State of Current Conowingo Monitoring

STAC Conowingo Infill Workshop
January 13, 2016

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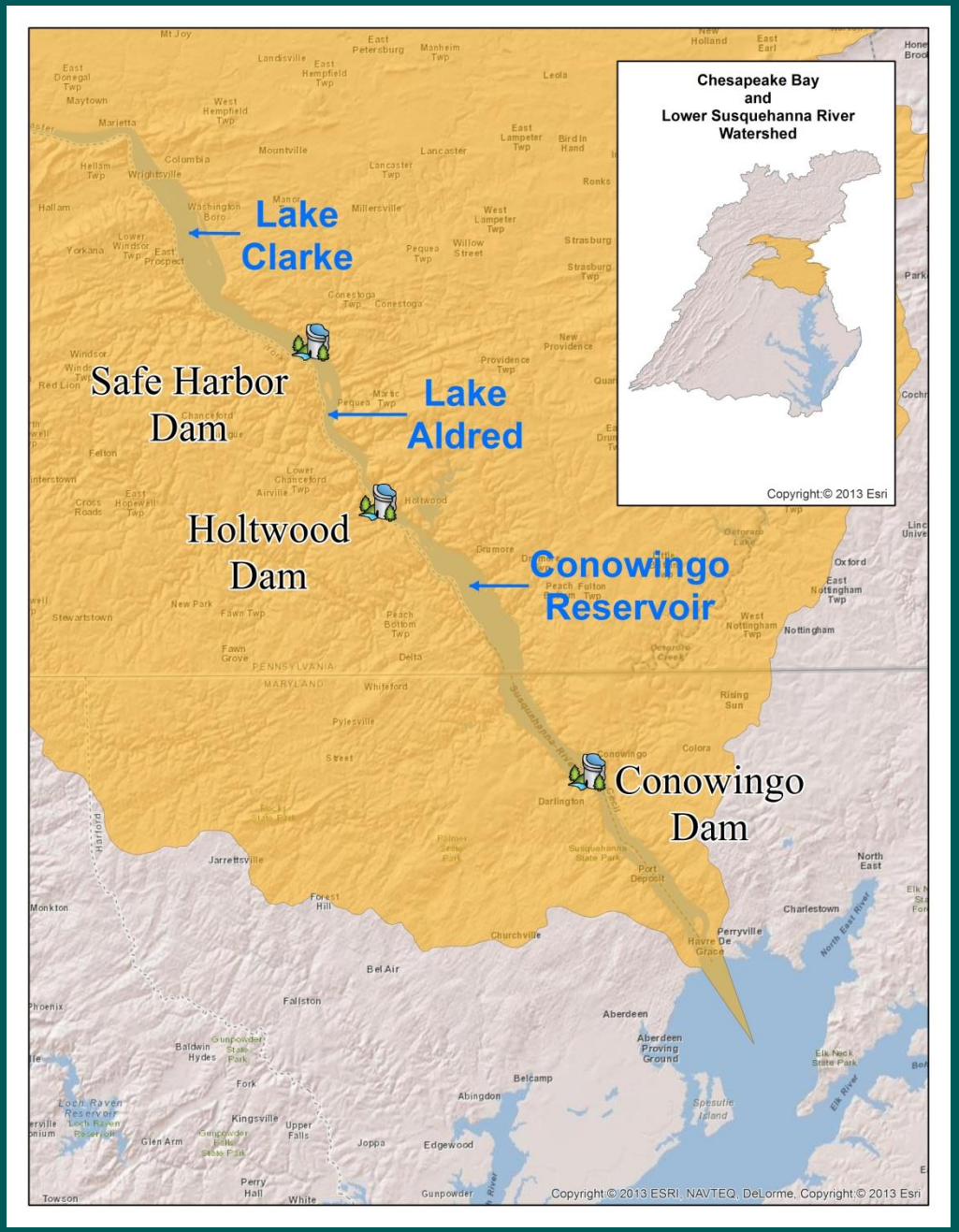
Maryland Department of Natural Resources

