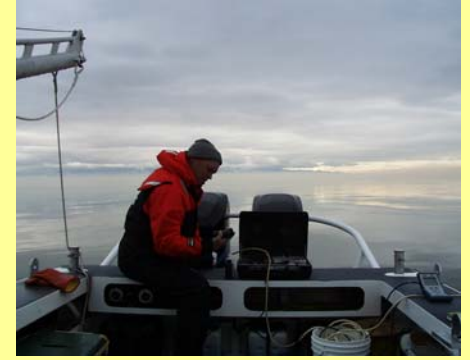


# Isotopic analysis as a tool for assessing nutrient flow in aquatic food webs

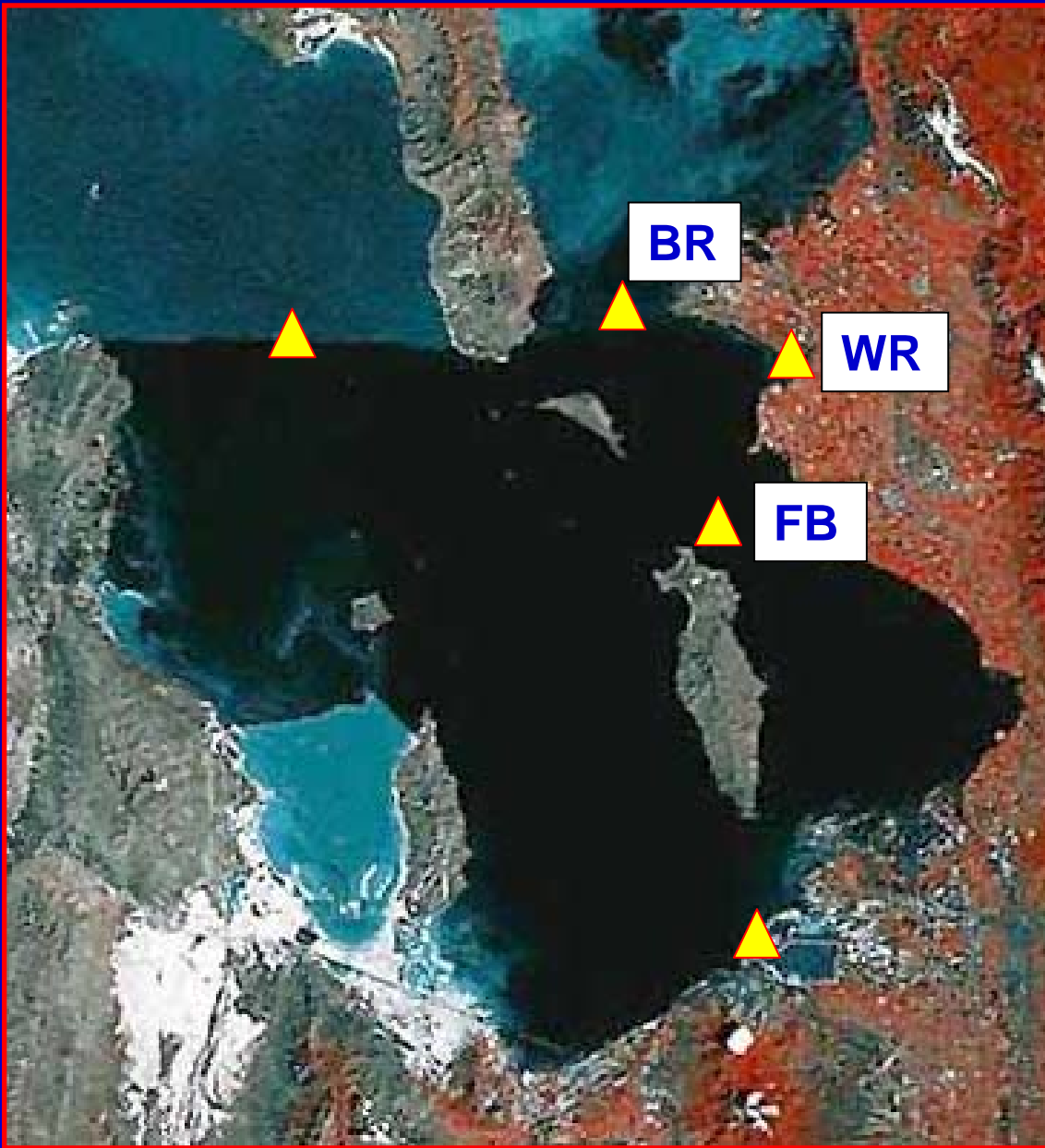


*David Naftz and Terry Kenney, USGS, Salt Lake City, UT*

*Steve Silva, USGS, Menlo Park, CA*

*Ryan Mosley and Jim Van Leeuwen, UDWR, Salt Lake City, UT*

# Great Salt Lake inflow sites



# TOPICS

- ◆ **Background information on stable isotopes**
- ◆  **$\delta^{15}\text{N}$  results for archived shrimp**
- ◆ **2004  $\delta^{15}\text{N}$  results from shrimp and POM**
- ◆ **Sampling results**
- ◆ **Other isotopic tools**

