Developing a Wetland Regional Monitoring Network(RMN) in Regions 1,2,3 and 5

2024 Joint Meeting of MAWWG and NEBAWWG

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Developing a Wetlands Regional Monitoring Network - Wetland RMN

Changes in precipitation and temperature from climate change will affect surface and groundwater supply, leading to shifting baselines of wetland condition. Therefore, continuously monitoring multiple indicators in water will improve detection of different stressors and their attributions to wetland condition.

Developing a Wetlands Regional Monitoring Network - **Wetland RMN**

- **Background**- There is lack of long-term continuous data needed to detect and understand shifting baseline conditions in wetlands.
  - Reference sites have long served as a standard against which to assess other waterbodies but lack of understanding of the long-term changes in these systems may undermine their utility for use in assessment, criteria development and other Clean Water Act Protections.

EPA tool to compliment NWCA and assist in regulatory support

- National Wetlands Condition Assessments (NWCA)
  - One of 4 companion surveys under EPA's National Aquatic Resource Survey (NARS)
- Mitigation requirements under CWA
- Further our understanding of climate change effects in wetlands and allow for detection of changes and trends.
- Supports EPA, State and Tribal responsibilities under CWA

Understanding and tracking hydrologic changes are particularly important for wetlands.

- It is critical for monitoring programs to document current thermal and hydrologic regimes, identify how they are changing, and understand how these changes are affecting the condition of aquatic ecosystems.

- Altered patterns of precipitation, increasing temperatures, and related increases in evapotranspiration can result in changes in surface and ground water levels, where a change of only a few centimeters can have dramatic impacts on wetland size, characteristics, and ecosystems services provided.

2021 & 2024 EPA RESEARCH GRANTS

- Engage Federal, State and Tribal partners

  77 participants from Regions 2 and 3!!!

- Develop a framework for consistent, long-term data collection which will include:
- (1) Reference screening criteria
- (2) Site Screening
- (3) Prioritized list of data collection protocols
- (4) Proposed network of sites
- **2024 ROAR**
- (1) Assemble workgroup
- (2) Finalize protocols
- (2) Develop QAPP
- (3) Expand workgroup to R1, R5
- (4) Add additional sites

WHAT ARE WE MONITORING?

INDICATORS of change in

- Vegetation (communities, T&E, invasive species)
- Hydrology (+/-, temp)
- Soil (organic carbon, change in redox)

PROTOCOLS (still under development)

- Vegetation (highest priority)
- Hydrology (highest priority)
- Soils (highest priority)
- Game Cameras (highest priority)
- Wetland Delineation (medium priority)

- Water Quality (lower priority)
- Temperature (lower priority)
- Weather Stations (lower priority)
- Birds (lower priority)
- Amphibians (lower priority)
- Insects (lower priority)
- Algae (lower priority)
- Carbon Sequestration (wish list)
- eDNA (wish list)
- Drone Imagery (wish list)


