
Impacts of Aquatic Vegetation on Power Generation

T. Matthew Boyington, Ph.D., P.E.
TVA (River Management)

October 11, 2021



Overview

Increase in floating aquatic vegetation (FAV) in past two years

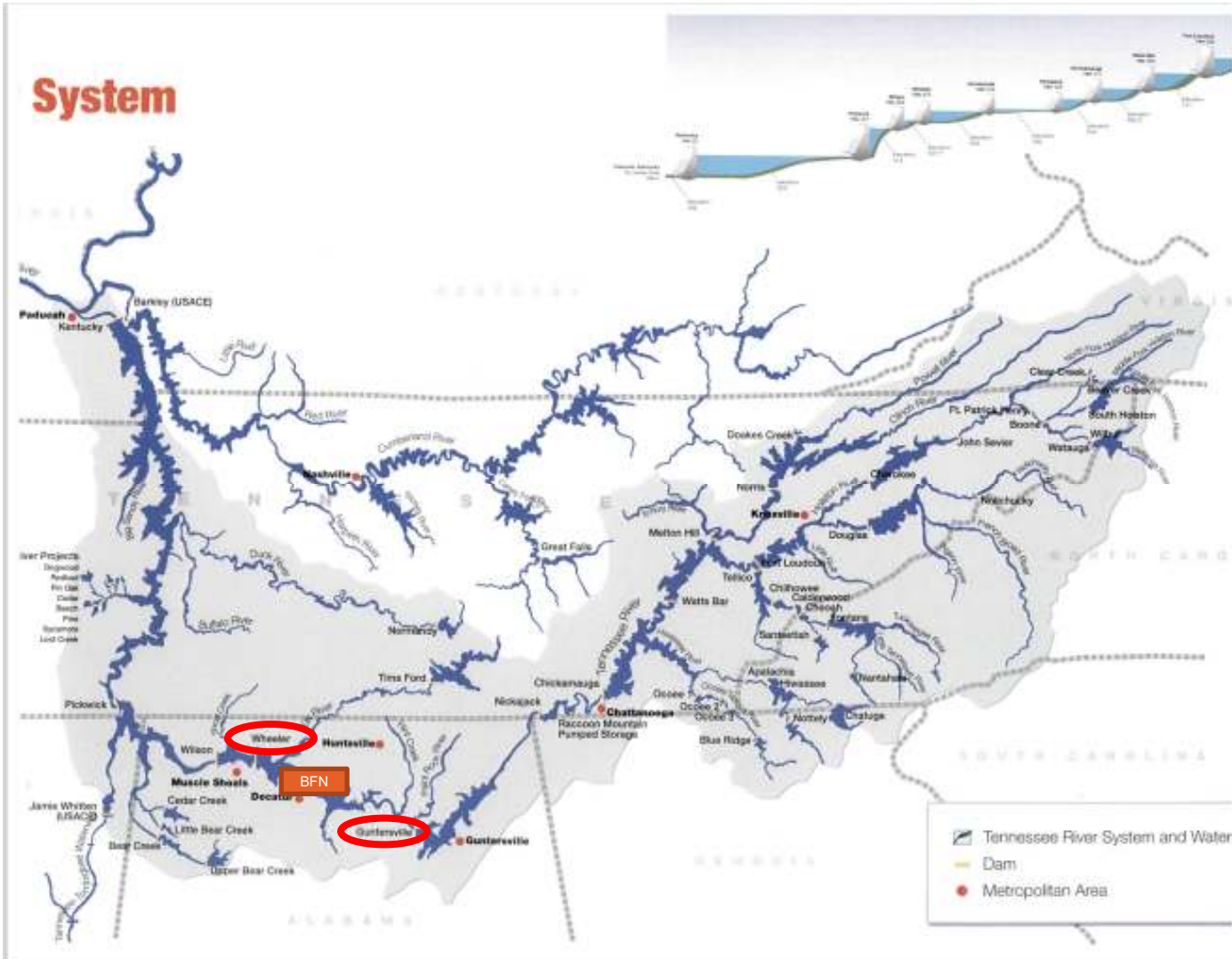
Eelgrass now seen in Wheeler Reservoir and is widespread on Guntersville Reservoir

