



OARS

# NASHOBA BROOK AND WARNER'S POND

OARS Data for Warner's Pond Task Force

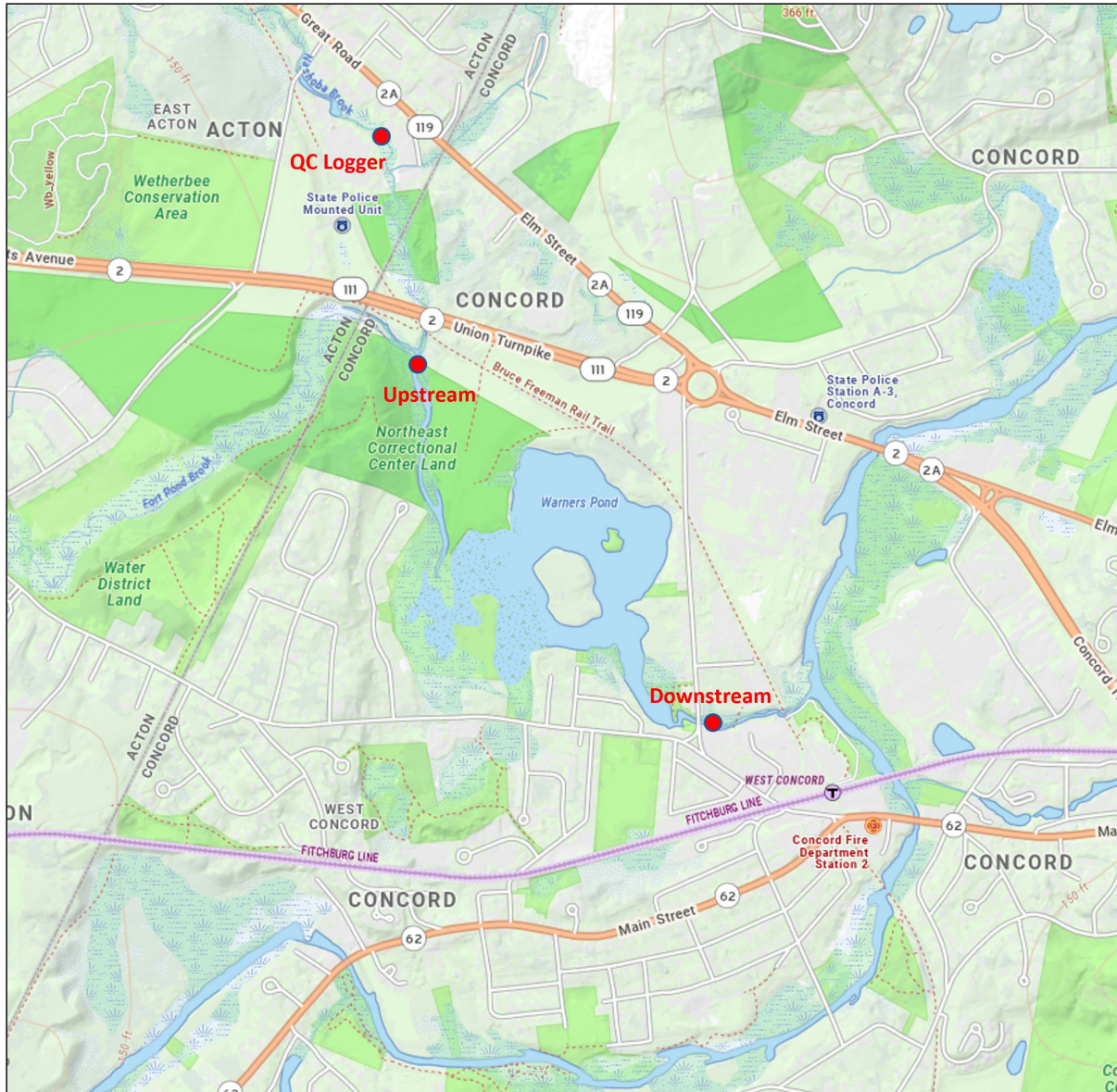
# TOPICS

- Water Temperature
- Water Quality
  - Dissolved Oxygen, pH, Nutrients
- Geography of Dams

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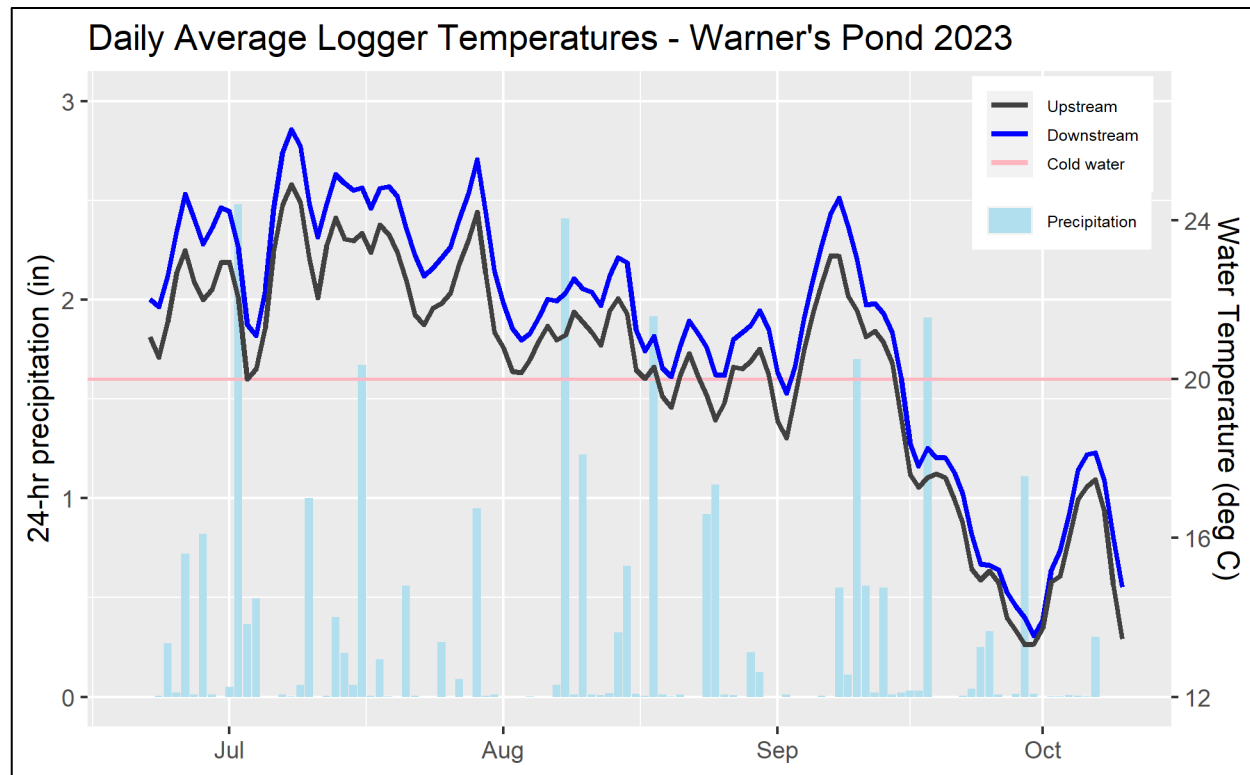
WATERSHED ORGANIZATION FOR THE SUDBURY ASSABET AND CONCORD RIVERS

# WARNER'S TEMPERATURE STUDY



- Summer of 2023
- Deployed temperature loggers upstream and downstream of Warner's Pond
- Objective: to measure the change in temperature resulting from the wide shallow pond impoundment
- Temperature is a stressor for aquatic organisms