We Need You!
08.01.2023

Join Workgroup
- Monthly calls
- Webinars

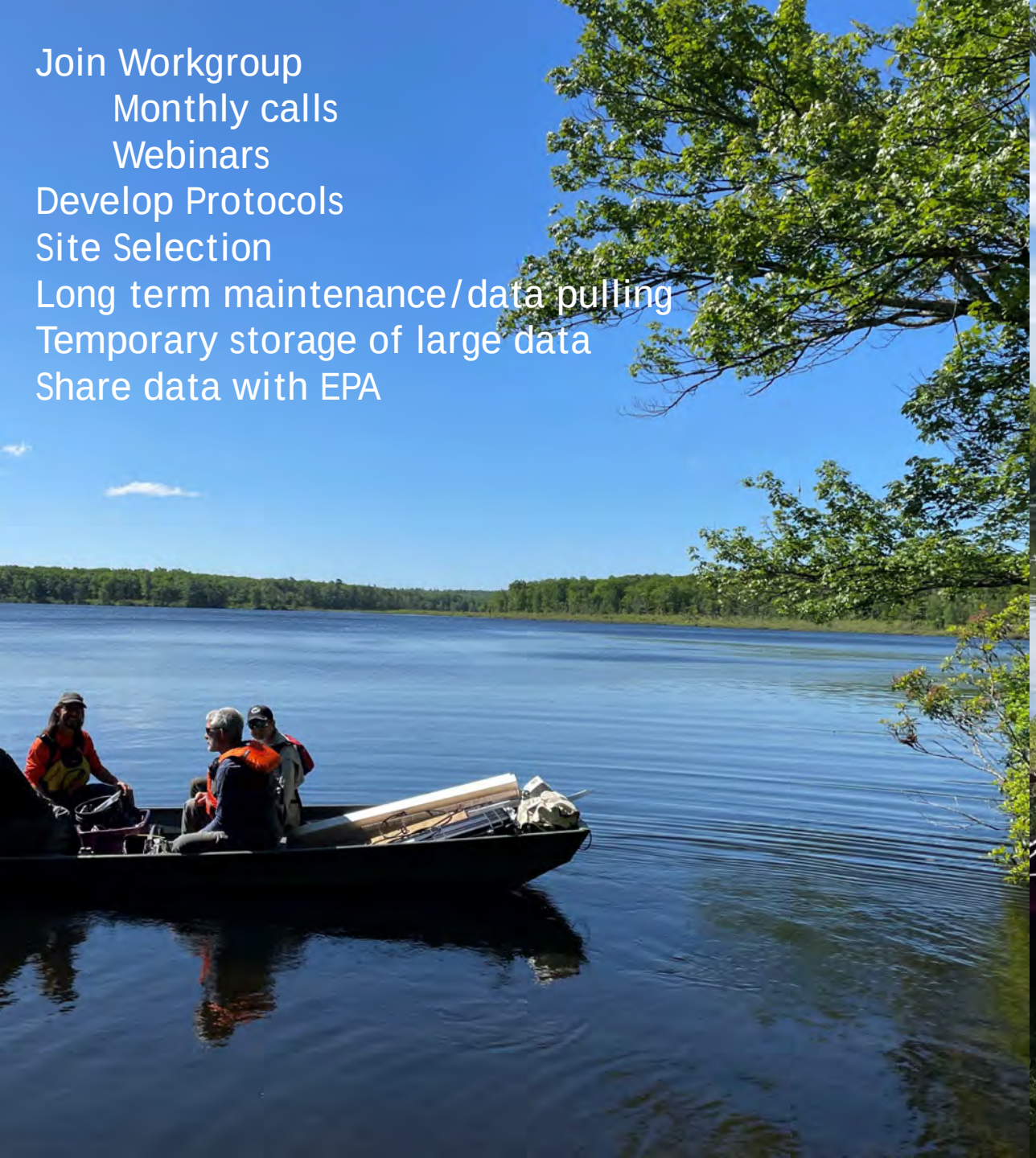
Develop Protocols

Site Selection

Long term maintenance/data pulling

Temporary storage of large data

Share data with EPA



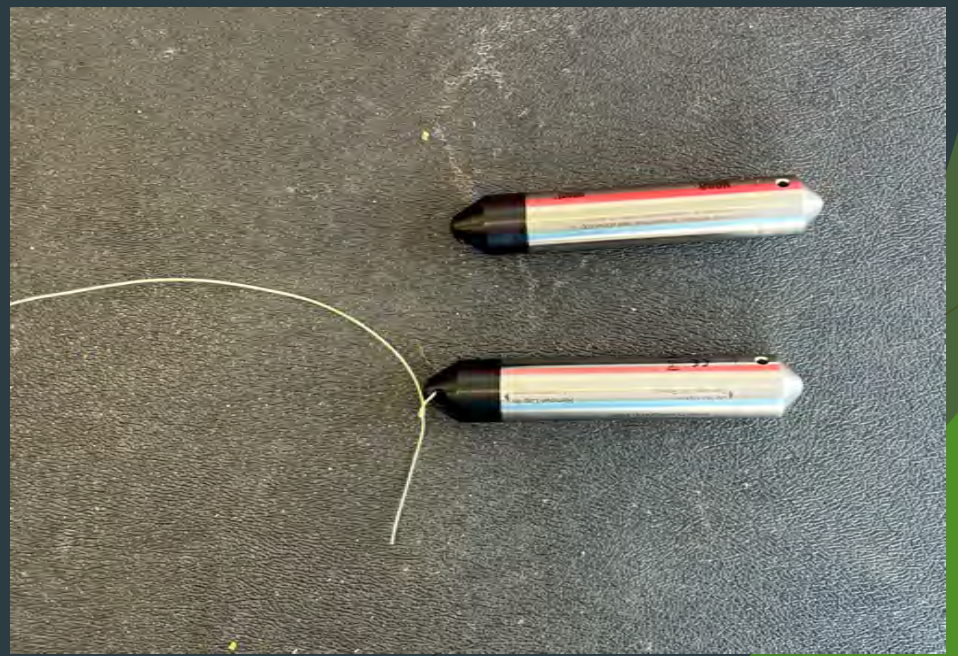
Monitoring Well and Piezometers

- Piezometers – slotted bottom 6”
- Well – slotted throughout
- Riser – not slots
- Flat bottom end – mineral soils or confining layers
- Pointed end – pushing through peat
  - End pieces should have holes drilled for drainage
- Vented well cap
- Master lock
- PVC cutters
- May require angle iron to keep from heaving in certain sites locations (shallow peat)

Hobo Waterproof Shuttle to set and read Hobo Data Loggers

Hobo U20 Data Logger

- Stainless steel for freshwater (U20-001-04)
- Plastic/Titanium for salt/brackish water
- Monofilament or stainless-steel wire to hang Hobo in well



Barometer or Weather Station

Hobo U20 placed on land to collected barometric pressure

- 2” PVC pipe with holes drilled in it
- 2 end caps

The barometric pressure readings are used to adjust the data loggers within the wells/piezometers on site

Bentonite – to seal the top of the well at surface and for uses in piezometers installations

Sand – sand is packed in the bore hole around the piezometer and sealed with bentonite.

Piezometer installed in shallow peat. Angle iron used to help prevent heaving and destruction by bears. The bears still damage them.