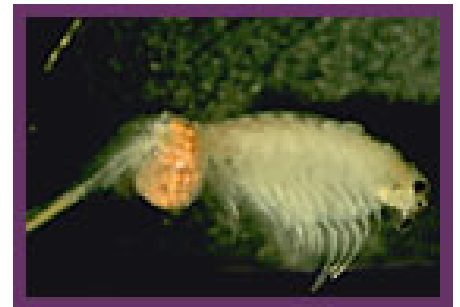
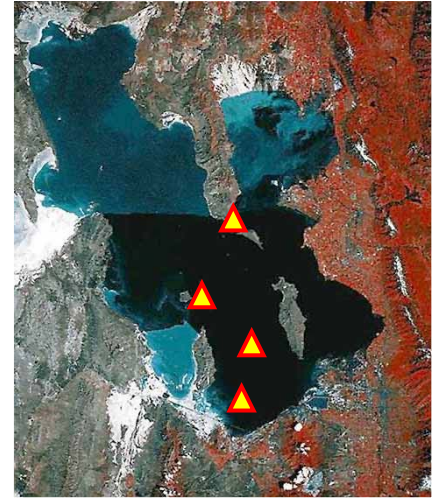
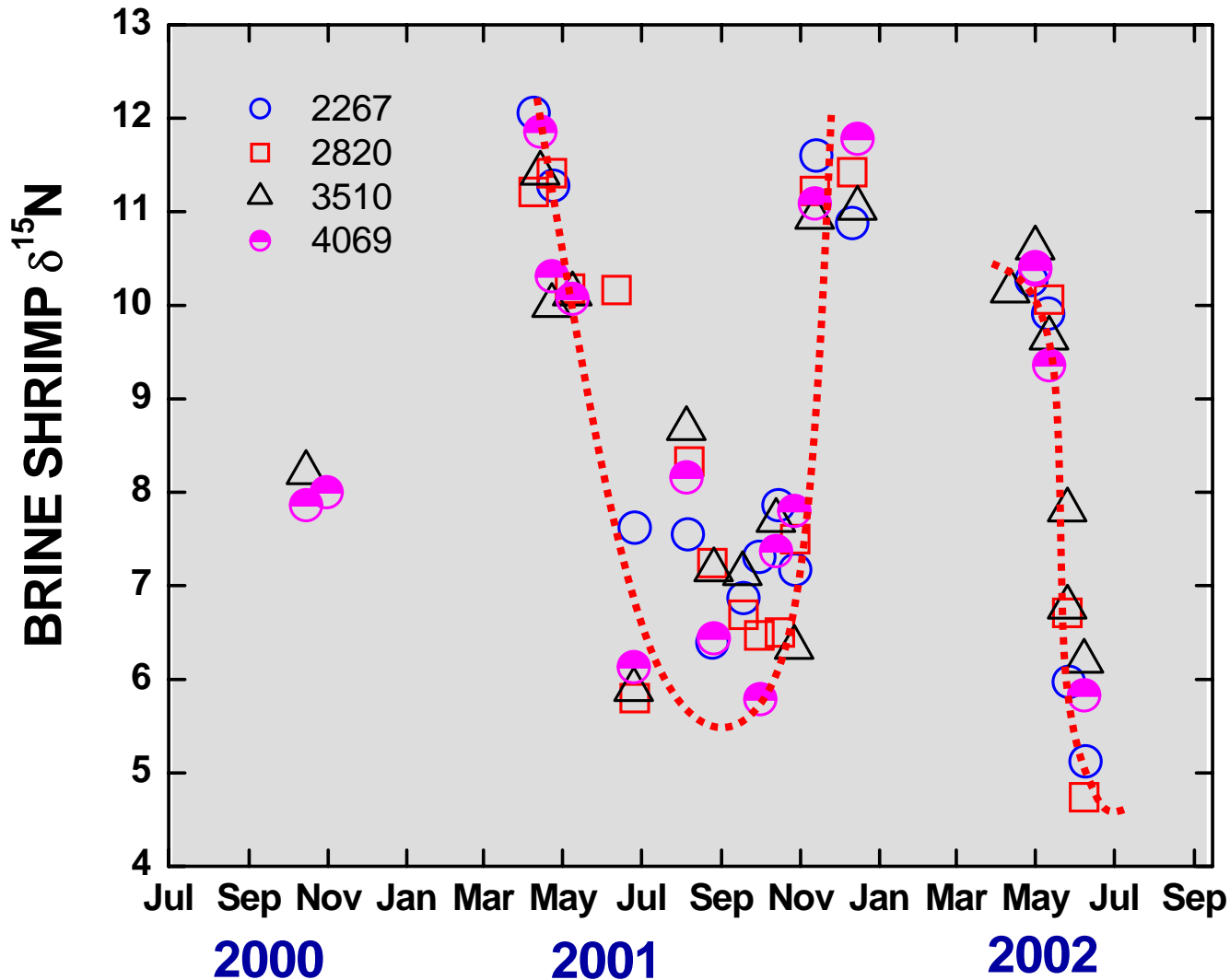


