

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Point and
Non Point Source Management

Susquehanna River Water Quality Monitoring & Assessment 2012-14

2012-14 Water Quality Monitoring

- Discrete Water Quality Transect Characterization
- Continuous Instream Water Quality Monitoring (data sondes)
- Water Chemistry Grab Sampling
- Water Column Microcystin
- Periphyton Monitoring (Fixed Transect & Random)
- Benthic Macroinvertebrate Surveys
- Semi-Quantitative Fish Surveys (Fish Health)
- Mussel Surveys
- Passive Sampler Deployment (EDCs)
- Sediment Contaminant Sampling
- Thiamine/Thiaminase Characterization
- Benthic Fatty Acid Characterization
- Routine Fish Tissue Sampling

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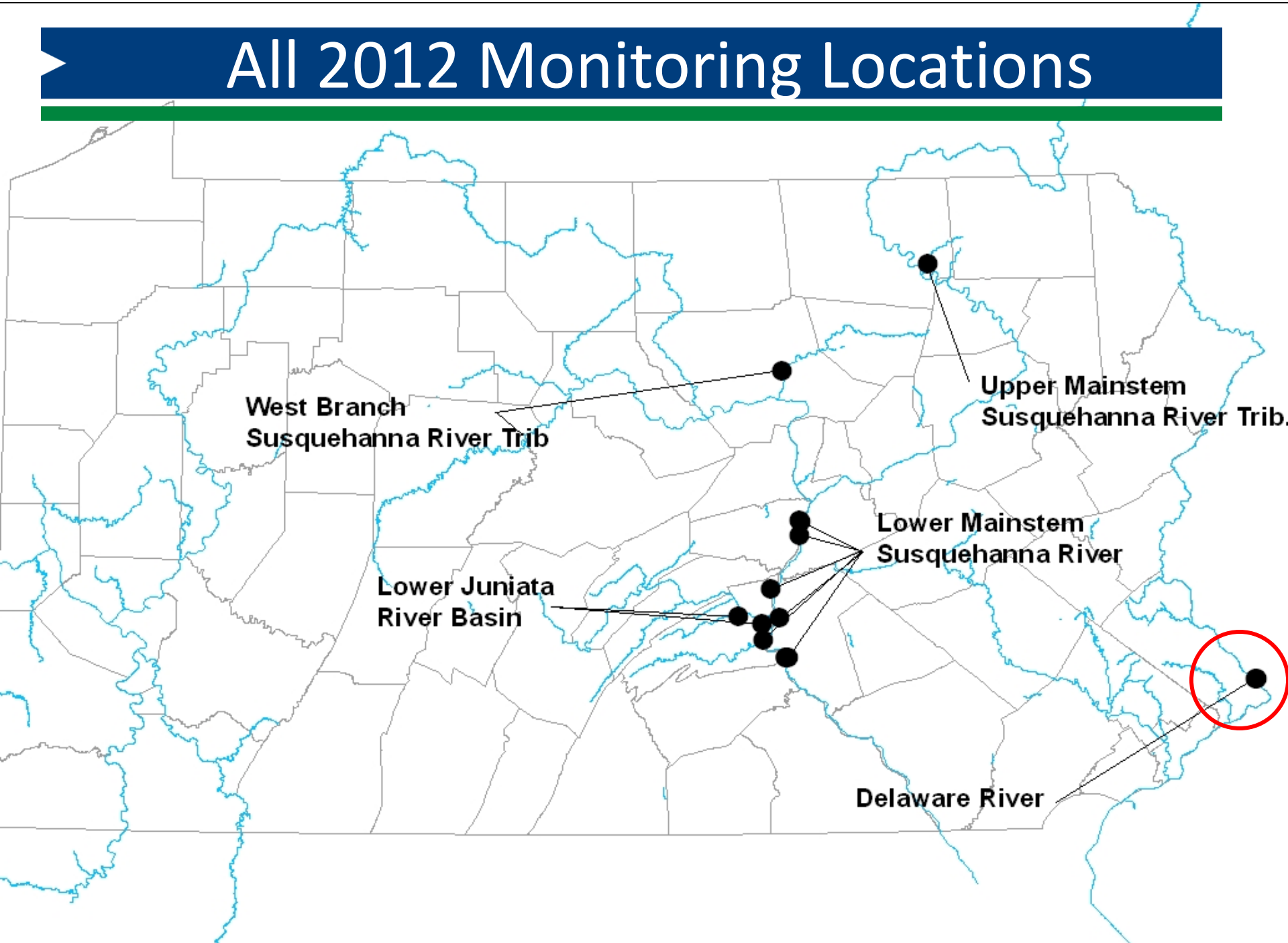
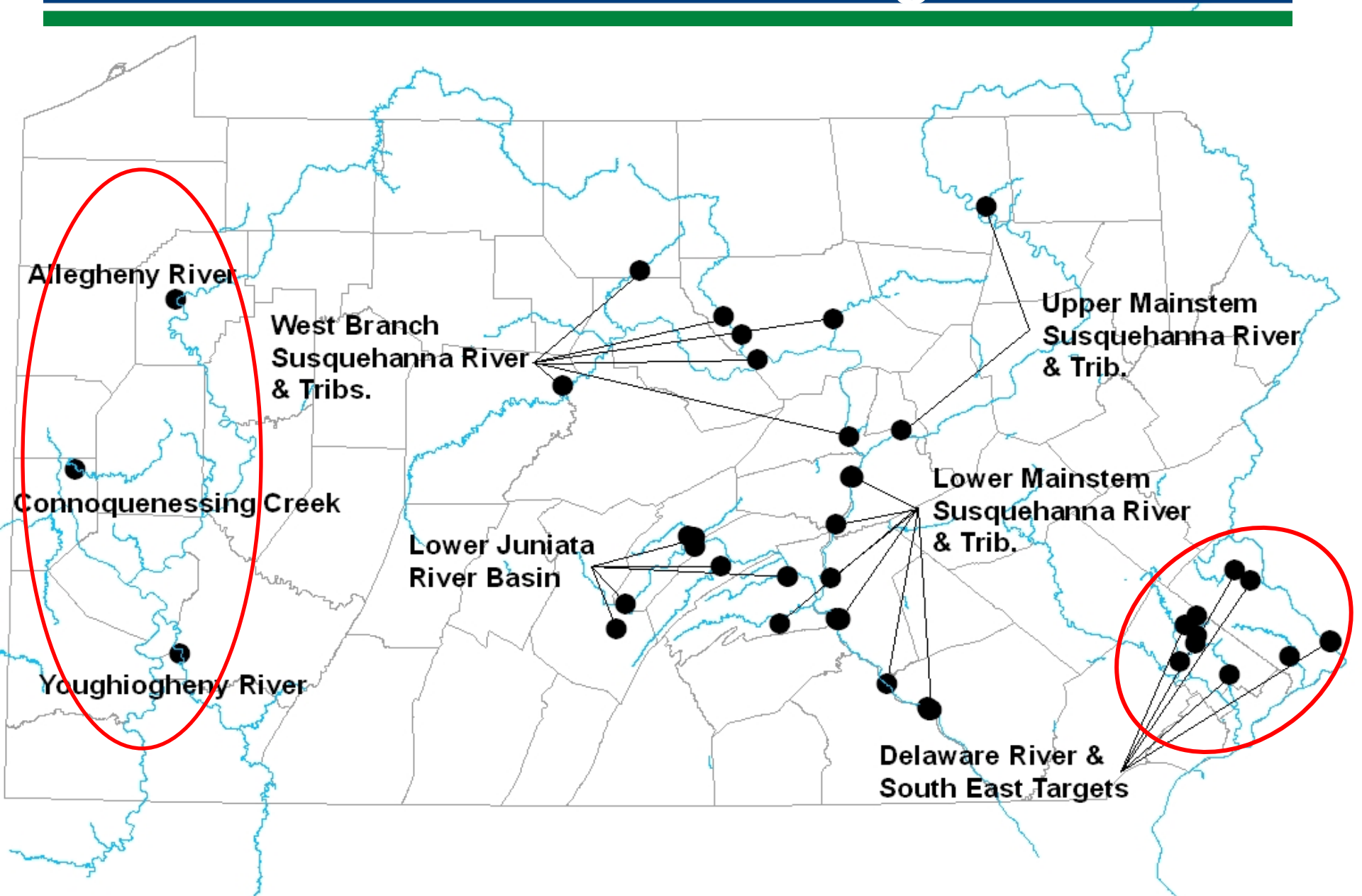
Large River Core Sample Locations

