

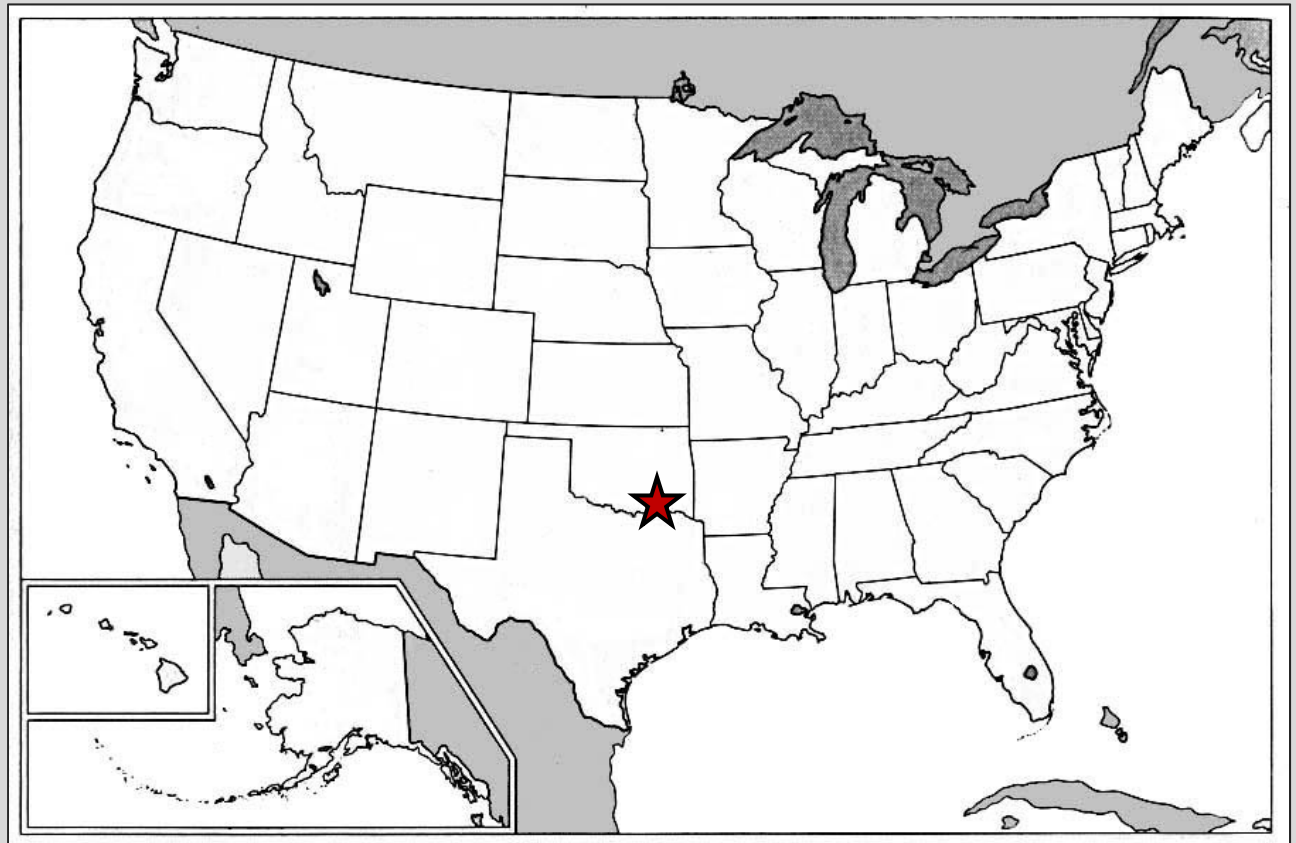
# Potential effects of zebra mussels in Lake Texoma, a large subtropical reservoir

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# Lake Texoma

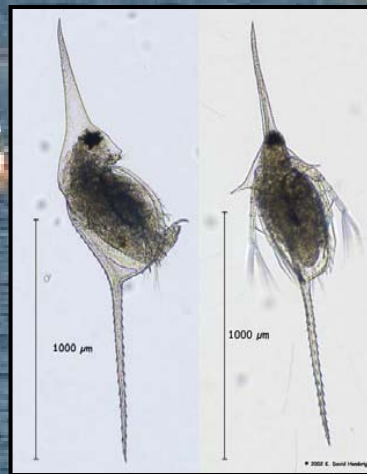
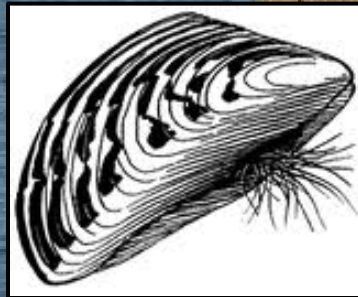
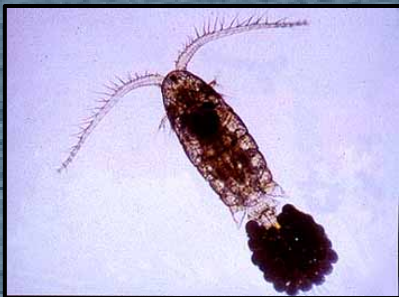
- Completed in 1944 for flood control – water levels regularly vary by  $> 2\text{m}$  annually
- Variable salinity
- Temps range from  $6\text{-}32^{\circ}\text{C}$





# Lake Texoma

- 12<sup>th</sup> largest reservoir by surface area
- 23<sup>rd</sup> largest reservoir by volume in the United States
- Over 6 million visitors a year