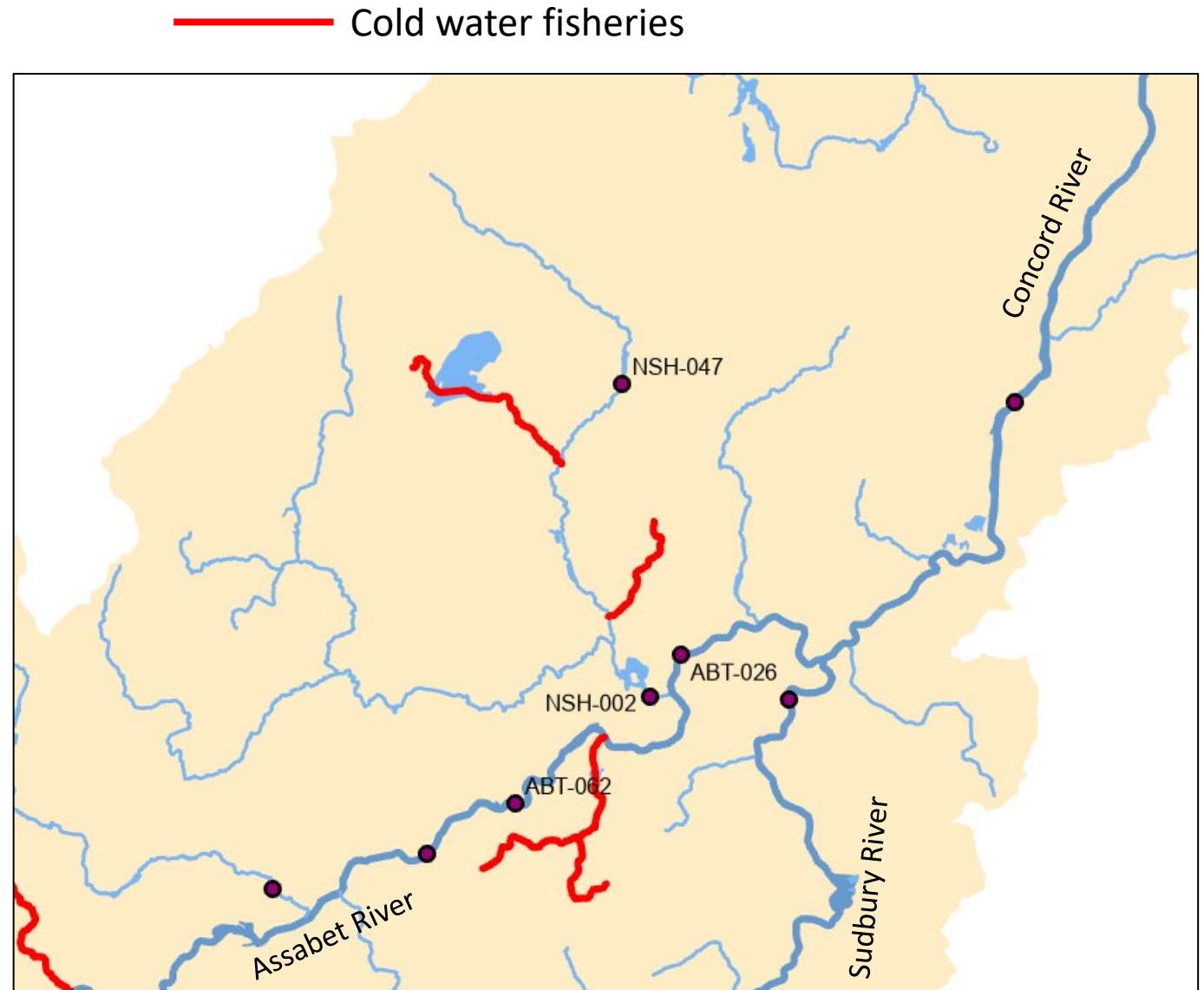
# WARNER'S TEMPERATURE STUDY



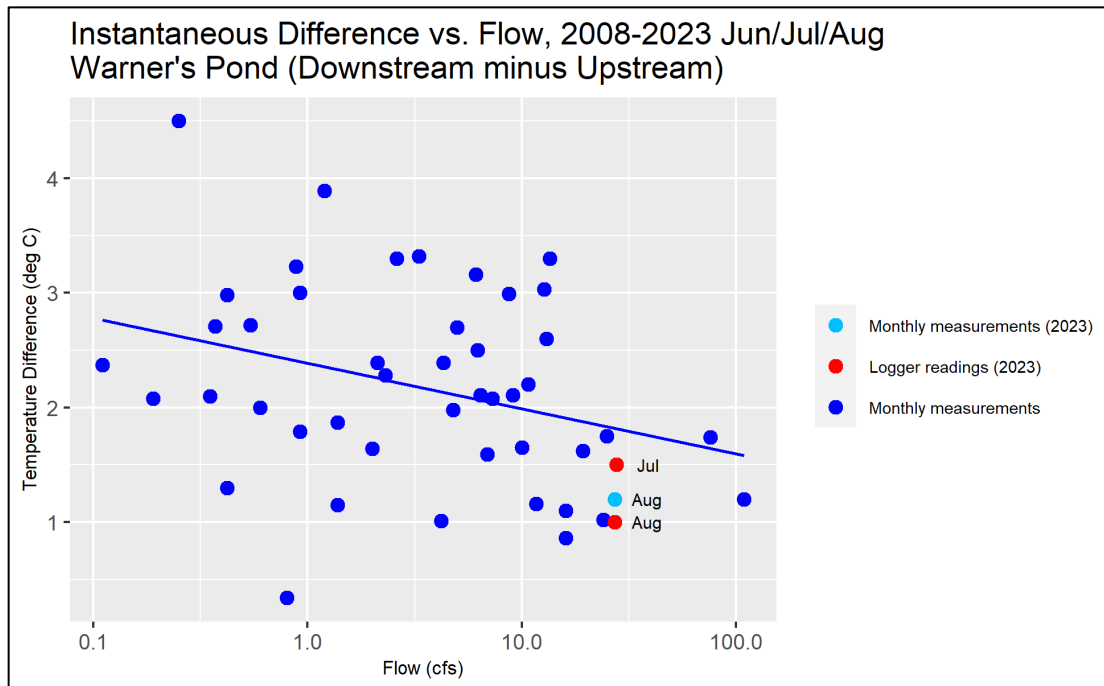
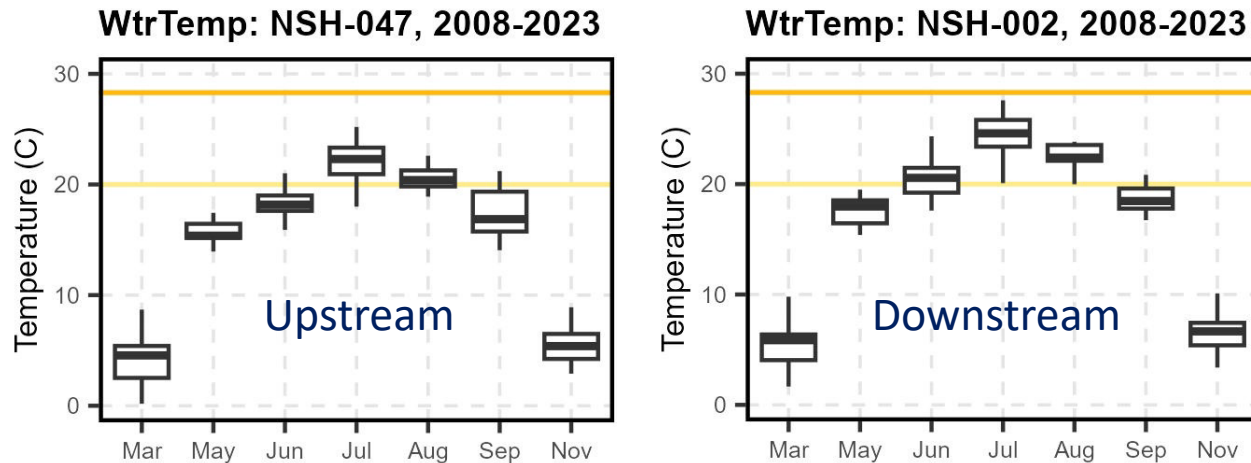
- Study confirmed a consistent temperature increase of about 1°C
  - Median Difference – 0.9°C / 1.6°F
- July temperature range 20-25 °C (68-77 °F)
- Mass DEP Recommended Maximums (mean of 7-day daily maximum):
  - Warm Water
    - 28.3°C / 83°F
  - Cold Water
    - 23.9°C / 75°F (Brown Trout)
    - 20.0°C / 68°F (Brook Trout)
- 1°C increase is significant when stream temps close to thresholds
- Expect increase to be greater during drier summers

