



Metlakatla: A Dehydrated Community in Southeast, Alaska

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GROUNDED IN TRADITION. CHARGING INTO THE FUTURE.

Bill Nye the Science Guy states “Climate change is happening, humans are causing it, and I think this is perhaps the most serious environmental issue facing us.”

Research Question

How is climate change affecting coho salmon and community well-being in Metlakatla, Alaska?

Introduction

Coho salmon are an important cultural and economic resource for many Indigenous tribes along the Pacific Rim, specifically Metlakatla, Alaska. The ocean, particularly around the coast of Southeast Alaska, is a dynamic and complex environment. Many salmon species play an important role both locally and worldwide as an economic resource, as well as a high-priority food supply for the Metlakatla Indian Community tribal members and coastal villages.



Fig. 1 Kelly Bolton 2010



Fig. 2 Metlakatla, Alaska a remote island in Southeast, Alaska



Fig. 3 Traditional kippered salmon smoke by Kelly

Ocean Acidification

Carbon dioxide has been steadily increasing in the atmosphere as a result of human activity. This has contributed to global warming. However, not all of the CO₂ emitted remains in the atmosphere. Some of it is absorbed by the world's oceans. As a result, the pH of the water has been lowered, a process known as acidification (Geiger et al 2019).

When ocean water absorbs carbon dioxide from the atmosphere, it causes acidification, which changes the ocean's pH (Geiger et al 2019).

As saltwater becomes increasingly corrosive, salmon's capacity to detect danger appears to deteriorate (Geiger et al 2019).

Temperature

For salmonids, water temperature is an important feature of water quality, and extremely high-water temperatures can limit their dispersion, migration, health, and performance (Mantua, Tohver, and Hamlet et al 2010).

Summertime will be stressful for stream-type salmon populations with freshwater rearing periods, as streamflow's will be reduced and stream temperatures will rise. Increased winter floods in transient runoff watersheds will most certainly affect egg-to-fry survival rates for both ocean and stream-type salmon (Mantua, Tohver, and Hamlet et al 2010).

Warmer air temperatures globally lead to warmer water temperatures locally and for species, including salmon, that thrive in colder waters, and is very harmful (Kemp et al n.d.)

Precipitation

Droughts Impacts:

- Salmon can get trapped in water pools
- vulnerable to predators due to low water levels

Precipitation Impacts:

- helps wash the watershed's chemical "scent" downstream
- easier for adult salmon to find their way back to the streams where they were born
- rain also elevates stream levels
- Salmon to reach areas inaccessible during other times of the year



Fig. 5 Sidney Brendible 2018

Traditional Ecological Knowledge (TEK)

We were always taught to return the bones back to the ocean after preserving salmon, and we were assured that the salmon run would return in a tremendous abundance the following year.

The ocean can hold the dissolved calcium bicarbonate. It helps marine creatures by reducing the acidification induced by high carbon levels, which has been reported to affect shellfish.

Ocean acidification impacts reduce calcium, which is an important building block for shelled marine life like Dungeness crabs, clams, mussels, etc. The bones reintroduce calcium availability back into the ocean.

Chester Lake water level decrease due to prolonged drought



Fig. 4 2013



2016

Scott, Wagner, and Winter 2018

Methods

- Interviews with elder tribal members/fisherman
- USGS data comparison analysis
- ArcGIS data comparison analysis
- I will be using an Exo Sponde which will measure temperature, salinity, pH, and other abnormalities and will keep track of the water quality in our waterways.

I will do a comparison analysis over a 20-year span.

Contact Information

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