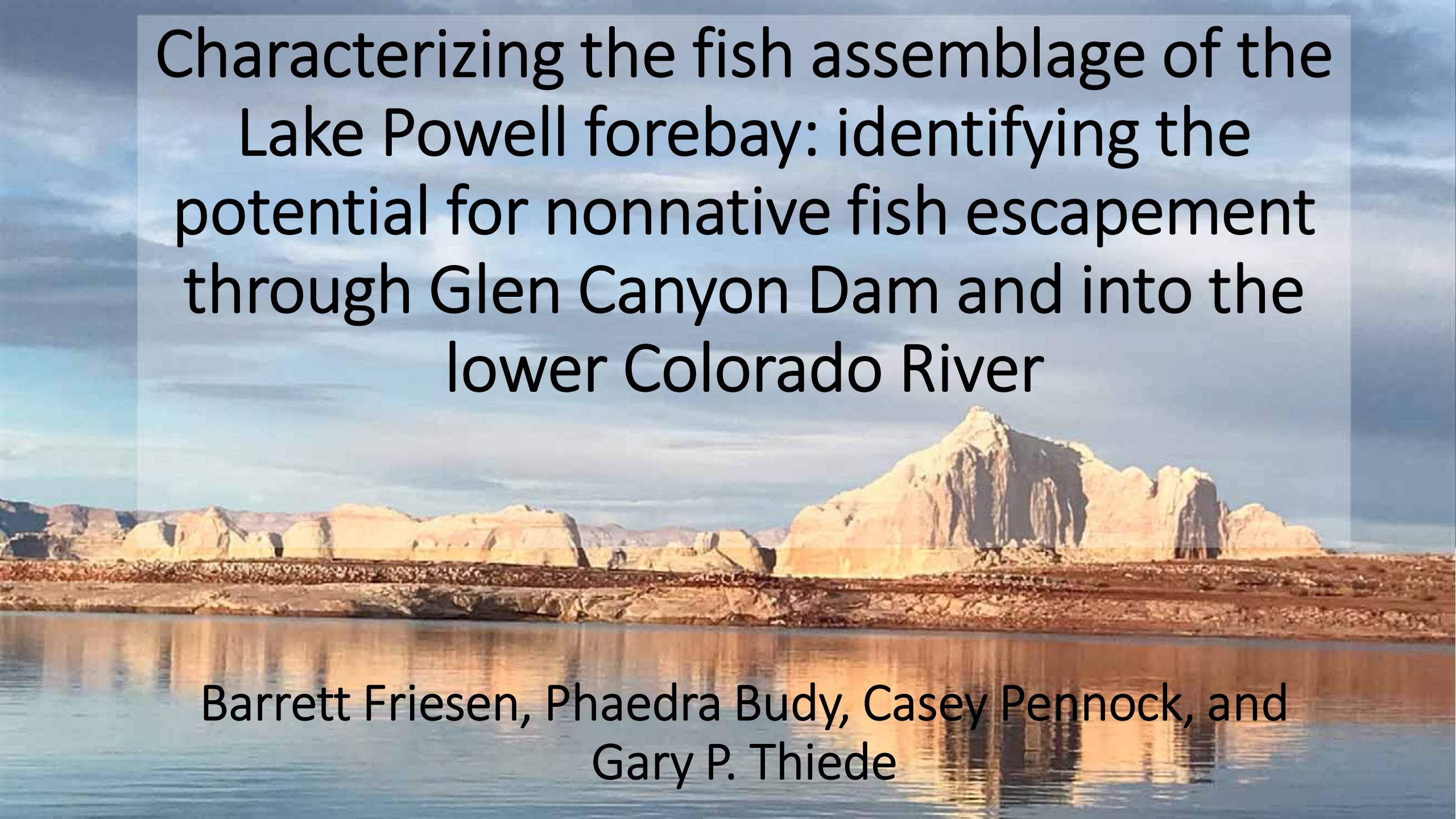
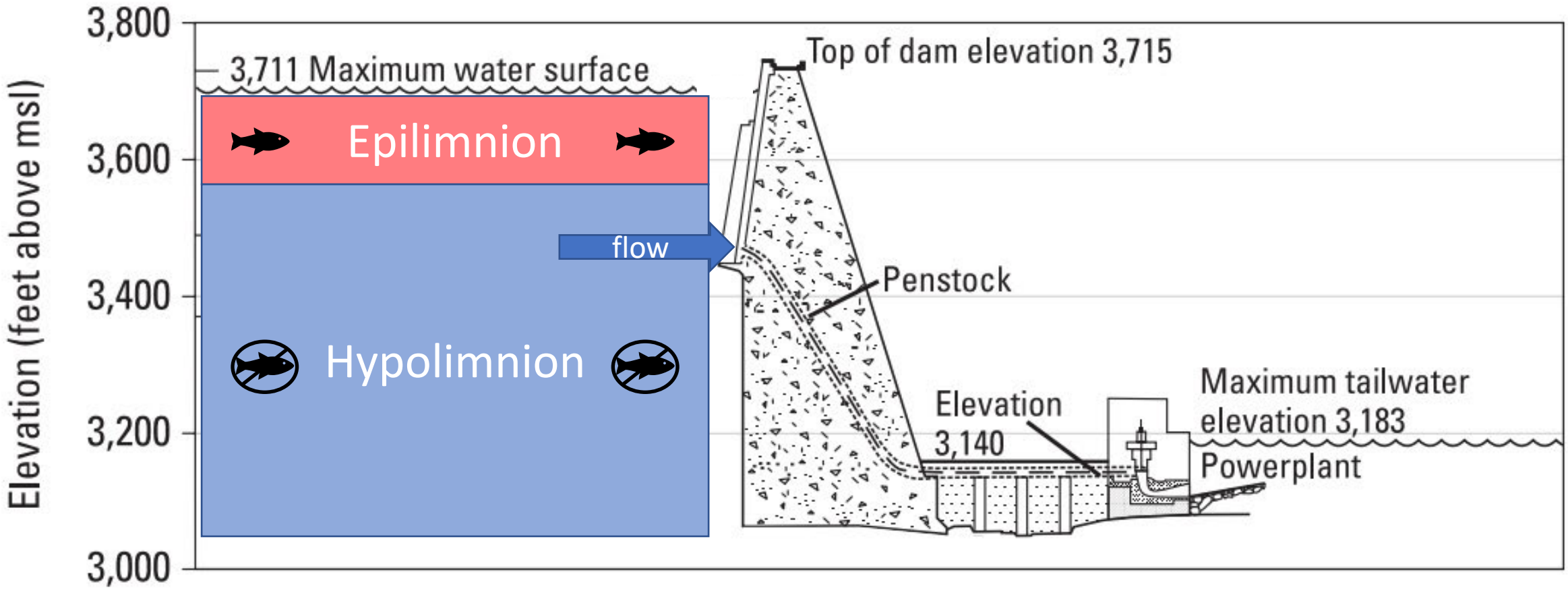
Characterizing the fish assemblage of the Lake Powell forebay: identifying the potential for nonnative fish escapement through Glen Canyon Dam and into the lower Colorado River