# LONG-TERM MONITORING

- OARS conducts monthly water quality sampling at 25 sites throughout the watershed
  - NSH-002 Commonwealth Ave bridge
  - NSH-047 Wheeler Lane (4.5 miles upstream)
- Designated cold water fisheries
  - Nagog Brook
  - Unnamed Brook
  - Second Division Brook



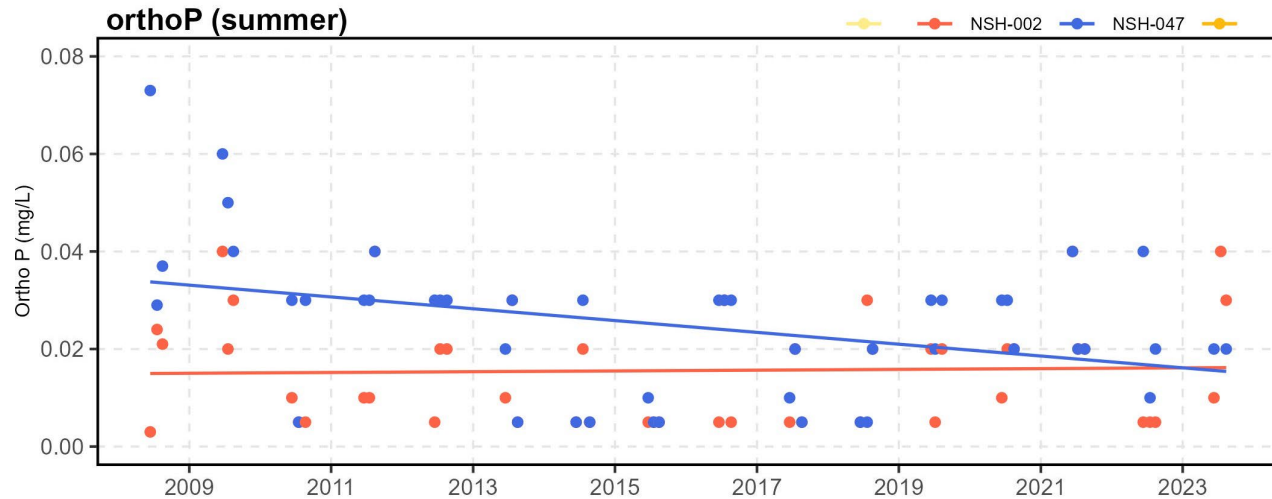
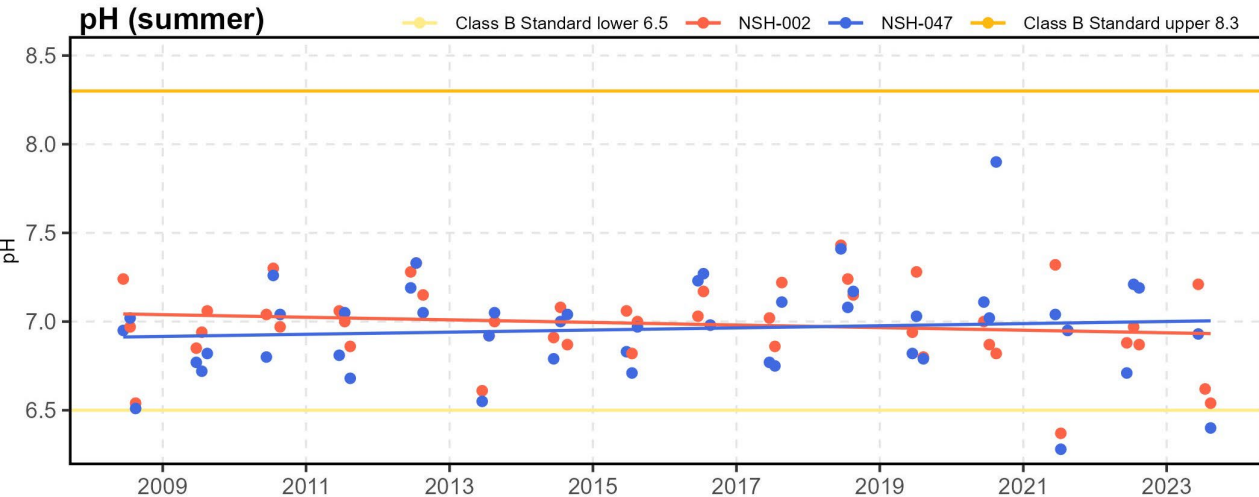
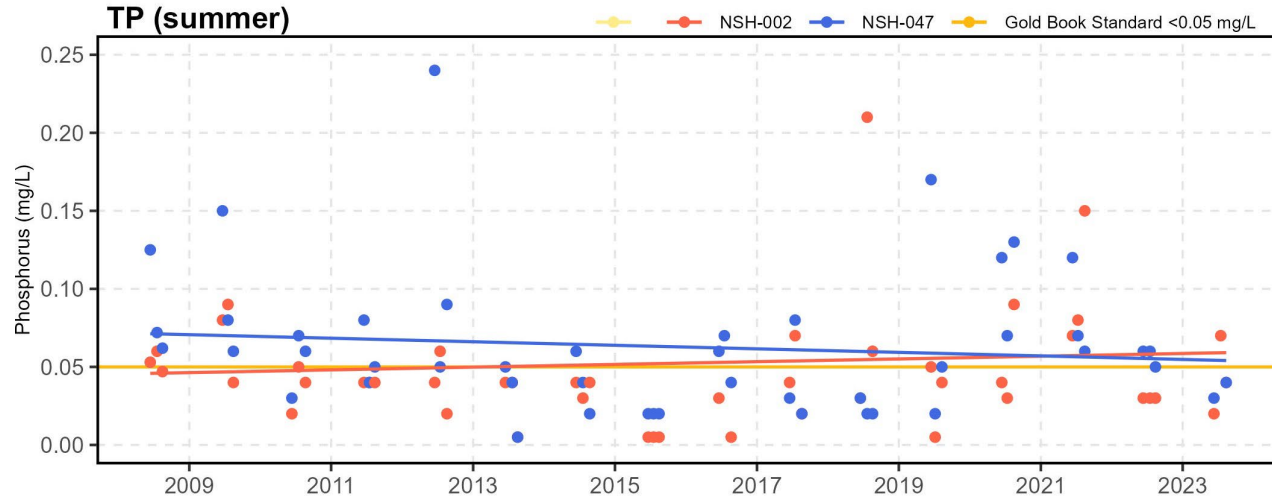
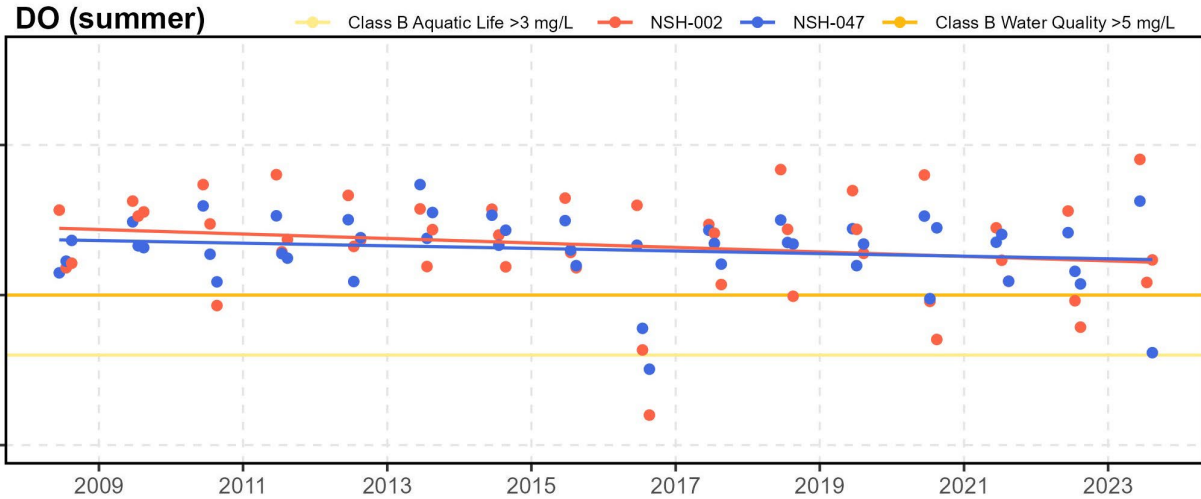
# UPSTREAM/DOWNSTREAM TEMP



