Great Salt Lake Microalgae Populations As Indicator Species Of Habitat Quality: Novel Methods For Monitoring

Isaac Hall[1], Jaimi Butler[1], Bonnie K. Baxter[1], Duc Tran[2] and Juergen Polle[2]
[1]Great Salt Lake Institute, Westminster College
[2]CUNY-Brooklyn

Significance

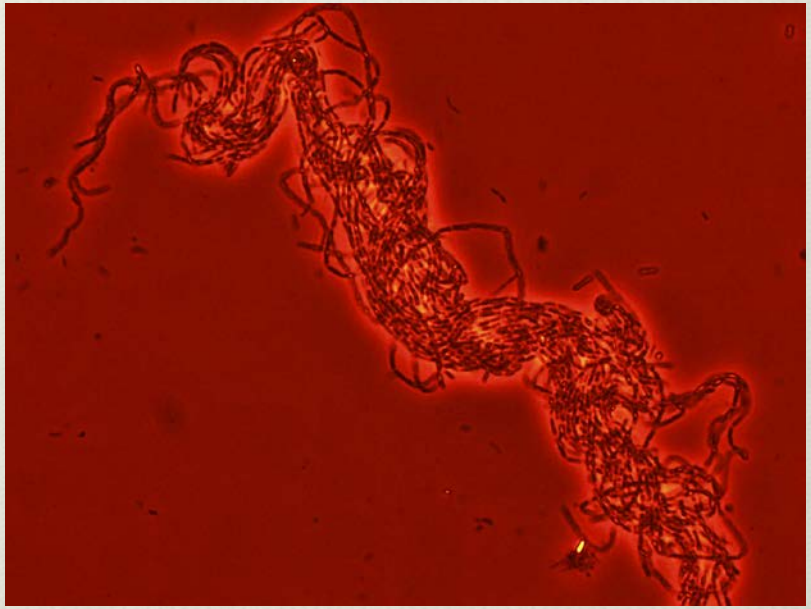
- Overarching Objective: To understand the health of Great Salt Lake and relationship between algal populations and *Artemia* population.
  - Microalgae of Great Salt Lake remain virtually uncharacterized
  - To assist in predictive tools for *Artemia* industry
  - To connect the microbes to the food chain in a real way
  - Microalgae as biofuels

Specific Goals

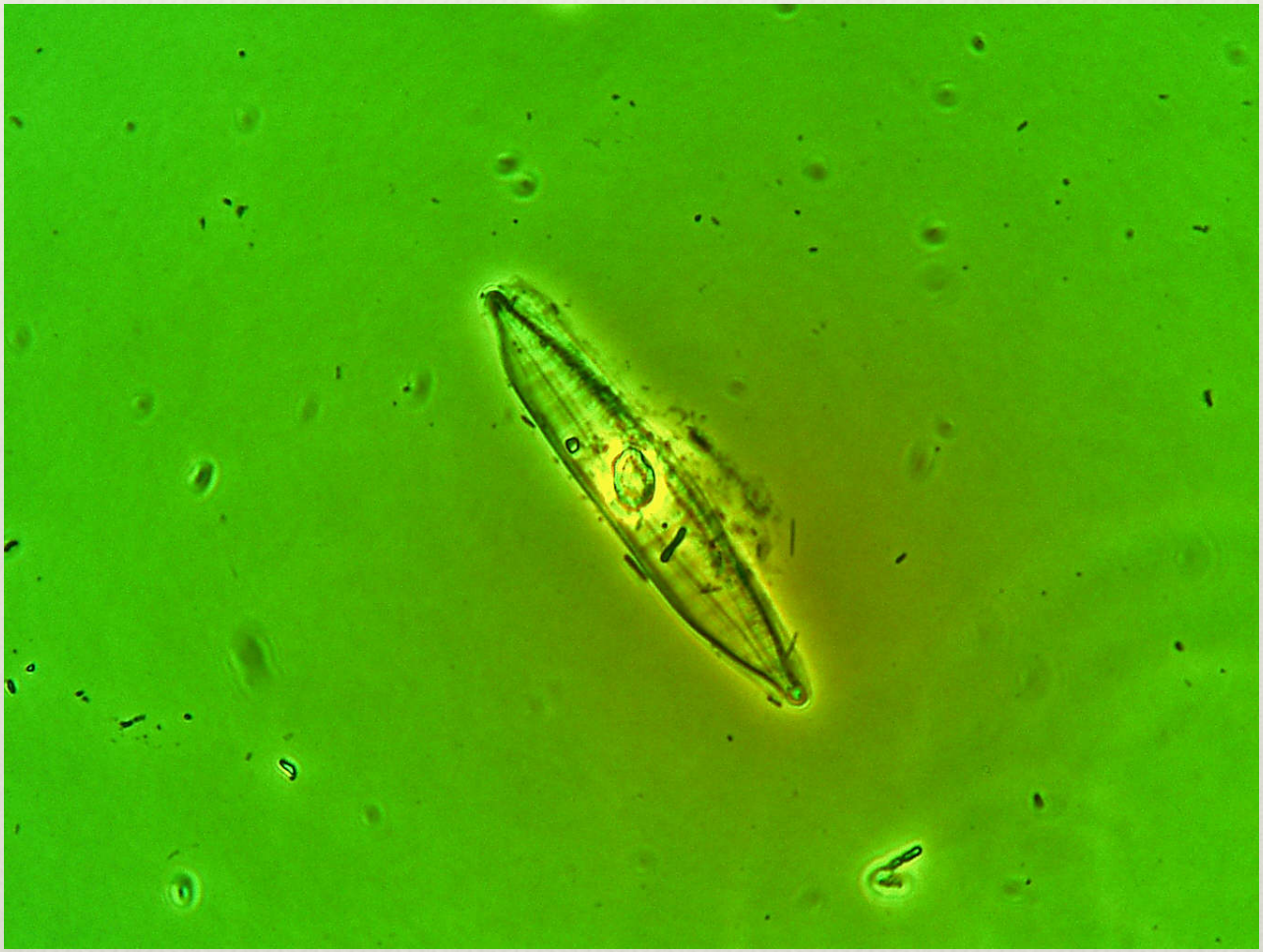
- To monitor concentrations and community composition of algae in GSL in an effort to enhance predictive assessments of brine shrimp populations.
- Follow algal density at select sites at different times throughout the year.
- Determine the composition of algal species at selected sites throughout the year
- Use molecular techniques to aid speciation of algae.