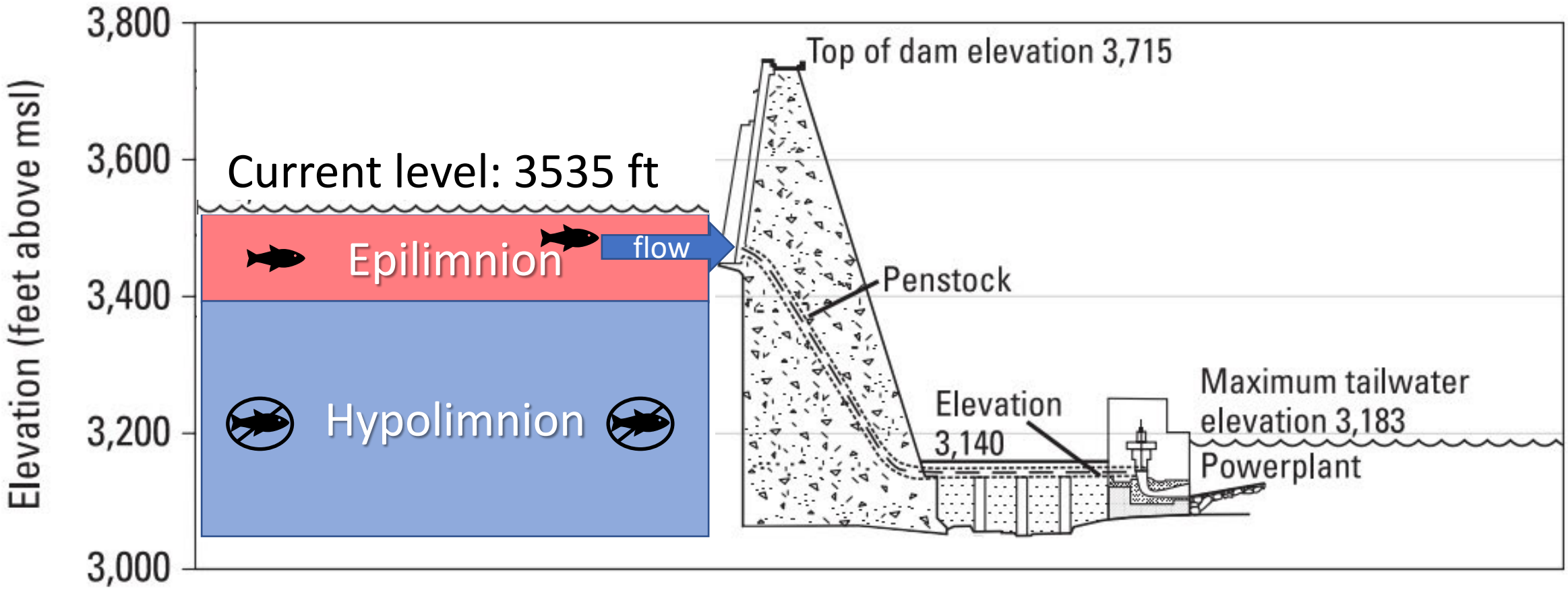


Barrett Friesen, Phaedra Budy, Casey Pennock, and Gary P. Thiede

Historical conditions: withdrawal from hypolimnion



Current conditions: withdrawal from epilimnion



Lake level has risen 12 ft since April TWG meeting

Objectives

1. Characterize the potentially ‘entrainable’ fish population in Lake Powell
   - Space, depth, and seasons (time)

2. Determine the likelihood that a fish that does get entrained, will survive the journey

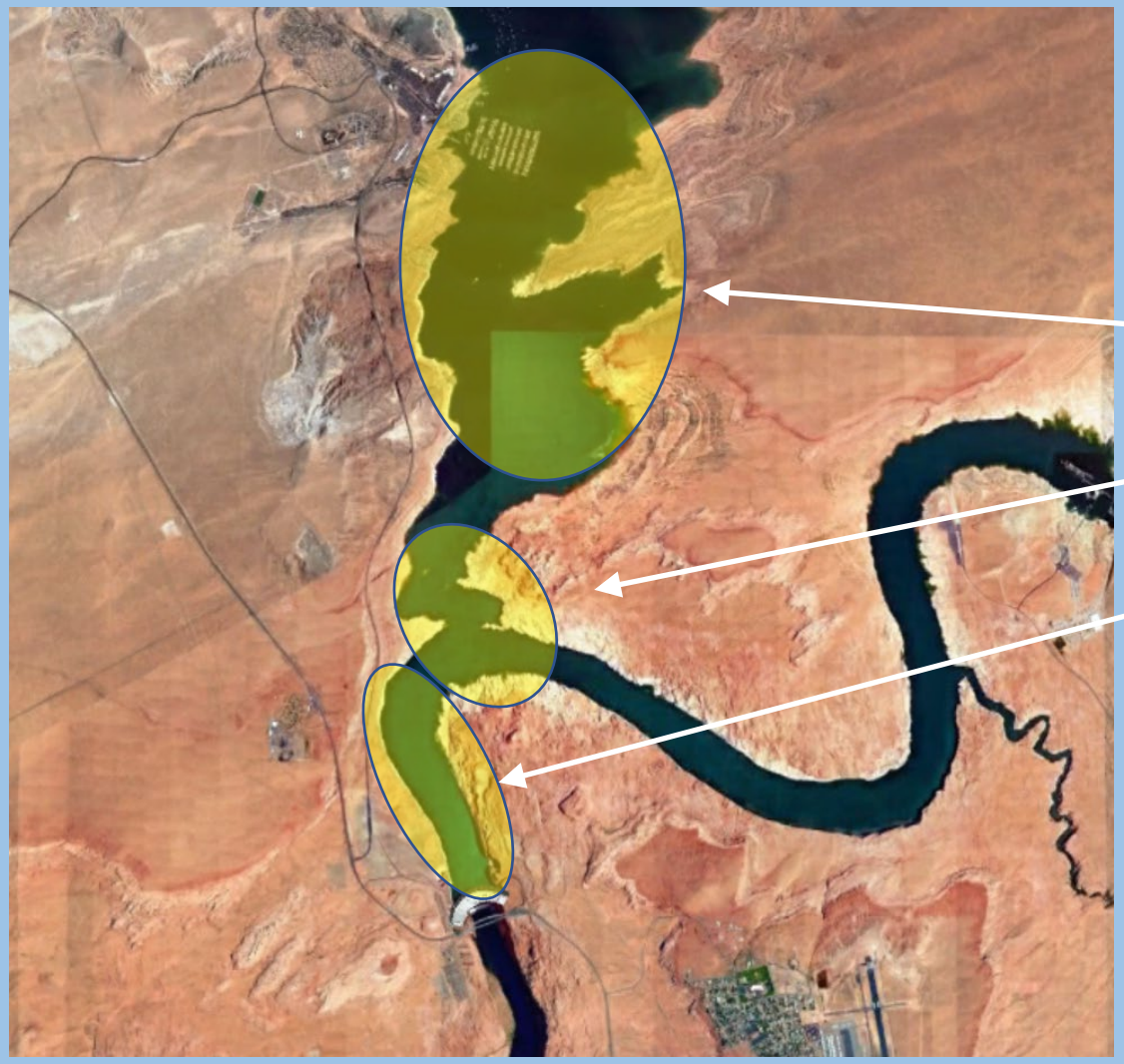
Efforts to date

- November *pilot* sampling

- March and June full sampling
  - Temperature and Oxygen Profile
  - Gill netting
  - Minnow trapping
  - Larval fish tows
  - *BoR TSC = Hydroacoustics*

  - Sensor Fish deployment planning (dam tour)
  - Ultrasonic network planning/permitting