# WE SHOULD ANALYZE ARCHIVED SHRIMP

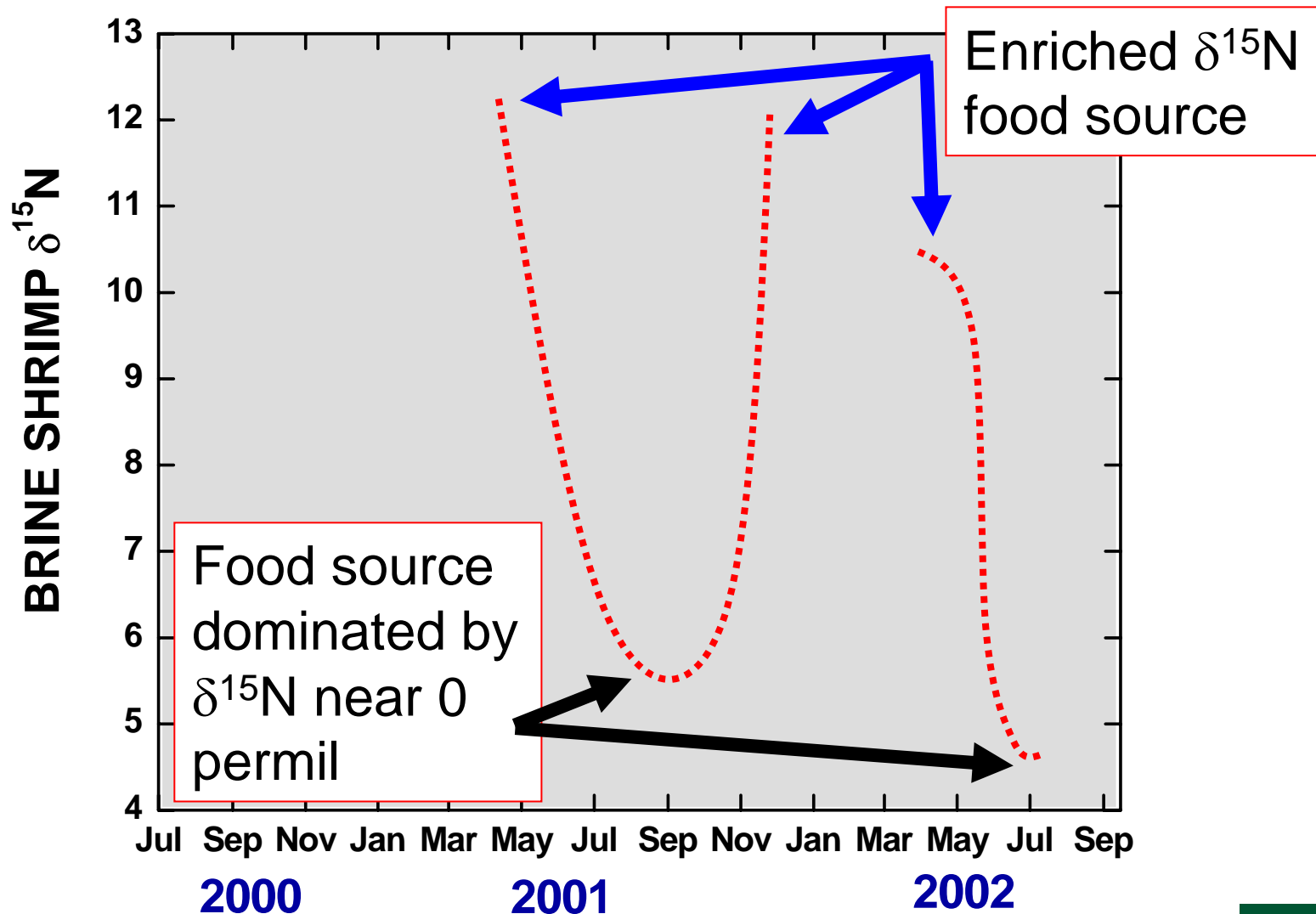


- ◆ Archived shrimp stored in formalin
- ◆ Literature indicates minimal shift in isotopic signature
- ◆ Approximately 2 years of archived samples