- Susquehanna River at Marietta (New 2013)
- Susquehanna River at Harrisburg
- Susquehanna River at Sunbury
- Susquehanna River at Danville (New 2014)
- WB. Susquehanna River at Lewisburg (New 2014)
- Juniata River at Newport
- Juniata River at Lewistown Narrows (New 2013)
- Delaware River at Trenton (Out-of-basin control)
- Allegheny River at Franklin (Out-of-basin control, New 2013)
- Youghiogheny River at Sutersville (Out-of-basin control, New 2013)
- Connoquenessing Creek @ Zelienople (Out-of-basin control, New 2013)

All 2012 Monitoring Locations

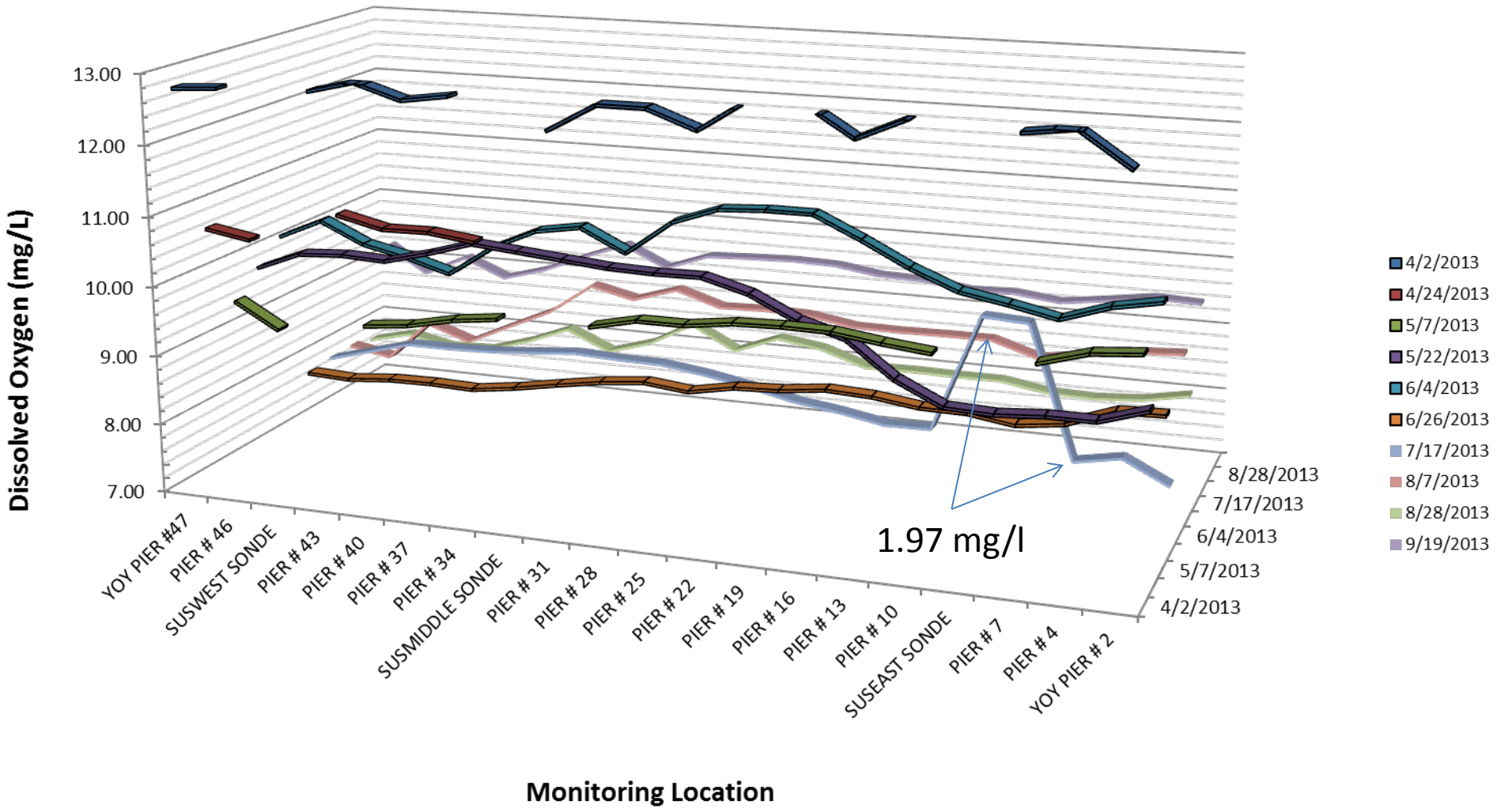


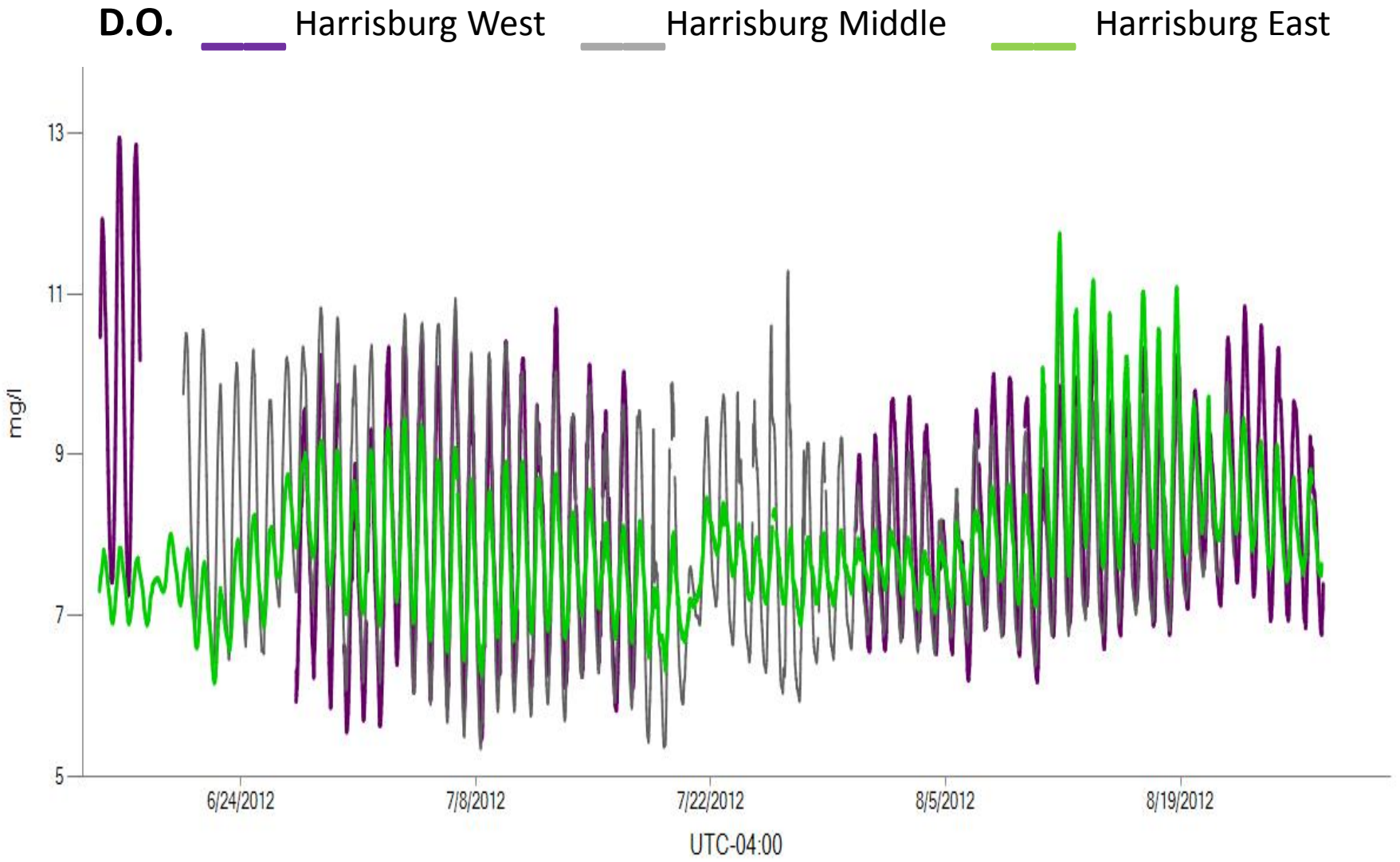
All 2013 & 14 Monitoring Locations



Rockville Water Quality Transect

Susquehanna River Rockville Transect - DO (mg/L)





Dissolved Oxygen, Susquehanna at Harrisburg Sample location – 6/14/12-8/31/2012

Associated Water Chemistry 2013 & 14

* Bay Loading Suite

- Total Suspended Solids
- Total Dissolved Solids
- Nitrogen, Total and Dissolved
- Ammonia, Total & Dissolved as N
- Nitrate & Nitrite, Total & Dis. as N
- Phosphorus, Total and Dissolved
- Phosphorus Ortho, Total & Dissolved
- Total Organic Carbon
- Hardness
- Calcium, Total
- Magnesium, Total
- Sodium
- Chloride
- Sulfate
- Barium
- Boron
- Copper, Total
- Iron, Total
- Lead, Total
- Manganese, Total
- Nickel, Total
- Strontium
- Zinc, Total
- Aluminum, Total
- Selenium
- Osmotic Pressure
- Bromide