Sample locations



Wahweap

Confluence

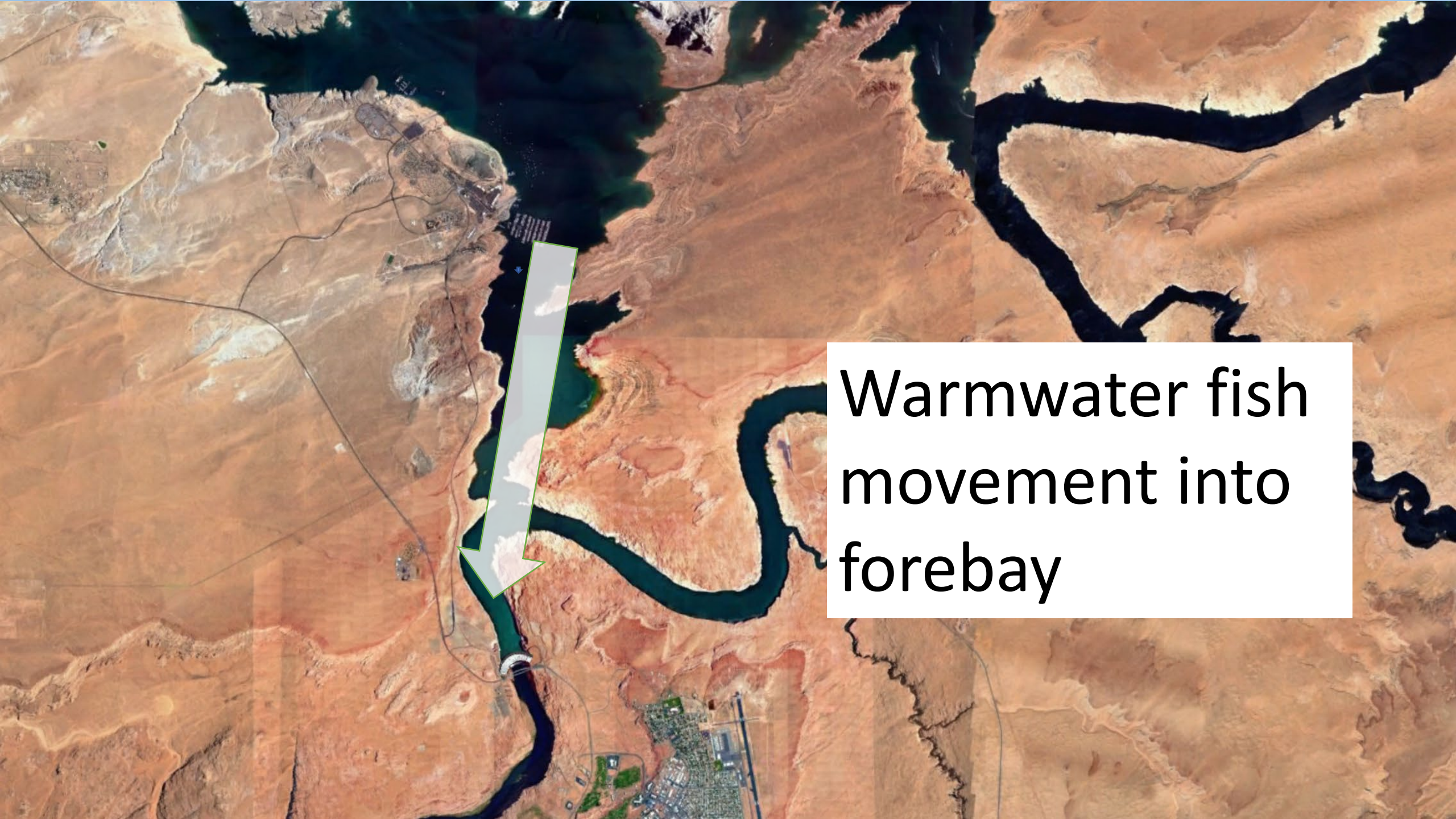
Forebay

Each location sampled
3 times per visit

What's changed since March?

Lake temperature/stratification

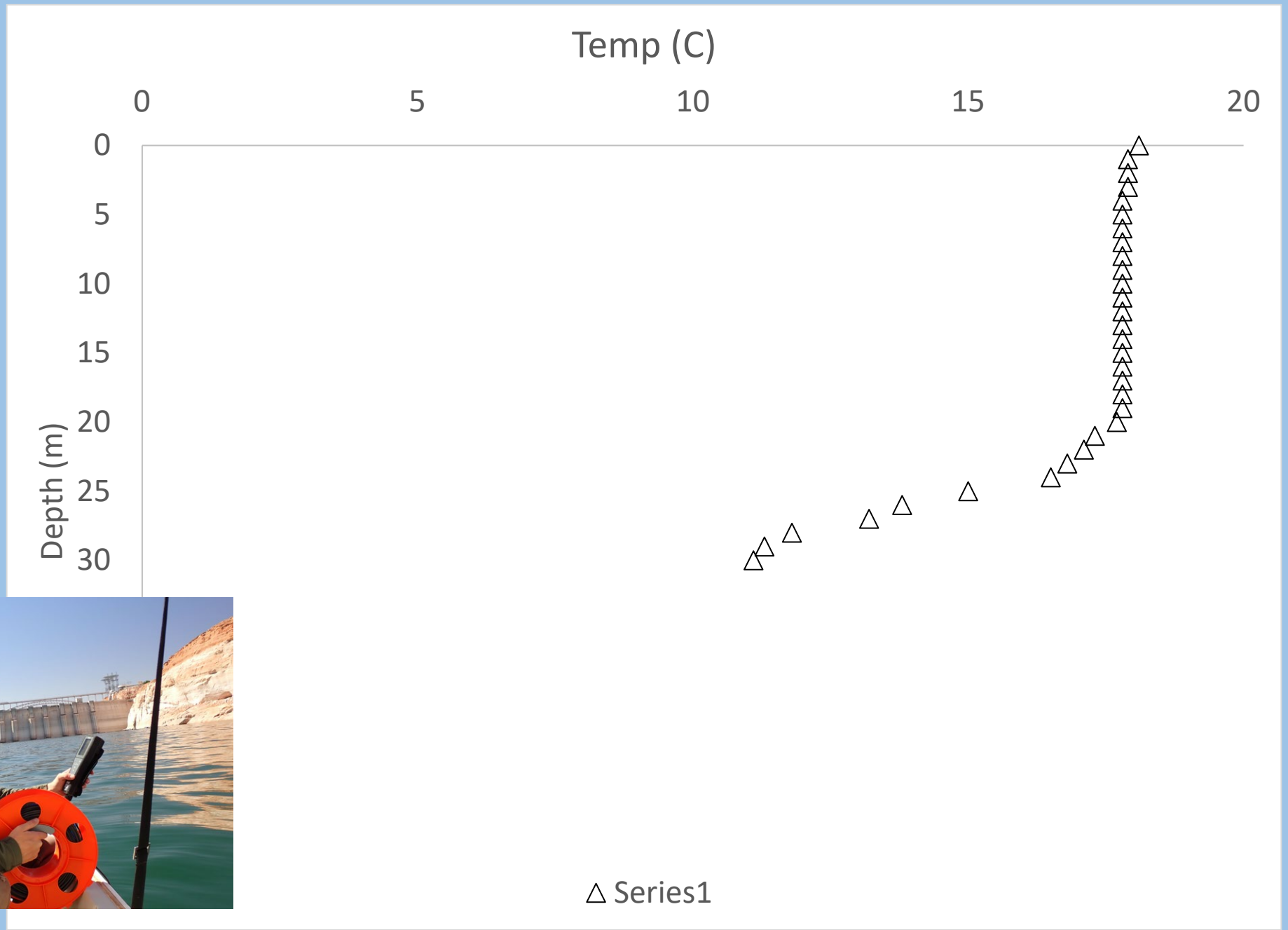
Forebay fish community composition


Warmwater fish movement into forebay

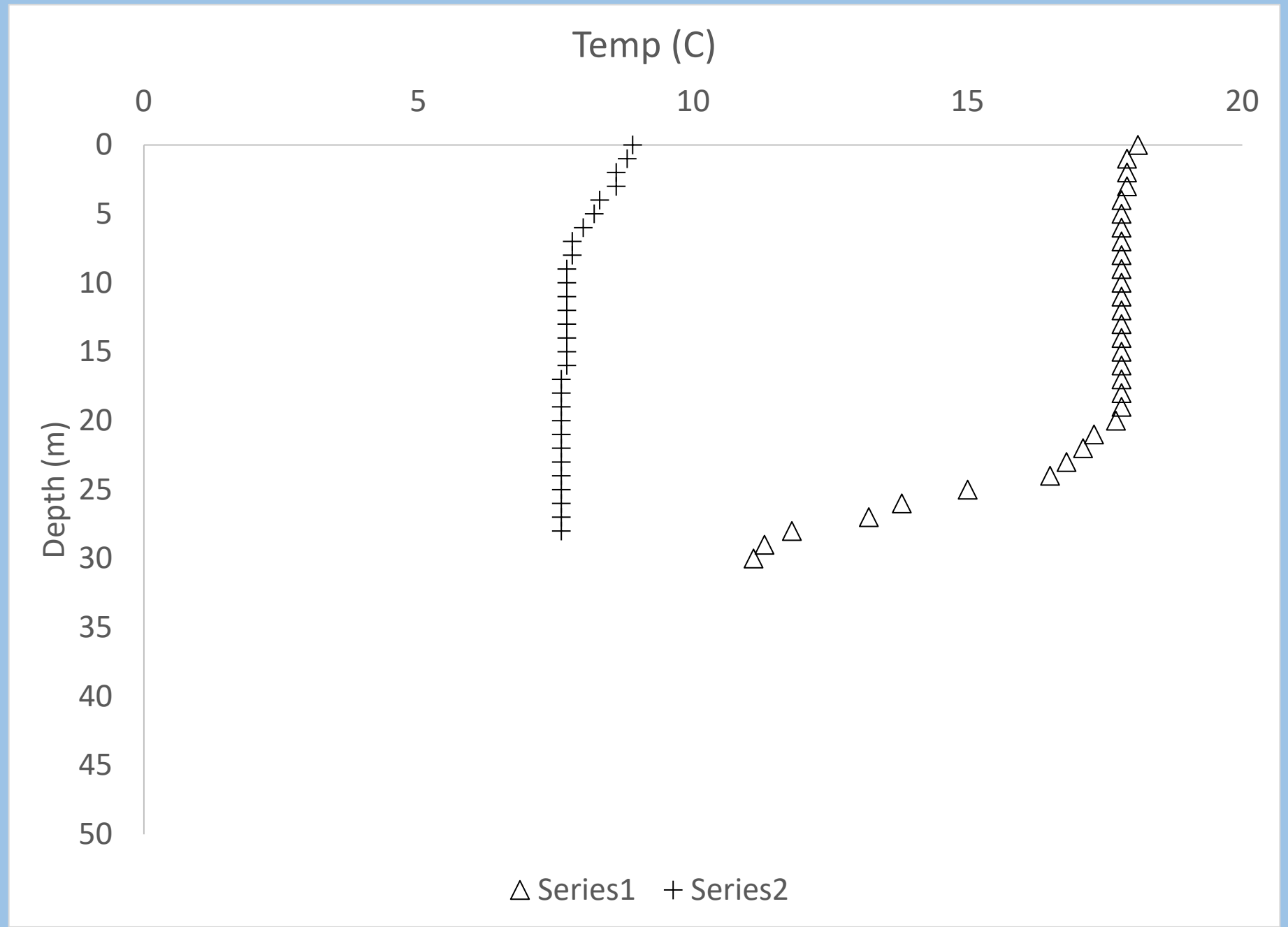
SMB in forebay (shallow)