- Monthly monitoring since 2008 at...
  - Wheeler Lane
  - Commonwealth Ave
- Upstream almost achieves brook trout standards
- Summer upstream/downstream difference ranges from 1°C to 3.5°C (1.8-6.3°F).
- Lower flows result in higher temperature differences.
- 2023 study was done during the wettest year in more than 20 years.

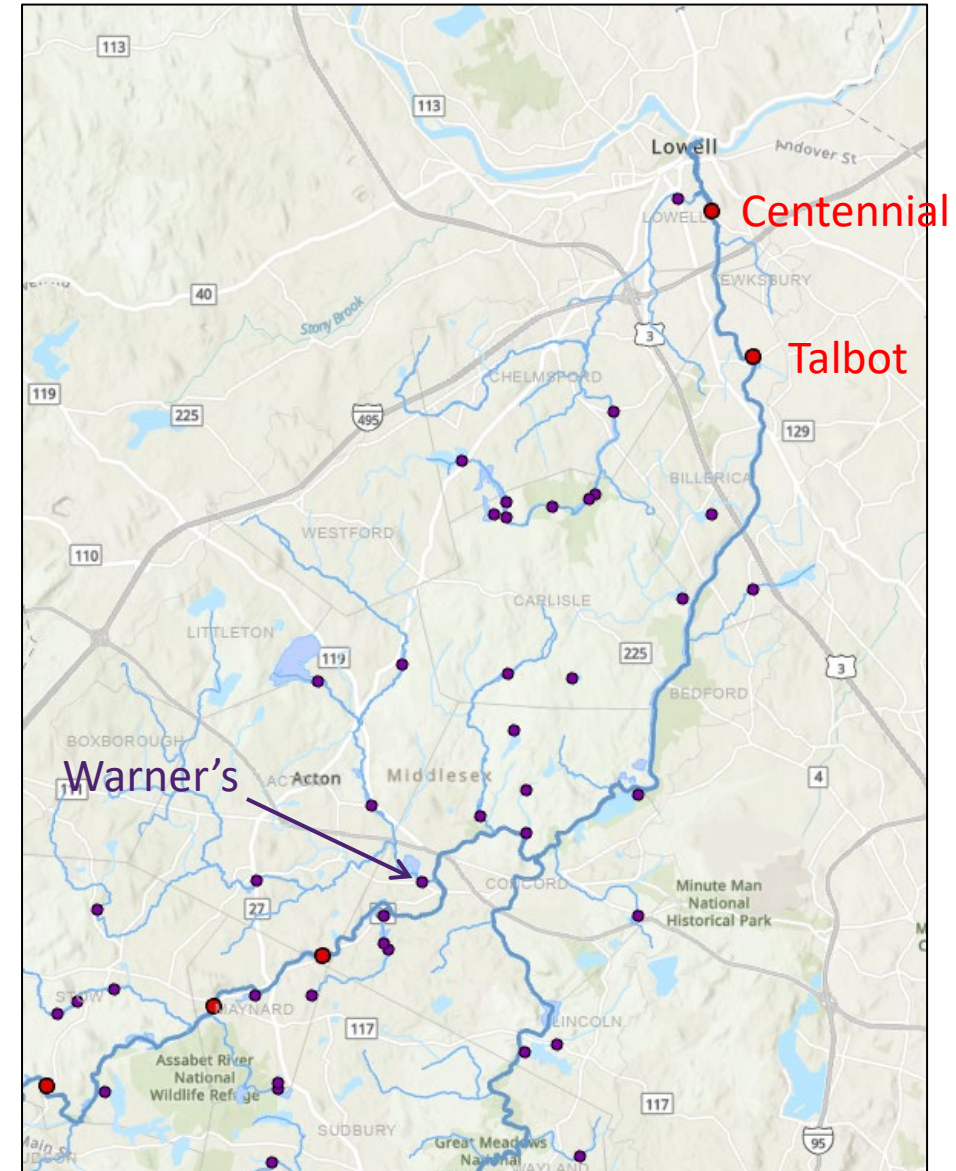
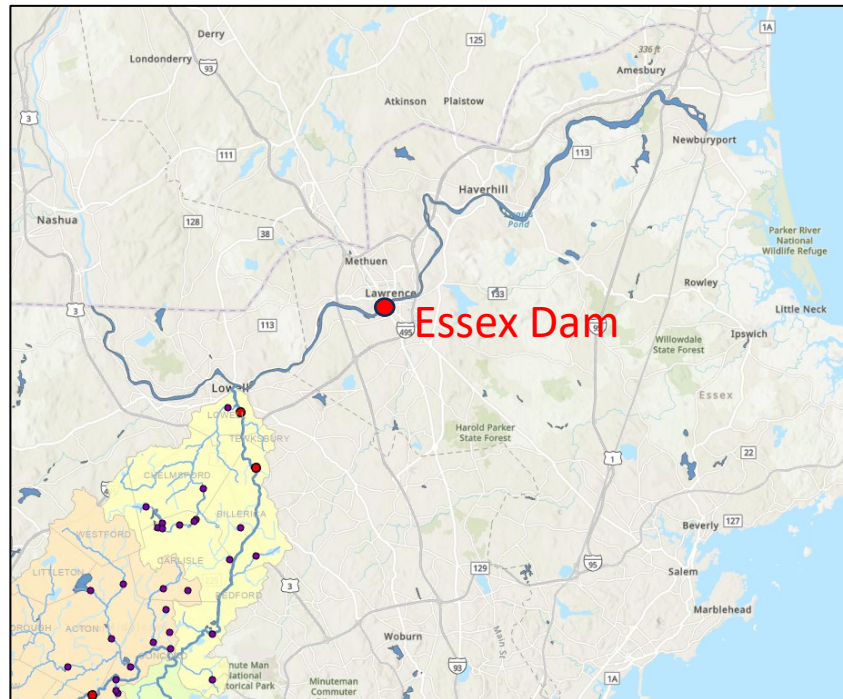
# EUTROPHICATION TRENDS

