

Background Information:

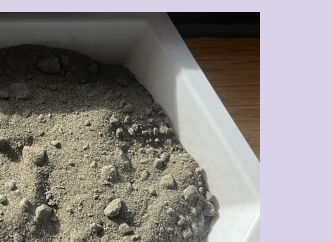
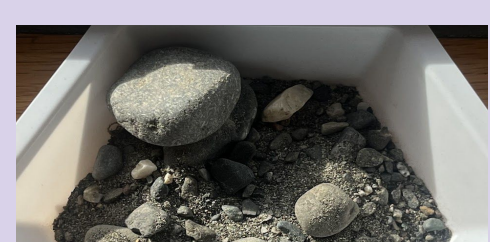
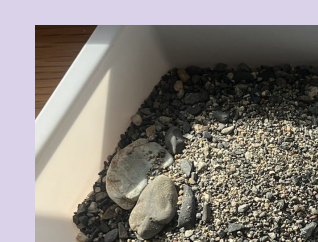
The Nooksack River Basin is the primary river system in Whatcom County and originates from Mt Baker, Mt Shuksan, and the Twin Sisters. *Fig. (d)* displays the River and its Forks. The dominant bed material varies along the Nooksack River Basin, at its steep headwaters, boulders are prevalent. Finer gravels and sands are common in wide and slow segments of the river² along the basin. This sand composition becomes the norm downstream of Ferndale. "Sand and gravel bars are emergent" in regions where the river has a low to moderate flow, a tendency that is observed "upstream of Lynden and each of the forks"² Logging, commercial fishing, mining and other forms of profit driven extraction have had a negative impact on the Nooksack Rivers health and flow of sediment. Other human influences include changes made to the Bellingham bay shoreline and the construction of a diversion dam in the Middle Fork³.

Research Question:

What does the composition of sand collected from the Nooksack River Basin and Delta suggest about how sediment erodes, moves, and deposits?

Method:

- I collected 2 sand samples from 3 different locations along the Nooksack river and the North Fork Nooksack River.
- After drying the samples; *fig. (a)* and running the samples through a sieve; *fig. (b)*, each weight category could be weighed and recorded.
- *Figure (c)* contains the coordinates of where samples were collected, images of where samples were collected, and what they looked like dry.
- To facilitate comparison between previously collected sand samples and my own, I reformatted and graphed data from [*"Sediment Composition of The Nooksack River Delta", (N. Bhanot, E. Falcone, M. Smith, T. Wade)*]¹
- The locations of samples collected along the delta¹ and the Nooksack River samples have been placed onto a map in *fig. (d)*

Nooksack River Mouth (M)	Everson, Wa (E)	Glacier, Wa (G)
(48.7914906, -122.5895114)	(48.9193693, -122.3523626)	(48.9019522, -121.9115633)
		