Carp by trash rack

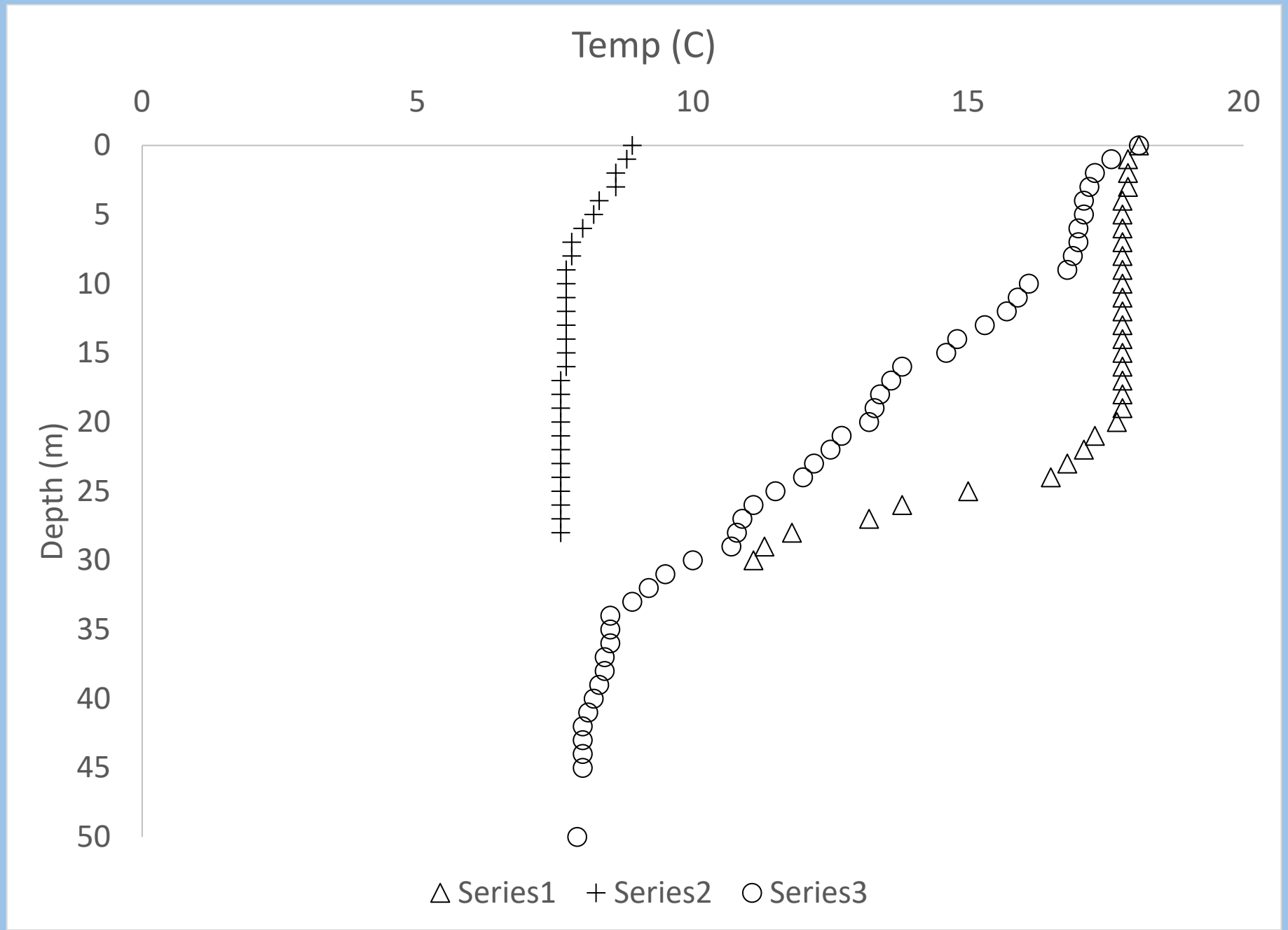
Forebay profile - temp



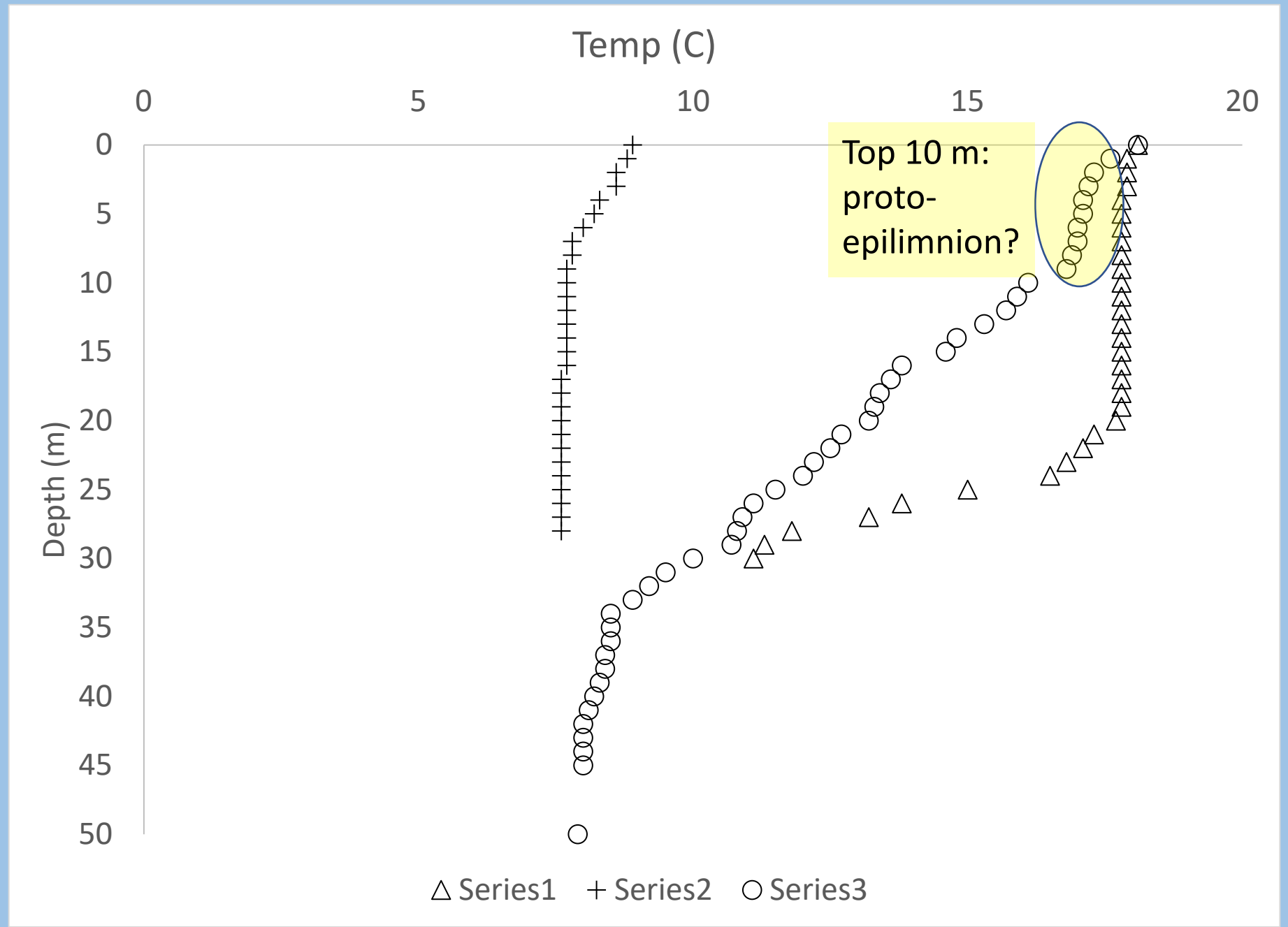
Forebay profile - temp



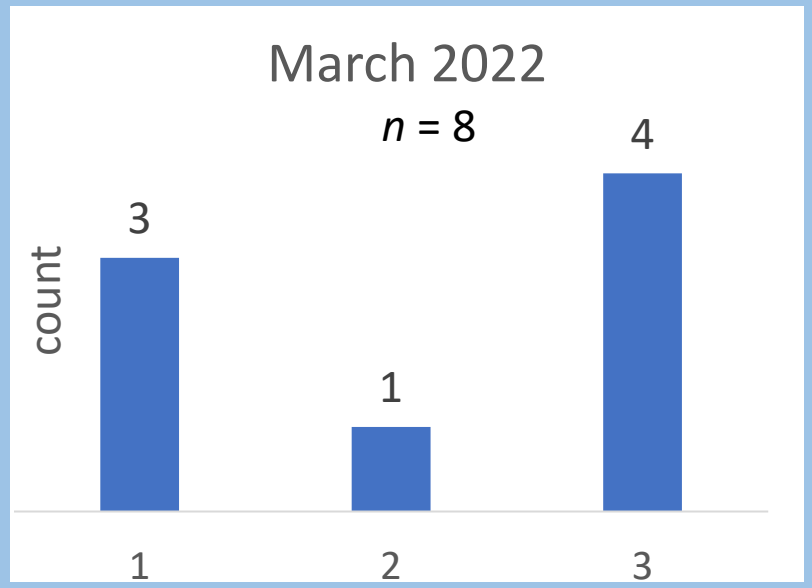
Forebay profile - temp



Forebay profile - temp