All water quality indicators are trending more toward eutrophication below Warner's Pond



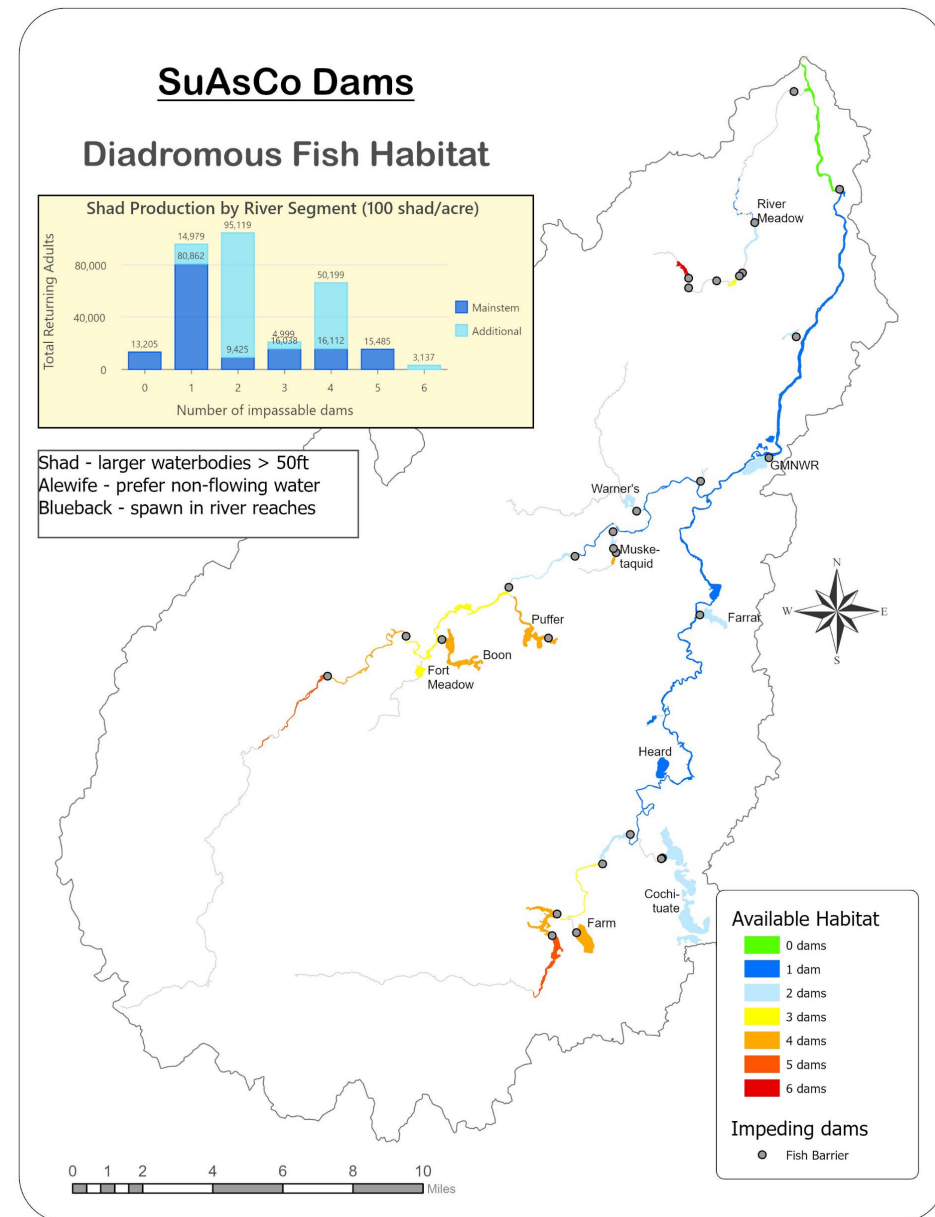
# DAMS DOWNSTREAM/UPSTREAM

- Downstream:
  - Essex Dam (fish elevator, hydro)
  - Centennial Island (fish ladder, hydro)
  - Talbot Mills (being removed)
- Upstream: Allen Dam, Erikson Dam
  - River Street Dam removed in 2023



# DIADROMOUS FISH HABITAT

- Shad and Blueback spawn in large waterbodies and rivers
- Alewife prefer non-flowing water for spawning
- Potential Alewife habitats:
  - Warner's
  - GMNWR
  - Farrar
  - Cochituate
- Talbot Dam removal – opens 35 miles of mainstem river
  - But most tributaries are blocked
- Warner's Dam removal – would open 5 miles of tributary habitat





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# THANK YOU

Questions?

# RIVER STREET DAM, ACTON

- River Street Dam removed August 2023



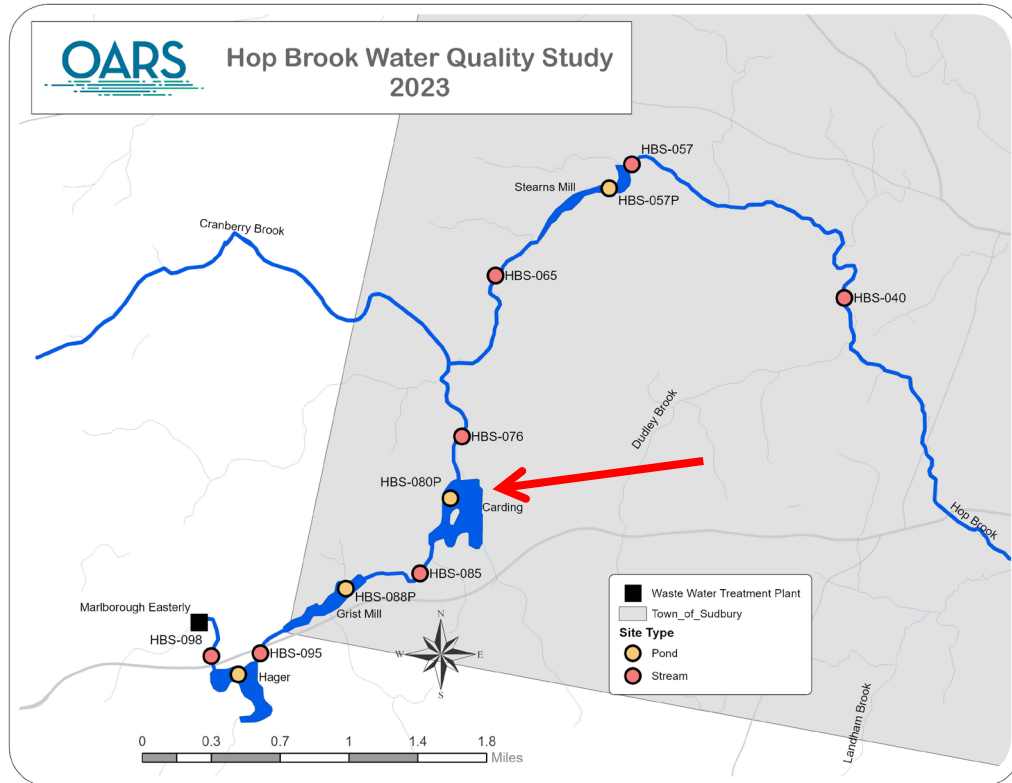
Before



After

# CARDING MILL POND

- Carding Mill Pond in Hop Brook is example of advanced eutrophic state



# ROCK RAMPS

- Rock Ramps can maintain water level while allowing fish passage
- Won't necessarily solve water quality issues