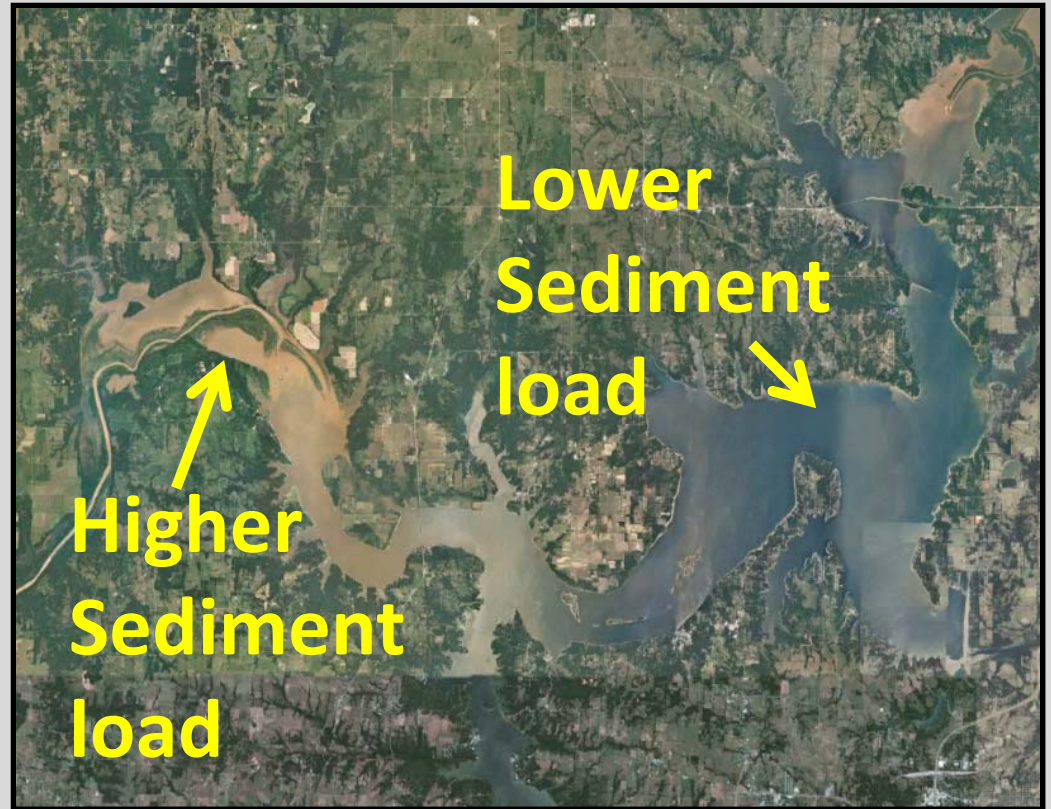
# Zebra Mussels

- Introduced to Lake Texoma in 2009
- Originally temperate
- Notorious bio-foulers
- Ecosystem Engineers
  - Increase water clarity



# Lake Texoma: Not your typical habitat

- Low water clarity with a high sediment load
- High summer temperatures
- Other introduced species

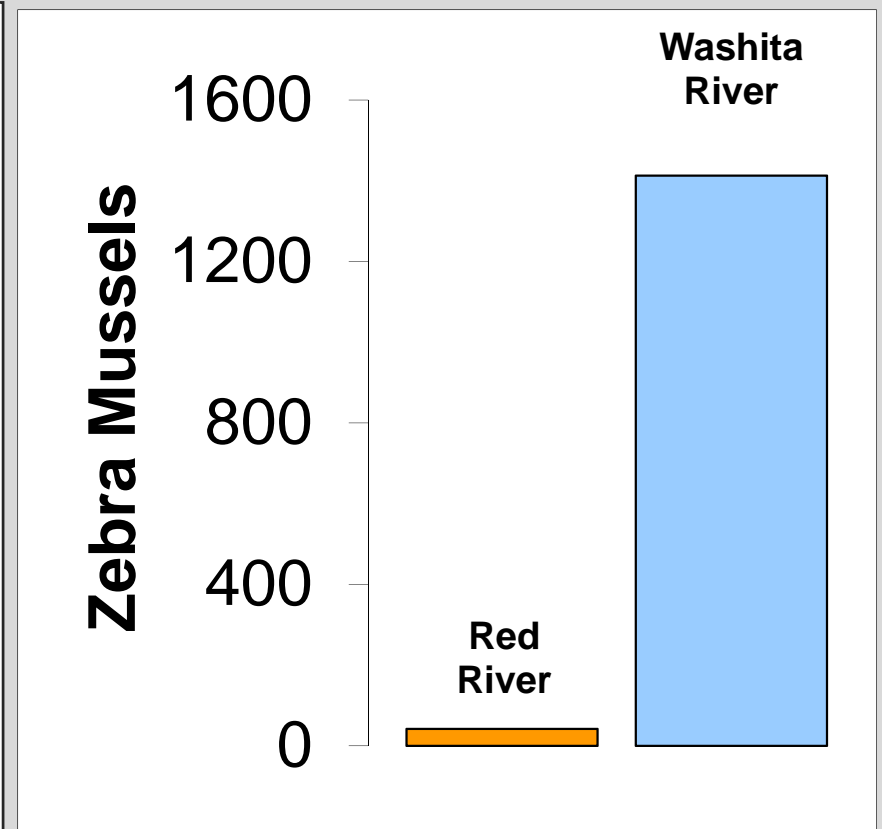
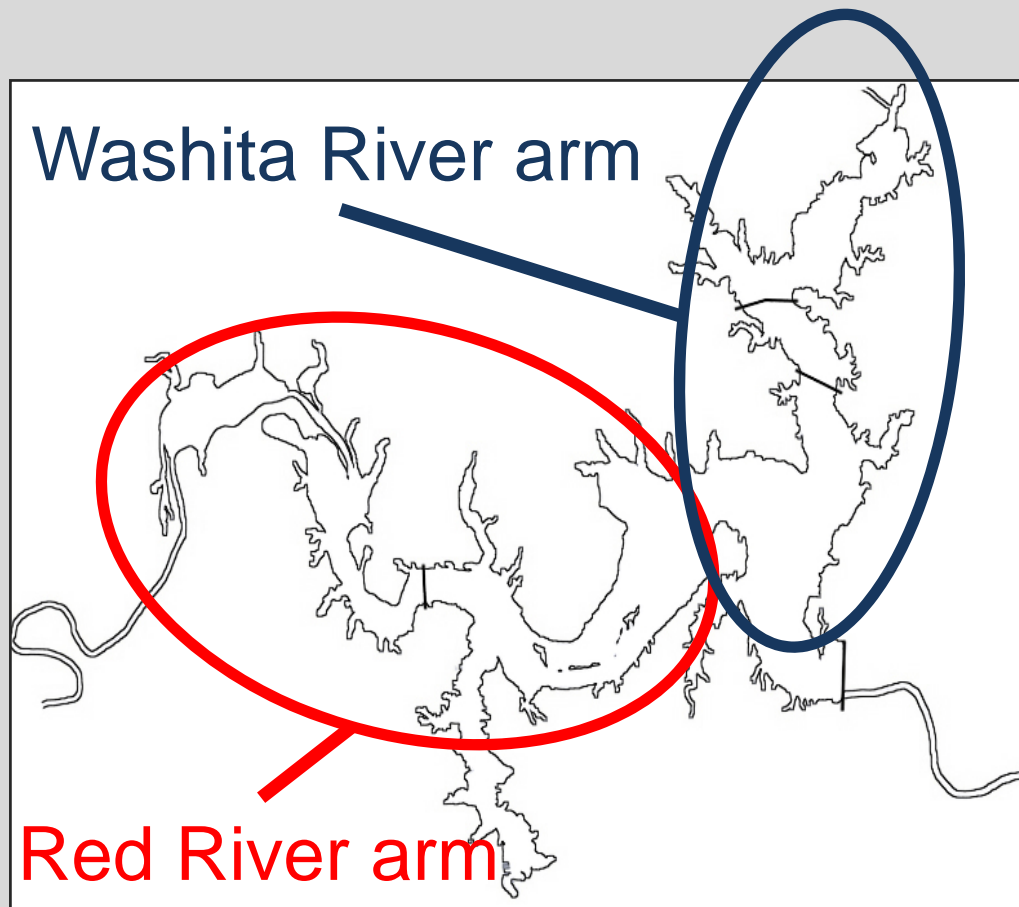