Lower Susquehanna Study Area

Graphic courtesy of SRBC

Susquehanna originates in NY, empties into Bay at Havre de Grace, a distance of 444 miles

Conowingo Dam determined to have an impact on achieving WQS



Lower Susquehanna River Integrated Sediment and Nutrient Monitoring Program

- Funded by Exelon
- Partners – DNR, UMCES, USGS, SRBC and Exelon contractors
- Project to monitor 6 high flow events (>100,000 cfs) over 2 years
- Results will be used to inform the CB 2017 Mid Point Assessment and 401 WQC
- 2 high flow event captured on April 6-14 and April 21-26, 2015
- Preliminary event captured March 14-18, 2015

LSR Integrated Sediment & Nutrient Program

Program Goals:

- Determine the impacts of storm events of 100,000 – 400,000 cfs on sediments and nutrients entering the LSR from upstream sources and Conowingo Dam

- Determine the resulting impacts of storm events upstream, scouring from sediments behind the Dam and passing through the Dam on Chesapeake Bay water quality

LSR Integrated Sediment & Nutrient Program

Program Objectives:

- Determine SS concentration and load to Conowingo Pond during storms
- Quantify sediment passing Conowingo Dam
- Determine % total SSL passing Dam
- Determine nutrient concentration associated with SSC and SSL of major tributaries entering Conowingo Pond
- Determine the bioavailability and reactivity of sediment and associate nutrients passing Conowingo Dam during storms
- Develop a better understanding of the fate and effects of particles in the upper Bay

LSR Integrated Sediment & Nutrient Program

- **Program Tasks:**
- Suspended sediment and nutrient monitoring during high flow events
  - Lower Susquehanna River mainstem
  - Lower Susquehanna River and Conowingo Pond tributaries
- Nutrient Monitoring, Experiments, and Modeling
  - Both Conowingo Pond and Chesapeake Bay
  - Sediment-water exchange
- Sediment Core Collection and analysis