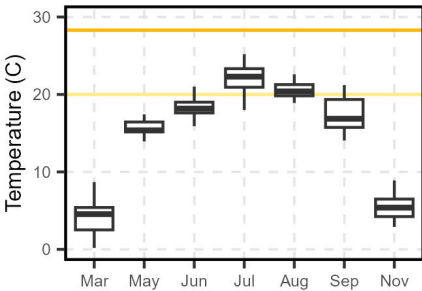


Bradford Dam, Pawcatuck River

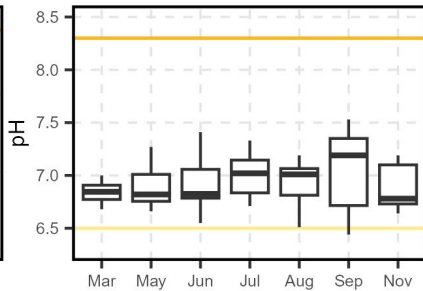
# WATER QUALITY MONTHLY

## Upstream

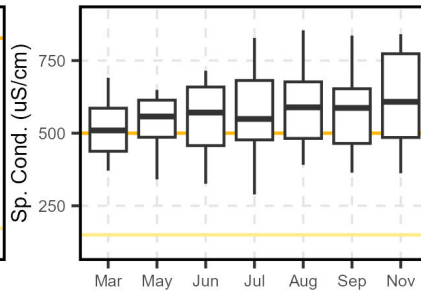
WtrTemp: NSH-047, 2008-2023



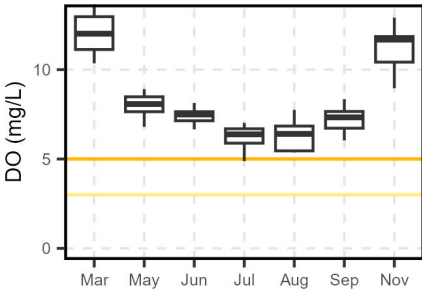
pH: NSH-047, 2008-2023



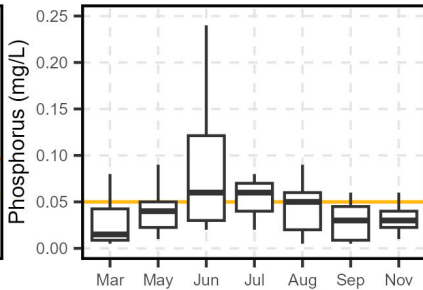
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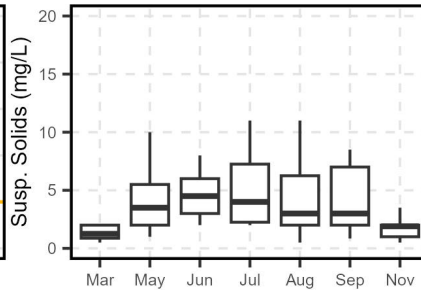
DOConc: NSH-047, 2008-2023



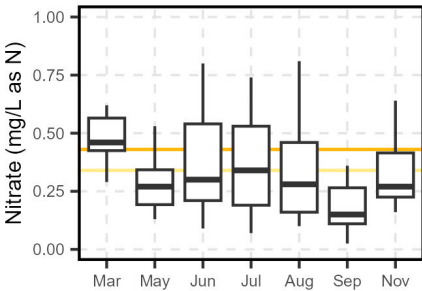
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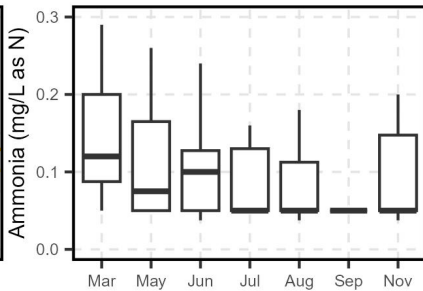
TSS: NSH-047, 2008-2023



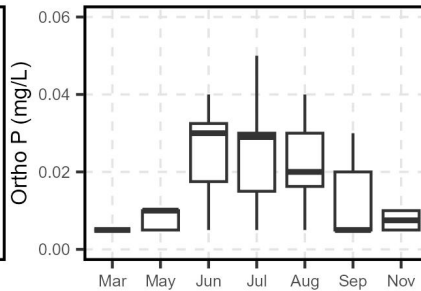
NO3: NSH-047, 2008-2023



NH3: NSH-047, 2008-2023

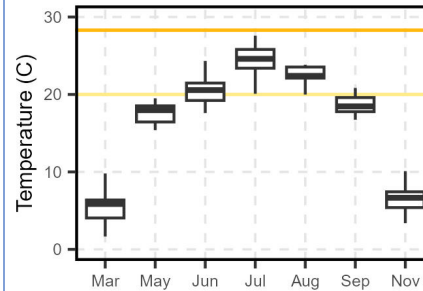


orthoP: NSH-047, 2008-2023

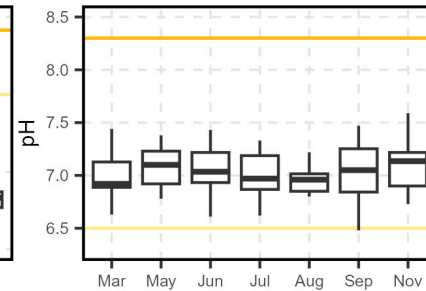


## Downstream

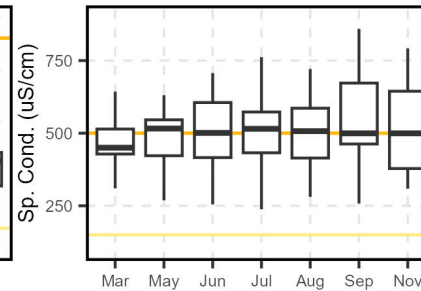
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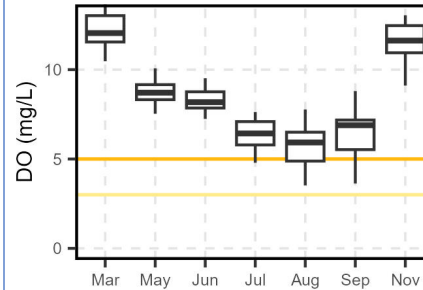
pH: NSH-002, 2008-2023