# Predictions

- Distribution will be patchy



# Zebra mussel distribution in Lake Texoma



# Predictions

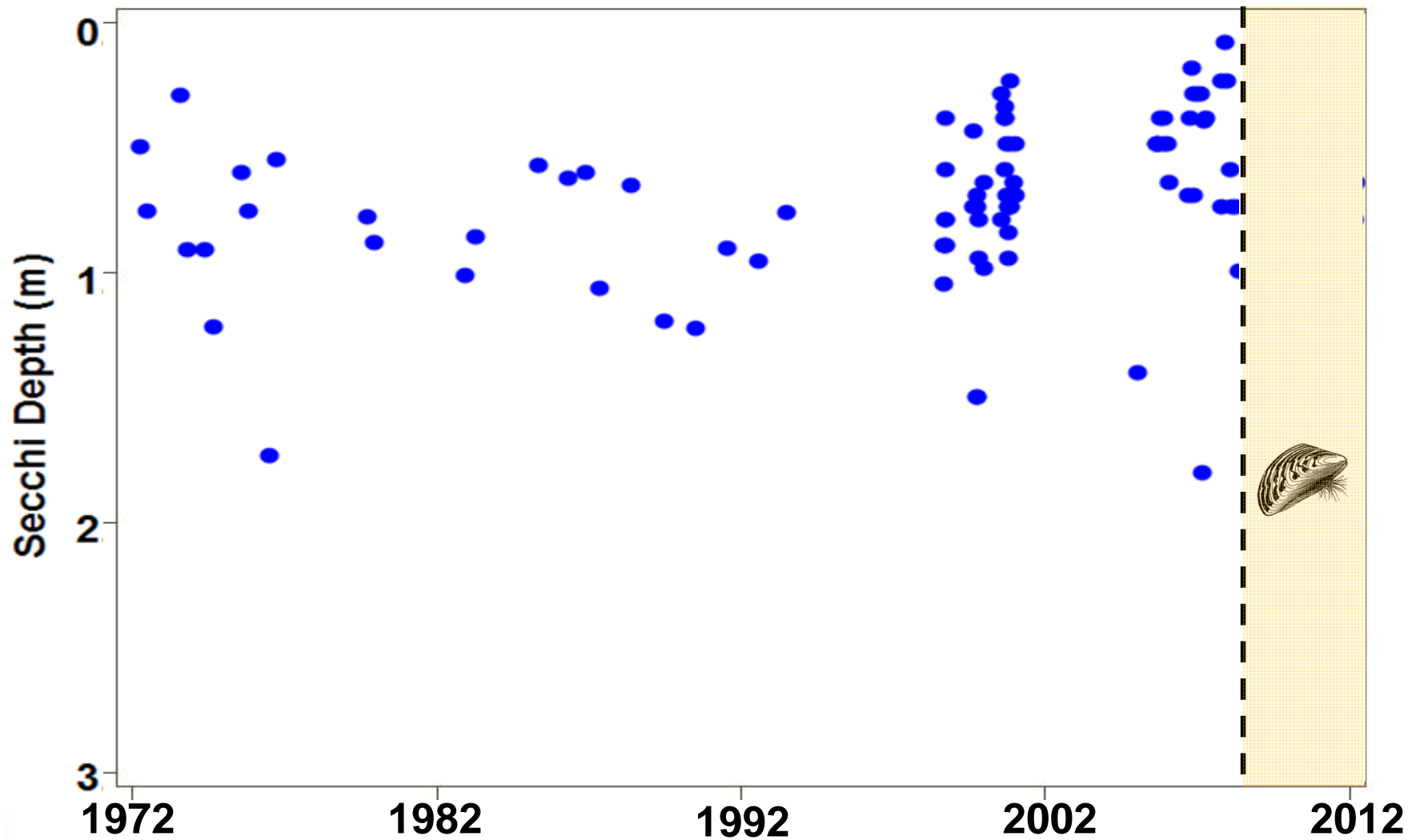
- Increase in Secchi depth



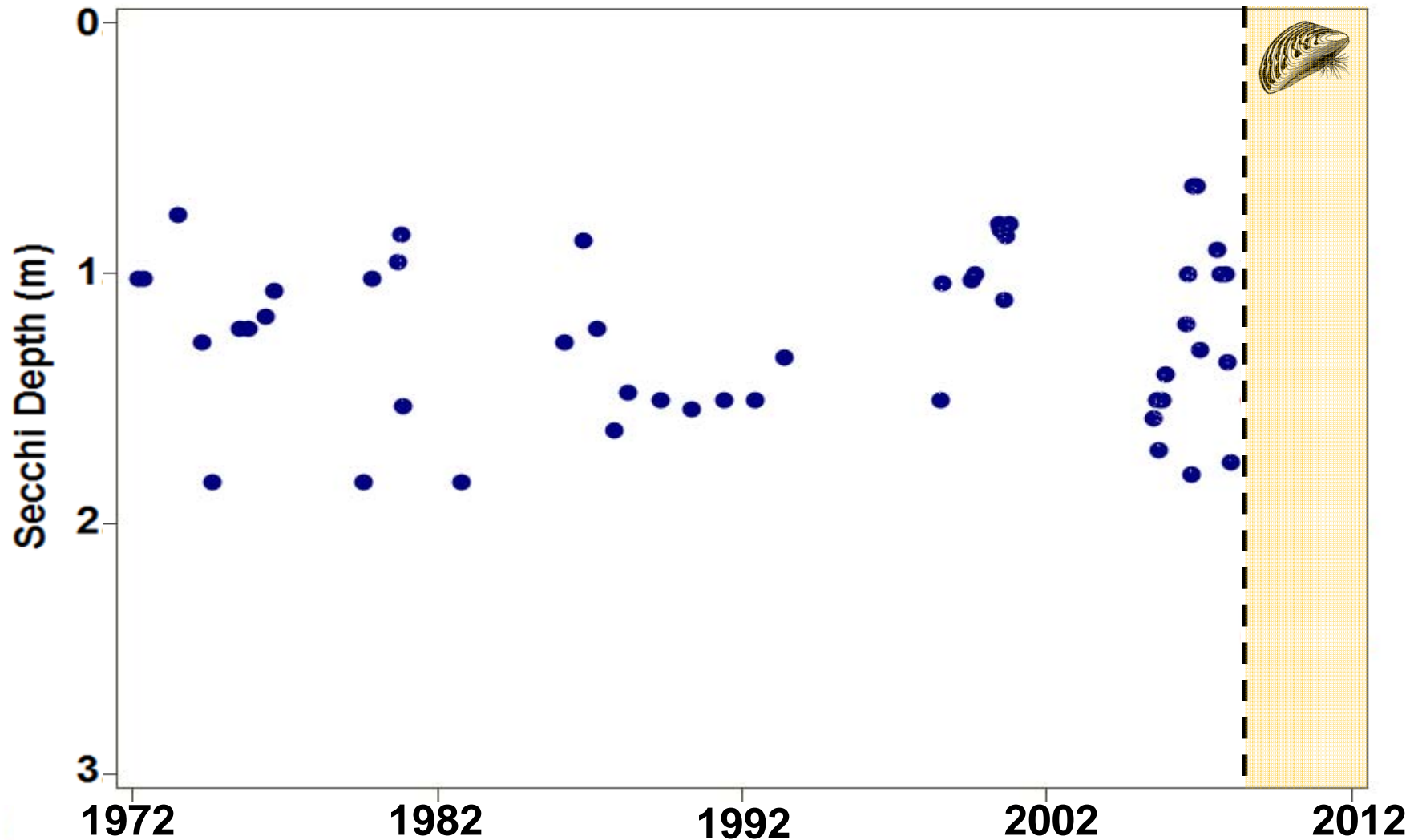
# Long-term data

- Assembled long-term data for testing changes in Secchi depth
  - 1974-current, from a variety of sources
- Infrequent and uneven sampling for earlier data
- Multi-year gaps between earlier data

