

**Question:** What is the correlation between nitrate content in streams and human activity?

**Hypothesis:** A stream or waterway will have more nitrate when it's near high human activity than without.

**What is Nitrate?**

Nitrate is a polyatomic ion with the chemical formula  $\text{NO}_3^-$ . Nitrate is found in fertilizers and organic matter. Nitrate has many forms and occurs in water everywhere.

Although too much can kill fish and can affect how blood carries oxygen.

Nitrate is caused by Wastewater treatment plants, runoff from lawns and crop land, septic systems, running from manure storage.

**Process:**

Go to four different streams or waterways, two with high human activity and two with low human activity, to collect samples. To collect Nitrate samples we fill two vials full of stream water at each site. Then we dip the Nitrate strips in the water sample for two seconds and we do not shake the water off.

After this wait for sixty seconds and immediately compare the strip to the color patterns on the package.

Depending on the color recorder the number of ppm for each sample. We also record any details about the stream, where it is, and latitude and longitude.

**Locations:**

Stream	Town	Latitude	Longitude	PPM
DeGroot	Lynden	48.919693	-122.48577	1
Berthusen Park	Lynden	48.962285	-122.509491	3
Whatcom Creek	Bellingham	48.45756	-122.255916	5
N/A Creek	Bellingham	48.724736	-122.487936	5

**Details:**

1. Right next to the highway bridge and boat access, bathrooms, concrete parking lot, and free fishing. Plus lots of grass and small trees.
2. Surrounded by large old trees and plenty of shrubbery. Only one road and a small bridge.
3. Right off Kansas street near a neighborhood, Parking lot, Walkway bridge over the creek, lots of people on the trails daily around the area. Lots of trees, and wildlife. Kayakers using the creek to practice.
4. Plenty of trees and blackberrys. Found trash and clothing in the stream.

**Samples of Berthusen's stream**



“Nitrate samples” - Gillian Spears  
De groot



“De Groot” - wdfw.wa.gov

N/A Waterway Behind Apartment



“Behind

Apartments” - Issac Ourser

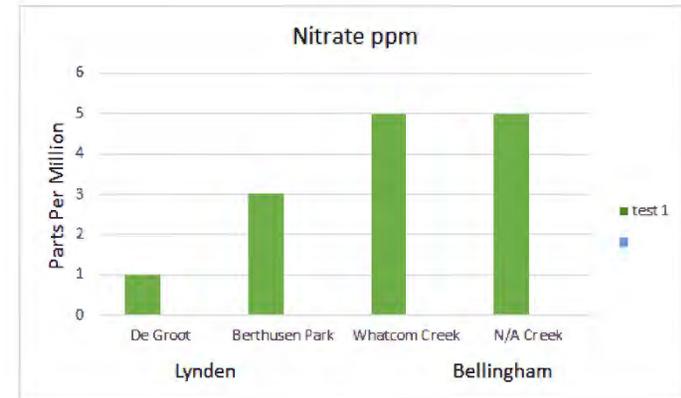
### Conclusion:

The hypothesis is correct based on our data we collected over a two week span in november. Based on the data, Lynden has less nitrate than in Bellingham. Because Bellingham has more human activity and the streams are more frequently visited, the nitrate levels are higher.

### So What?

Too much( + 80ppm) can indicate if the watershed is unhealthy or healthy. Plus too much can lower DO( Dissolved oxygen) Salmon need Nitrate levels from 0 – 40 ppm, which are generally safe for fish. Anything greater than 80 can be toxic.

### Nitrate Chart



### Citations:

U.S Environmental Protection Agency, (1997). Volunteer Stream Monitoring: A Methods Manual - US EPA.  
<https://www.epa.gov/sites/production/files/2015-06/documents/stream.pdf>

### Mentions: Thank you!

- Crystal Spears~ Great driver and teacher
- Grace Yaley - Graph help.