Mix of invasive and non-invasive species

Cause of increased aquatic vegetation not known

Increased threats to power generation due to floating aquatic vegetation (FAV)

Wind is a significant driver of uprooting and incursion seen at Browns Ferry



System

Dam	River Miles
Wheeler	74
Guntersville	55

Facility	Capacity (MW)
Browns Ferry	3,600
Wheeler	300
Guntersville	120

BFN Incursion

- July 2020



BFN Incursion



Guntersville and Wheeler Dams



- Over past 18-24 months
- Multiple events at Guntersville Dam and Wheeler Dam
- Threats to generation

Shorelines and Boat Docks



Reservoir



Aquatic Species

Eelgrass



- New to Wheeler Reservoir (2 years)
- Fragile (low tensile strength)
- Small mass
- Interconnected



Hydrilla, Stargrass, and Coontail

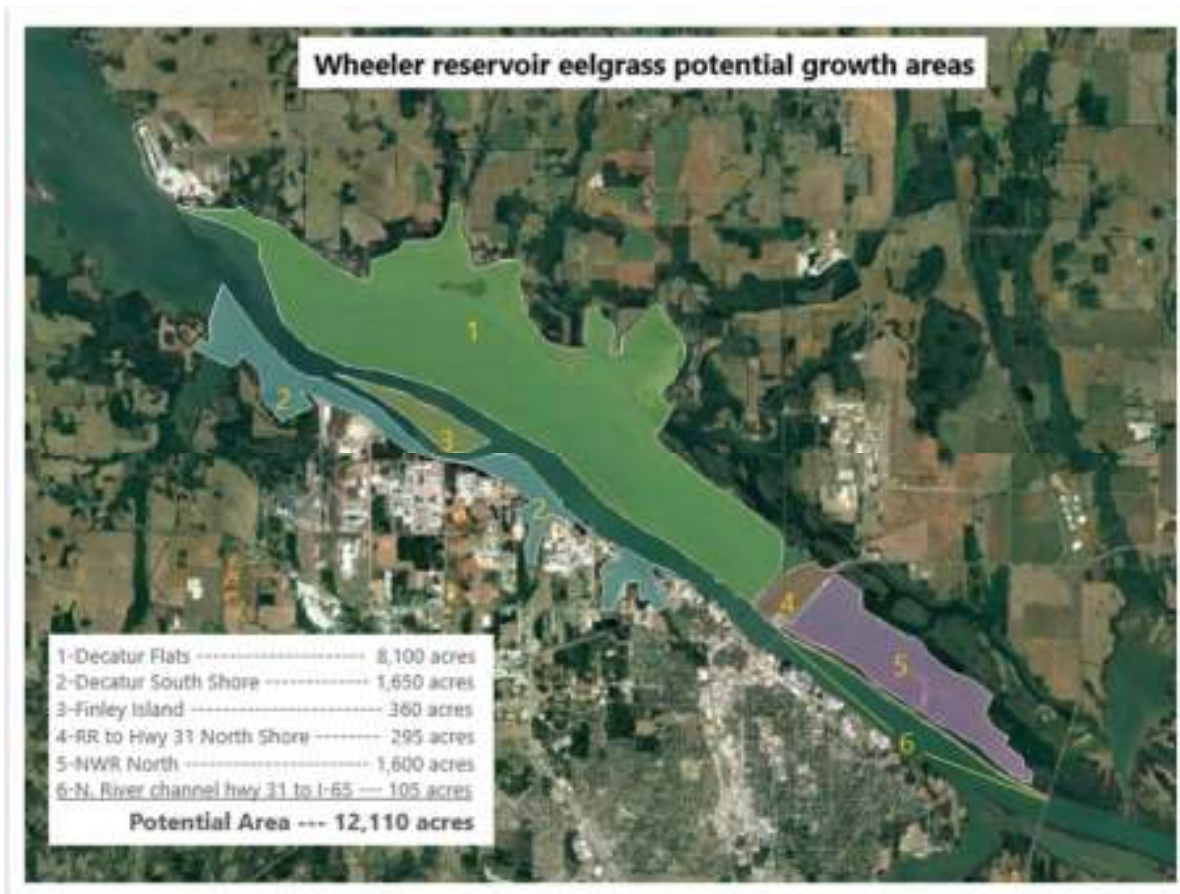
Stargrass



Hydrilla

Coontail





Response

BFN Barge Wall



Harvesters

- 24/7 staffing
- Logs e-mailed 2x per day



Observations

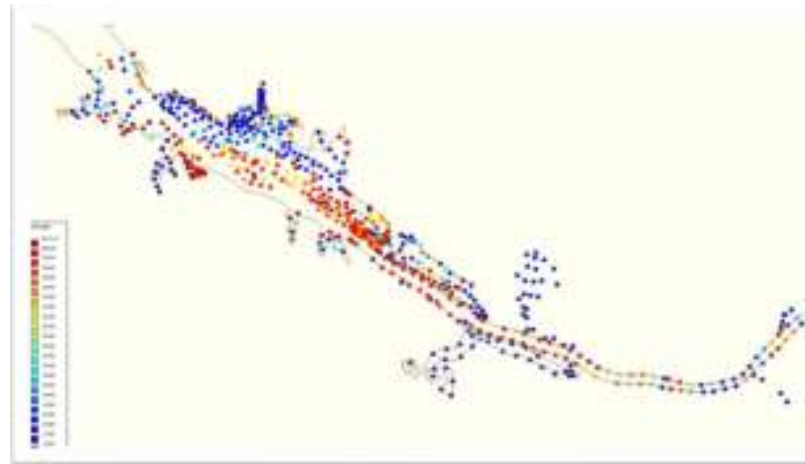
- Helicopter or airboat observations of Wheeler Reservoir and Gunterville Reservoir
- 2x per week
- Mailed to River Management



Mapping and Field Investigations

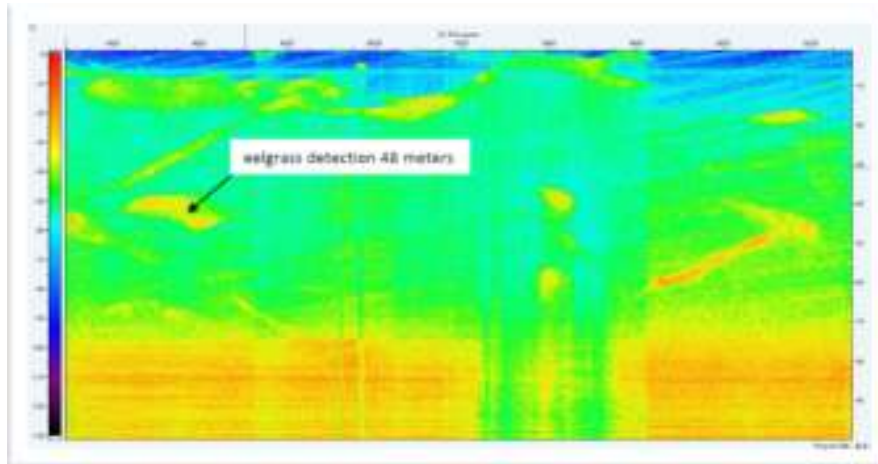


- Aquatic plant mapping (Summer 2021)
- 2300+ data points
- 200x200 meter grid
- Tensile strength tests of major species
- Bathymetric survey commissioned in 2021