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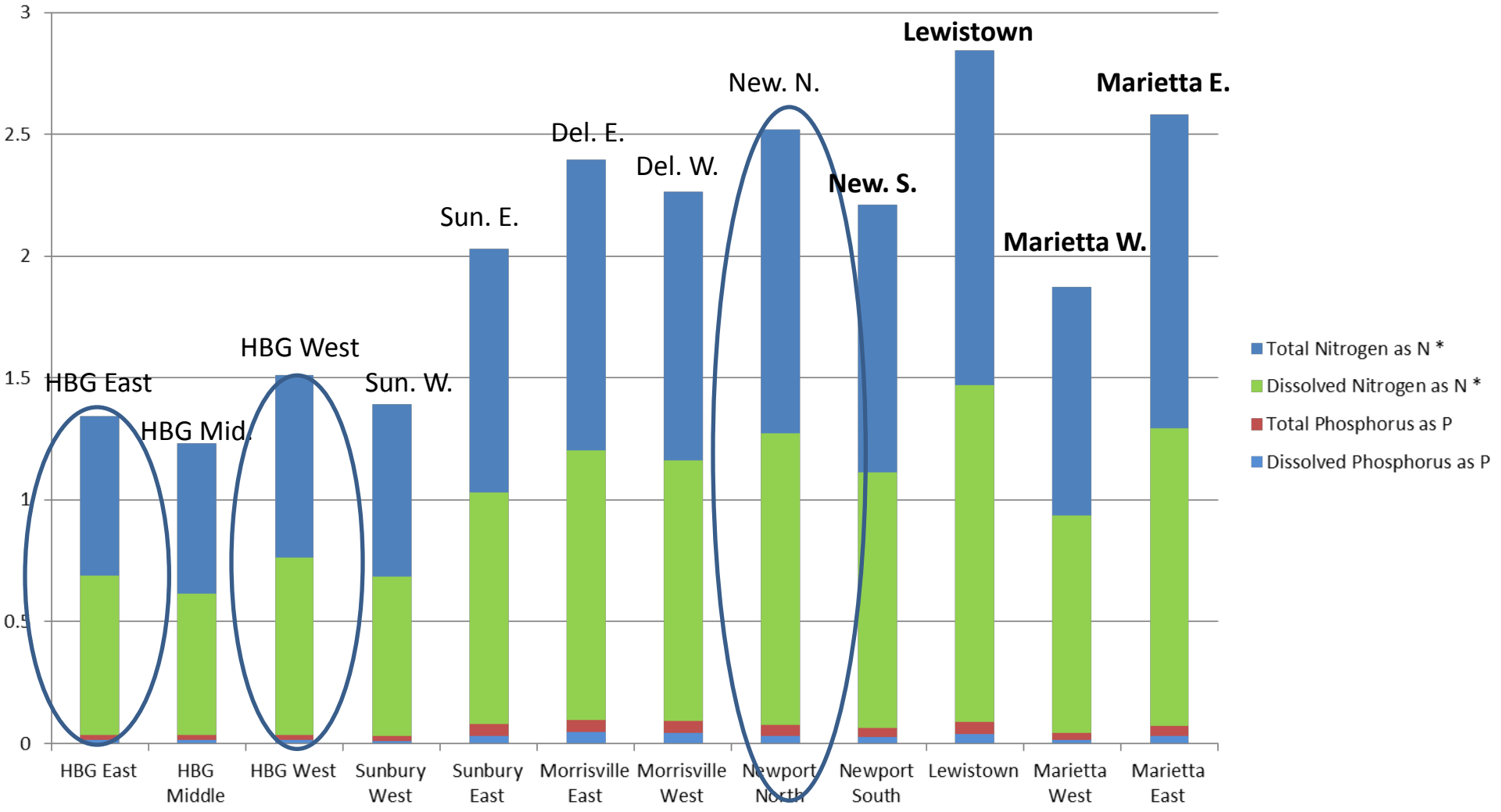
Associated Water Chemistry 2013



Sediment & Passive Water Sampling

Sediment sampling done:
May & August 2013
May & August 2014

Tested:
hormones (USGS)
wastewater compounds (USGS)
current pesticides (USGS)
historical pesticides (DEP BOL)
metals (DEP BOL)
PCBs (DEP BOL)

Water sampling done:
August 2013
May & August 2014

Tested (USGS):
hormones
wastewater compounds
PCBs
current pesticides
historical pesticides
PBDEs
pharmaceuticals
PAHs
total estrogenicity

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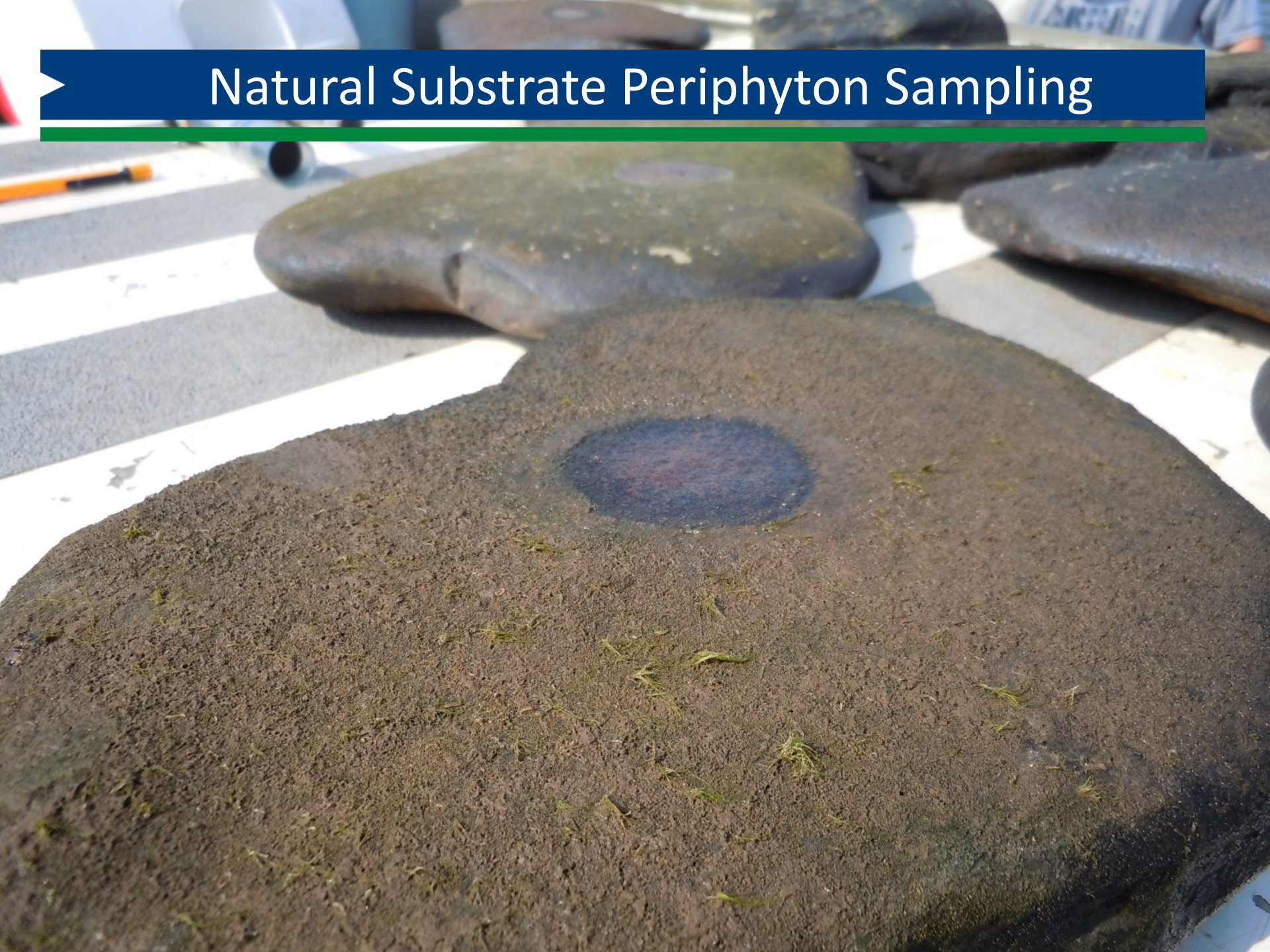
Periphyton(Algal/Diatom) Sampling

Very good indicator of nutrient inputs and associated in-stream production.