Lower Susquehanna River Long-Term & Enhanced Monitoring

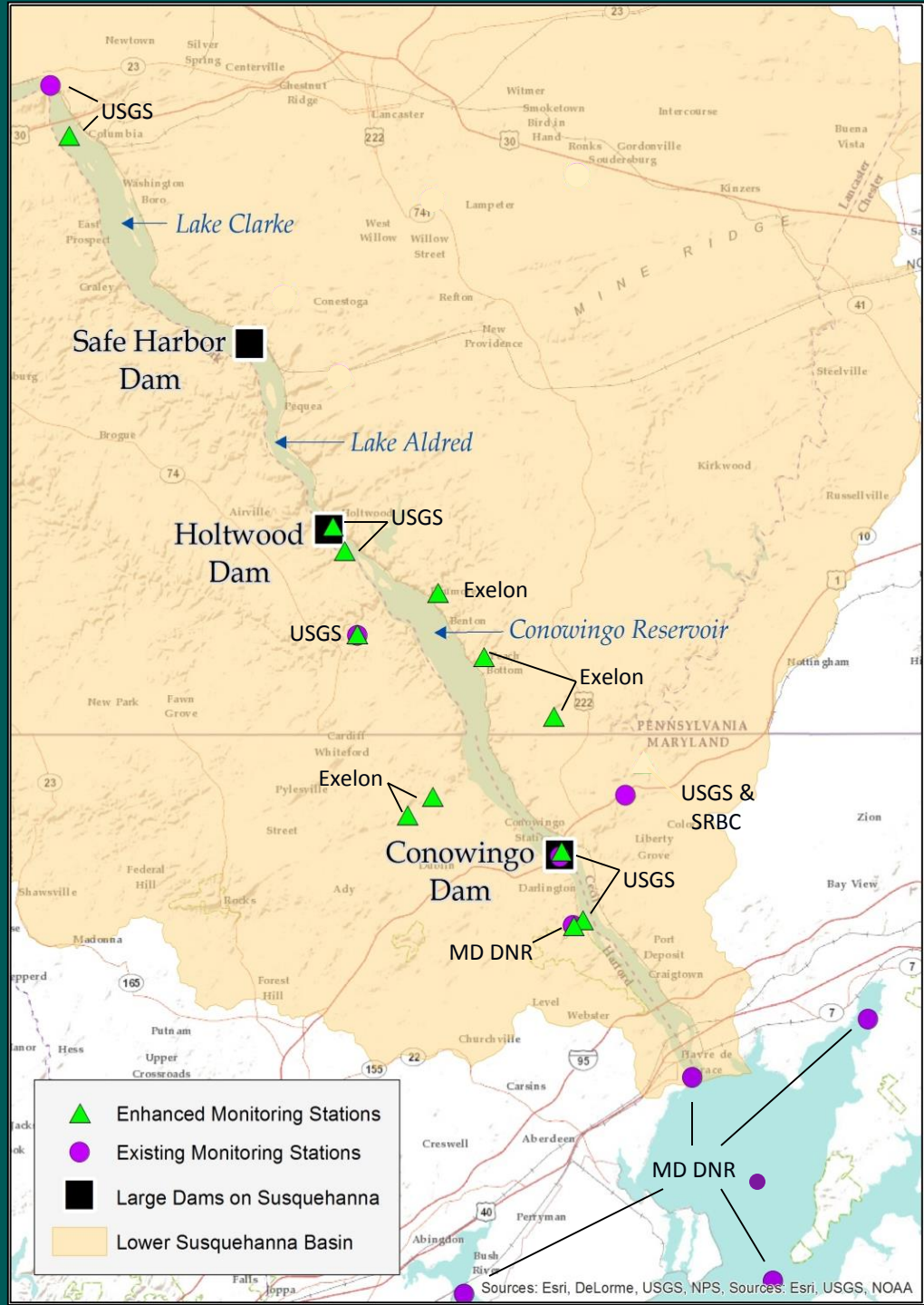
Long-Term (Existing)