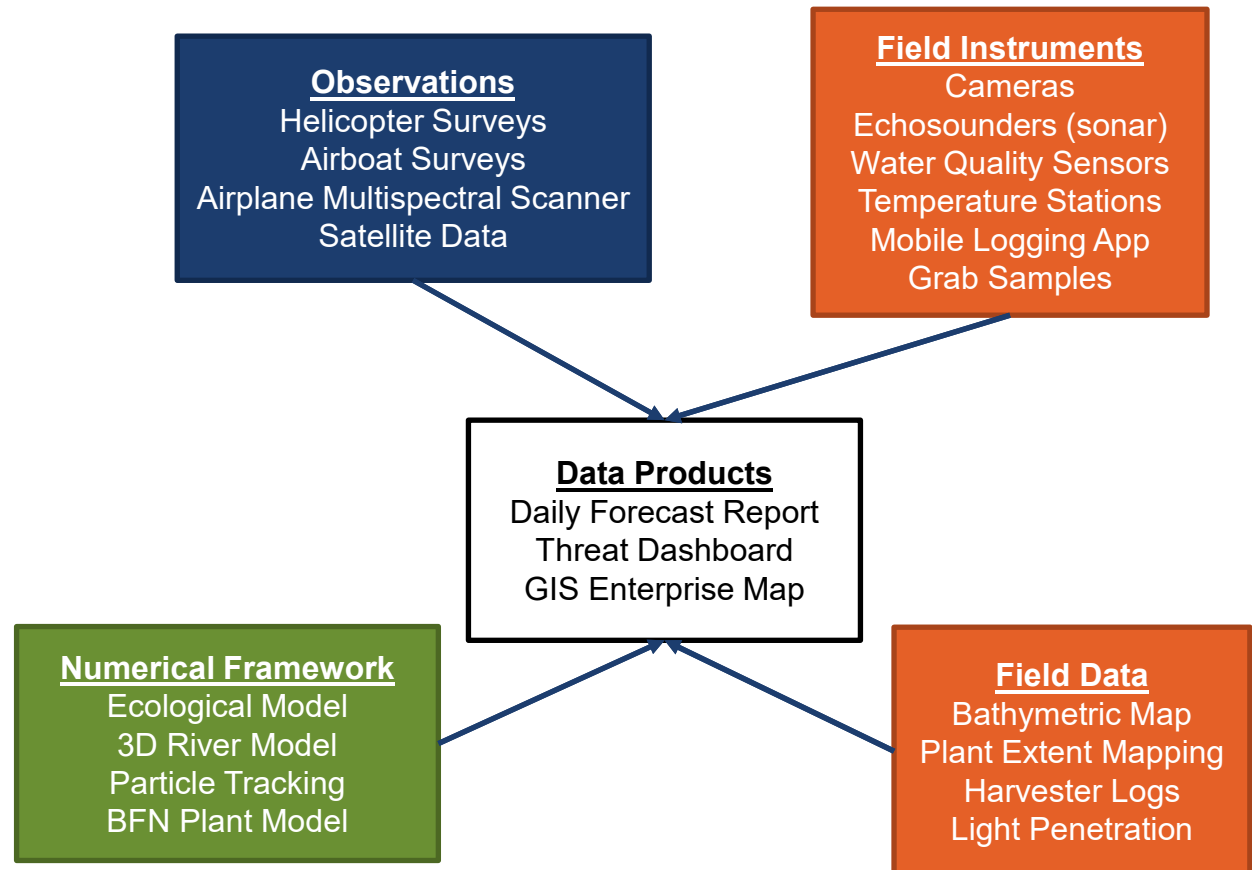
Instrumentation

- Visible spectrum cameras at strategic locations
- Photogrammetric analysis to calculate surface area of floating vegetation maps
- Echosounders (sonar) to measure flux of submerged aquatic vegetation



Forecasting

- Project under way to develop an Aquatic Vegetation Predictor (AVP) model
 - Extension of the modeling framework used for the river temperatures
 - Initial deployment in late 2021
- Dashboard to report severity of various indicators
- Daily forecast report to be issued by River Management
- Regular field observations to continue



Summary

Path Forward

Explore operating strategies on Wheeler Reservoir (e.g., low pool levels during winter months to desiccate seeds)

Closely monitor wind conditions (uprooting and incursions at BFN intake)

Deploy forecast modeling framework to provide advanced notice of significant events on Wheeler Reservoir

Continue regular field observations

Foster close working relationships between strategic business units

TVA

**TENNESSEE
VALLEY
AUTHORITY**