Microalgae of Great Salt Lake

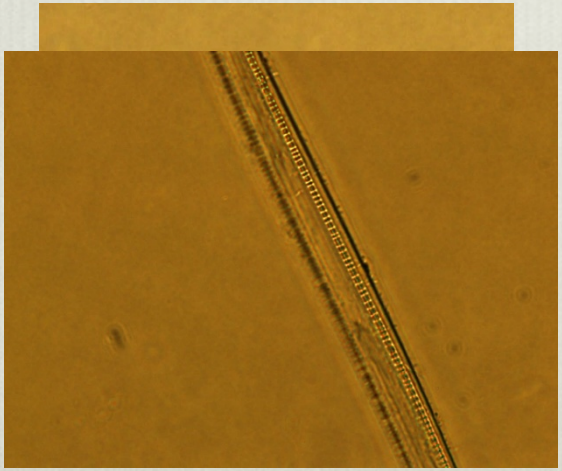
- Diatoms (Bacillariophyceae)
- Cyanobacteria
- Green Algae (Chlorophycae)



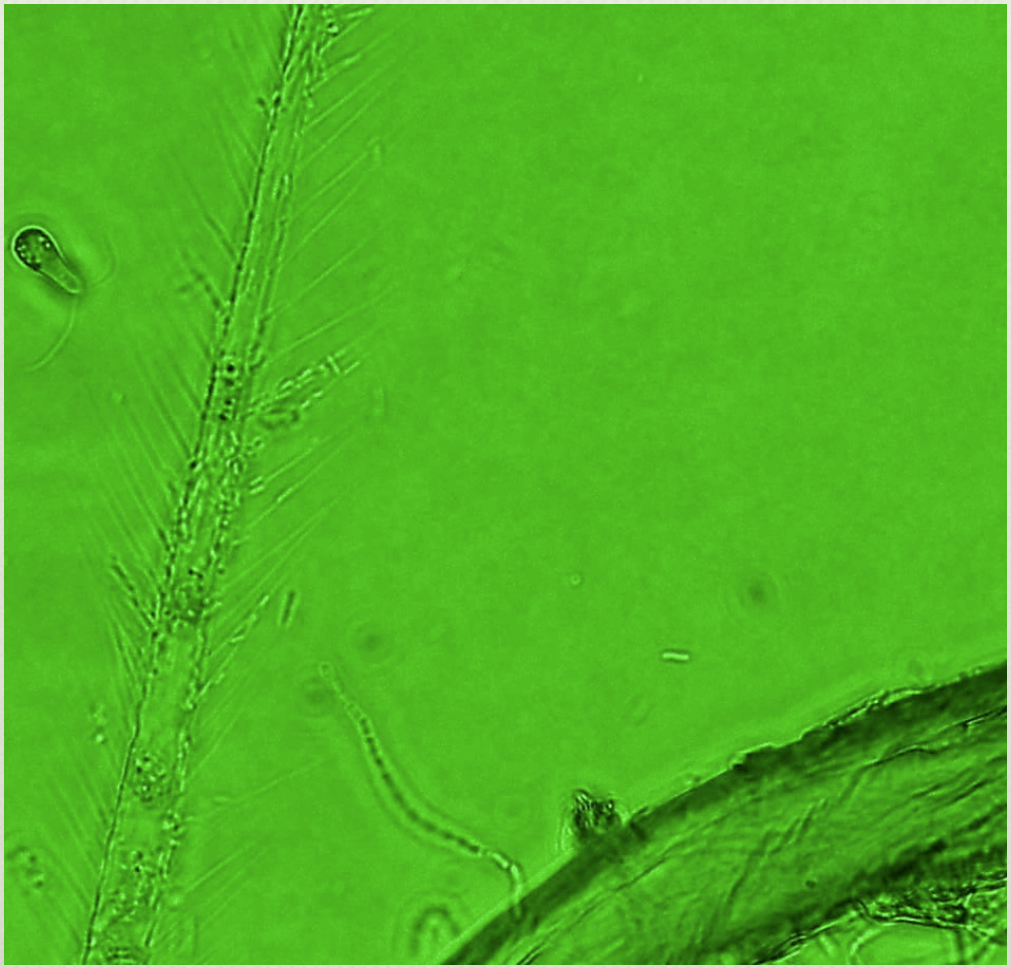
Diatoms



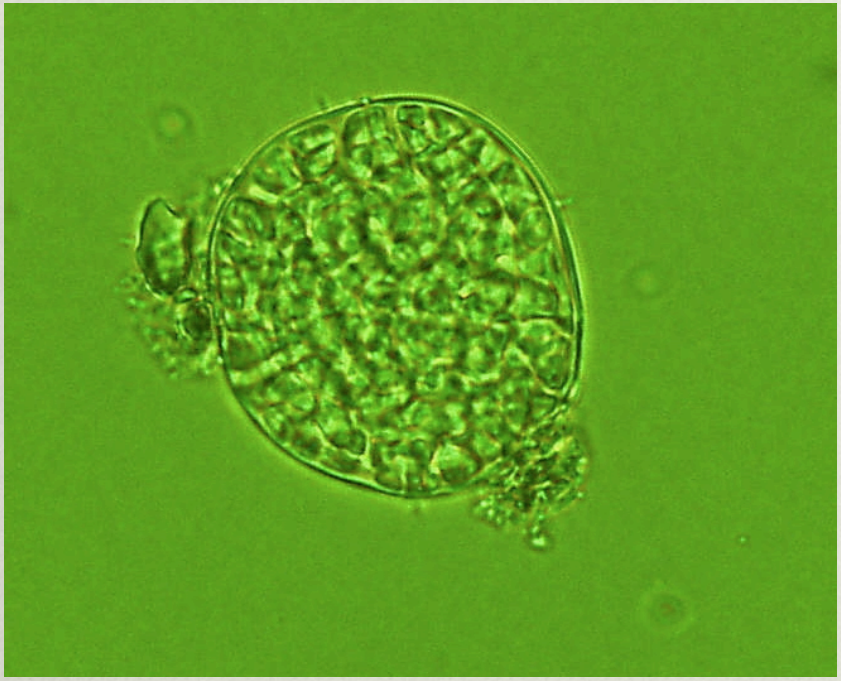
Diatoms



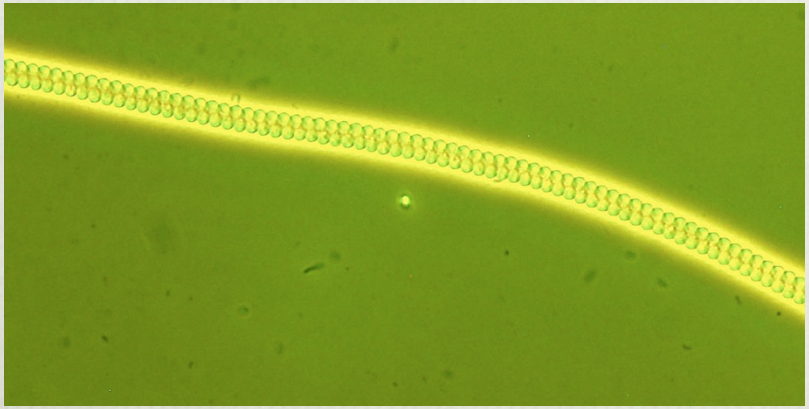