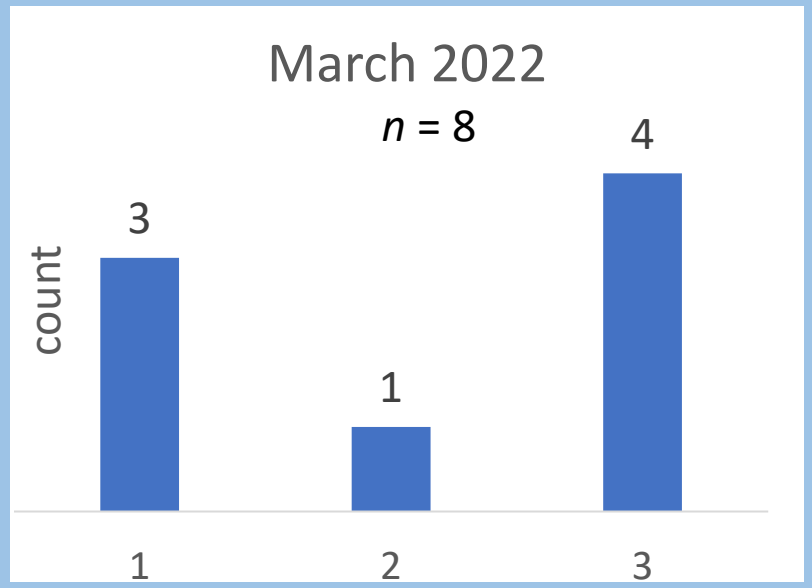


Forebay gillnets – species composition change

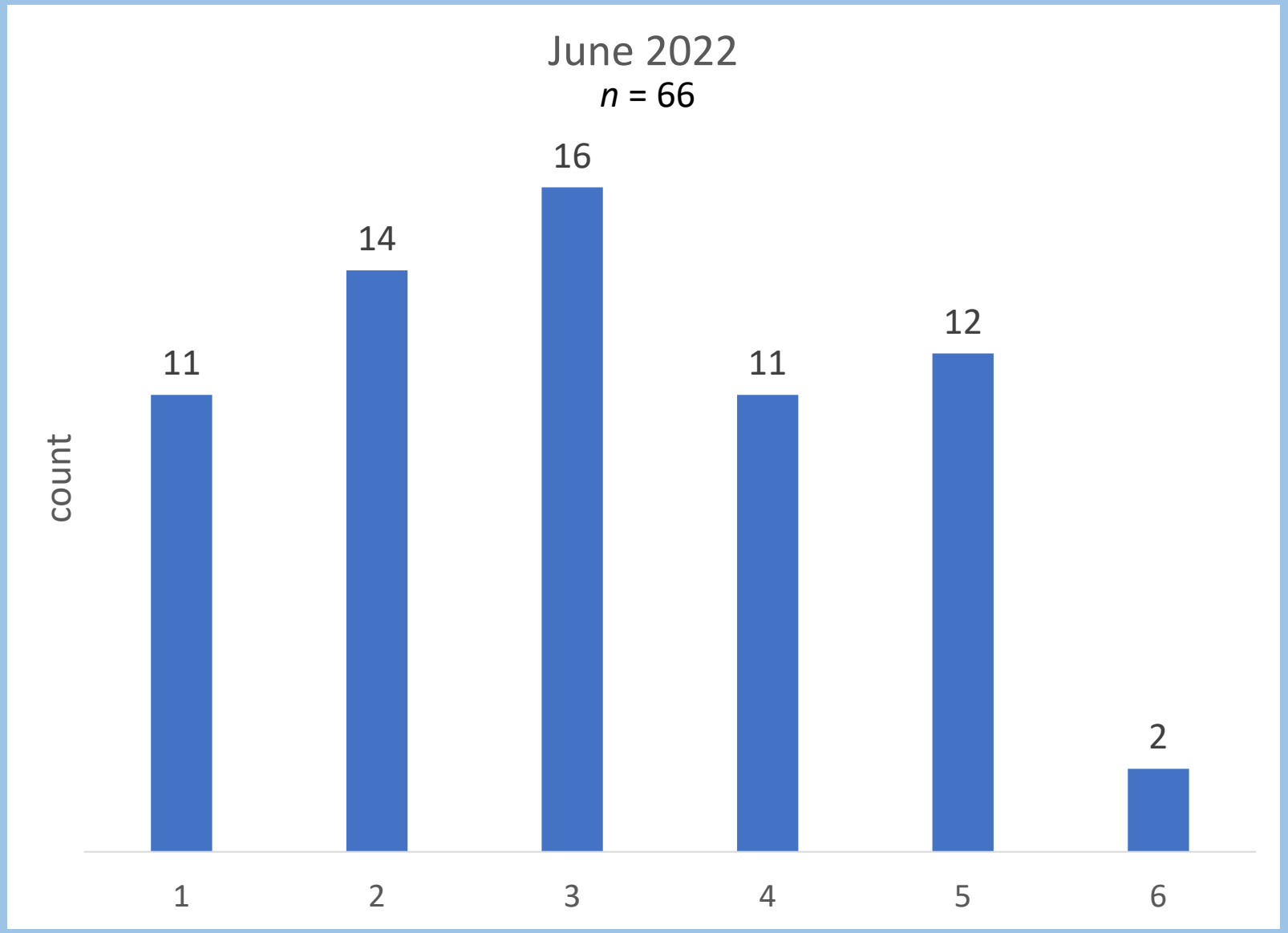


CPUE: 0.021 fish/net hr

Forebay gillnets – species composition change

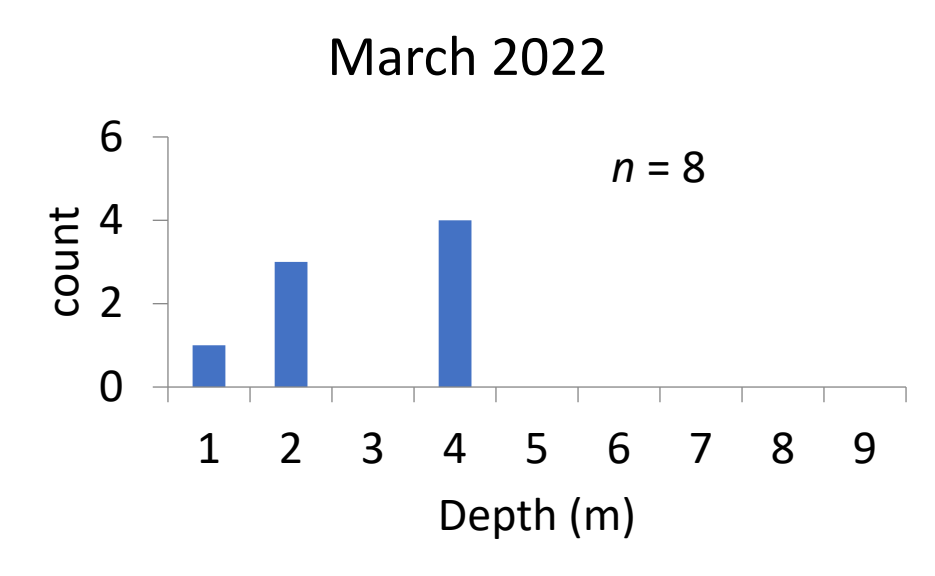


CPUE: 0.021 fish/net hr