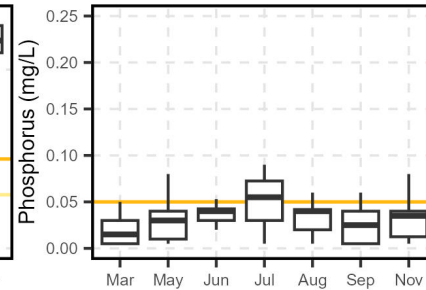
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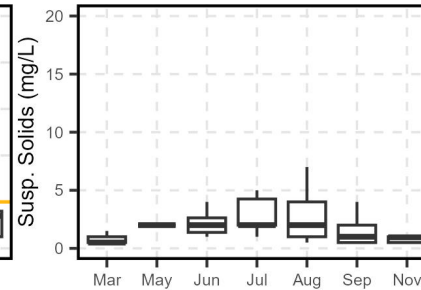
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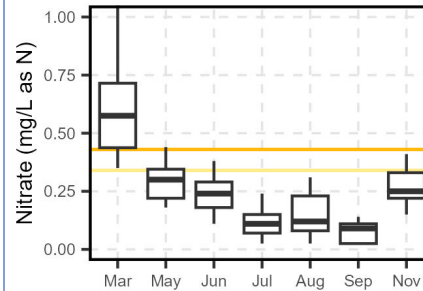
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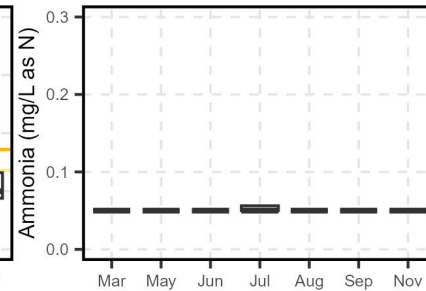
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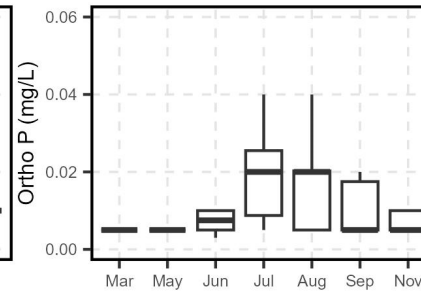
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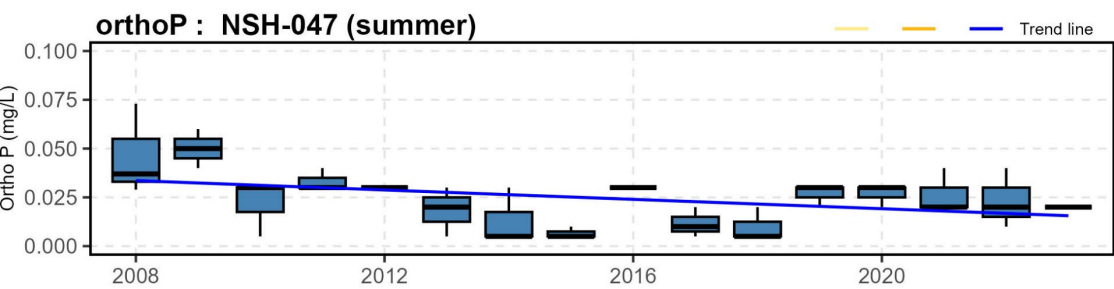
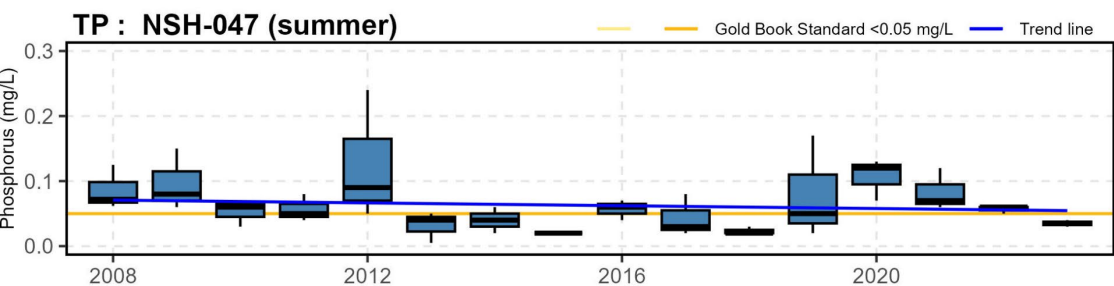
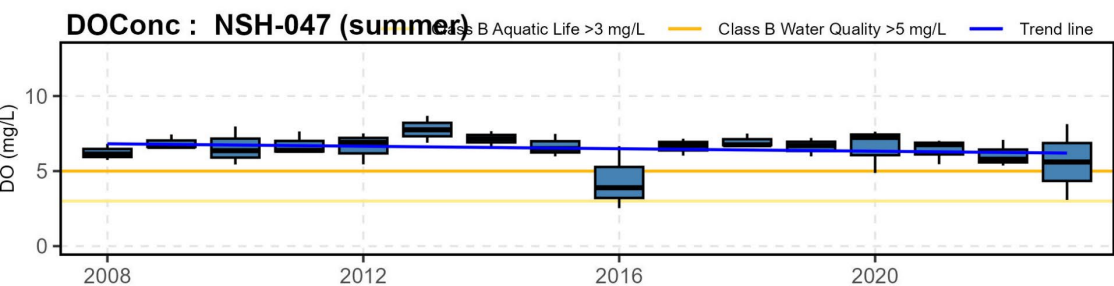
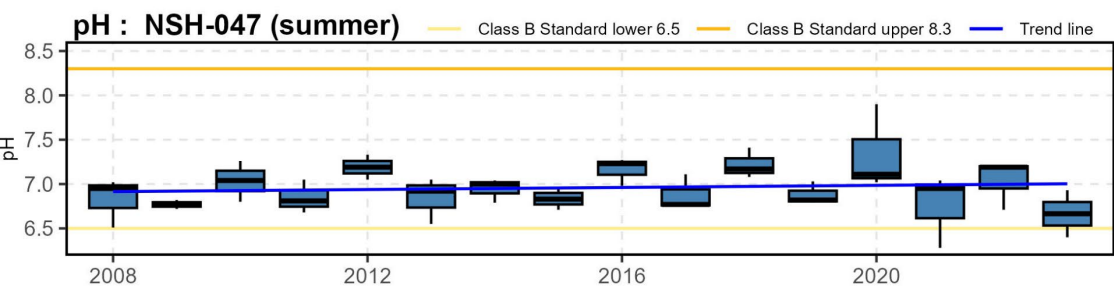
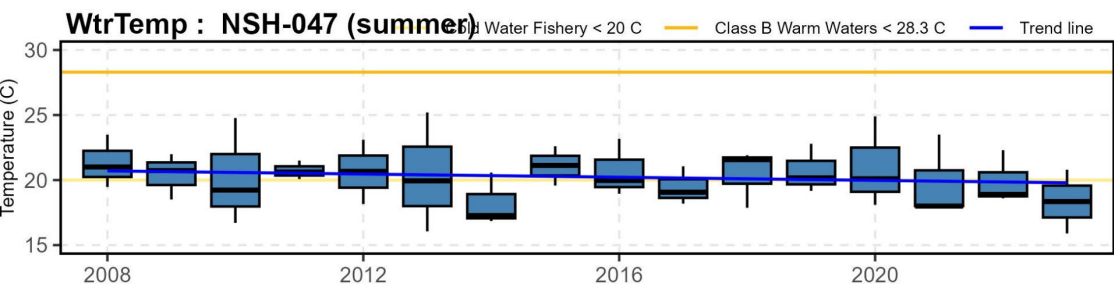