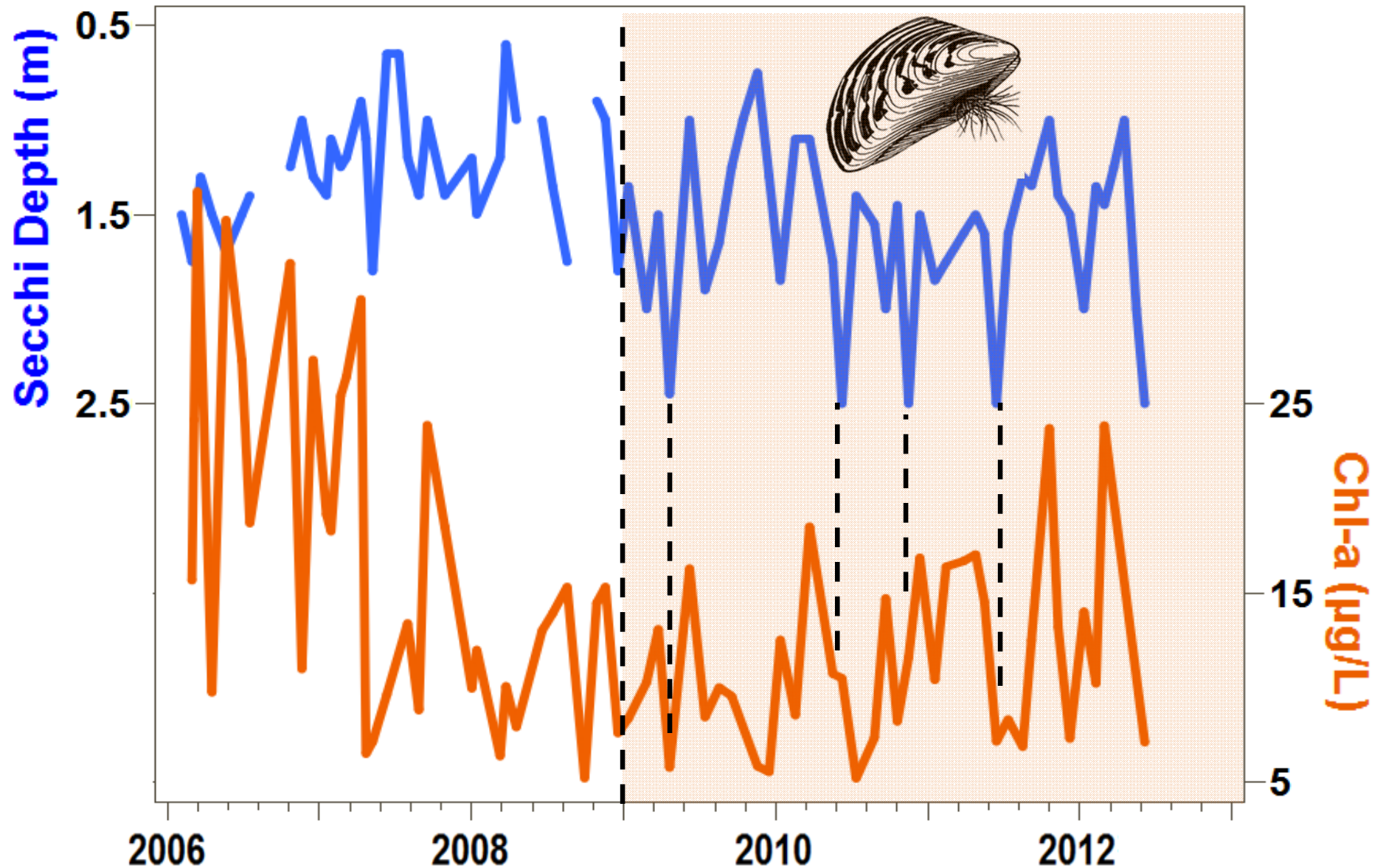
# Red River spring/summer Secchi depths



# Washita River spring/summer Secchi depths

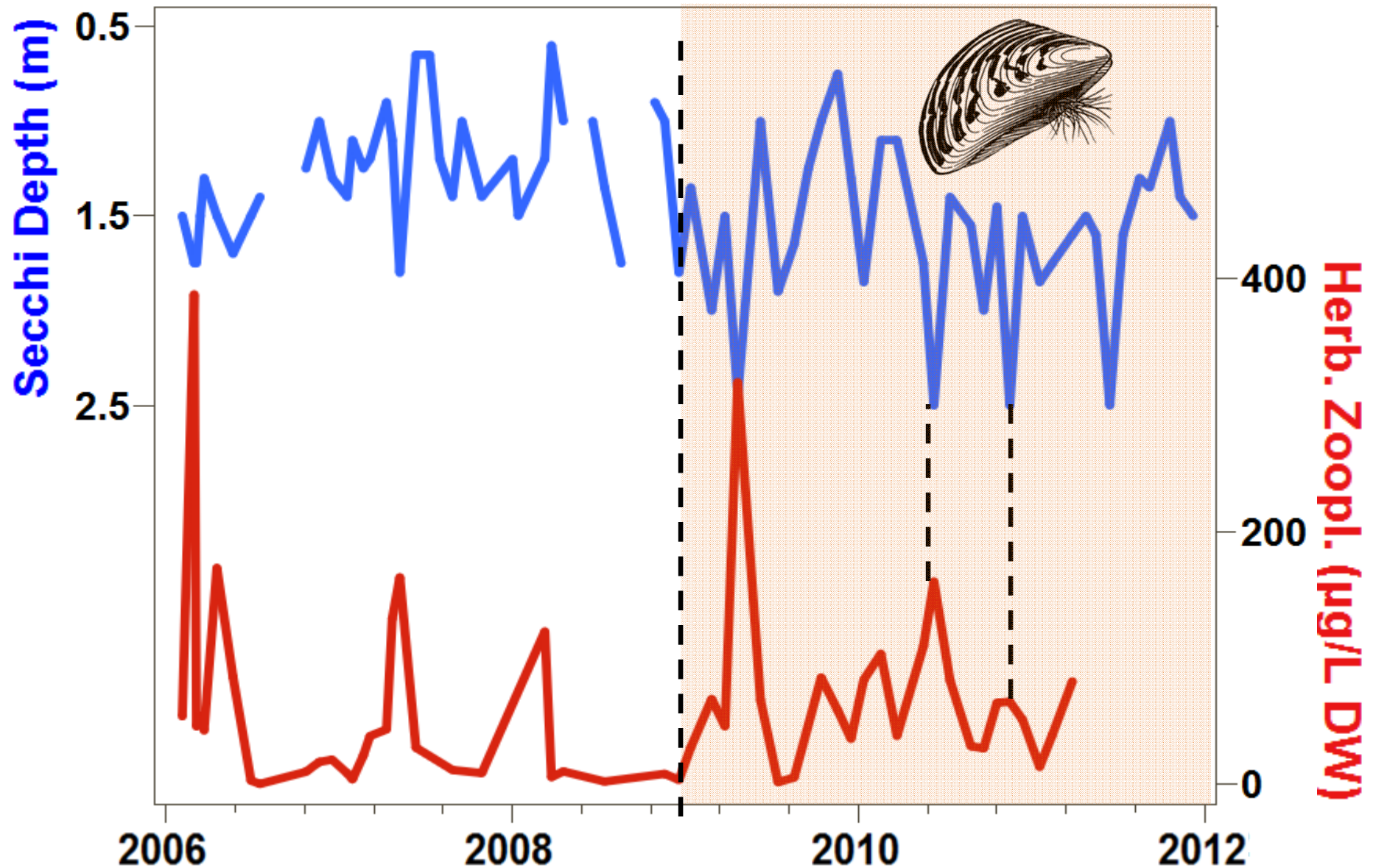


# Washita year round PELL data





# Washita year round PELL data



# Predictions

- Frequent die-offs
  - High temperature