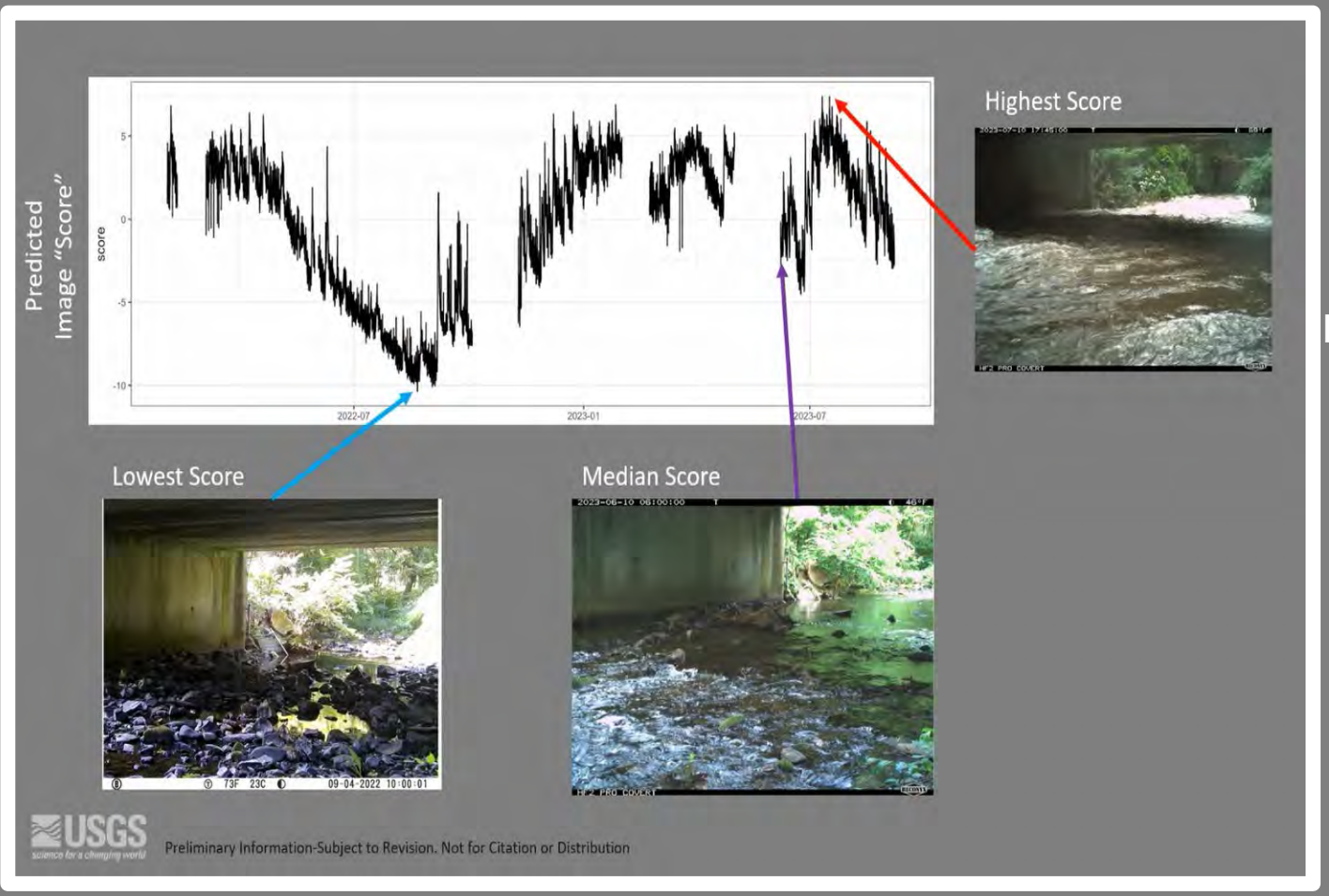
Difficult to see the bentonite seal but its present.

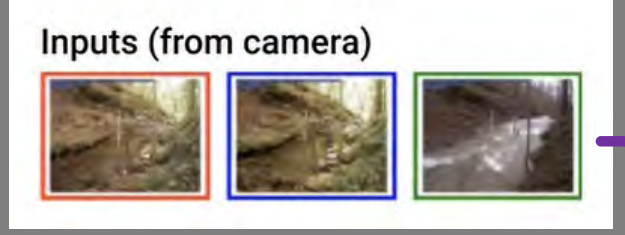
Reconyx Hyperfire 2 Trail Camera

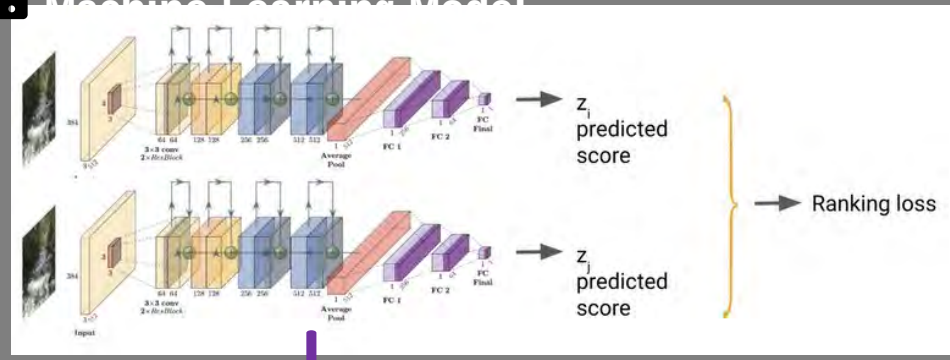
- Hyperfire 2 Security Enclosure
- *12 Lithium-Ion Batteries*
- Wire bike lock

