

Florida Department of Environmental Protection



Upper Wakulla River and Wakulla Springs BMAP Monitoring Plan

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Reminder - Criteria

- The TMDL will be achieved when the Upper Wakulla River meets the nitrate concentration of 0.35 mg/l and attains the Class III biology criterion.
- This is consistent with the springs numeric nutrient criteria, which will be applied to the water quality of the Wakulla Spring boil during the next 5 year assessment cycle.



Monitoring Plan Objectives

- Primary Objectives:
 - Track trends in nitrate concentrations and loads in the Upper Wakulla River and Wakulla Springs.
 - Determined through water quality sampling.
 - Track trends in the biological communities in the Upper Wakulla River.
 - Determined through biological assessments.



River Monitoring

- To meet the first of the primary objectives, the following monitoring will occur on the river:
 - Northwest Florida Water Management District (NFWFMD) will continue to collect monthly samples near the upper bridge and field parameters at the recreational area boat dock.
 - NFWFMD will start collecting monthly samples at the boat dock.
 - NFWFMD will start collecting water quality samples two times per year at the biological sampling sites.
 - The Florida Department of Environmental Protection (FDEP) will start collecting water quality samples two times per year at the biological sampling sites.



River Monitoring, continued

- Changes since the May meeting:
 - FDEP added water quality samples twice per year at the biological sampling sites.
 - The list of water quality parameters was refined to match the NFWFMD's standard parameters list.
 - FDEP added NFWFMD's continuous river level recorder and continuous pH, specific conductance, and temperature recorders to the monitoring plan.



Water Quality Parameters – River Sites

Core Parameters	Supplemental Parameters	Field Parameters
Nitrate + Nitrite (as N)	Chlorophyll-a	Water Temperature
Ammonia (as N)	Total Organic Carbon	pH
Kjeldahl Nitrogen	Total Phosphorous	Specific Conductance
-	Chloride	Dissolved Oxygen
-	Sulfate	Sample Depth
-	Fluoride	Secchi Depth
-	Calcium	-
-	Magnesium	-
-	Sodium	-
-	Potassium	-
-	Alkalinity	-
-	Hardness	-
-	Turbidity (lab)	-
-	Specific conductance (lab)	-
-	Color (true)	-
-	Total Suspended Solids	-
-	Total Dissolved Solids	-



Spring Vent/Conduits Monitoring

- To meet the first of the primary objectives:
 - NFWFMD will continue to collect quarterly water quality samples at the spring vent.
 - FDEP's Ground Water Management Section will continue to collect quarterly samples at the spring vent and six conduits.
 - FDEP's Ground Water Management Section plans to purchase and have installed a continuous Sauna Nitrate Meter at the spring vent.



Spring Vent/Conduits Monitoring, continued

- Changes since the May meeting:
 - FDEP monitoring staff talked with Wakulla Springs State Park staff about the tick problem around some of the conduits.
 - Park staff will clear around the conduits to allow for quarterly sampling.
 - The list of water quality parameters was refined to match the Ground Water Management Section's standard list of parameters.
 - FDEP added the continuous spring vent nitrate meter to the monitoring plan.



Water Quality Parameters – Spring Vent and Conduit Sites

Core Parameters	Supplemental Parameters	Field Parameters
Nitrate + Nitrite (as N)	Sucralose	Water Temperature
Ammonia (as N)	Nitrogen Isotopes	pH
Kjeldahl Nitrogen	Oxygen Isotopes	Specific Conductance
-	Total Phosphorous	Dissolved Oxygen
-	Ortho-Phosphate (as P)	Sample Depth
-	Organic Carbon	-
-	Dissolved Solids	-
-	Suspended Solids	-
-	Turbidity	-
-	Color (true)	-
-	Boron	-
-	Calcium	-
-	Magnesium	-
-	Sodium	-
-	Potassium	-
-	Chloride	-
-	Sulfate	-
-	Fluoride	-
-	Alkalinity	-



Biological Monitoring

- To meet the second of the primary objectives, the following monitoring will occur:
 - Rapid Periphyton Survey (RPS) - Assessment of algae in river, both abundance and variety.
 - Linear Vegetation Survey (LVS) - assessment of plants in river, presence of native versus non-native species.
 - Stream condition index (SCI) - assessment of the number of different organisms present.
 - Habitat assessment (HA) - assessment of the river conditions and habitat present to help support the SCI evaluation.



Biological Monitoring, continued

- NFWFMD will conduct RPS, LVS, SCI, and HA two times per year a half mile downstream and 200 meters downstream of the upper bridge.
- FDEP will conduct RPS, LVS, SCI, and HA an additional two times per year at the same two biological monitoring sites.



Biological Monitoring, continued

- Changes since the May meeting:
 - FDEP determined that quarterly biological sampling for a few years should provide enough information to determine a statistically significant frequency.
 - FDEP will collect biological data two times per year, in addition to NFWFMD's two times per year.
 - SCI and HA were added at both biological sampling locations.



Flow Monitoring

- To understand concentrations as river loads, which will meet the first primary objective, the following flow monitoring will occur:
 - The U.S. Geological Survey (USGS) will continue to maintain the flow gage at the upper bridge, which is funded by FDEP.
 - NFWFMD will continue to maintain the flow gage at the spring vent, which include direction of flow, conductivity, temperature, and pressure.
 - FDEP's Florida Geological Survey (FGS) will continue to maintain the flow gages in B, C, D, AD, K, and AK tunnels.
 - FDEP and partners are looking to re-establish the flow gage at Spring Creek.



Flow Monitoring, continued

- Changes since the May meeting:
 - The NWFWMD flow gage at the spring vent was added to the monitoring network.
 - The FGS flow gages in the conduits were added to the monitoring network.

Proposed BMAP Monitoring Network





Discussion on the Proposed BMAP Monitoring Plan



Questions

- For questions and comments on the monitoring plan, please contact:
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