NH3: NSH-002, 2008-2023

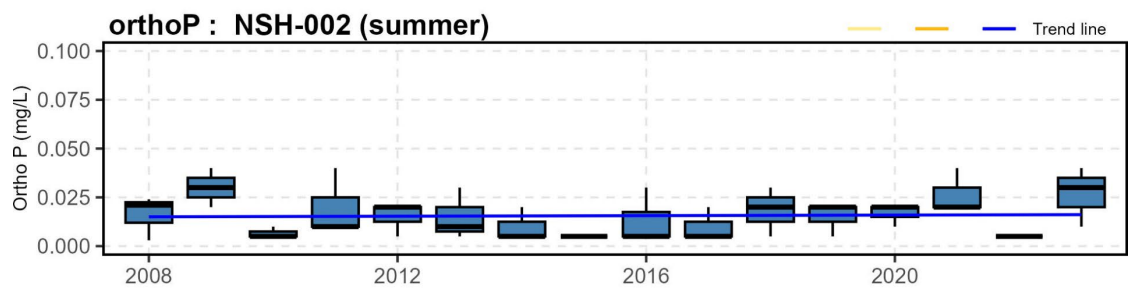
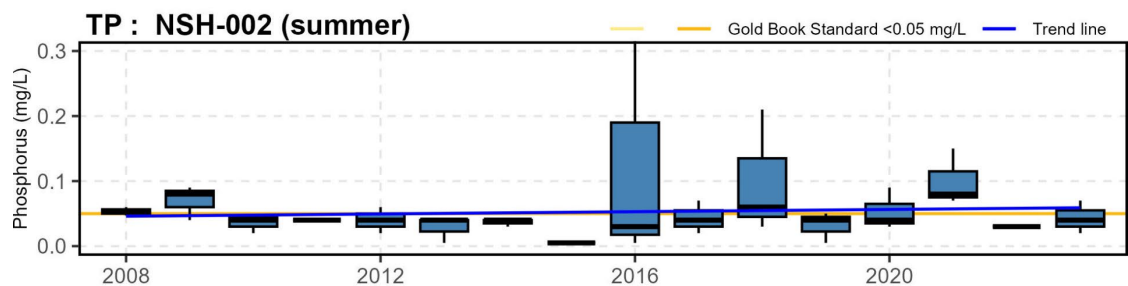
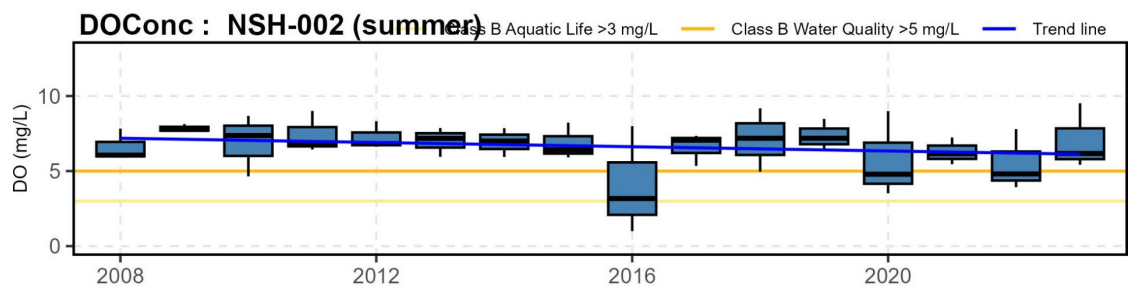
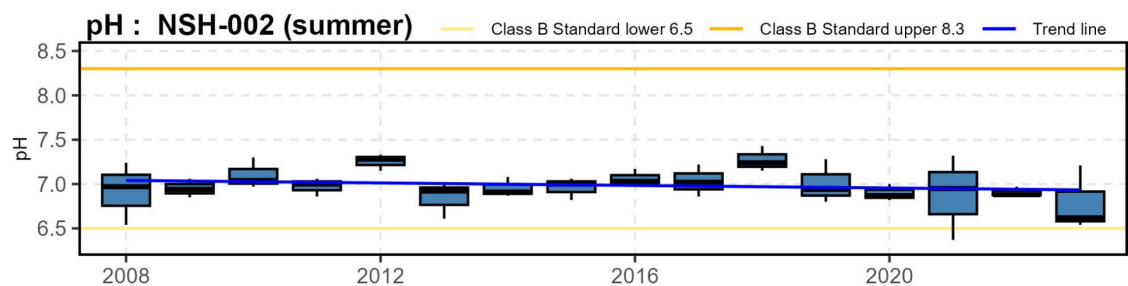
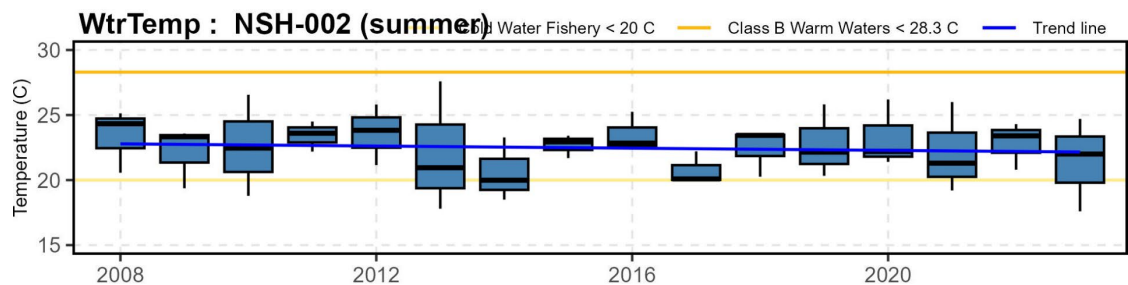


orthoP: NSH-002, 2008-2023





Upstream

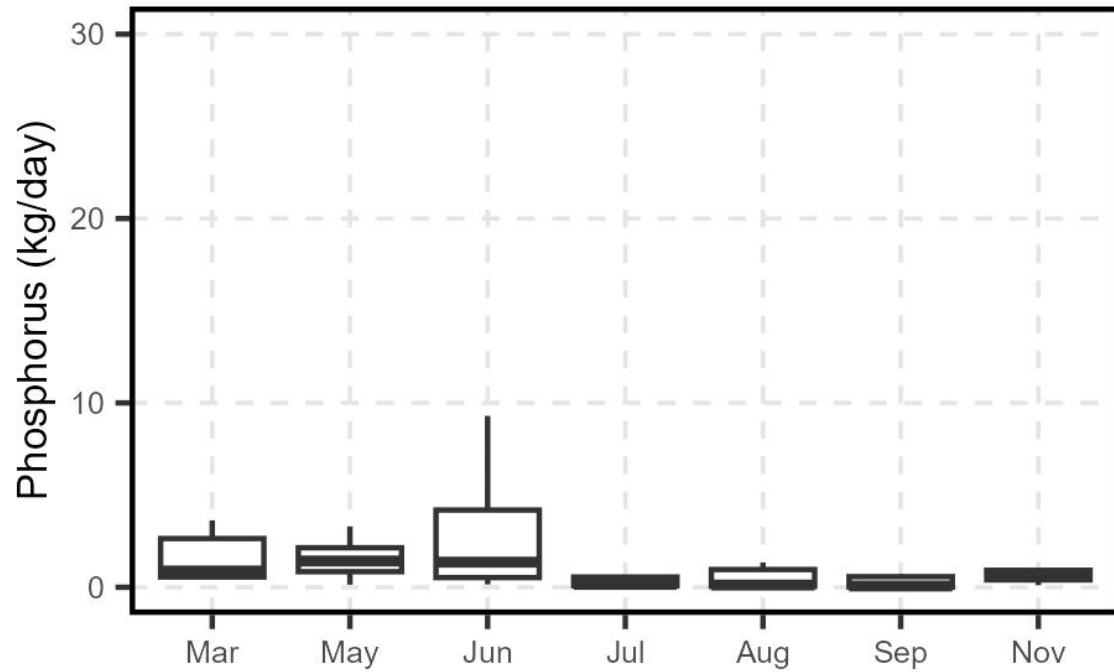


Downstream

# PHOSPHORUS LOAD

Upstream

TP Load: NSH-047, 2008-2023



Downstream

TP Load: NSH-002, 2008-2023