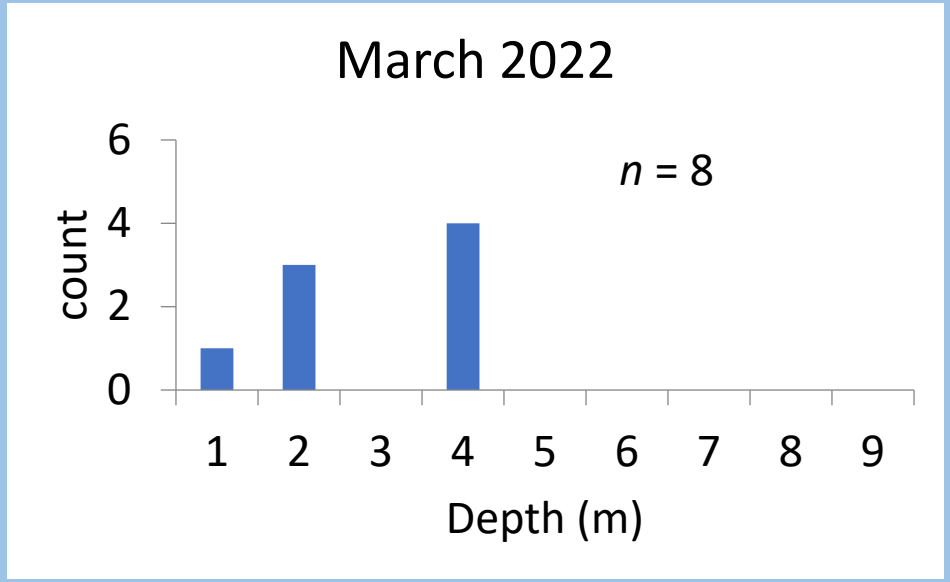


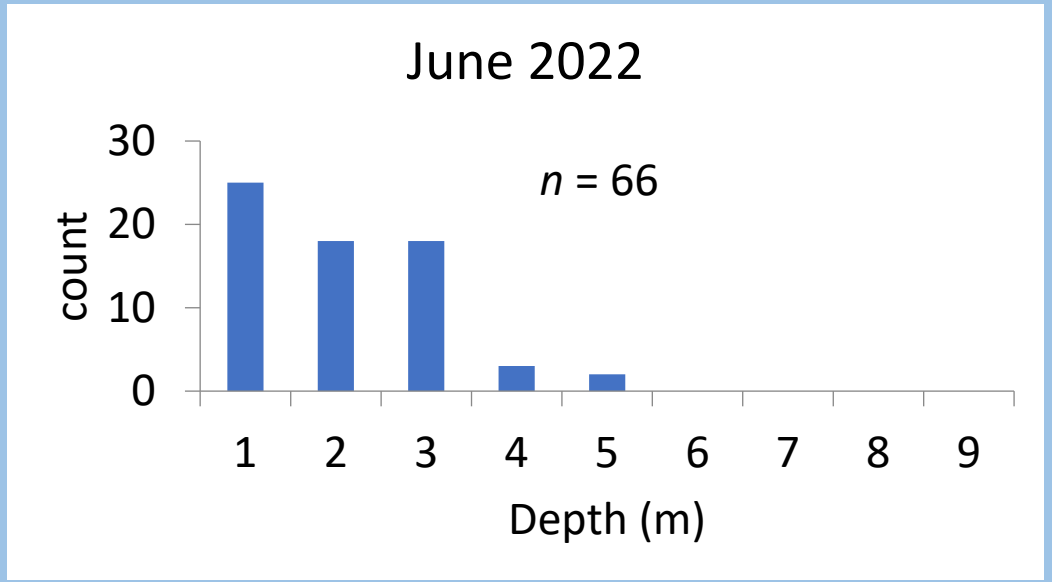
CPUE: 0.156 fish/net hr

Forebay gillnets – how deep are the fish?

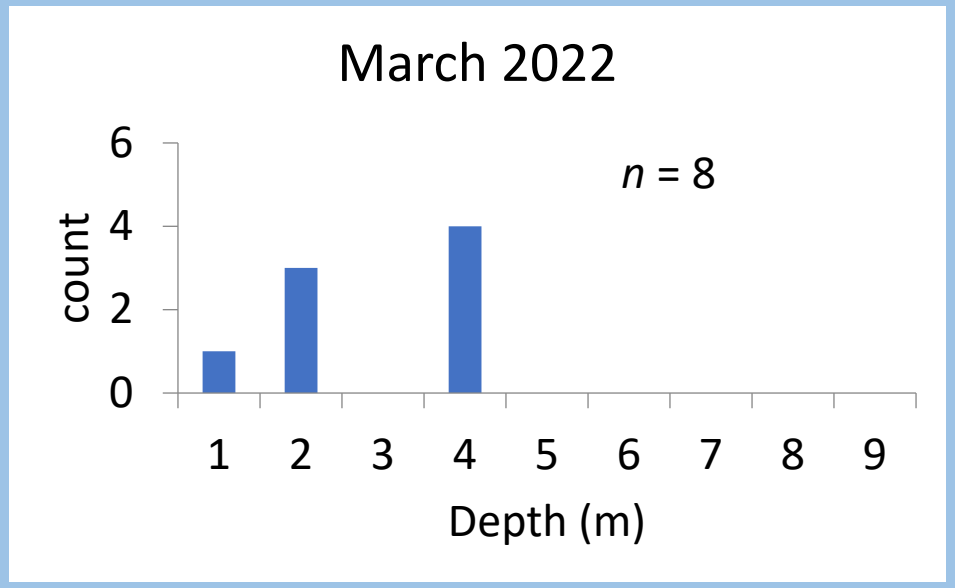


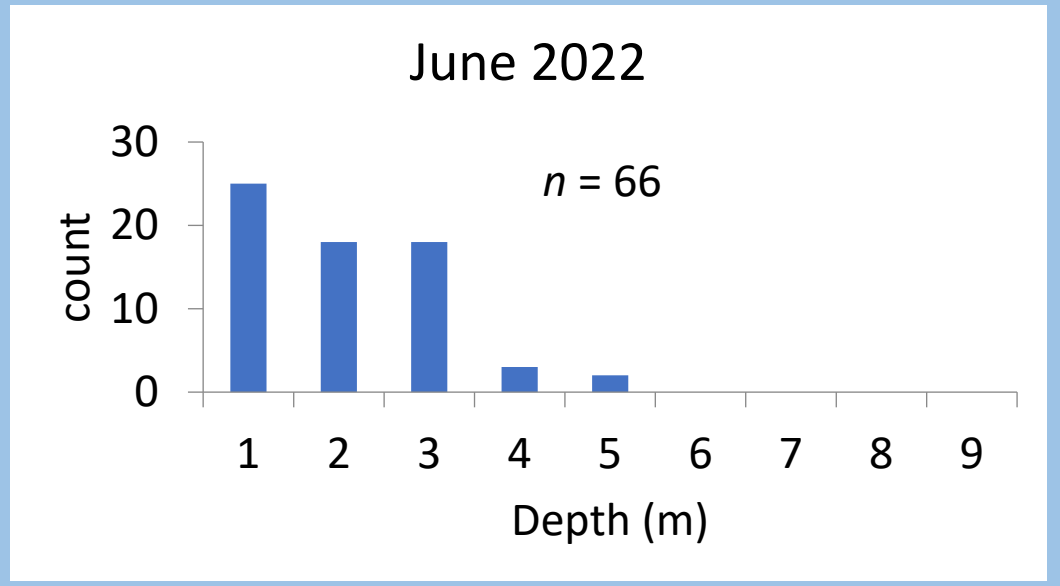
Forebay gillnets – how deep are the fish?