		
<i>Figure (c):</i>		

Sediment Composition along the Nooksack River Basin and Delta

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Winter 2025, Geology 211

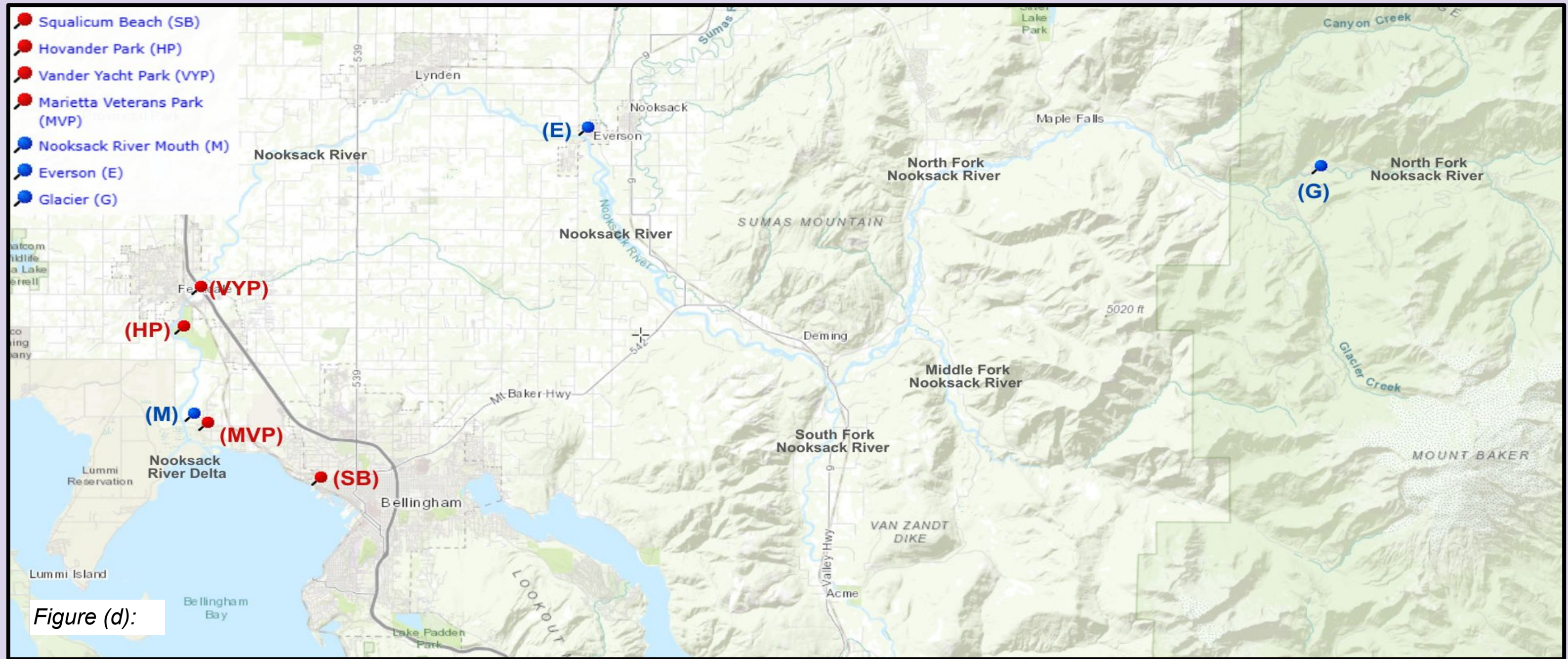


Figure (a): Sand samples being dried before being usable.



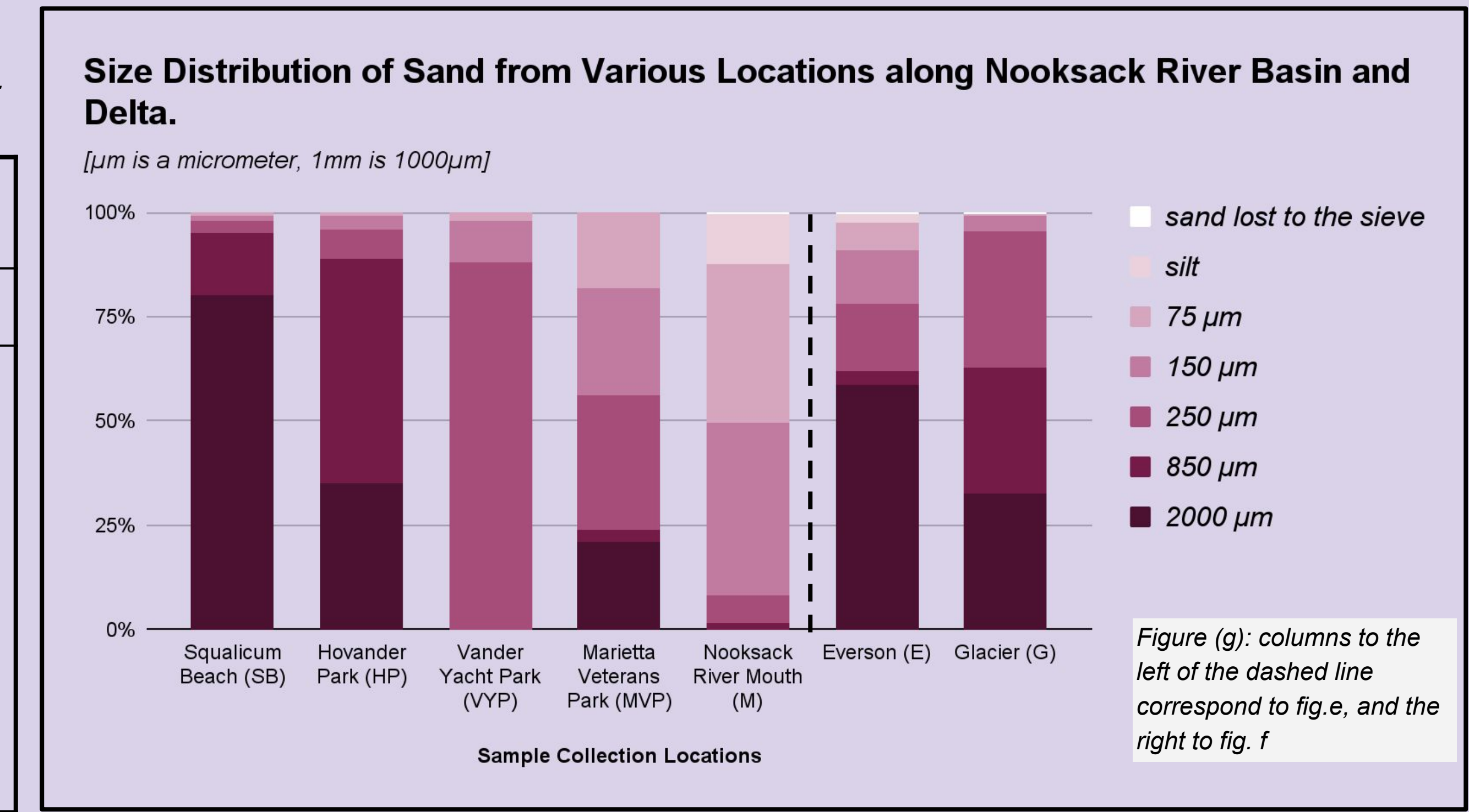
Figure (b): Sieve used to measure separating sand size.