Green Algae

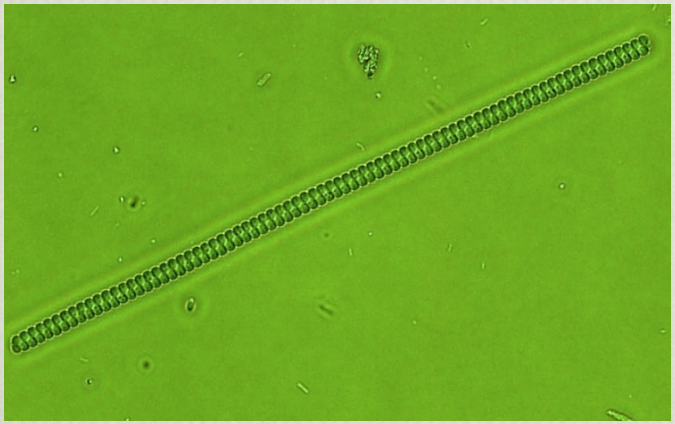


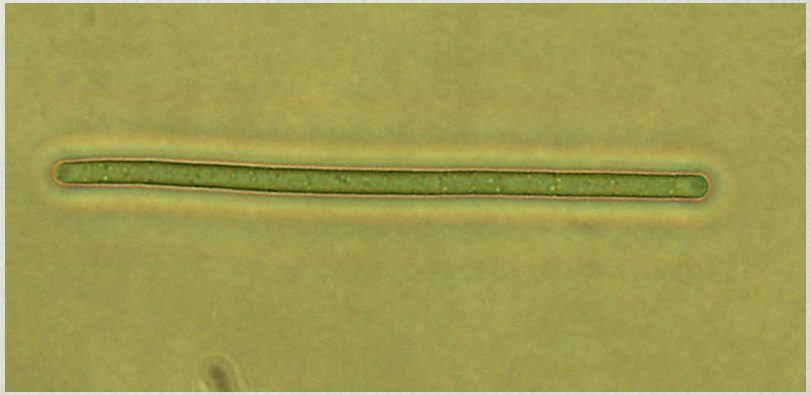
Green Algae



Cyanobacteria







Sampling & Sites

- Collection of surface samples by Westminster
- Collection of offshore sites by DWR
- Coordinate all with environmental Data