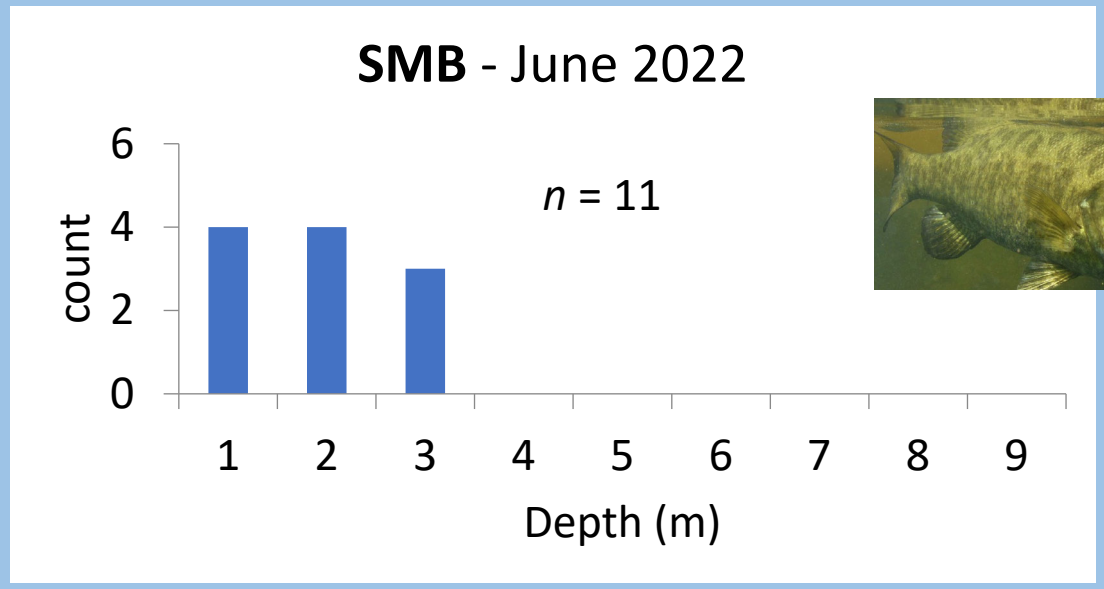




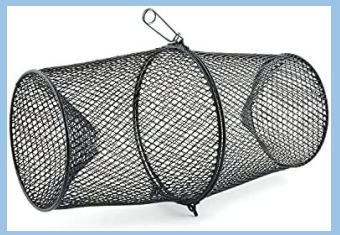
Forebay gillnets – how deep are the fish?

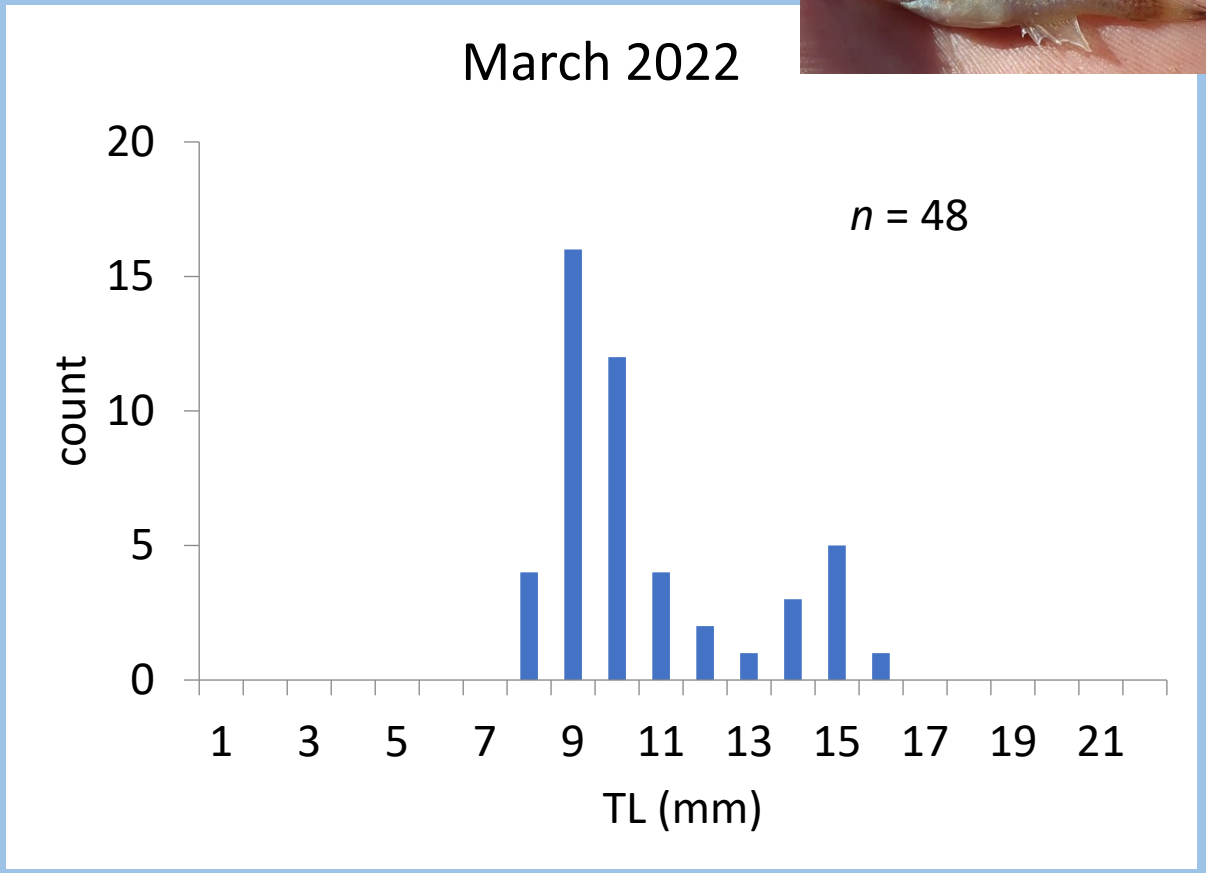






Minnow traps (all GSF)

