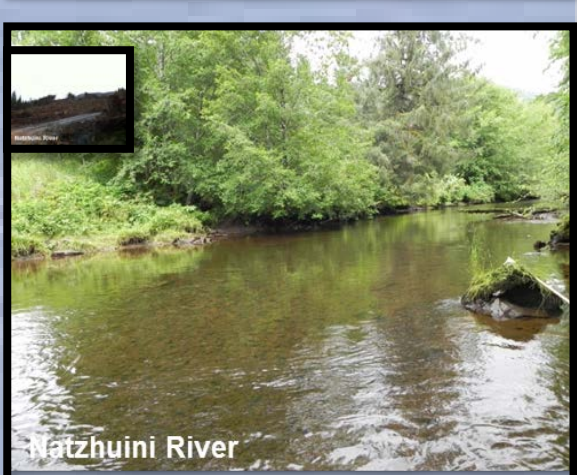
Hydaburg River is the main watershed for the community of Hydaburg. The river has a diverse and abundant community of macroinvertebrates, and hosts a variety of salmon species. Microbial assessments indicate acceptable levels of microorganisms.



Sallery River flows into a shell fish harvesting estuary. The river has is flanked by the city dump and a logging sort yard. There is low diversity of macroinvertebrates, but a thriving salmon population. Microbial assessments indicate acceptable levels of microorganisms.



Sallery Estuary is a main shellfish harvesting site for the community. Microbial assessments indicate extremely high levels of fecal coliform, which led to the closure of this estuary for harvesting.



Natzhuini River used to host a variety of salmon species prior to logging. Prior to logging it had a diverse and plentiful community of macroinvertebrates. Microbial assessments indicate that there is a acceptable levels of microorganisms and no fecal coliform present.

Conclusions

We found that the rivers that were identified by the elders to have “*bad*” water did not have a diverse macroinvertebrate community and had less salmon. This was due to the karst geology of the region, where carbon dioxide is released from ground waters. Rivers that were identified as being healthy had plentiful and diverse communities of macroinvertebrates and salmon populations, unless perturbed due to human activities such as logging and loading of logs onto ships, release of sewage, and seepage of contaminants into ground water from the local dump site.