Kelton
Garland
Tremonton
Mendon
Logan
Providence
Nibley
Honeyville
Wellsville
Hyrum
Promontory
Paradise
Corinne
Brigham City
Mantua
Perry
Willard
North Ogden
Farr West
Plain City
Harrisville
Huntsville
Ogden
Riverdale
*DWR3
Hooper
Roy
South Weber
West Point
Clearfield
Syracuse
Layton
Morgan
*2820
*2935
Kaysville
Farmington
Antelope Island State Park
Centerville
*3510
Woods Cross
Bountiful
Salt Lake City
*4069
*Black rock
West Valley City
Magna
Burmester
Taylorsville
Holladay
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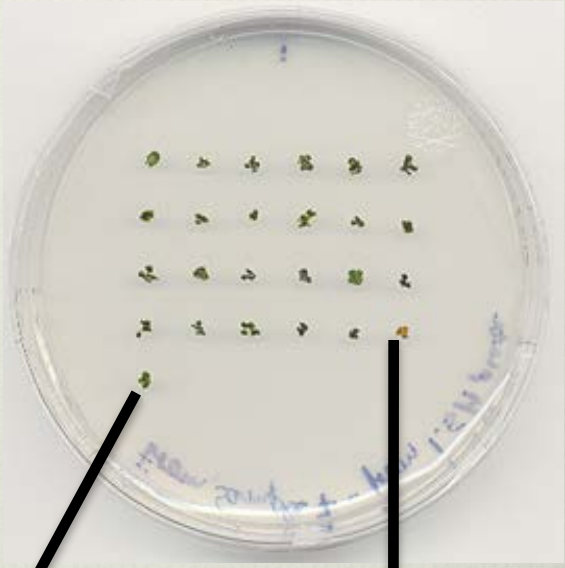
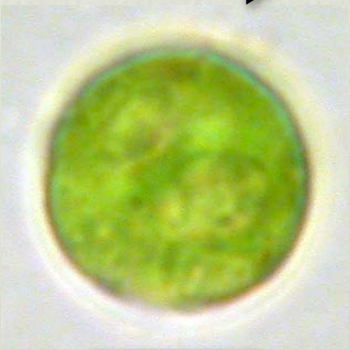
Traditional Strain Isolation