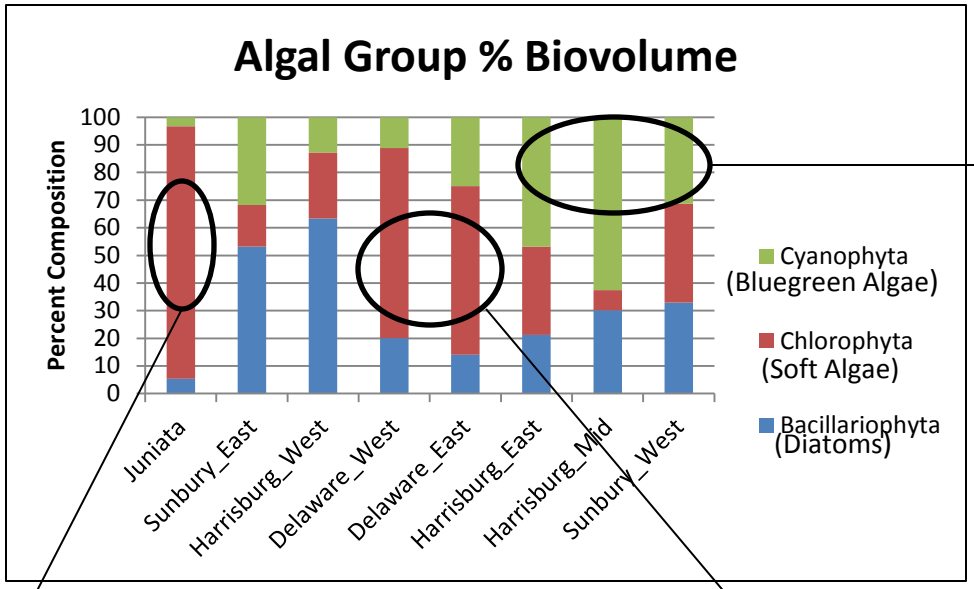
Algae and diatoms have the ability to luxury uptake and store nutrients for later use. This can characterize nutrient loading over a period of time more efficiently than standard water chemistry grab samples.

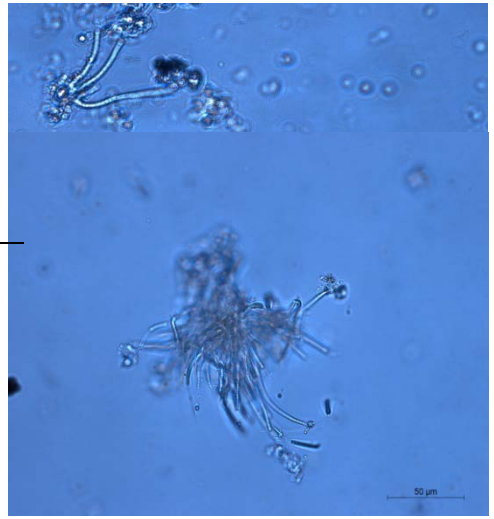
Periphyton Block & Tile(s) Artificial Substrate Sampler

Natural Substrate Periphyton Sampling

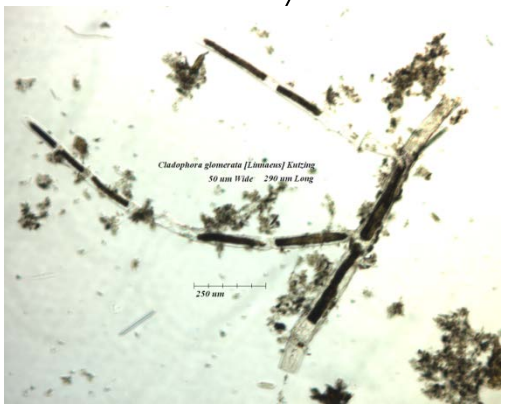


Algal Composition in Large Rivers Systems: Preliminary 2012 TMDL Periphyton Sampling Results

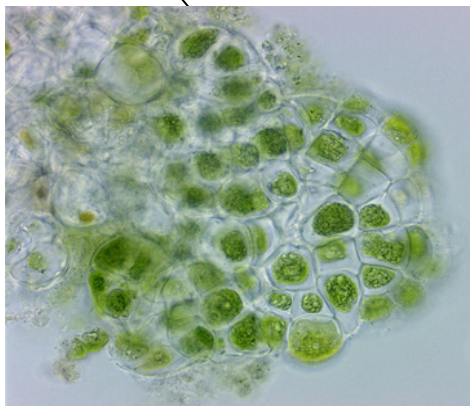




Homeothrix janthina
Filamentous bluegreen alga
Grows under low nutrients
Modifies benthic habitat



Cladophora glometata
Filamentous green alga
Grows under high nutrients
Modifies benthic habitat



Coleochaete sp.
Parenchymous green alga
Grows under high nurients
Modifies benthic habitat