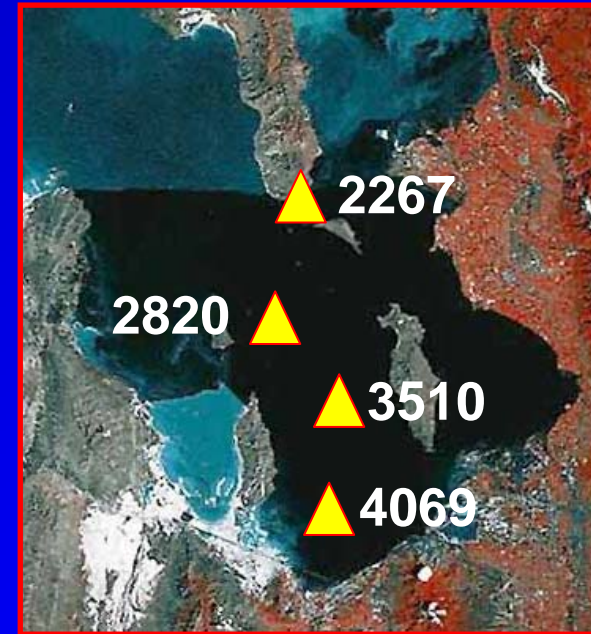
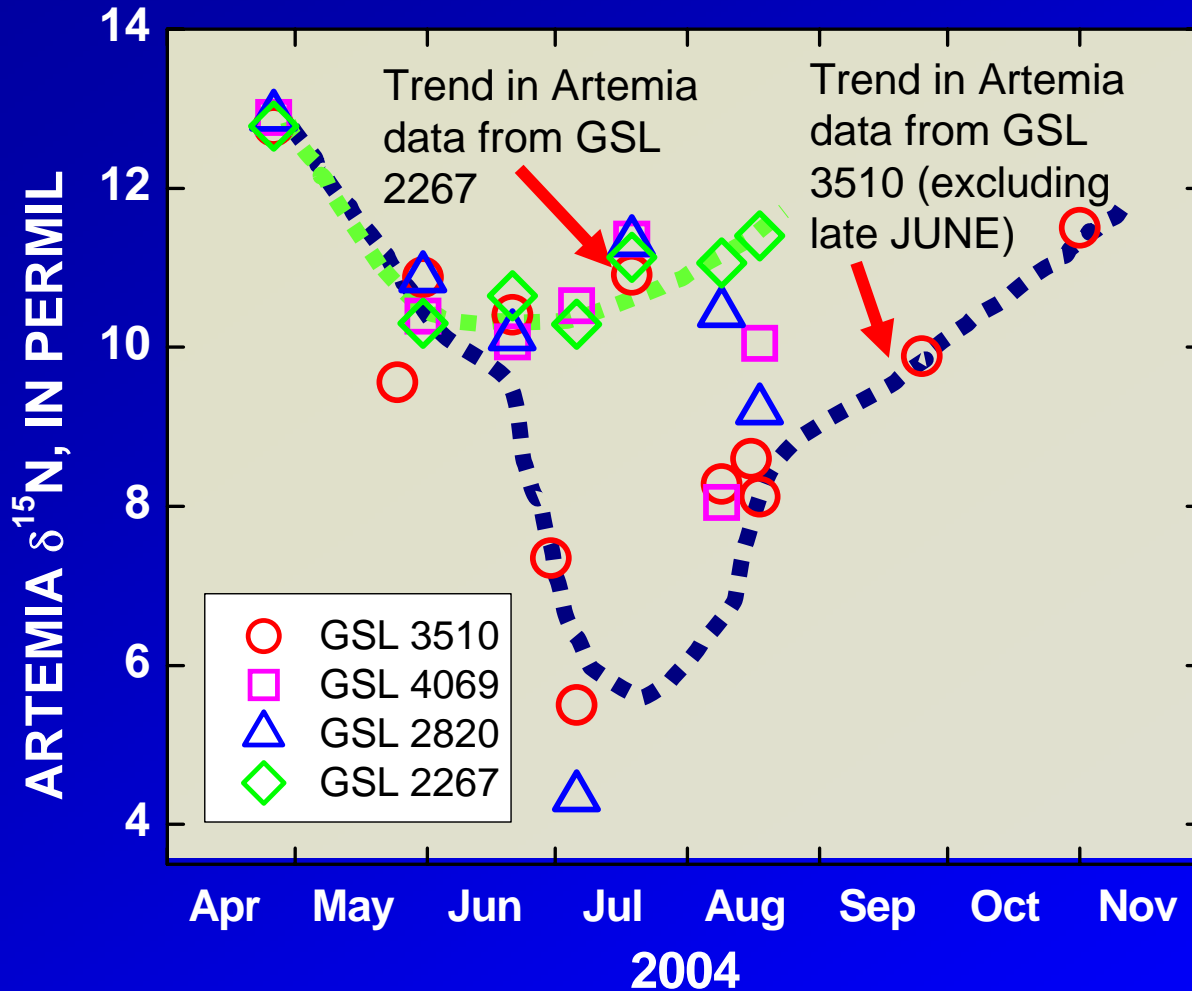
# ARCHIVED BRINE SHRIMP