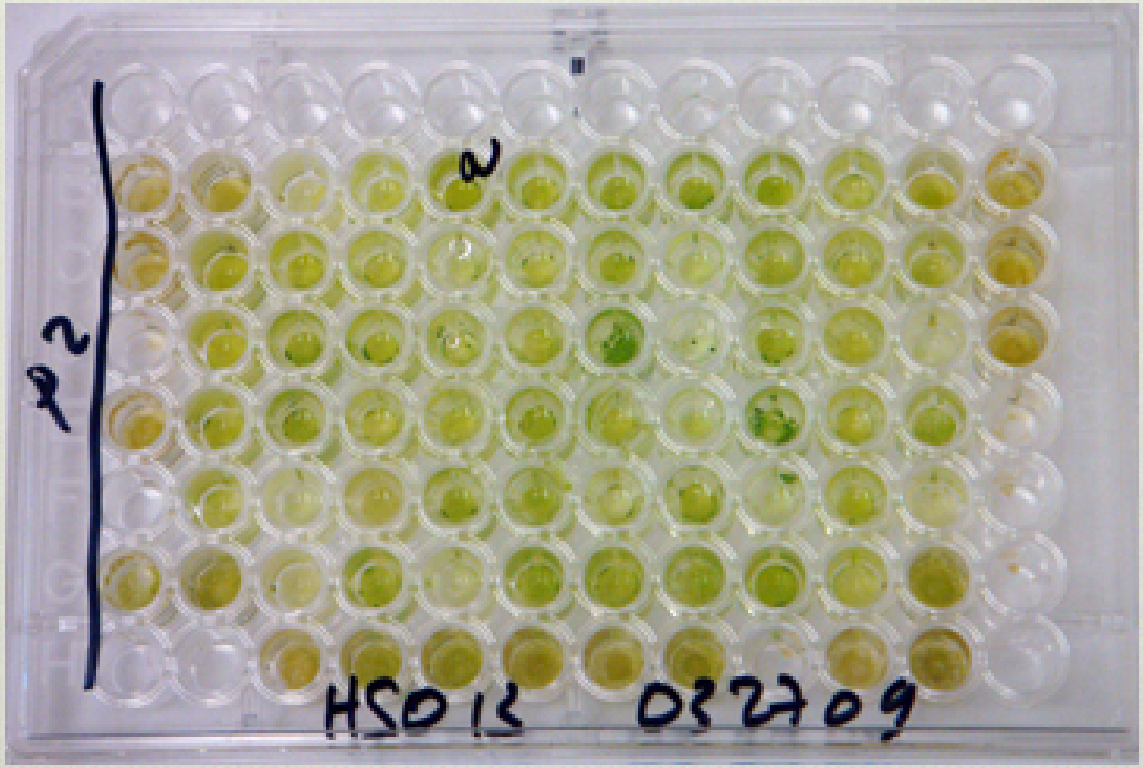




10 µm

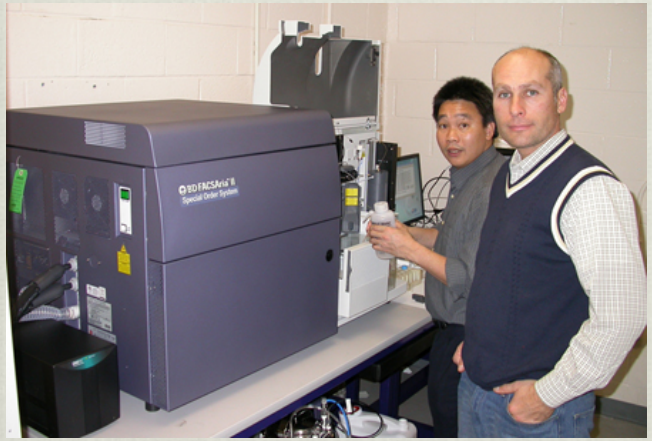
Cultivation and Identification

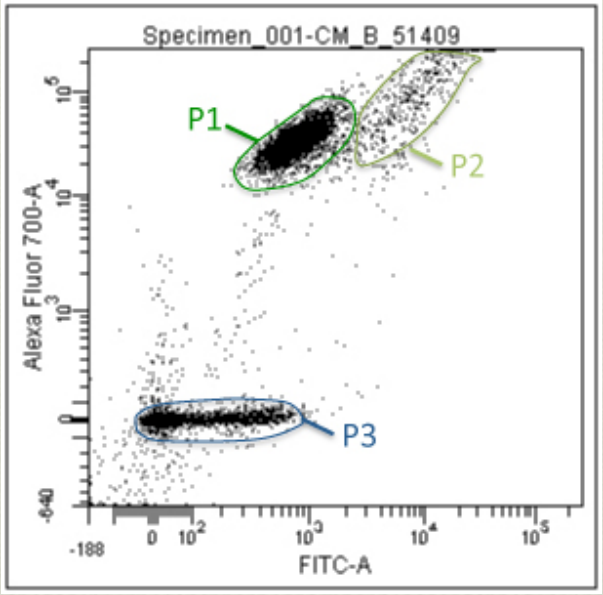
- Algae can be cultured and identified out of environmental samples



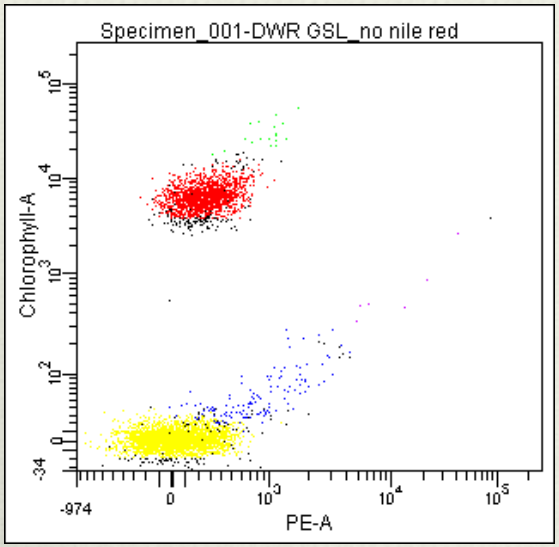
Cell Sorter

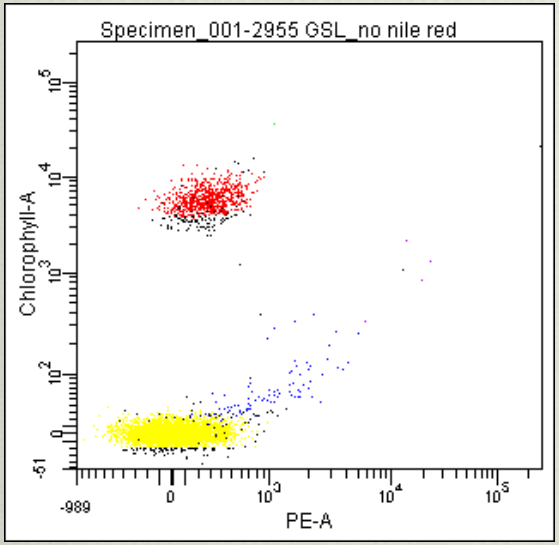
- Can be used to separate cells in environmental samples based on size, charge and shape