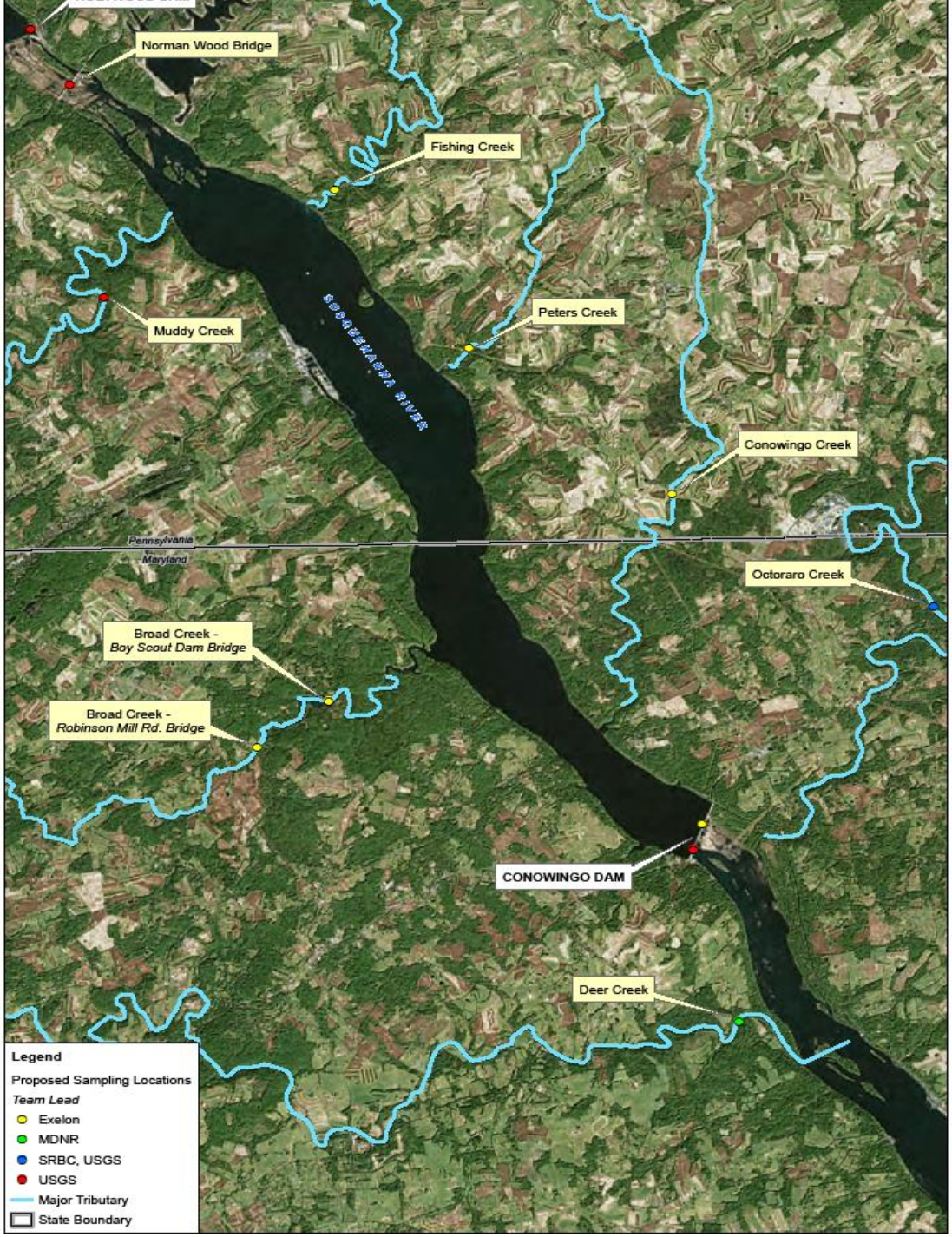
Limited information to adequately characterize Conowingo impacts

Short-Term (Enhanced)

Discrete – coordinated to capture 6-high flow events

Continuous turbidity and flow – to augment discrete sampling




Norman Wood Bridge
Fishing Creek
Muddy Creek
SUSQUEHANNA RIVER
Peters Creek
Conowingo Creek
Pennsylvania
Maryland
Octoraro Creek
Broad Creek -
Boy Scout Dam Bridge
Broad Creek -
Robinson Mill Rd. Bridge
CONOWINGO DAM
Deer Creek
Legend
Proposed Sampling Locations
Team Lead
Exelon
MDNR
SRBC, USGS
USGS
Major Tributary
State Boundary