# $\delta^{15}\text{N}$ SHIFT = CHANGE IN FOOD

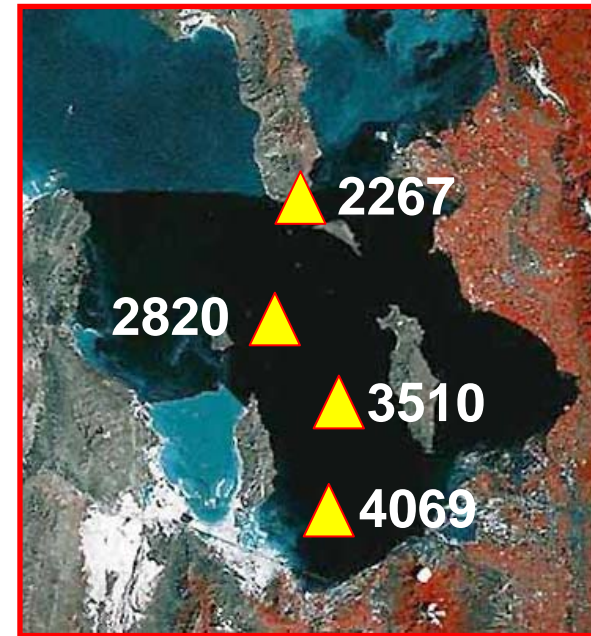
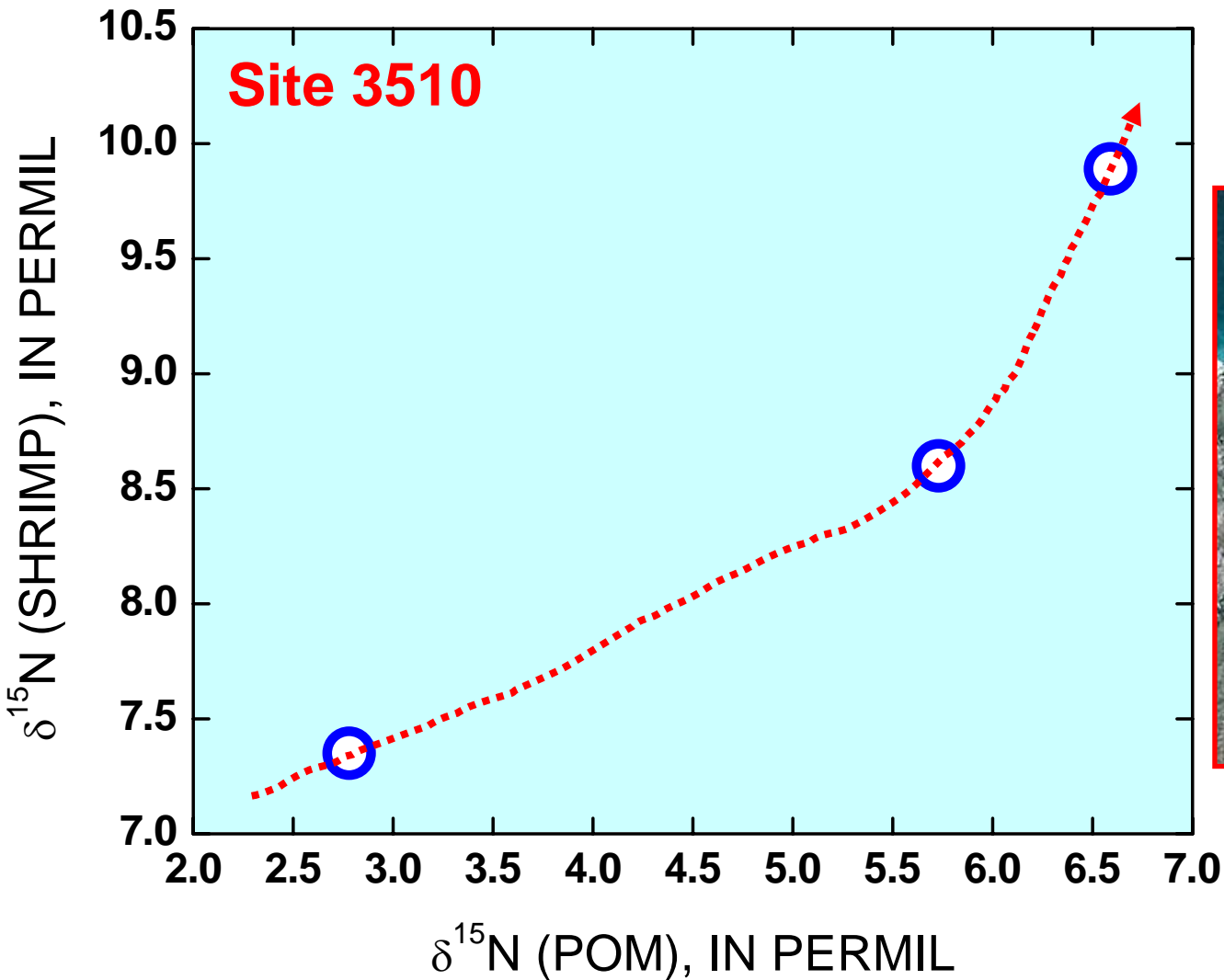