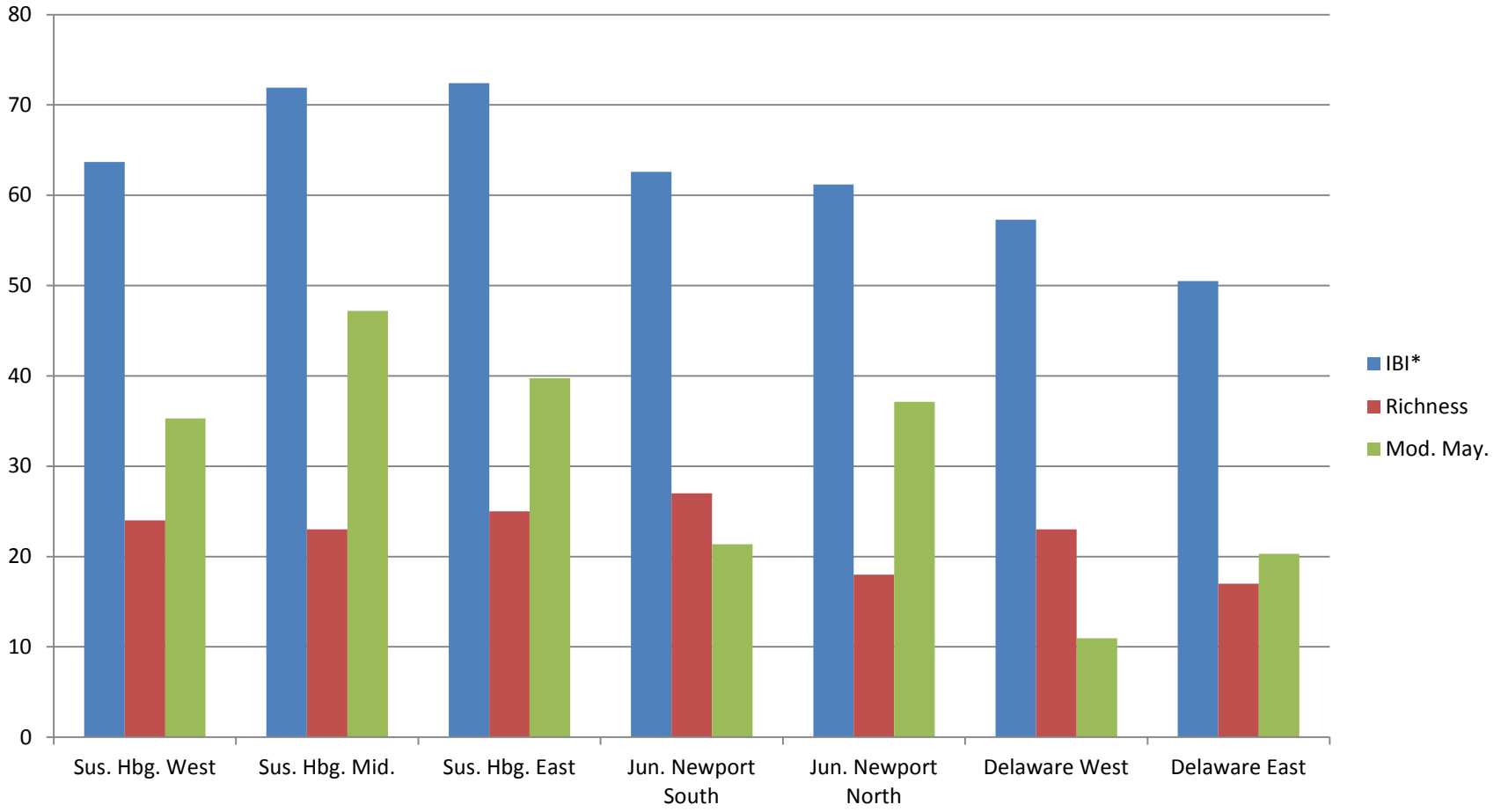
Slide by Hunter Carrick,
Dept. of Biology
Central Michigan University

Benthic Macroinvertebrates (6D-200)