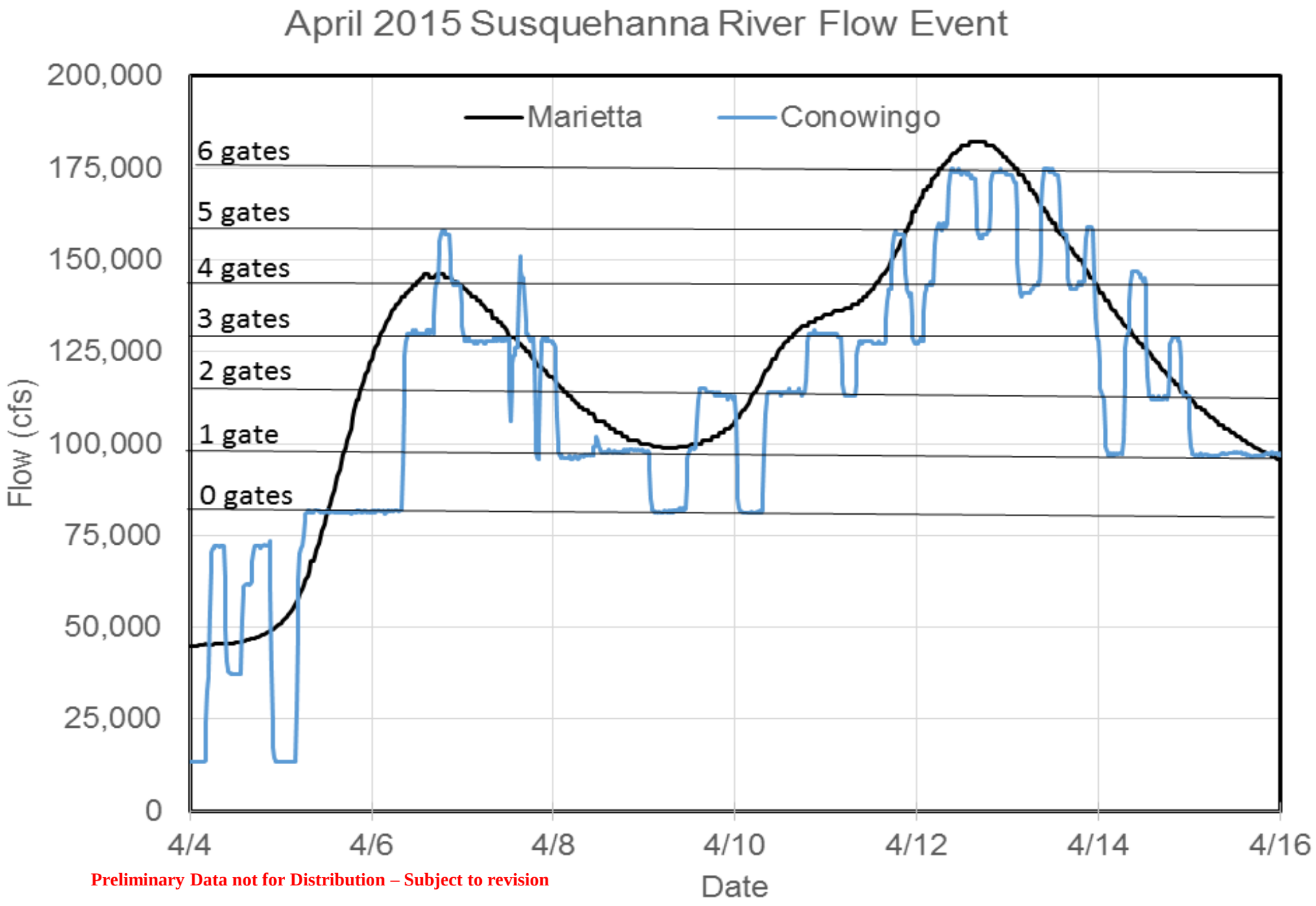
USGS Continuous Monitor – Downstream of Conowingo Dam