# 2004 BRINE SHRIMP DATA

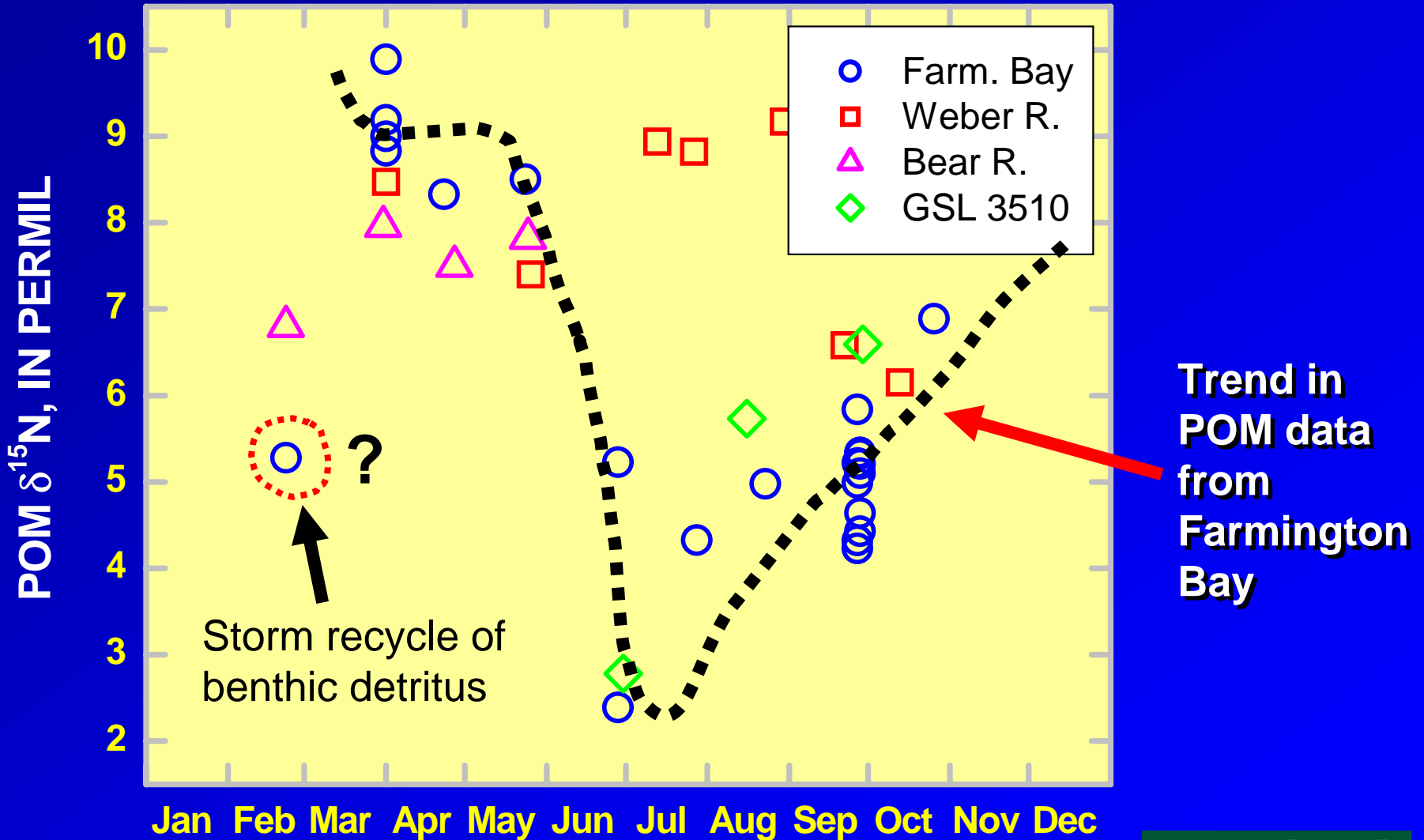




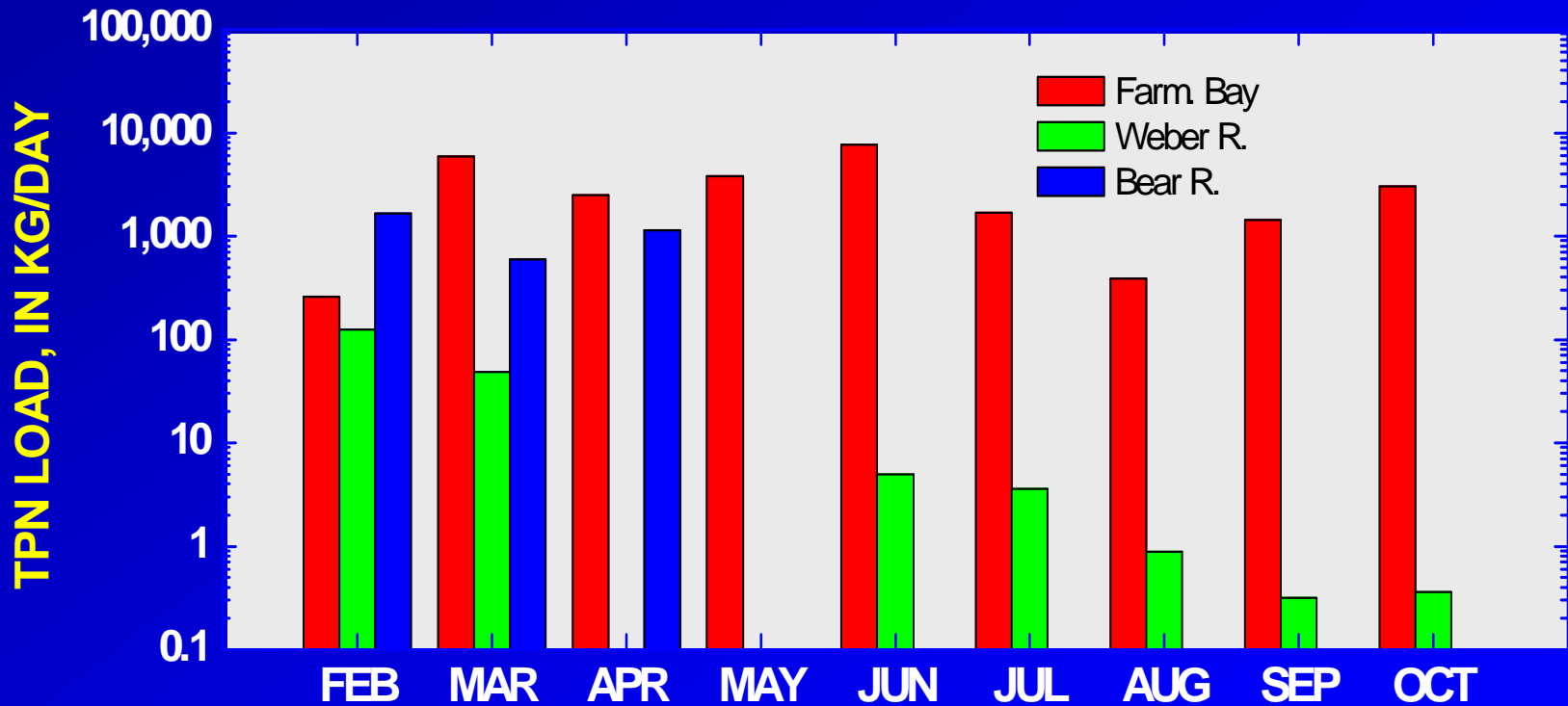
# SHRIMP REFLECT POM SIGNAL



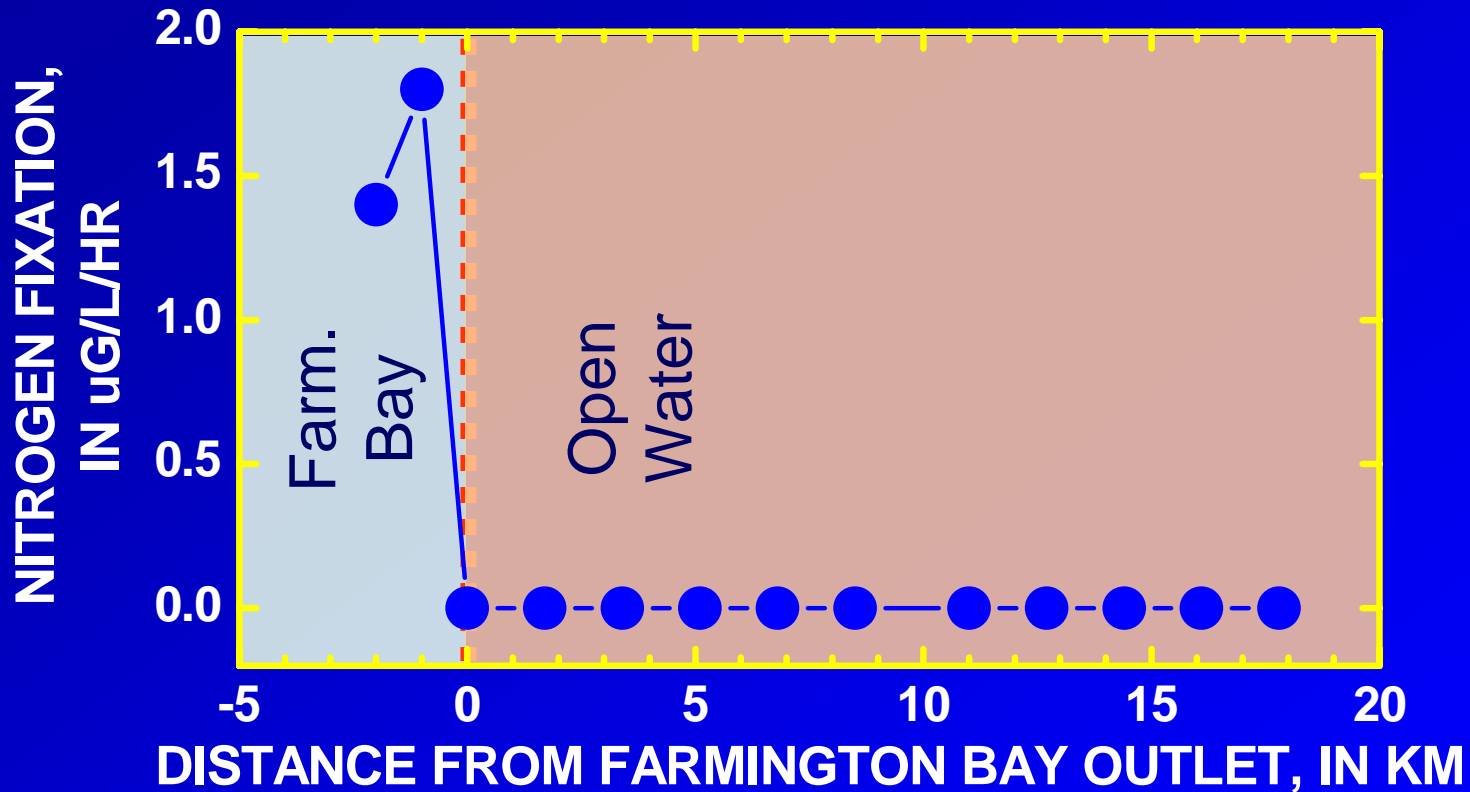
# $\delta^{15}\text{N}$ IN POM



# HIGHEST LOADINGS FROM FB

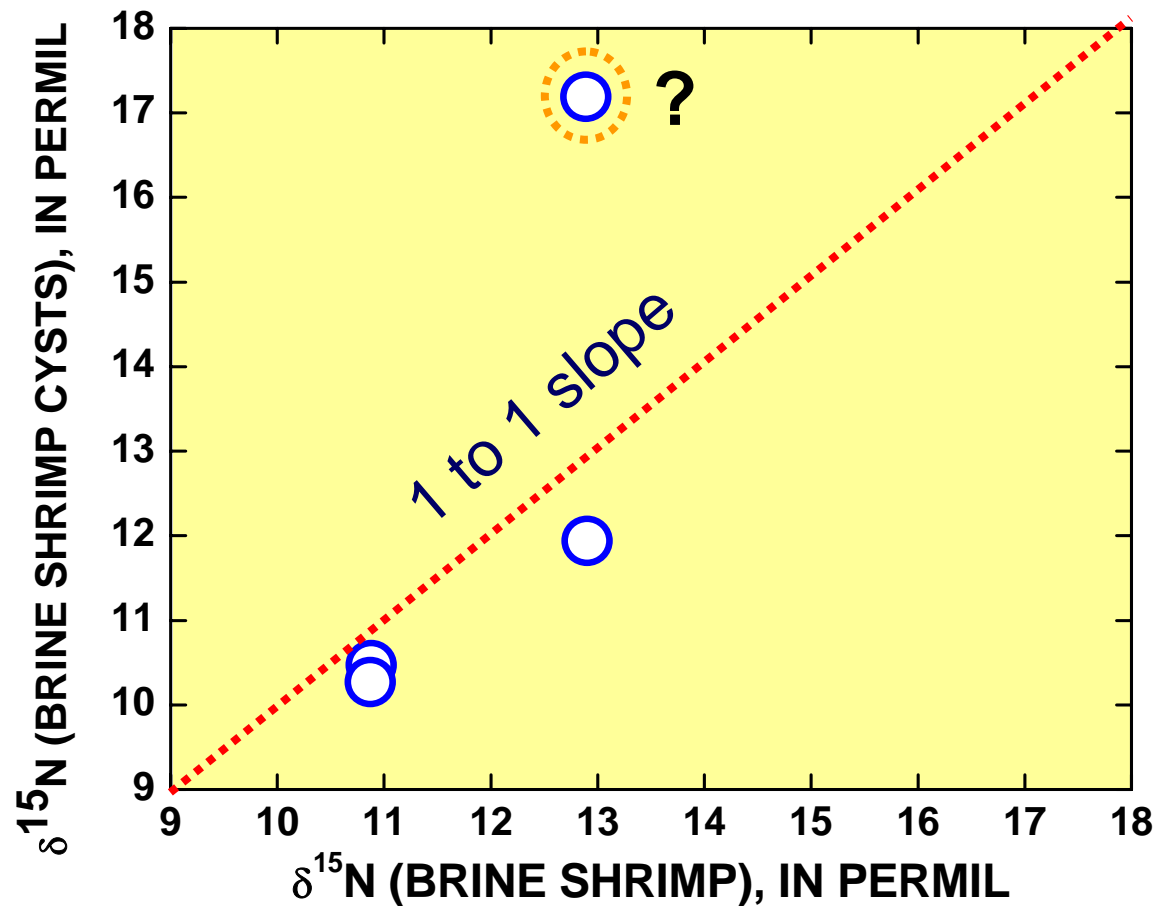


# N-FIXATION NEAR ZERO

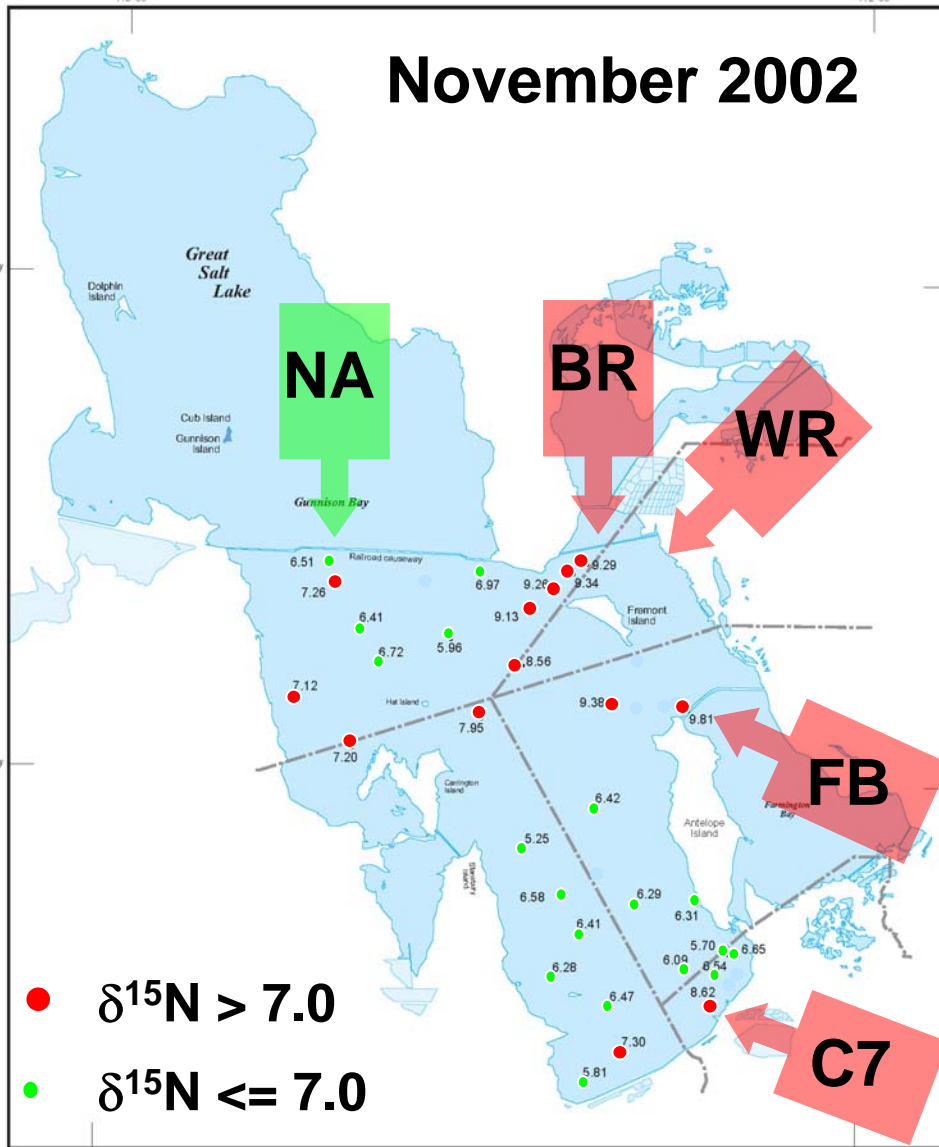


# $\delta^{15}\text{N}$ CYSTS = $\delta^{15}\text{N}$ BRINE SHRIMP

## 2004



November 2002



# GSL CURRENTS



*Farmington Bay currents*