Regional - ORD Applied Research

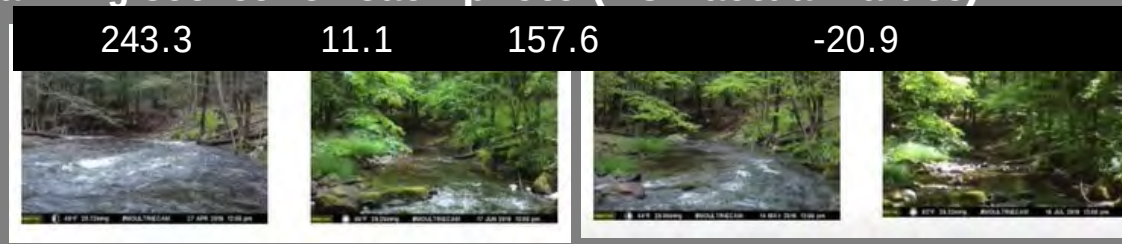
Aquatic Resource Monitoring with Machine Learning Modeling







Ranking Scores for each photo (NOT actual values)



Flow Photo Explorer
USGS web-based database & platform

Website

Provided by USGS Microsoft AI for Good

Estimated Costs

Wells

Hobo U20 freshwater- $600
Hobo U20 saltwater - $740
Hobo Shuttle - $325
Sand - $15
Bentonite - $15
Well screen - $45
Piezometer - $45
Riser - $25
Point/flat bottom - $15
Filter fabric - $35
Pipe cutter- $27
Barometer Holder - $20