  - Variable water levels



# Long term data conclusions

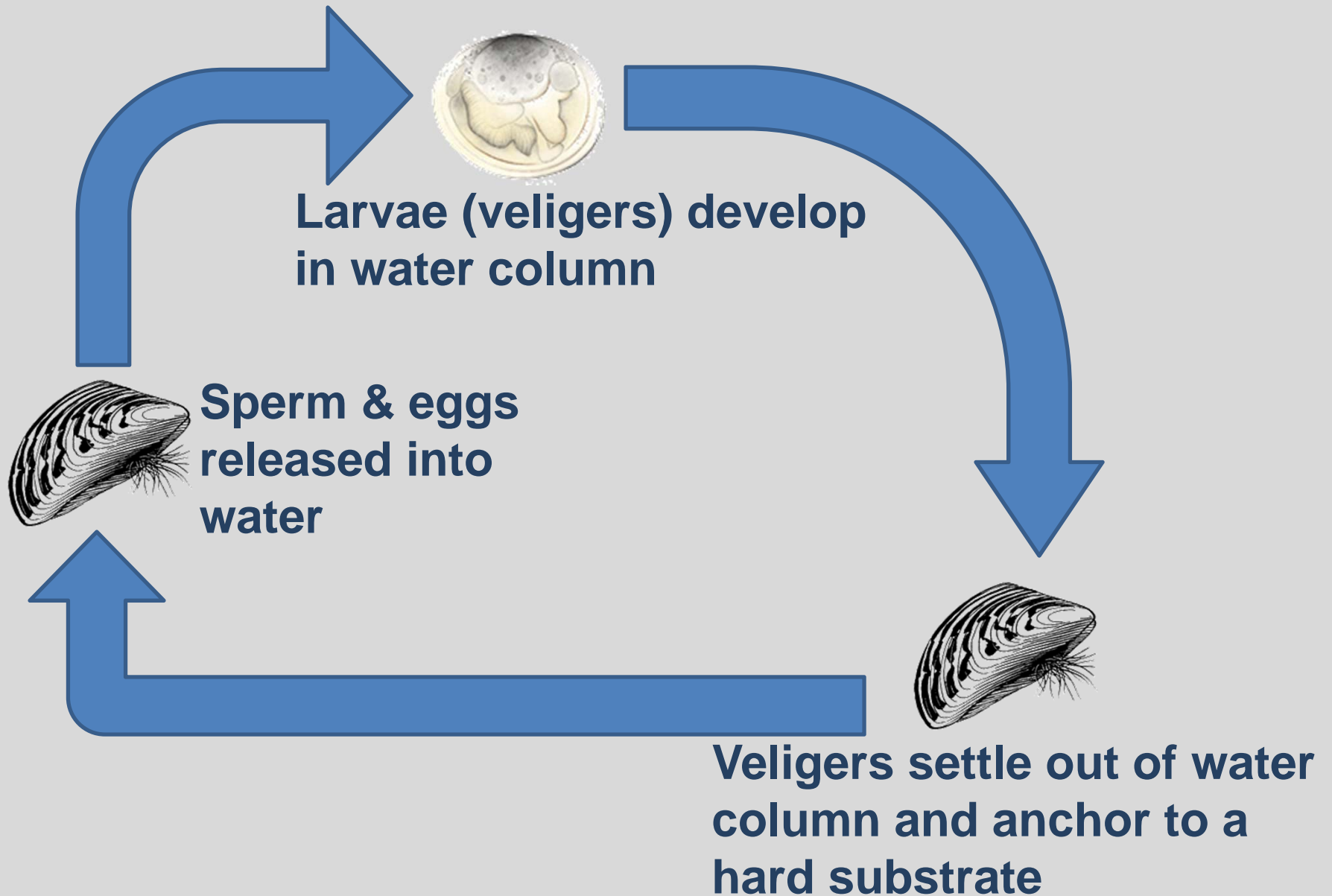
- Secchi depths increasing in Washita arm but not Red River arm
- Appearance of increased Secchi depths corresponds to zebra mussel introduction
- Summer die-offs may affect how zebra mussels impact Secchi depths