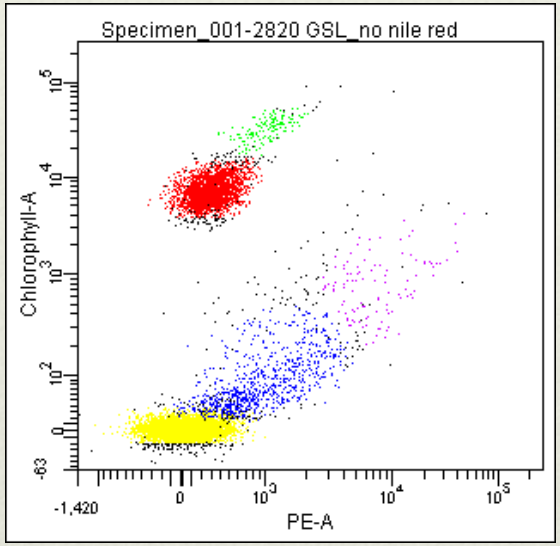


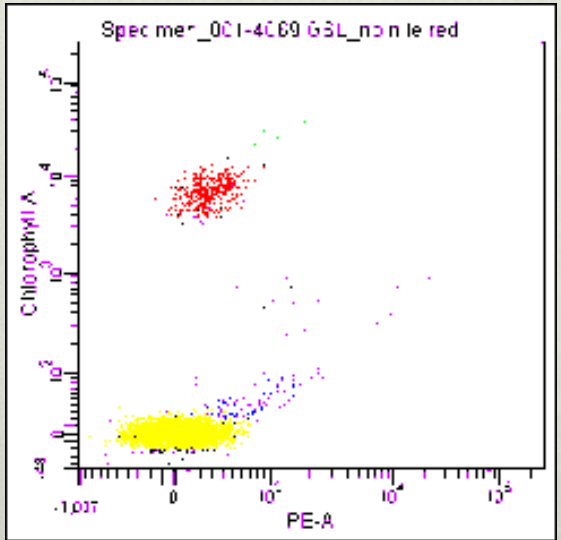


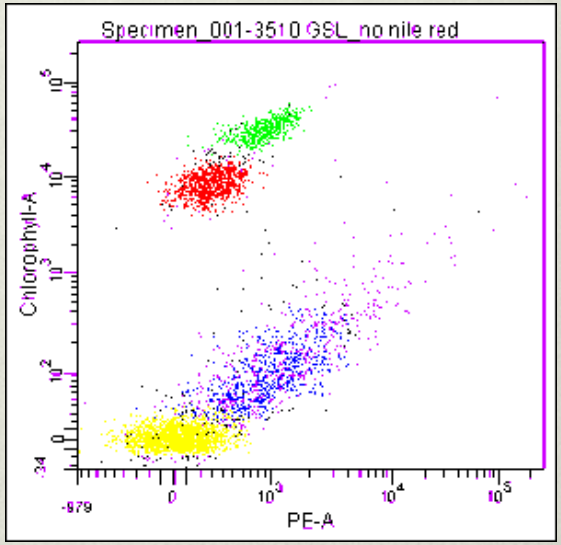
Algae Populations 08/13/09



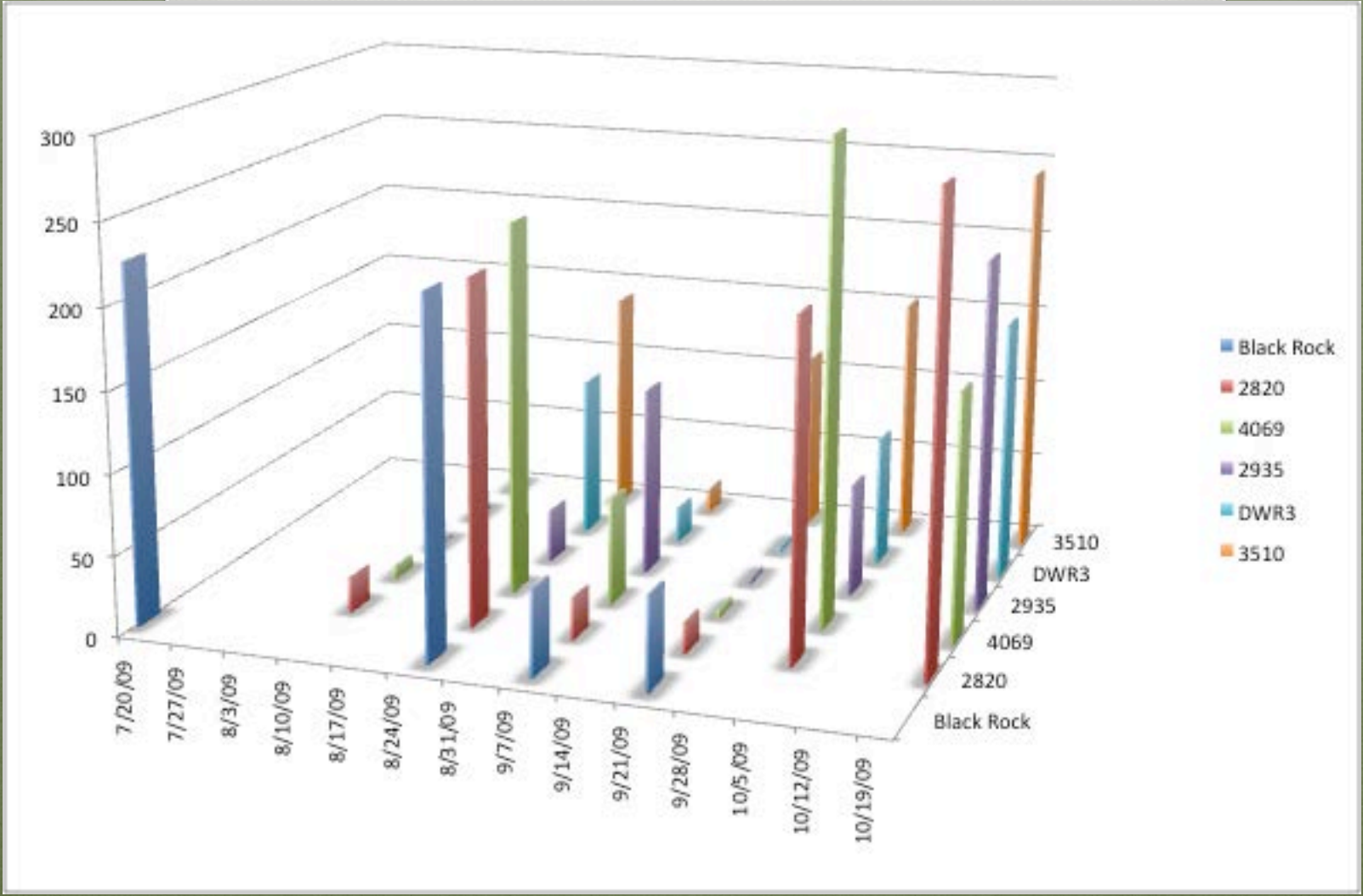




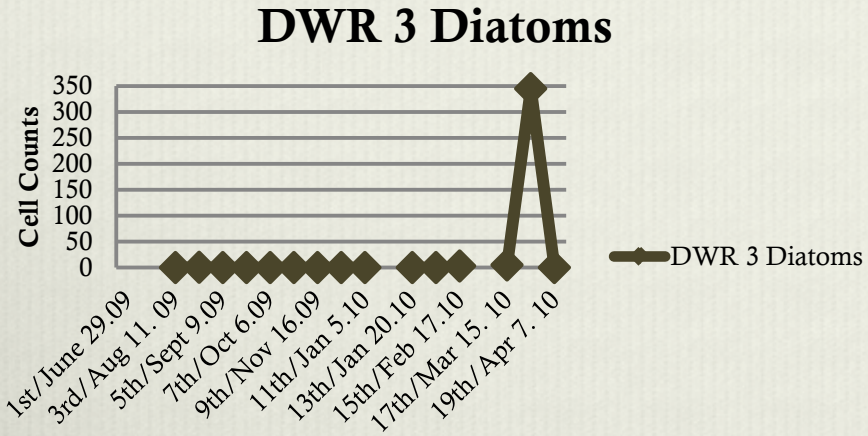


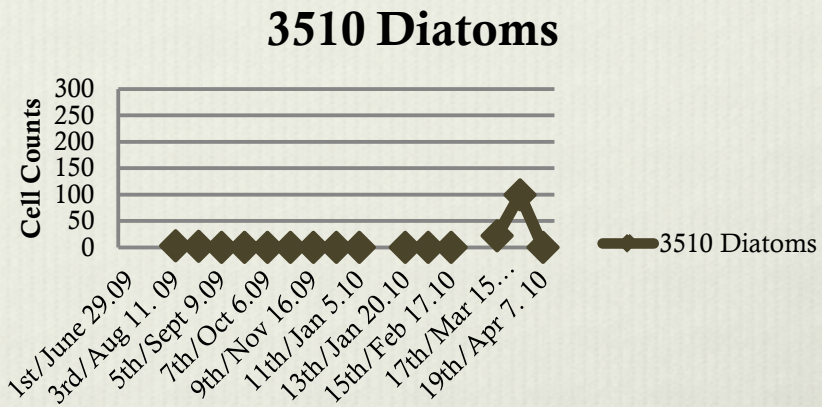


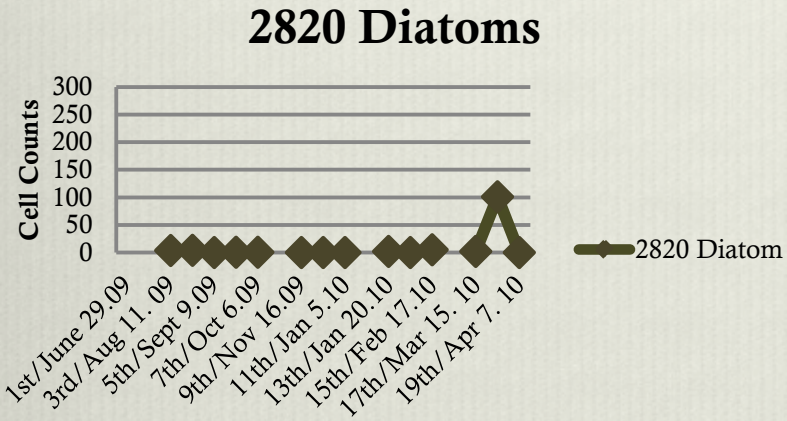
2009Green Algae Counts

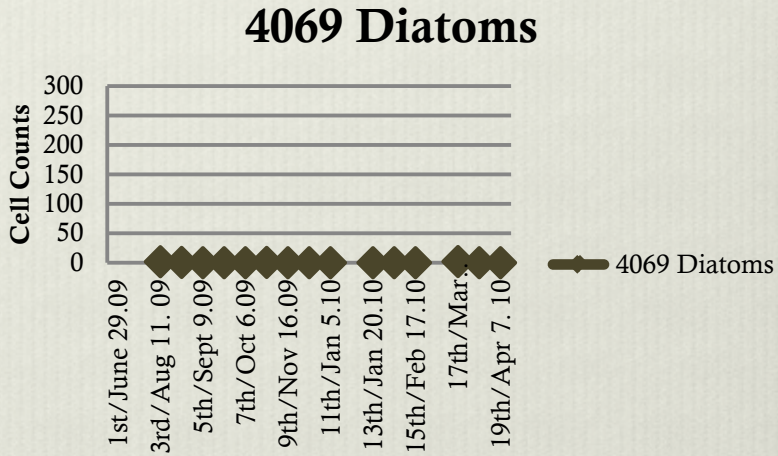