Camera

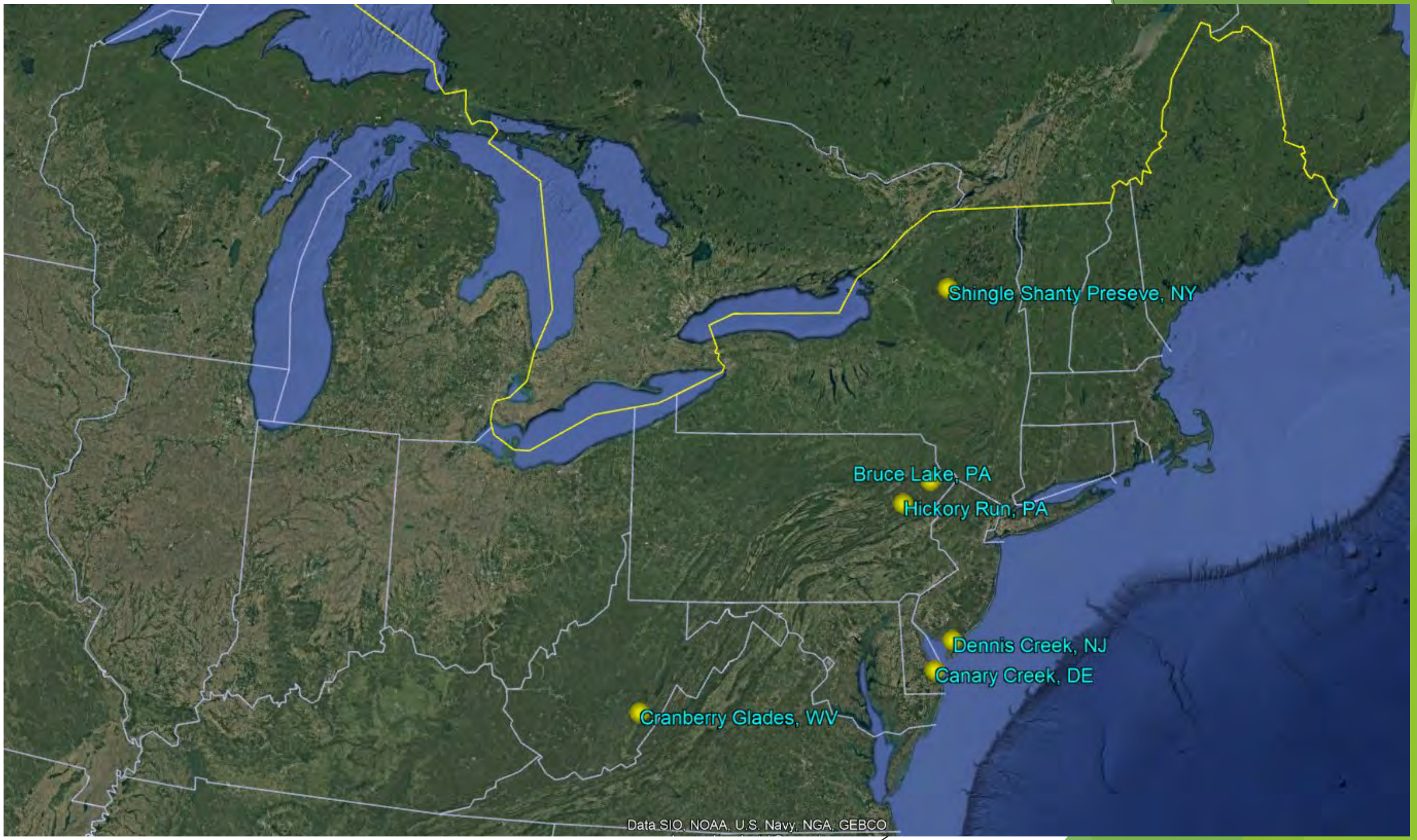
Hyperfire 2 - $400
Hyperfire enclosure - $50
Strap lock - $15
Batteries (12 lithium-ion) - $45
Large SD card and reader - $50

Additional Equipment

Auger/shovel/Munsell/Soils pit equipment
Monofilament or stainless-steel wire
Black trash bags
100/50 M Tapes
Tape measure
Write in Rain pen and book
GPS unit
GPS Camera
iPad
Screws
Straps
Drill with bits
Staff gauge

Site with 1 well, barometer and camera
Wells/Barometer = approximate cost $1725
Camera – approximate cost $560
Total = $2,285