# Zebra mussel monthly monitoring

- Goals
  - Describe patterns in zebra mussel abundance across space and time in a subtropical reservoir
  - Measure relative impacts of fish predation, siltation, and temperature on zebra mussels

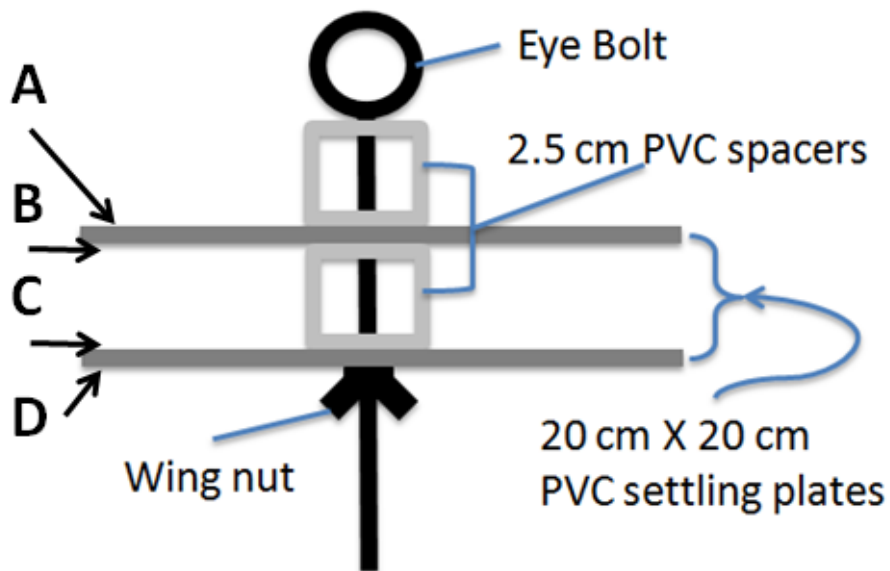


# Zebra mussel life cycle

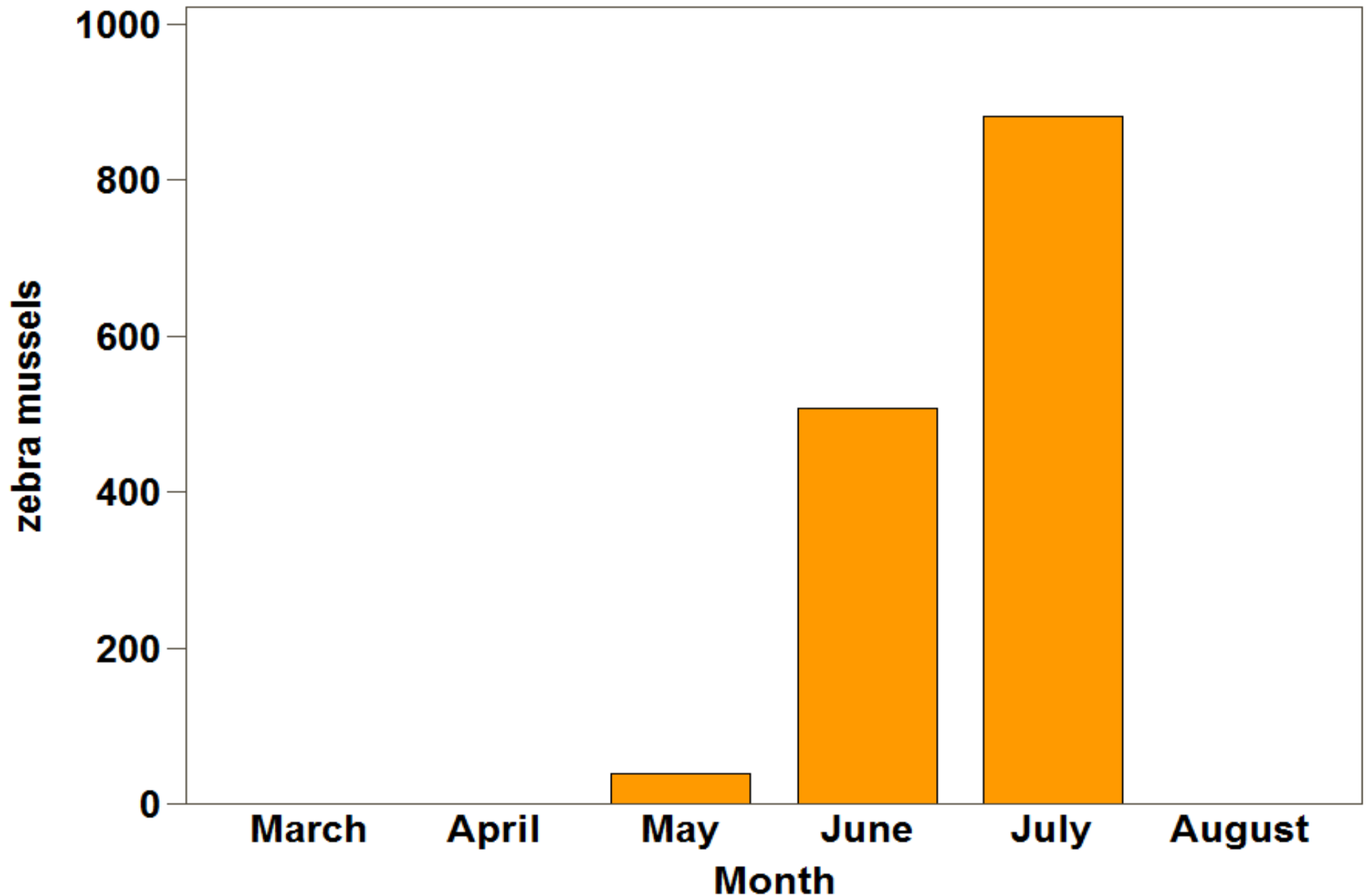