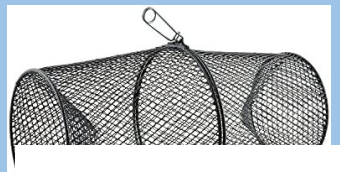


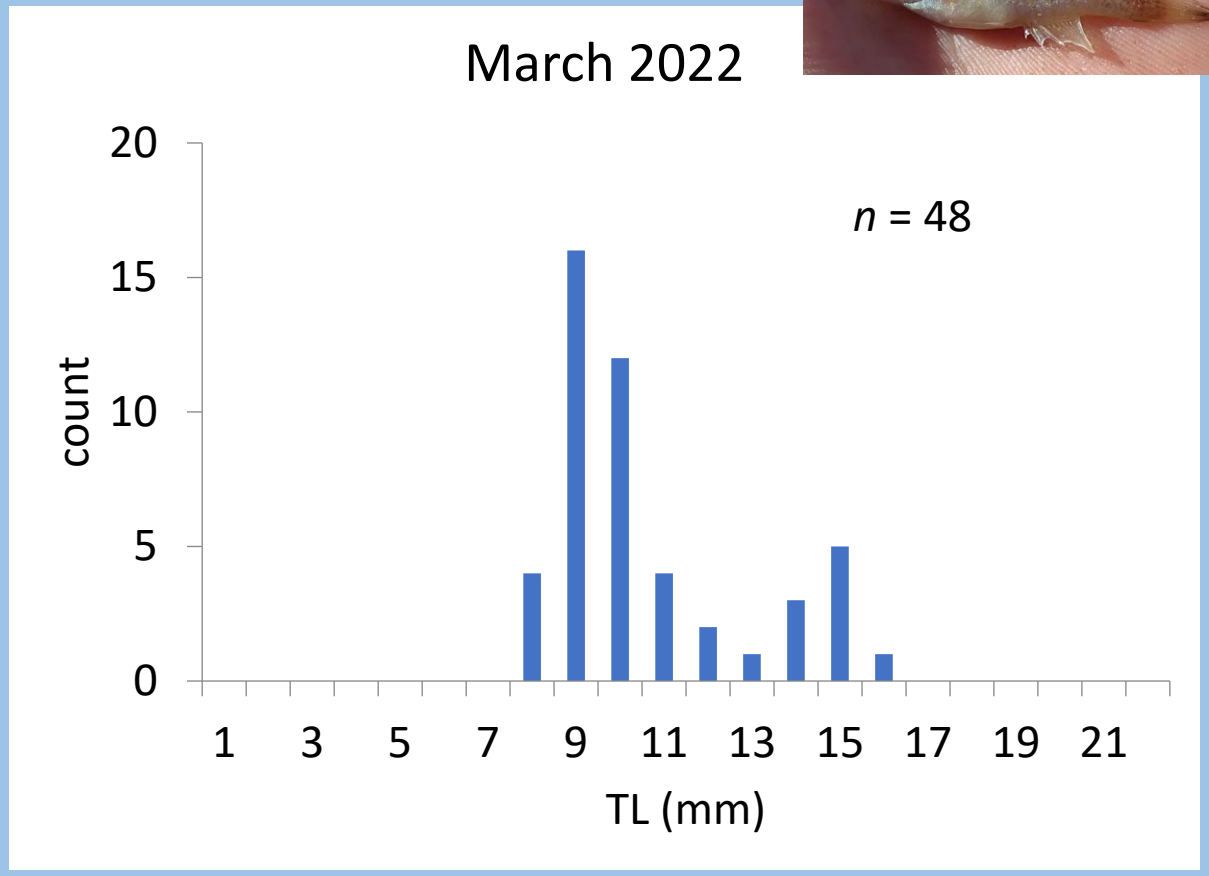


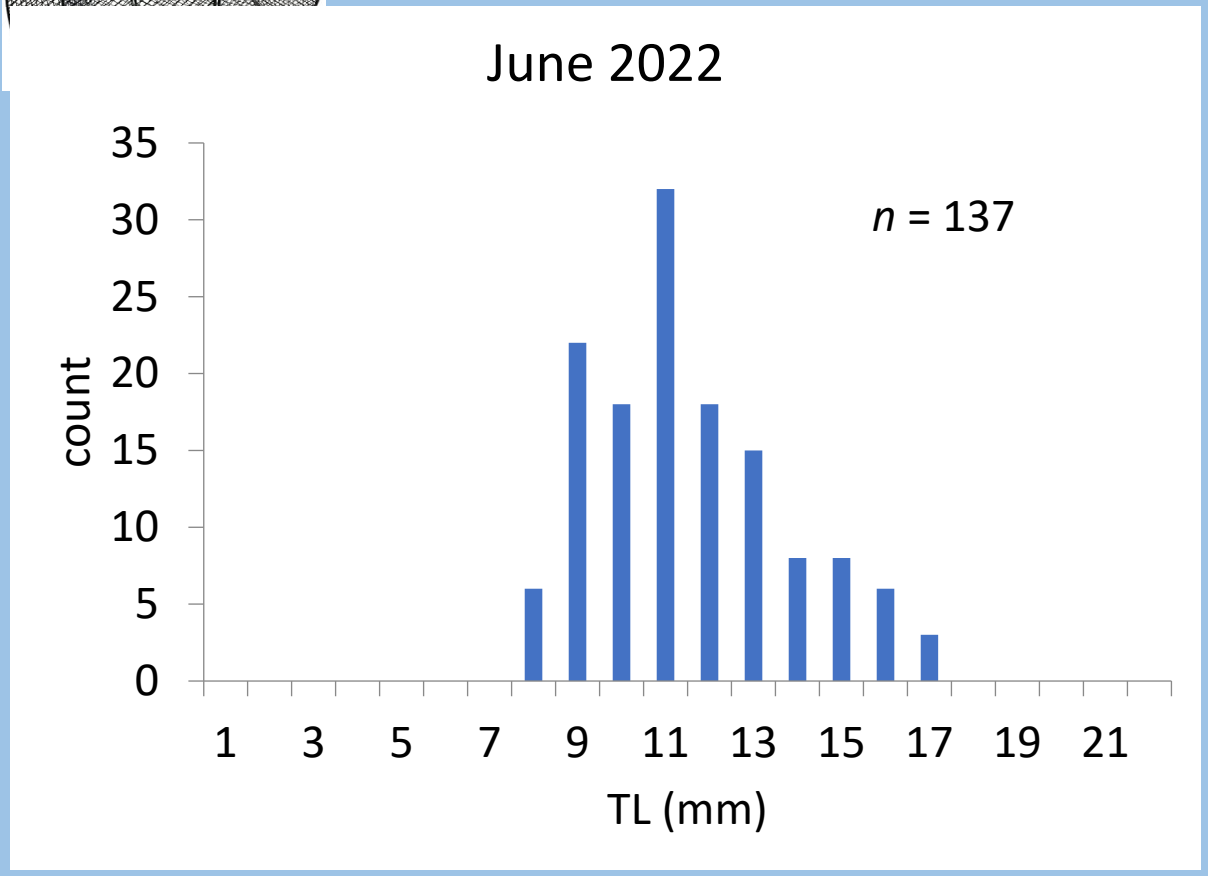
Mean TL: 46 mm

CPUE: 0.026 fish/trap hr

Minnow traps (all GSF)







Mean TL: 46 mm

CPUE: 0.026 fish/trap hr

Mean TL: 51 mm

CPUE: 0.063 fish/trap hr

Next steps

- Next full sample August & Autumn

- Ultrasonic telemetry August
  - Transmitters and receiver network
  - Depths
  - Movement

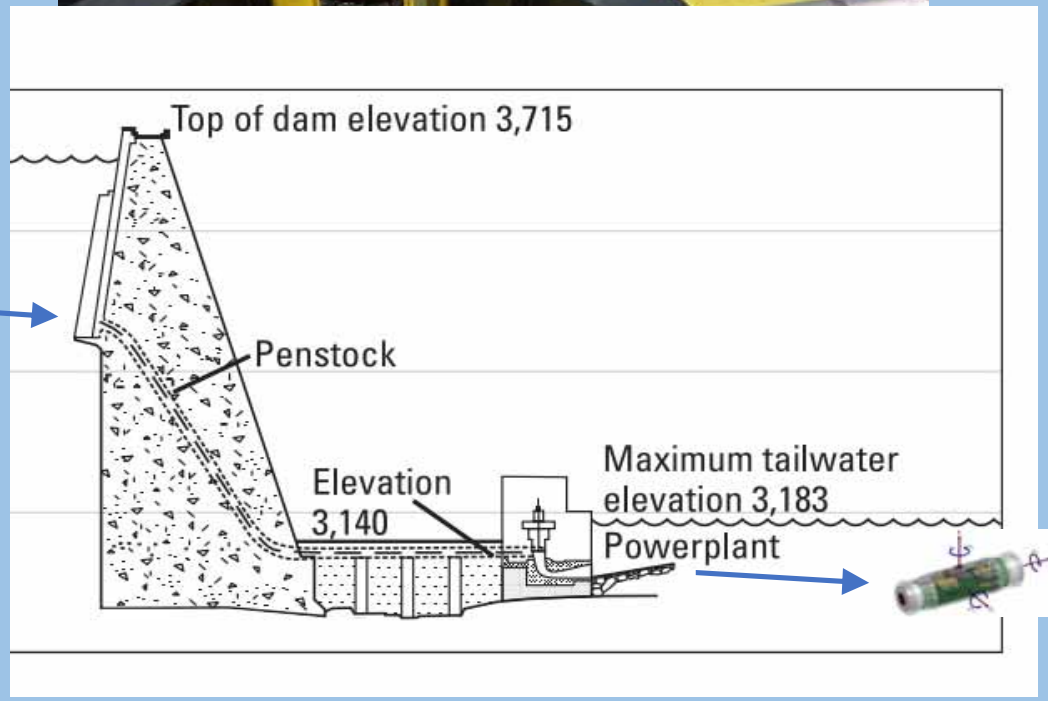
Next steps

Likelihood of fish dam passage survival?

- Sensor Fish instruments August & Autumn
- Varying wicket gate opening
- Varying pressure head

Sensor Fish

90 mm



Temperature
Pressure
Gyroscope (orientation)
Tri-axial accelerometer (change in acceleration)

Acknowledgments

Bureau of Reclamation

- Clarence Fullard
- Kerri Pedersen
- Mike Horn
- Mark McKinstry
- Kato Miyagishima

Utah State University

Glen Canyon Recreation Area

- Jeff Arnold

U.S. Geological Survey