2012 Sampled Core Locations = 7 sites

2013 & 14 Sampled Many More Locations = approx. 37 sites

2012 Preliminary Macroinvertebrate Results



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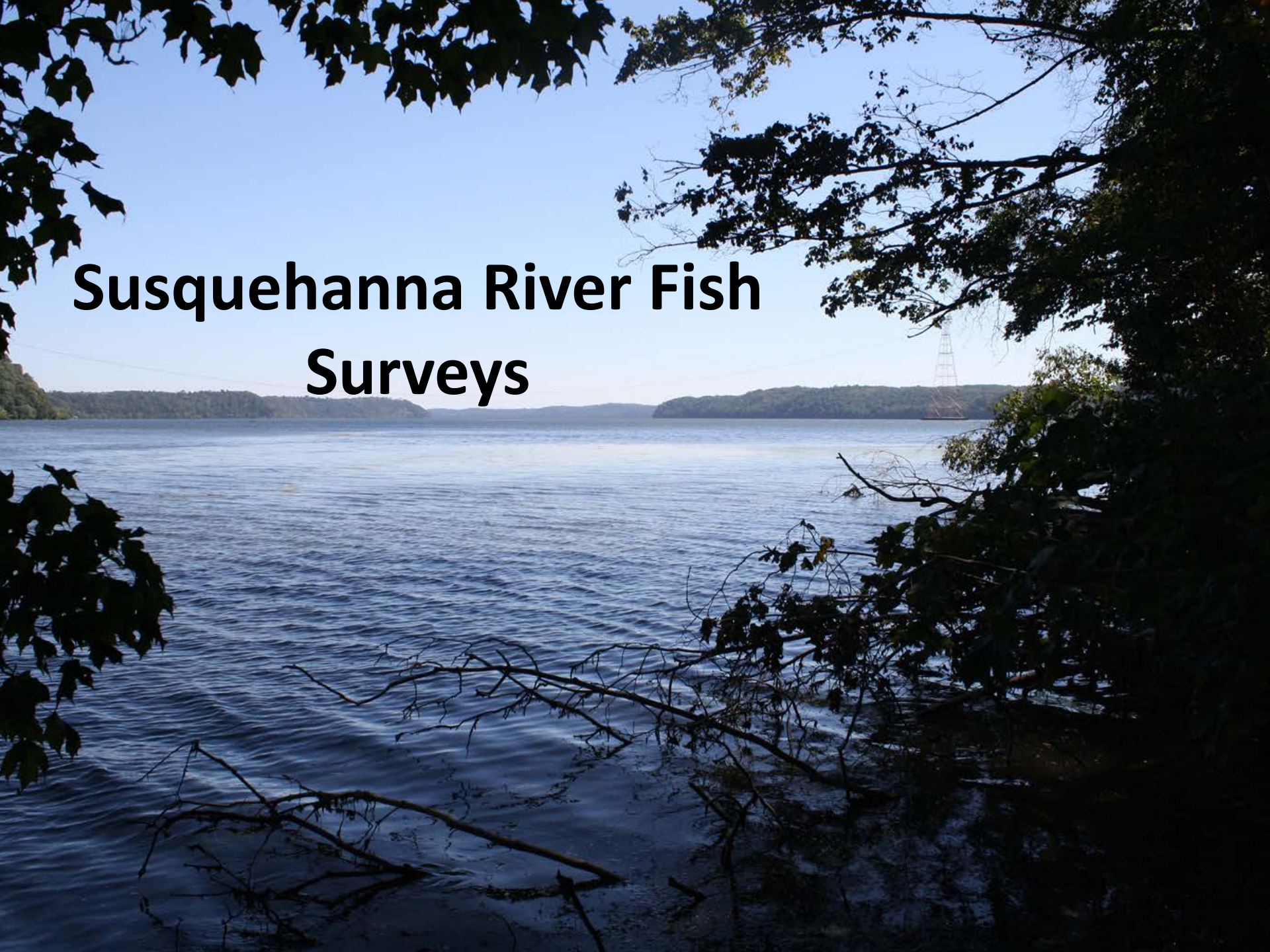
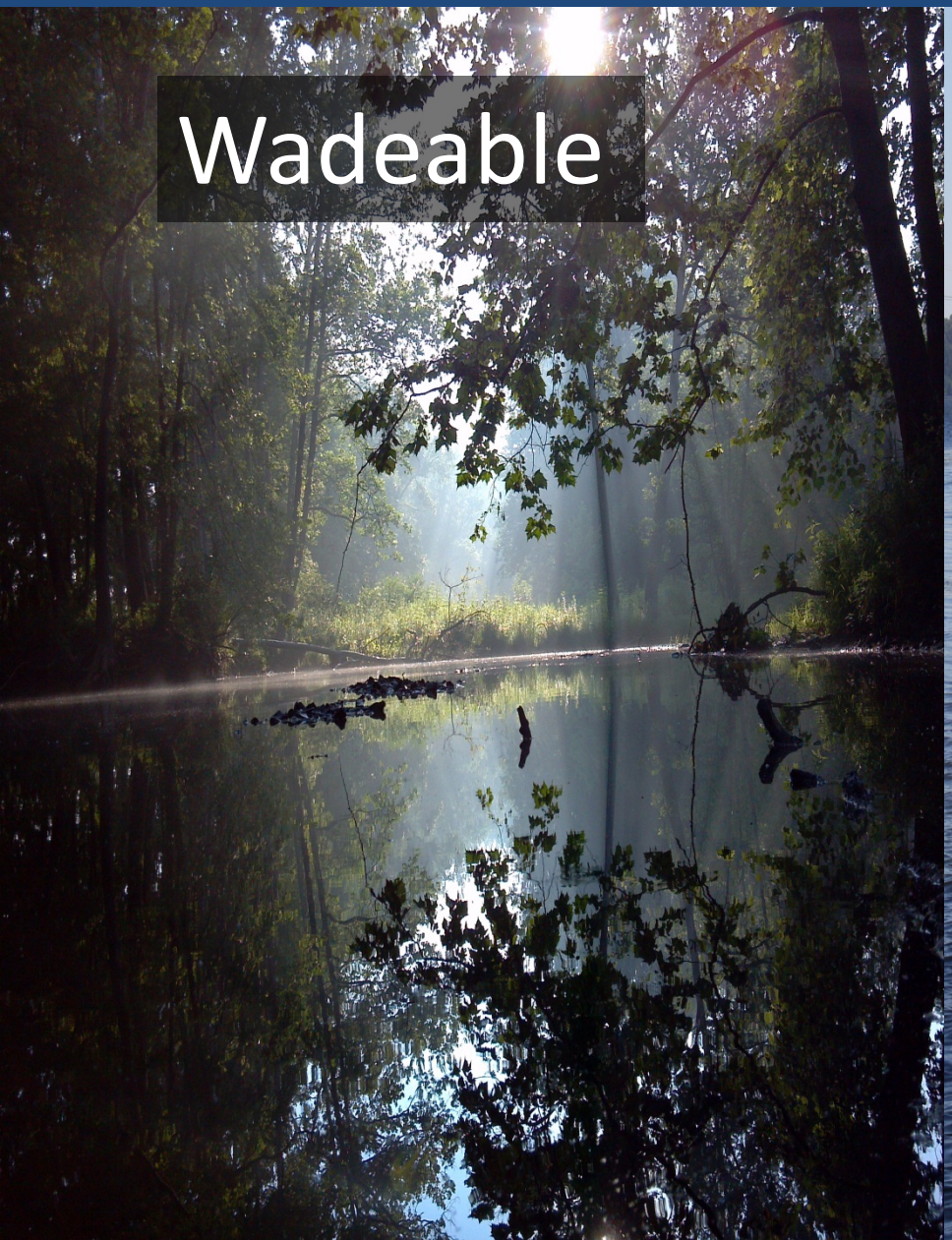
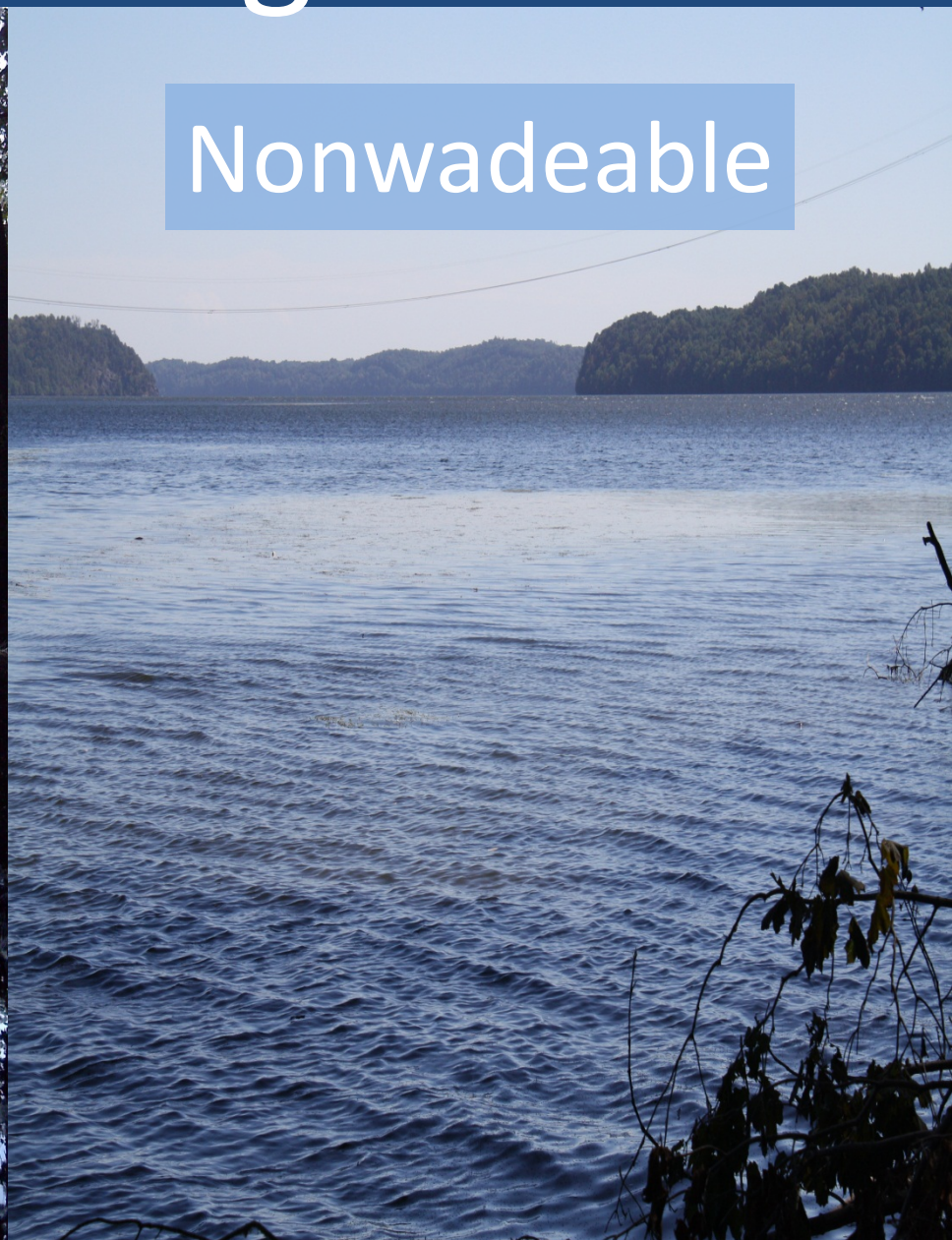