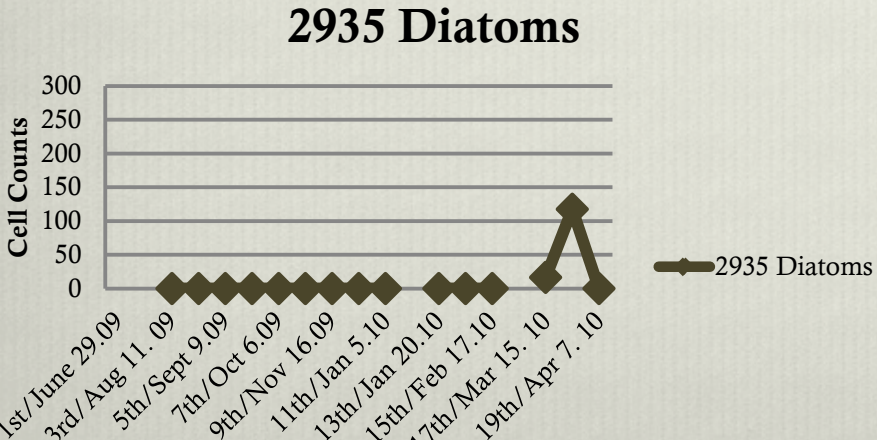
GSL Green Algae over time







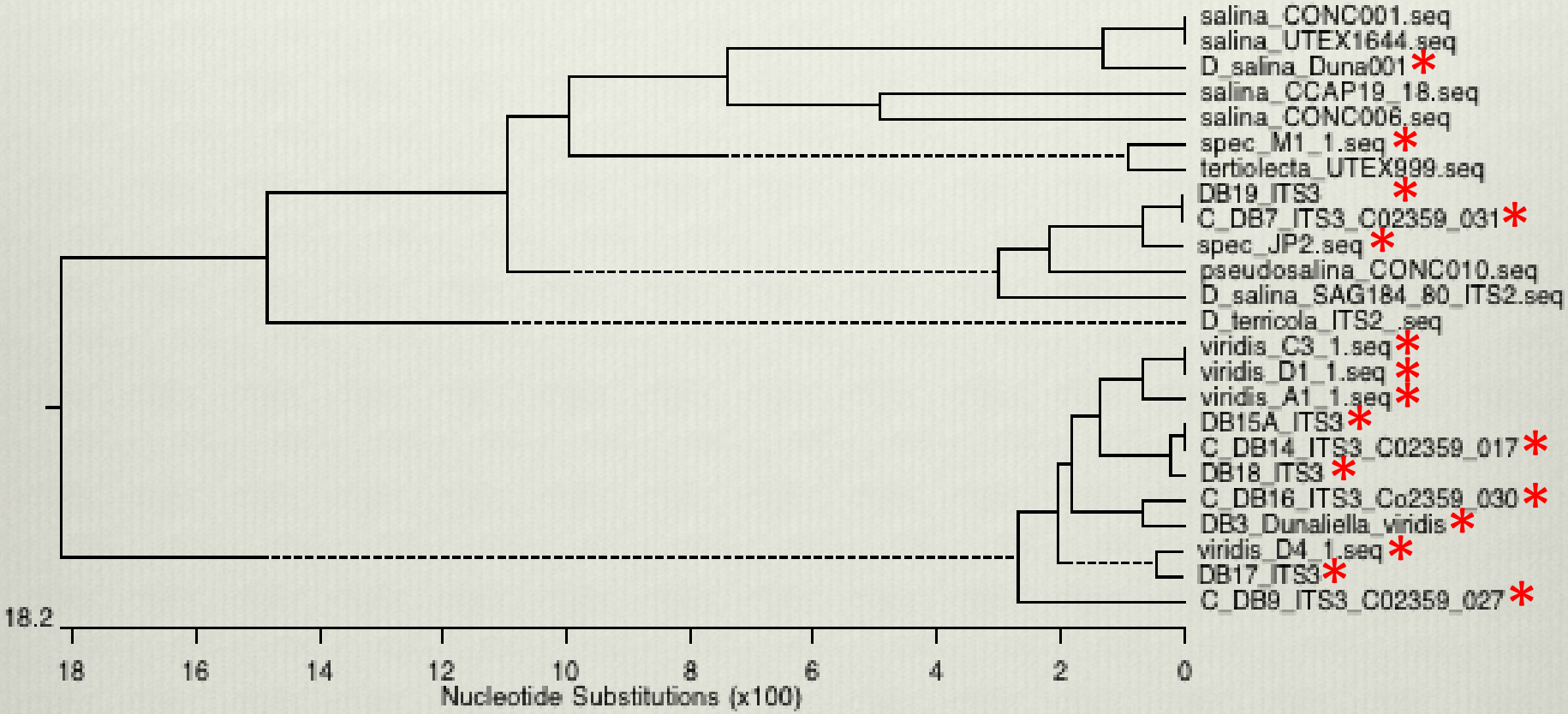




Genetic Identification

- If you can isolate the various species of algae, you can sequence their genes (16S rRNA gene as a starting place) and identify the genus and/or species

GSL *Dunaliella* Diversity



Future Directions

- These methods have limitations but are proving to be a reliable and fast way to assess the community of algae in GSL brine.
- Further refinement is necessary, in particular:
  - Increasing quantity of samples and filtration/concentration strategies.
  - Developing more broad genetic markers for isolates
  - Converting the methods into tight protocols that can be utilized in DWR