# Zebra Mussel Settling Plates

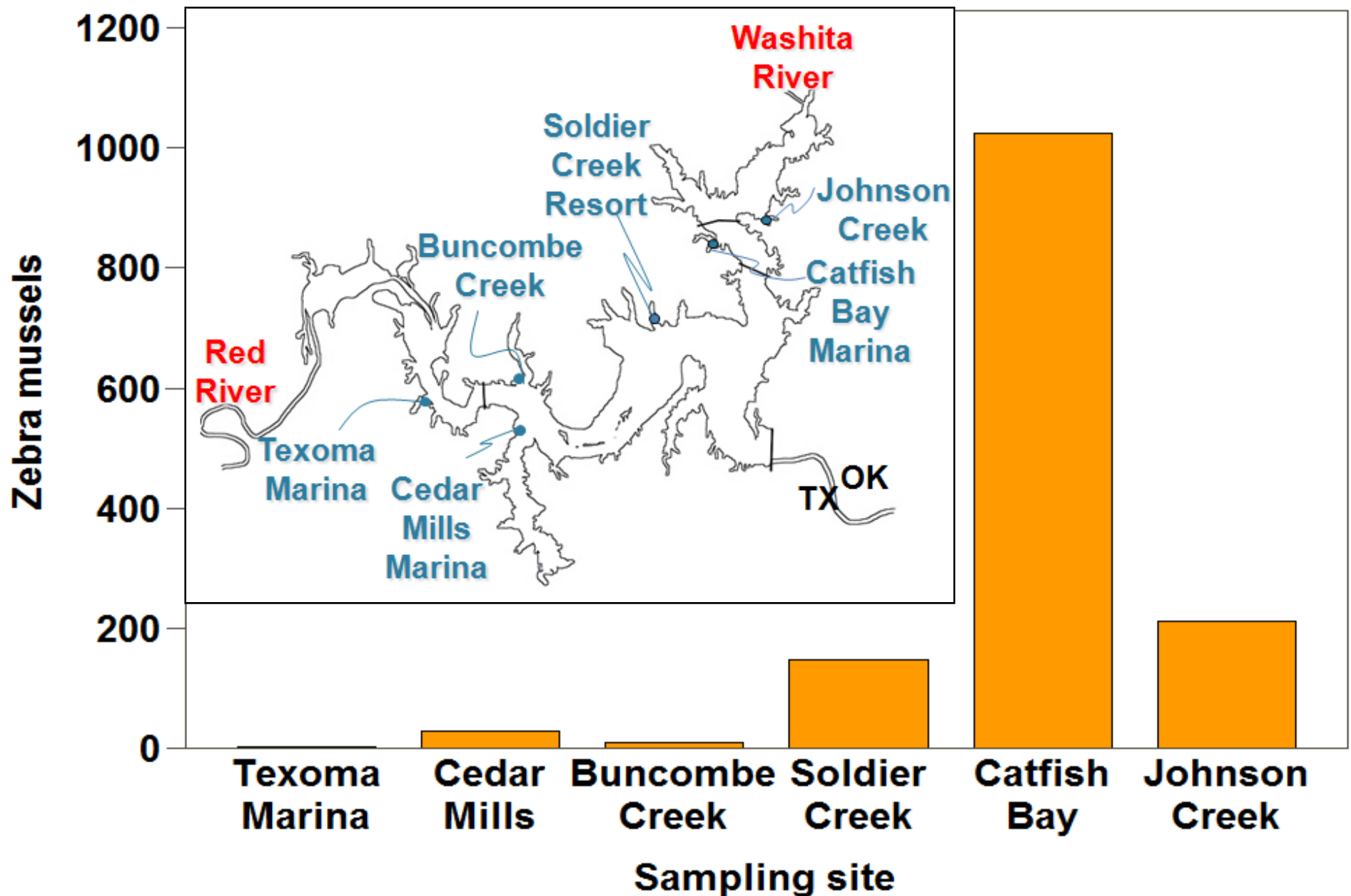
- 6 sampling sites across Lake Texoma
- 3 Samplers at 1 and 3 meters (6 total)
- Sampled monthly



# Zebra mussel settling by month

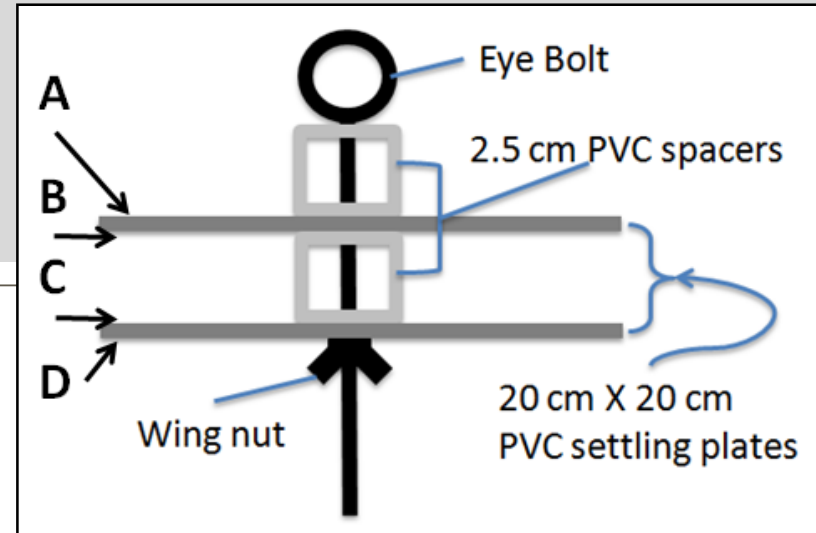
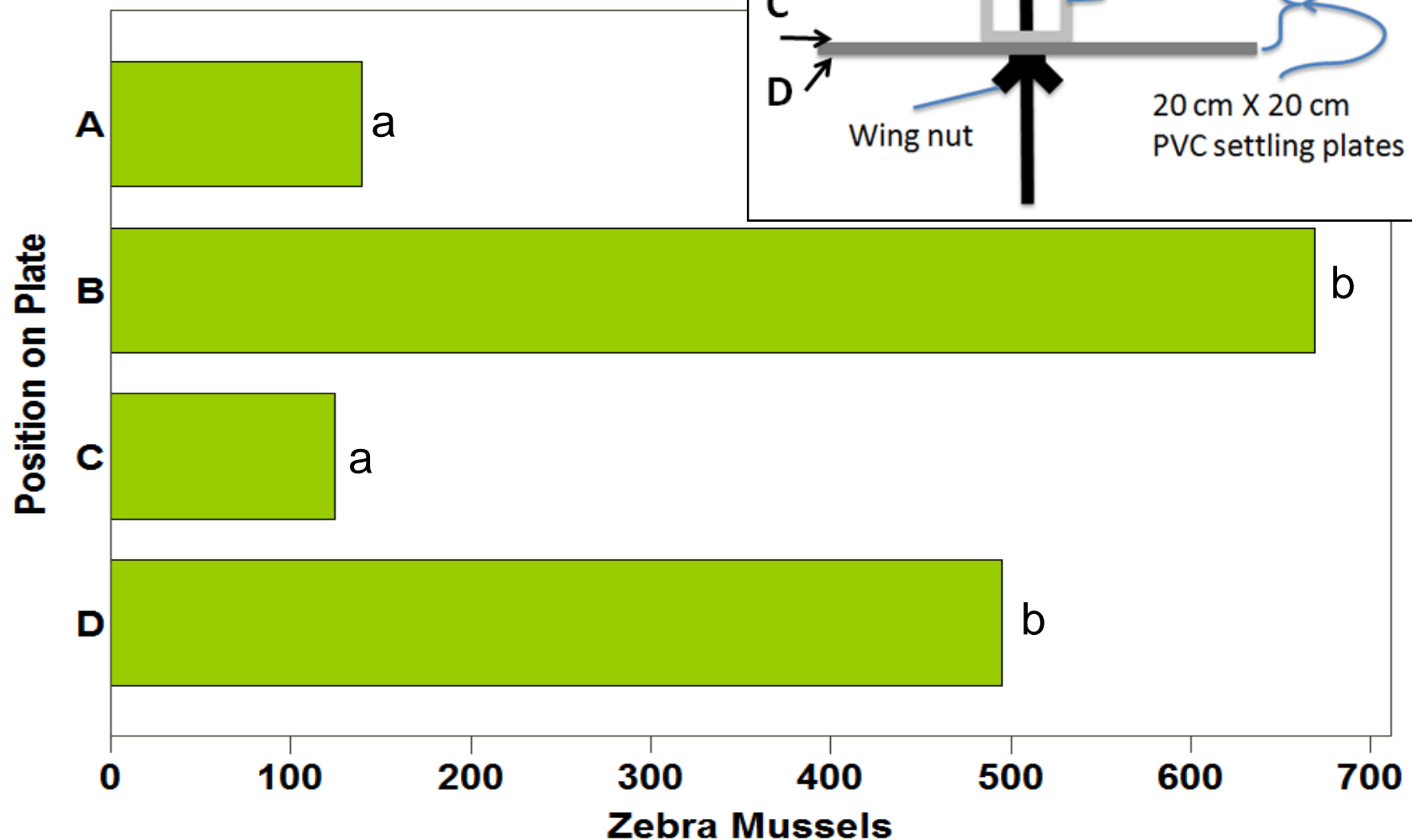