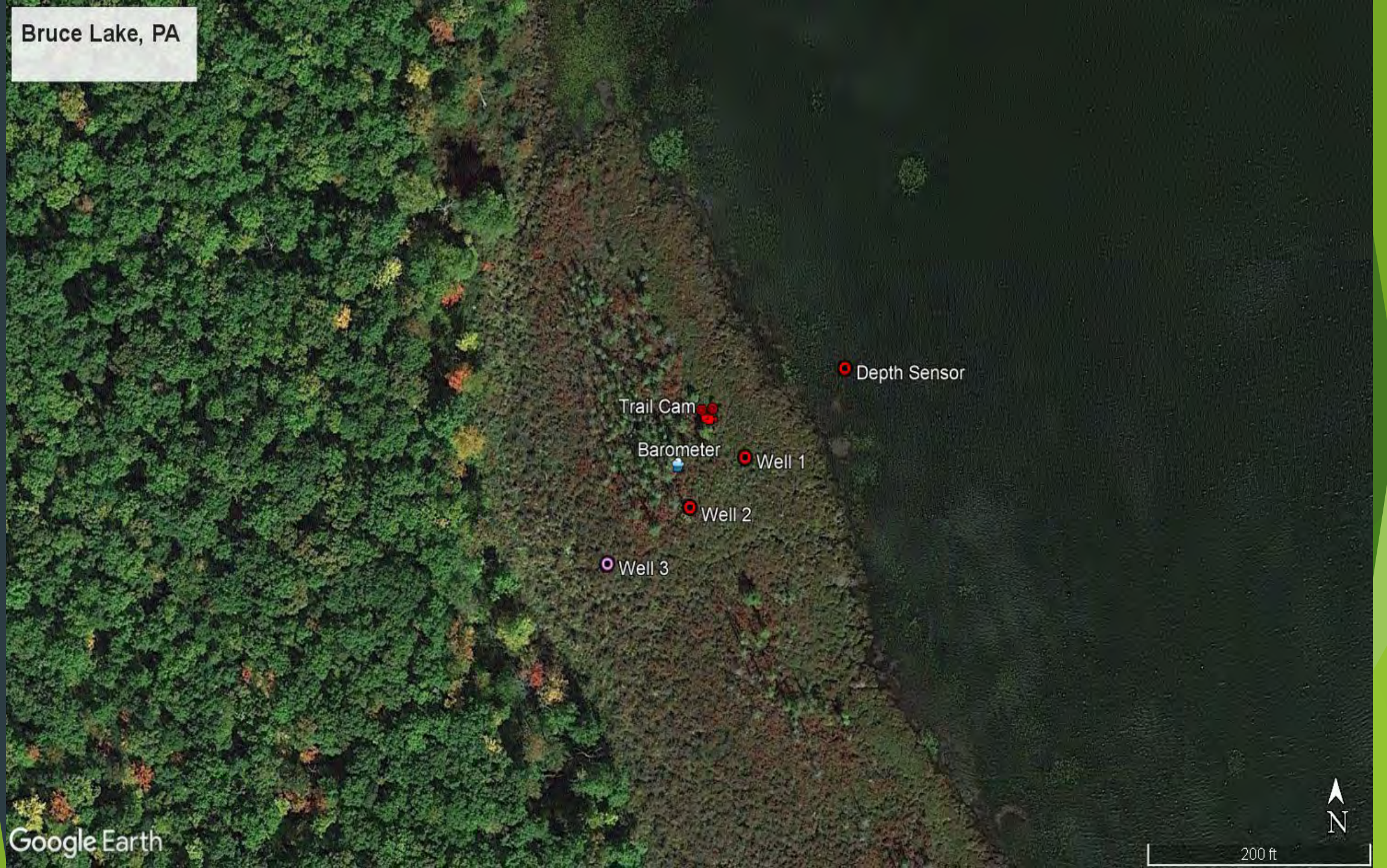

08.01.2023

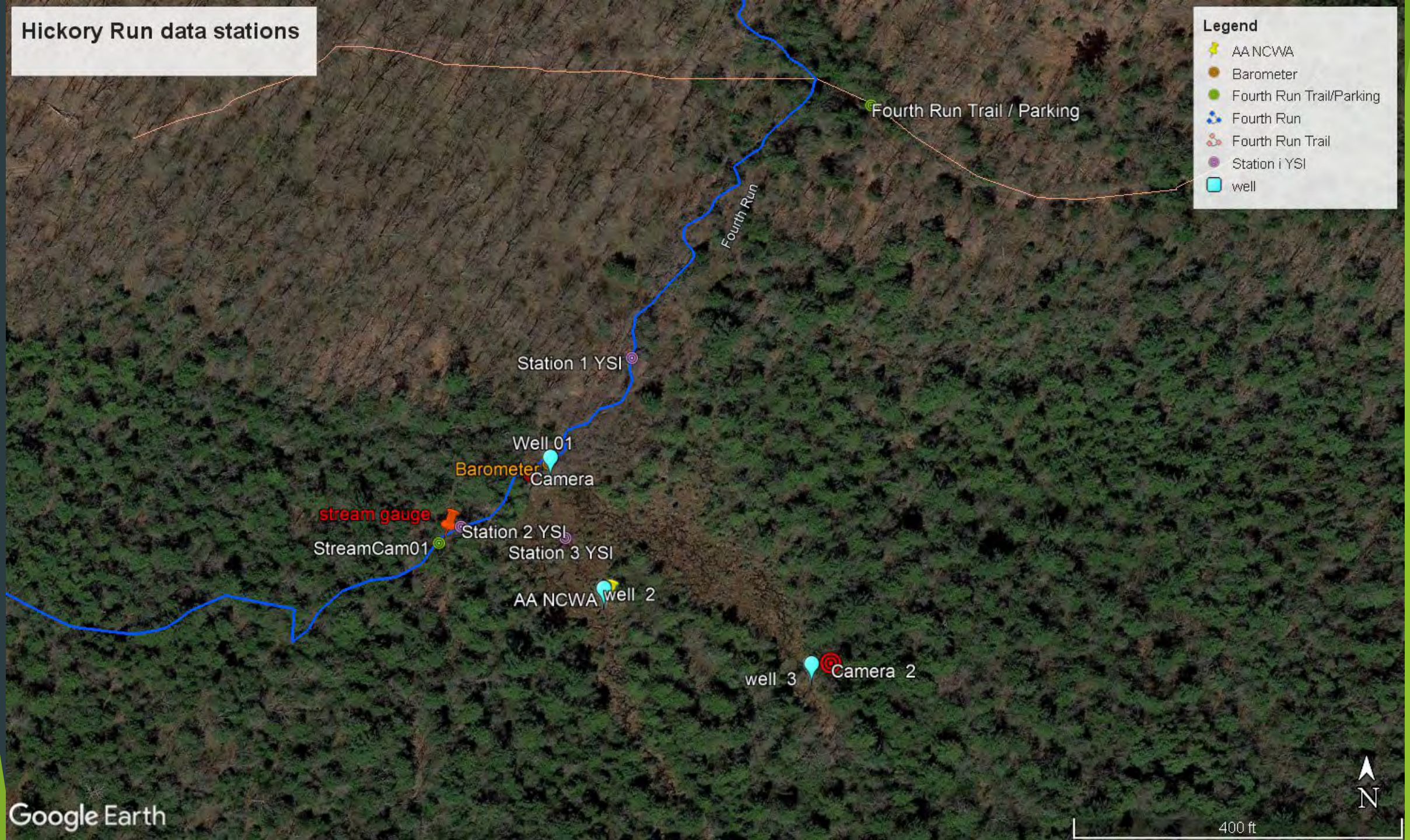

Shingle Shanty Preseve, NY
Bruce Lake, PA
Hickory Run, PA
Dennis Creek, NJ
Canary Creek, DE
Cranberry Glades, WV
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Delaware Station
Broadkill Watershed
Lewes

UD wind turbine


Cranberry Glade, WV
Cranberry Glades Botanical Area
Legend
Cranberry Glades, WV
level sensor and camera
soil
Transect
water level sensor and camera
PFO soil
NWCA & soil
Cranberry Glades, WV
evel sensor and camera
alder soil
Google Earth
N
1000 ft


Bruce Lake, PA
Depth Sensor
Trail Cam
Barometer
Well 1
Well 2
Well 3
Google Earth
N
200 ft


Hickory Run data stations
Legend
AA NCWA
Barometer
Fourth Run Trail/Parking
Fourth Run
Fourth Run Trail
Station i YSI
well
Fourth Run Trail / Parking
Fourth Run
Station 1 YSI
Well 01
Barometer
Camera
stream gauge
Station 2 YSI
StreamCam01
Station 3 YSI
AA NCWA
well 2
well 3
Camera 2
Google Earth
N
400 ft

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