

# ROCKY MOUNTAIN ALGAE AND A FLOWCAM

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## Overview

- ▣ Background
- ▣ Objectives
- ▣ Results
- ▣ Conclusions
- ▣ Further work



## Background-Green Lake 4

- ▣ Green Lake 4



## Background Green Lake 4

- ▣ Elevation: 3,561 m
- ▣ 4m, 13.1 m



## Background-GL4

- ▣ Water source, Silver Lake Watershed
- ▣ 40% of Boulder's water supply
- ▣ DOM
- ▣ Disinfection Byproducts



## Background-FlowCAM

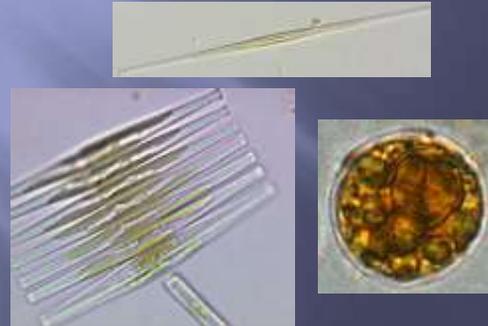
- ▣ Could potentially replace the use of settling technique and inverted microscope
- ▣ Microscope and camera in one
- ▣ Efficient



## Objectives

- ▣ Determine the amount of 3 specific algae species and see how their quantities vary over time
  - Synedra
  - Fragilaria
  - Chrysococcus
- ▣ Find a relationship between settling technique algae counts and FlowCAM algae counts

## Algae



## Technique-GL4

$$C_1 \cdot V_1 = C_2 \cdot V_2$$

$$C_1 = \frac{C_2 \cdot V_2}{V_1,000}$$

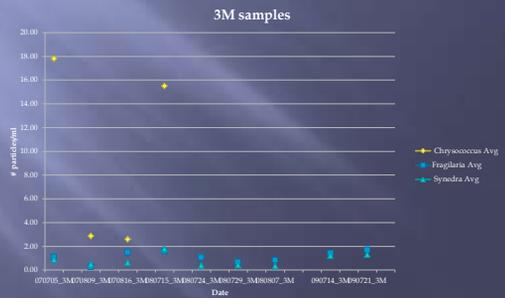
$C_2$  = concentration of specific species in settled sample

$V_2$  = volume of settled sample

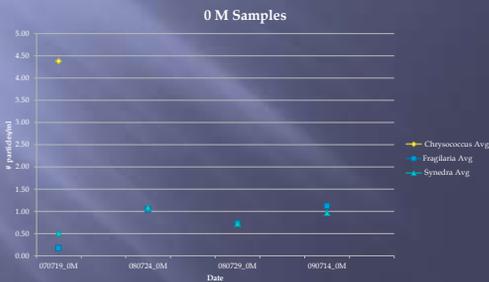
$V_1$  = original volume, 150 ml

$C_1$  = concentration of specific species in original sample

## Results-Green Lake 4



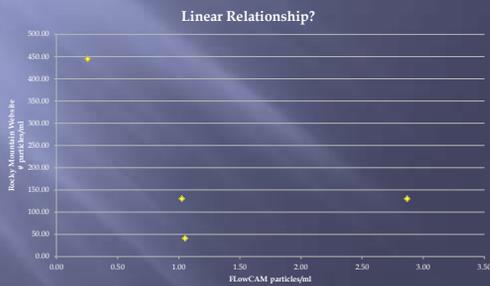
## Results-Green Lake 4



## Results-FlowCAM

Depth (m)	Sample	Chry/ml	Avg. Chry/ml	% difference
3	1	18.03	17.80	2.6%
	1	17.56		
0	2	4.50	4.38	44.2%
	2	4.26		
3	5	2.56	2.87	21.4%
	5	3.18		
3	6	2.15	2.59	33.9%
	6	3.03		
3	7	15.55	15.48	0.9%
	7	15.41		

## Results-FlowCAM



## Conclusion-GL4

- ❑ Algae species vary throughout the season.
- ❑ In samples from 080807\_3M there was a noticeable amount of Tabellaria, which was not noticeable in any other sample analyzed but has been seen in GL4 in previous years.

## Conclusion-FlowCAM

- ❑ % difference varied between 0.9 to 44.2 in sample duplicates.
- ❑ No linear relationship between the Rocky Mountain Lake Algae website particle count and FlowCAM count between the same samples could be established
- ❑ The FlowCAM is quick and convenient but comes with limitations
- ❑ Flaw in technique?

## Further Work

- ❑ Use the FlowCAM to identify additional species
- ❑ Comparing algae concentrations to concentrations found on the inverted microscope
- ❑ Explore a possible correlation between specific algae and production of DOM
- ❑ Relate change in algae to change in climate

## Acknowledgements

- ❑ Fellow REU students for motivating me, sparking my intellectual curiosity, and making this experience unforgettable
- ❑ Dr. Bielefeldt for making sure we had very organized and pleasurable REU experience
- ❑ Deena Garland for helping me and not making fun of me when I almost starting crying on the climb up to Green Lake 4
- ❑ My mentor Diane McKnight for giving me the opportunity to work with her and for her remarkable guidance

## QUESTIONS?

And hopefully some answers...