Conowingo Dam – High Flow Monitoring event: April 2015

LSR Integrated Sediment & Nutrient Program

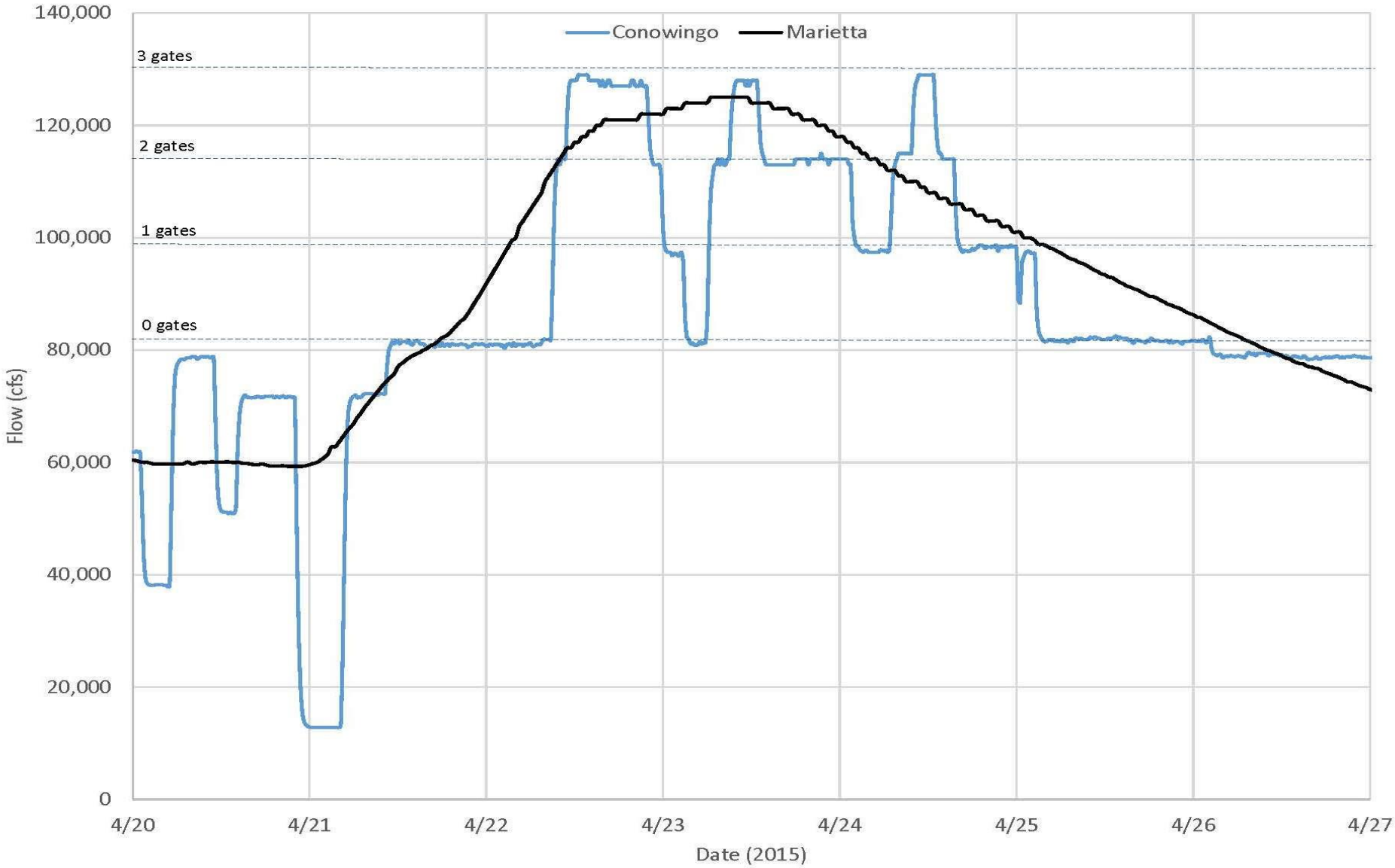
- Sampling Events
  - March 10-24; flows less than 100,000 cfs
  - April 6-14, flows ~155,000 cfs, ~175,000 cfs
  - April 22-25, flows ~130,000 cfs
  - June 27-28, Tributary only in anticipation of high flow event
- 2015 Baseline bathymetry survey completed – May 4-8
  - Surveys conducted similar to 2011, 2013 and 2014 to allow for direct comparison
- Conowingo Pond and Chesapeake Bay Long Cores collected August