	Squalicum Beach (SB)	Hovander Park (HP)	Vander Yacht Park (VYP)	Marietta Veterans Park (MVP)
2000 µm	80	35	0	21
850 µm	15	54	0	3
250 µm	3	7	88	32
150 µm	1	3	10	26
75 µm	1	1	2	18

Figure (e): displays compiled data from a previous research project¹. numbers represent percentages, the data is rounded to nearest percent.
[μm is a micrometer, 1mm is 1000μm]

	Nooksack River Mouth (M)	Everson (E)	Glacier (G)
2000 μm	0	58.7	32.5
850 μm	1.8	3.1	30.5
250 μm	6.4	16.2	32.5
150 μm	41.2	12.9	3.5
75 μm	38	6.8	0.6
silt	12.3	2	0
sand lost to the sieve	0.3	0.3	0.4

Figure (f): 100 grams of dry sand were run through a sieve and weighed at every interval. Data is rounded to nearest decimal. (the data in fig. d is assumed to have been obtained in a similar fashion)



Results:

- *Figure (e)* displays the data from previous winter 2024 research done focusing on the Nooksack Delta.
- *Figure (f)* displays data from 3 very different points along the Nooksack Basin.
- *Figure (g)* displays the data in the form of stacked column chart. This allows for a clear comparison of the grain sizes from each location.

Interpretation of Results:

- The data seems to suggest that there is very little silt found within the Nooksack River Basin, the only exception to this being sample M, which was comprised of 12% silt. There are clay deposits within the Delta so this suggests that the samples may have not taken that into account or perhaps silt/clay is only found in particular regions.
- It is interesting to note that sample G has an almost even split among the three largest (2000, 850, 250 μ m) sediment categories. In addition there are almost no smaller ($\leq 150\mu$ m) particles found at site G. This may suggest that all the smaller particles continue moving until depositing further down river.
- The overwhelming majority of one sediment size in samples VYP (88% 250 μ m) and SB (80% 2000 μ m) seems to suggest an external process outside of the river. This is most likely due to human influence and may also include deposits from the Bellingham Bay in the case of SB.

Limitations:

There are a variety of different limitations encountered throughout this research project, some of the most impactful include:

- Uncertainty surrounding the methodology of data collection from the research done on the River Delta¹
- Lack of defined direction throughout the project. I initially started this research with the intention to focus on mineralogy of the sand samples however after a number of hindrances, the direction of the research pivoted to focus on sediment distribution.
- Uncertainty surrounding the origin of the material where samples were collected. It is likely that some of the samples included non-native sand. Sample SB in particular is very likely to be influenced by humans given its proximity to Bellingham and the beach has been subject to city “Shoreline Enhancement⁴”

Acknowledgements and Citations:

I am very grateful to Professor Kaatje Kraft for help and support throughout the research process and the quarter as a whole. I am thankful to Chris the lab aside for facilitating my research and my peers Dylan and Athena for their advice and support. :3

¹Bhanot, N., E. Falcone, M. Smith, and T. Wade. **"Sediment Composition of the Nooksack River Delta."** *Intro to Oceanography*, Winter 2024.

² Anderson, S., C. Konrad, E. Grossman, and C. Curran. 2019. "**Sediment Storage and Transport in the Nooksack River Basin, Northwestern Washington.**" *Geological Survey Scientific Investigations Report 2019-5008*. <https://doi.org/10.3133/sir20195008>.

³ Steve Day, P.E., and April McEwen, **"Middle Fork Project Background,"** *City of Bellingham*, <https://cob.org/services/environment/restoration/middlefork/middle-fork-background>.

4"Little Squalicum Beach Park Shoreline Enhancement." *Port of Bellingham*.
<https://www.portofbellingham.com/1015/Little-Squalicum-Beach-Park-Shoreline-En>