# PHYCOCYANIN JUNE 2005

Potential source  
of depleted  $\delta^{15}\text{N}$

## GSL bathymetry

Contour interval  
1 foot



## GSL synoptic sampling site

### Farmington Bay

- Full sample
- Partial sample

### North

- Full sample
- Partial sample

### South

- ★ Full sample
- ☆ Partial sample

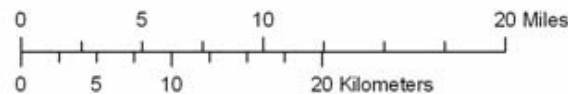
Current (5/13) lake elevation 4196

Stansbury  
Island

Liberty  
Island

Antelope  
Island

Salt Lake City



*S. Bradt, 2005*

# FUTURE WORK: HYDRODYNAMIC MODELING OF GREAT SALT LAKE

Univ. of Western Australia

- ◆ Real time hydrodynamic modeling in 3D (ELCOM)
- ◆ Lake temperature in 3D
- ◆ Total chlorophyll
- ◆ Cyanobacteria
- ◆ Dissolved oxygen



# SUMMARY

- ◆ Food web information available from archived brine shrimp (and cysts)
- ◆  $\delta^{15}\text{N}$  shrimp/POM verify seasonal changes and drought impacts
- ◆ Synoptic isotopic data indicate consistent lake currents
- ◆ Additional isotopes are promising