Susquehanna River Fish
Surveys

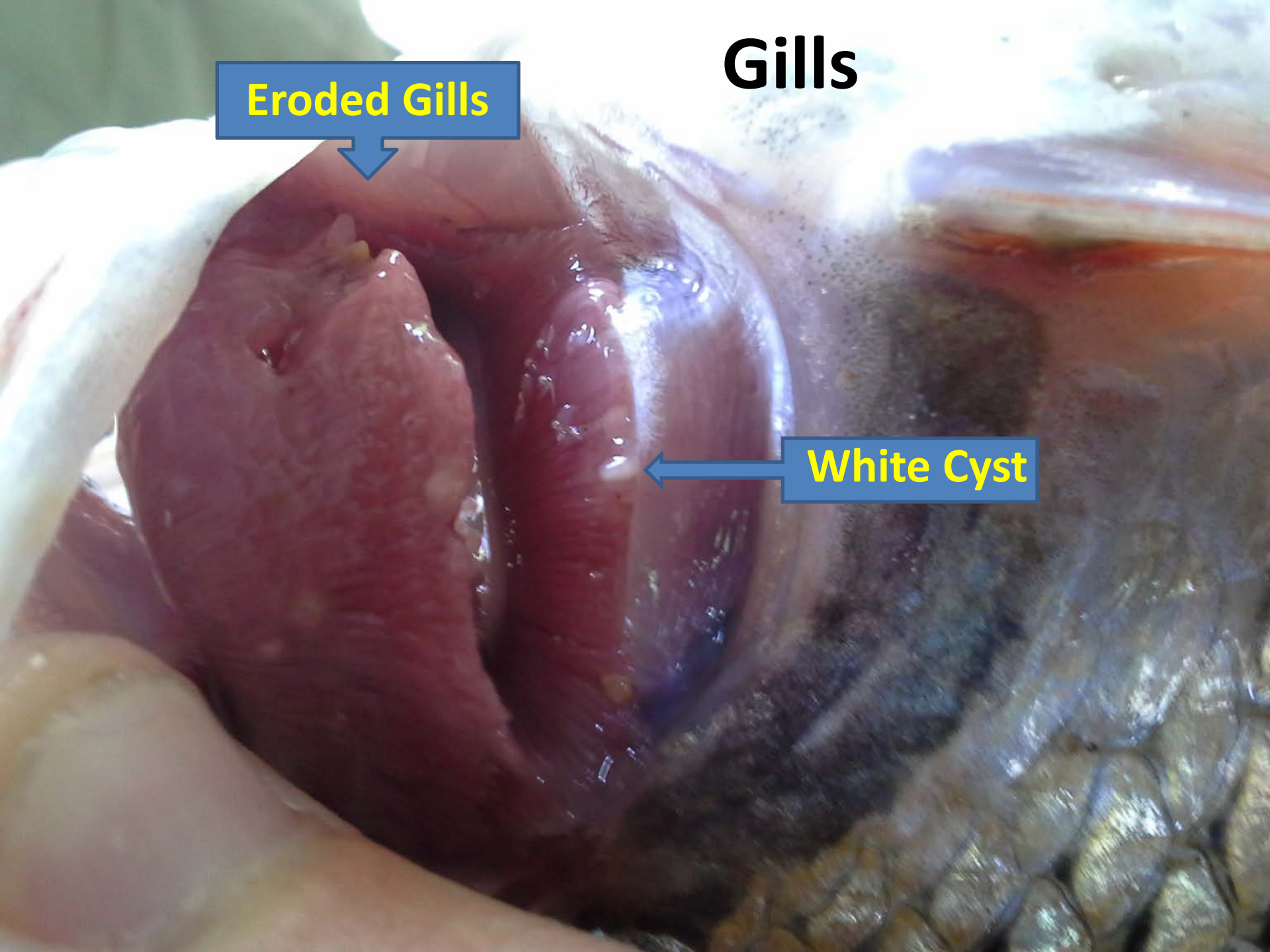
Methodologies





Fish Health Assessment

- Adapted from various Federal/State DELT assessments and USGS fish health protocol
- Designed to make a semi-quantitative assessment of fish health at a given location
- Incorporates an “observational” approach to fish health
- Potential data will be a many-to-one approach
- Still in developmental stages


Gills
Eroded Gills
White Cyst


Fungal Infection
Necrotic Tissue

CADDIS

(Causal Analysis/Diagnosis Decision Information System). CADDIS is a process developed to help scientists and engineers conduct causal assessments in aquatic systems. For more information on CADDIS, check out http://www.epa.gov/caddis/.

Those involved will analyze and evaluate all the available data collected on the river to determine the cause of the issues with the smallmouth bass population. The goal is to identify the cause of the smallmouth bass issues by late 2015 in order to use that information in the 2016 Integrated Report

Susquehanna River Monitoring and Assessment YouTube video:
http://www.youtube.com/watch?v=oYYS7Ok0eag

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