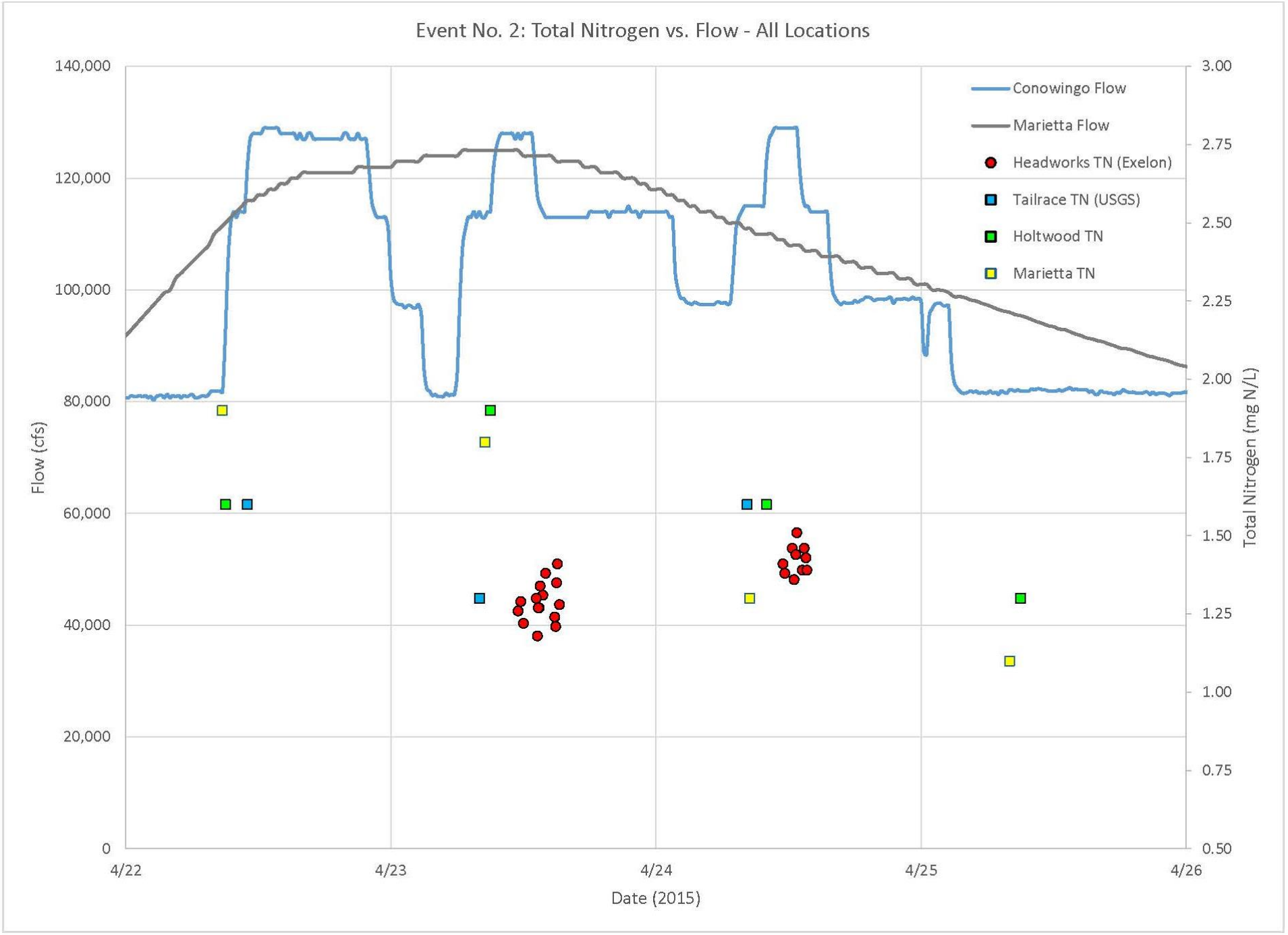
Sampling Event No. 1 - Results

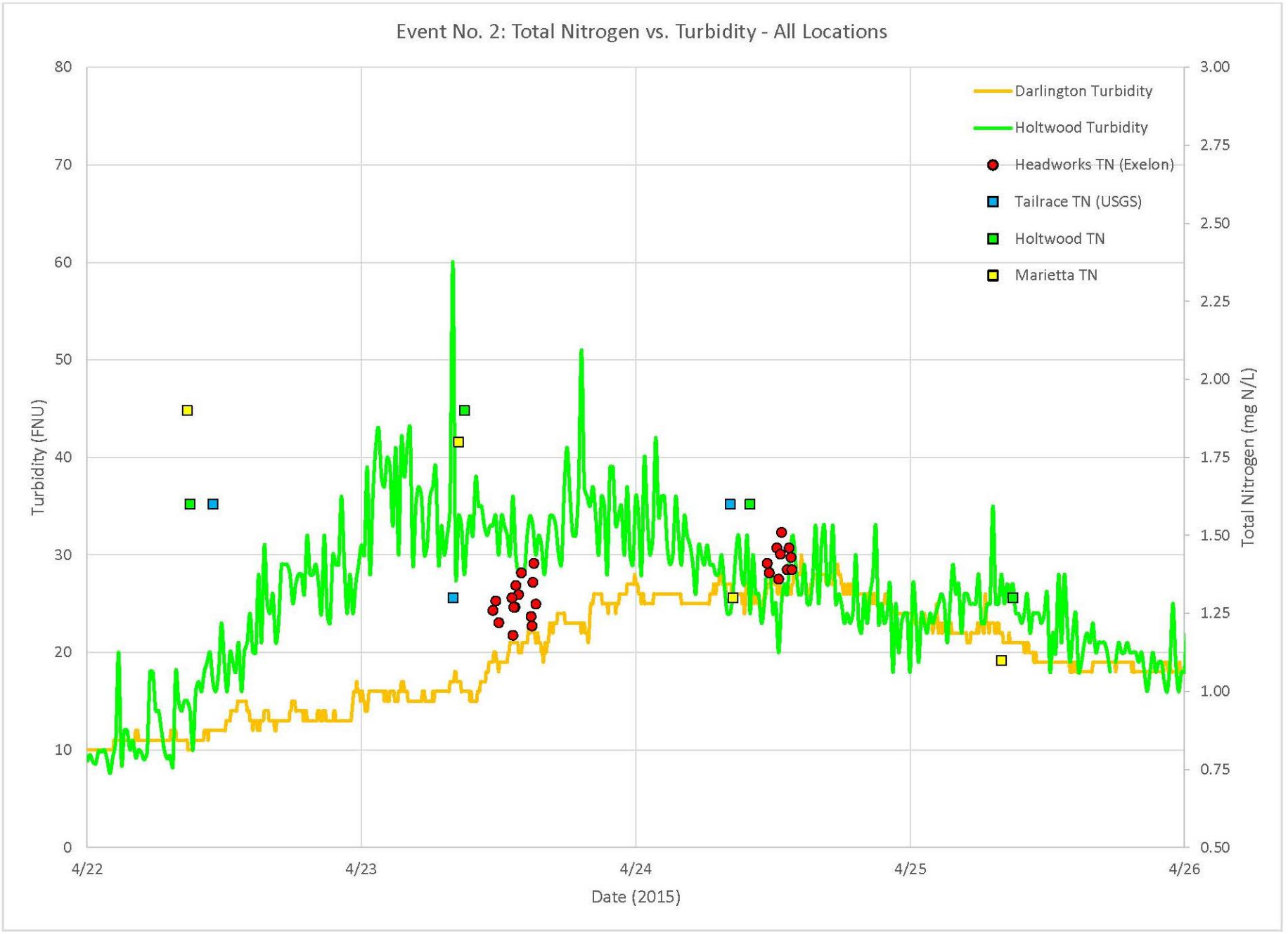


Preliminary Data not for Distribution – Subject to revision

Sampling Event No. 2 - Results







Concerns over Capturing 6 Storm Events within Bay Partnership Model Development - Options

- Develop "plug in" physically based nutrient/sediment mass balance model
- Develop more complex model to "inform" the parameter selection or special operations in HSPF
- Collect core samples within the upper reservoirs above Holtwood Dam and Safe Harbor Dam to characterize the nutrient and sediment composition of the bottom sediment similar to the cores sampled in Conowingo Pond.