# Zebra mussel settling by site

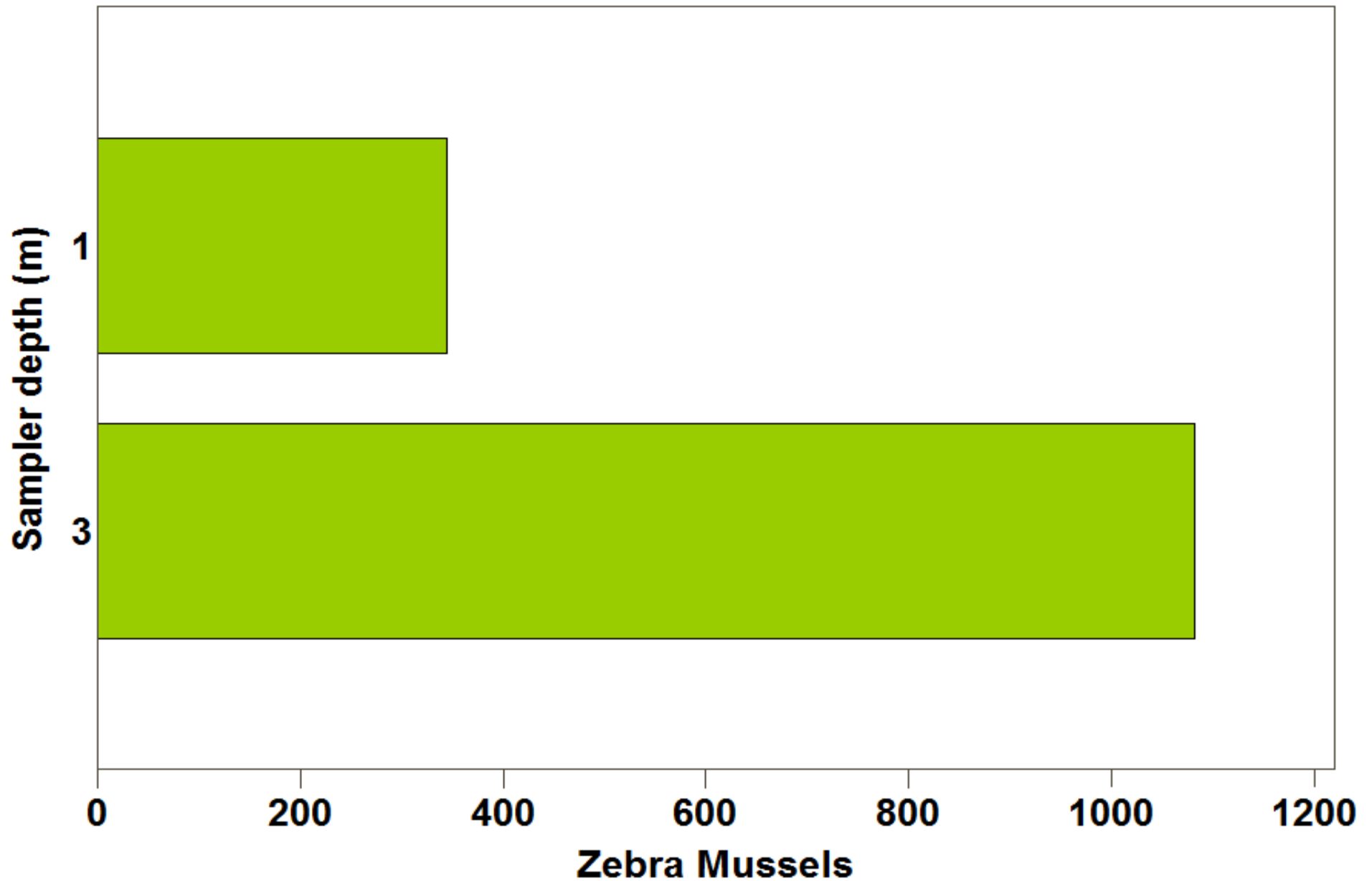




# Zebra mussel settling preference



# Zebra mussel settling preference



# Conclusions

- Settling begins as early as April, but peaks in July
- Occur more frequently in Washita river than Red river, most abundant at Catfish Bay
- Prefer undersides of plates, no preference for inside versus outside
- More frequent at 3 meters

# Future Research

- How will summer die-offs affect Secchi depth dynamics?
  - Summer 2013 may see increased Secchi depths
- Interactions between zebra mussels and other invasive species
- Continued monitoring is essential for understanding zebra mussels in subtropical reservoirs



# Acknowledgements

Thank you to my data and funding sources

## Data sources:



Matthews WJ & Hill LG (1988) Proceedings of the Oklahoma Academy of Science **68**:33-38

Matthews WJ & Gido KB, unpublished data 1999-2001

## Funding sources:

