



OVERVIEW OF THE STATUS AND TREND MONITORING NETWORKS

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Florida Department of Environmental Protection

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PRESENTATION OUTLINE

1. Division water quality monitoring efforts and associated programs.
2. Status and trend monitoring networks.
3. Uses of status and trend monitoring data and online resources.



DIVISION OF ENVIRONMENTAL ASSESSMENT AND RESTORATION (DEAR)

WATER QUALITY MONITORING

Why Do We Sample Water?

Federal Requirements:

- To “Protect physical, chemical, and biological integrity.”
- Clean Water Act sections 303(d) and 305(b).
 - Produce Integrated Report and submit to U.S. Environmental Protection Agency (EPA) every two years.

Florida Legislation:

- Florida Statutes (F.S.) Chapters 376 and 403 authorize DEP to monitor water quality through state programs.
- Florida Administrative Code (F.A.C.) Chapters 62-302 and 62-303 provide the regulatory framework to assess whether Florida waters are meeting water quality standards for designated uses.



DEAR

WATER QUALITY MONITORING

Programs with Monitoring Efforts

- Water Quality Monitoring Program – Sarah Noble.
- Water Quality Evaluation and TMDL Program – Kevin O'Donnell.
- Water Quality Restoration Program – Moira Homann.



DEAR WATER QUALITY MONITORING MONITORING NEEDS

Site-Specific Monitoring of Individual Waterbodies.

- Strategic monitoring used for determination of impairment.

Basin Management Action Plans (BMAPs) and Restoration Focus Areas (RFAs).

- Monitoring condition of watersheds containing impaired waters.

Statewide, Region-wide and Watershed Assessments.

- Status and Trend Monitoring for statewide and region-wide condition.



WATER QUALITY MONITORING PROGRAM

ADMINISTRATIVE STRUCTURE

Watershed Monitoring Section (WMS).

- Responsible for Status and Trend Monitoring Network Design and Implementation.

North Sampling Operations.

- DEP Northwest, Tallahassee, and Northeast Regional Operation Centers (ROCs).
- Christopher 'Stopher' Slade manages North ROCs.

South Sampling Operations.

- Central, Southwest, Southeast, and South ROCs.
- Sarah Meyer manages South ROCs.



WATERSHED MONITORING SECTION

STAFF

Section Administration.

- **James 'Jay' Silvanima.**

Quality Assurance.

- **Rachael Dragon.**

Project Managers.

- **Tom Seal:** Contracted sampling by NFWFMD, SJRWMD, and Alachua County.
- **Shaun Young:** Northwest, Northeast, and Tallahassee ROCs.
- **Vacant:** Central, South, Southeast, and Southwest ROCs and the SFWMD under a memorandum of understanding (MOU).

Data Management and Analysis.

- **Stephanie Sunderman-Barnes:** Oversight and QA/QC.
- **Thomas Adams and Vacant:** Data Management.
- **Rick Copeland and Lesette Campbell:** Data Analysis.

NFWFMD: Northwest Florida Water
Management District

SJRWMD: St. John's River Water
Management District

SFWMD: South Florida Water
Management District

QA/QC: Quality Assurance and
Quality Control



WATERSHED MONITORING SECTION

STATUS AND TREND MONITORING TEAMS

Department of Environmental Protection.

- Regional Operations Center Staff located in in Pensacola, Tallahassee, Jacksonville, Orlando, Temple Terrace, Fort Myers, and Fort Pierce.

External Partners.

- NFWFMD, SJRWMD, SFWMD, and Alachua County.

NFWFMD: Northwest Florida Water Management District

SJRWMD: St. John's River Water Management District

SFWMD: South Florida Water Management District



WATERSHED MONITORING SECTION

The foundation for scientific sampling is solid quality assurance.

Need to be sure we are following the same protocols!

- Sampling protocols taught for Status and Trends (S&T) network.
- Required to attend course and pass exam, five-year renewal policy.
- QA Officer oversees training and follows up with field audits throughout the state.



STATUS AND TREND MONITORING NETWORKS

Both focus on statewide/region-wide assessments.

Status Monitoring Network Goals.

- Characterize statewide and region-wide water resource conditions.
- Infer percentage of each resource that meets standards for designated use (surface water and groundwater) with known confidence.
- Provide estimates of change in Florida's freshwater resources water quality.

Trend Monitoring Network Goals.

- Provide estimates of change in water quality at set stations over time.
- Determine correlations with Status Network monitoring results in the same region.
- Estimate basin-wide surface water pollutant loadings.



STATUS MONITORING NETWORK

SAMPLE SURVEY DESIGNS

- Consist of a random set of water samples selected from a target population which are used to infer the characteristics of the target population.
- Status target populations are the seven water resources as defined in the Watershed Monitoring Section (WMS) Monitoring Design Document.

<https://floridadep.gov/dear/watershed-monitoring-section/documents/watershed-monitoring-design-document>



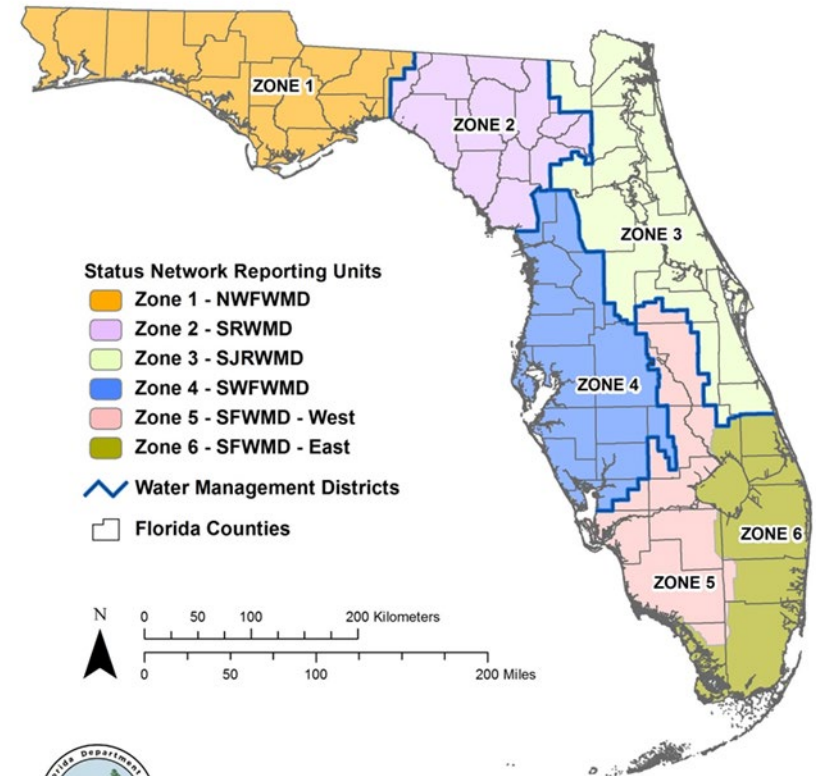
STATUS MONITORING NETWORK

STATUS NETWORK DESIGN

Six Regions/Zones and Seven Water Resources.

- 90 sites per year (15 per zone) sampled for each surface water resource, except for canals.
- 60 sites sampled for canals per year (15 each for zones 3, 4, 5 and 6).
- 120 wells sampled for each groundwater resource per year (20 per zone).

Watershed Monitoring Reporting Units



Created August 24, 2015 by Florida Department of Environmental Protection staff in the Division of Environmental Assessment and Restoration, Watershed Monitoring Section. This map is a representation of ground conditions and is not intended for further analysis. For more information contact (850)-245-8433.



STATUS MONITORING NETWORK

SURFACE WATER DESIGN

- Coverages of flowing waters and lakes are maintained in a geodatabase.
- Random site selections are made from each of the five surface water resources.
- Annually 15 primary selections + 135 alternate selections are made per zone.



STATUS MONITORING NETWORK

GROUNDWATER DESIGN

- List frame of confined and unconfined wells is maintained with input from the water management districts, U.S. Geological Survey (USGS), county/local governmental agencies, and DEP programs.
- Random well selections are made from the list frame for confined and unconfined aquifer sampling.
- Annually 20 primary selections + 180 alternate selections are made per zone.



STATUS MONITORING NETWORK

STATUS NETWORK SITE SELECTION

Resource Type	Site Selection Methodology
Confined & Unconfined Aquifers	Selected by well
Rivers, Streams and Canals	Selected by line work segments
Small Lakes ≥ 4 and < 10 hectares	Selected as centroid of single lake
Large Lakes ≥ 10 hectares	Selected by polygons of lake area – can have multiple stations in one lake



STATUS MONITORING NETWORK

STATUS WATER QUALITY INDICATORS

2022 Sampling Manual pages 128 and 131.

Surface Waters.

- **Core indicators:** field and physical measurements, major ions, metals, nutrients, and bacteria.
- **Resource specific indicators:** 1) habitat assessments for rivers and streams, and 2) lake vegetative index and sediment analyses for lakes.

Groundwater.

- **Core indicators:** field and physical measurements, major ions, metals, nutrients, and bacteria.



STATUS MONITORING NETWORK

STATUS WATER QUALITY INDICATORS

2022 Sampling Manual pages 128 and 131.

Periodically incorporate analytes associated with DEP initiatives.

- In the past, have sampled for pesticides, wastewater tracers, additional trace metals, radiometrics, and volatile organic compounds. These may be resource specific.

2026 calendar year Status Monitoring.

- Algal toxins in all Status surface water resources.



STATUS MONITORING NETWORK

STATUS RECONNAISSANCE / SITE EVALUATIONS

Exclusion Criteria found in 2022 Sampling Manual pages 135-136.

Are Alligators an Exclusion?

If determined to be a safety concern, Yes!

- Characterizing and tracking excluded sites is a challenging part of reconnaissance that carries over into data analysis.
- We have developed an in-house reconnaissance tracking tool to alleviate the problems of tracking information from the field – Generalized Water Information System (GWIS) Database Utilities.



STATUS MONITORING NETWORK

STATUS SITE EVALUATIONS 2020 - 2022

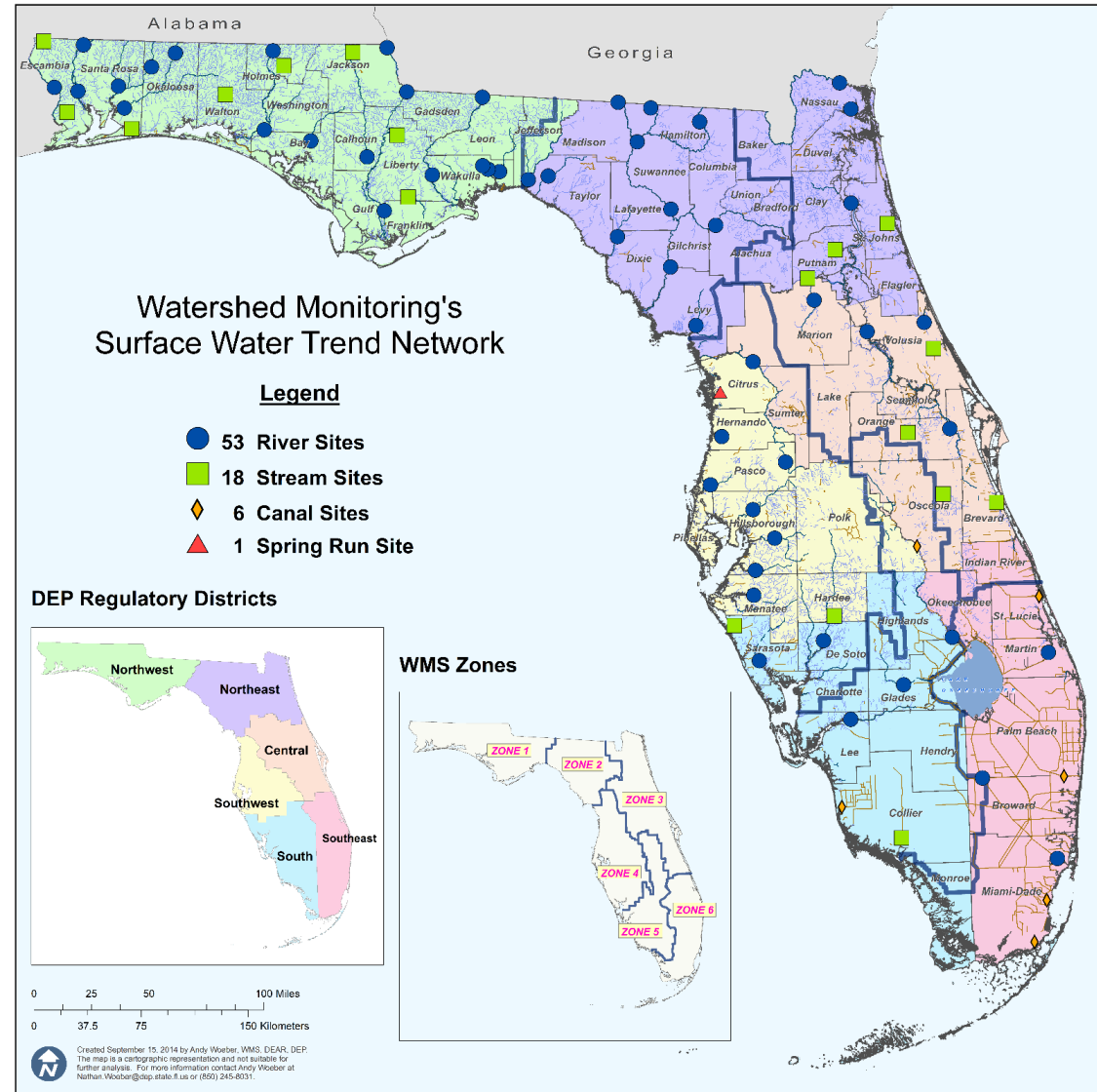
Water Resource	Resource Size - Number in Population	Resource size - Length (miles)	Resource size - Area (acres)	Sites Assessed	Sites Sampled	(%) Sampled	(%) Dry	(%) Inaccessible No Permission Other	(%) Wrong Resource
Large Lakes	1,684	N/A	934,109	323	268	83	3	13	1
Small Lakes	1,574	N/A	24,796	320	182	57	4	34	5
Rivers	N/A	2,616	N/A	405	263	65	7	27	1
Streams	N/A	15,065	N/A	815	203	25	8	61	6
Canals	N/A	2,370	N/A	242	180	74	4	22	0
Unconfined Aquifers	22,581	N/A	N/A	1126	343	30	1	67	2
Confined Aquifers	15,424	N/A	N/A	984	349	35	0	62	3



TREND MONITORING NETWORK

SURFACE WATER TREND NETWORK

78 surface water fixed stations
sampled monthly.





TREND MONITORING NETWORK

SURFACE WATER TREND WQ INDICATORS

2022 Sampling Manual page 131.

- Standard suite of physical and chemical measurements monthly.
- Trace metals suite annually in April.
- Bioassessments (HA, SCI, RPS, LVS) attempted to be performed twice a year (at least four months apart) for sites deemed appropriate for the SCI. Refer to Page 140 figure 2 of the Sampling Manual.
 - HA = Habitat Assessment.
 - SCI = Stream Condition Index.
 - RPS = Rapid Periphyton Survey.
 - LVS = Linear Vegetation Survey.
- Additional analytes at specific sites may include metals, wastewater tracers and pesticides.



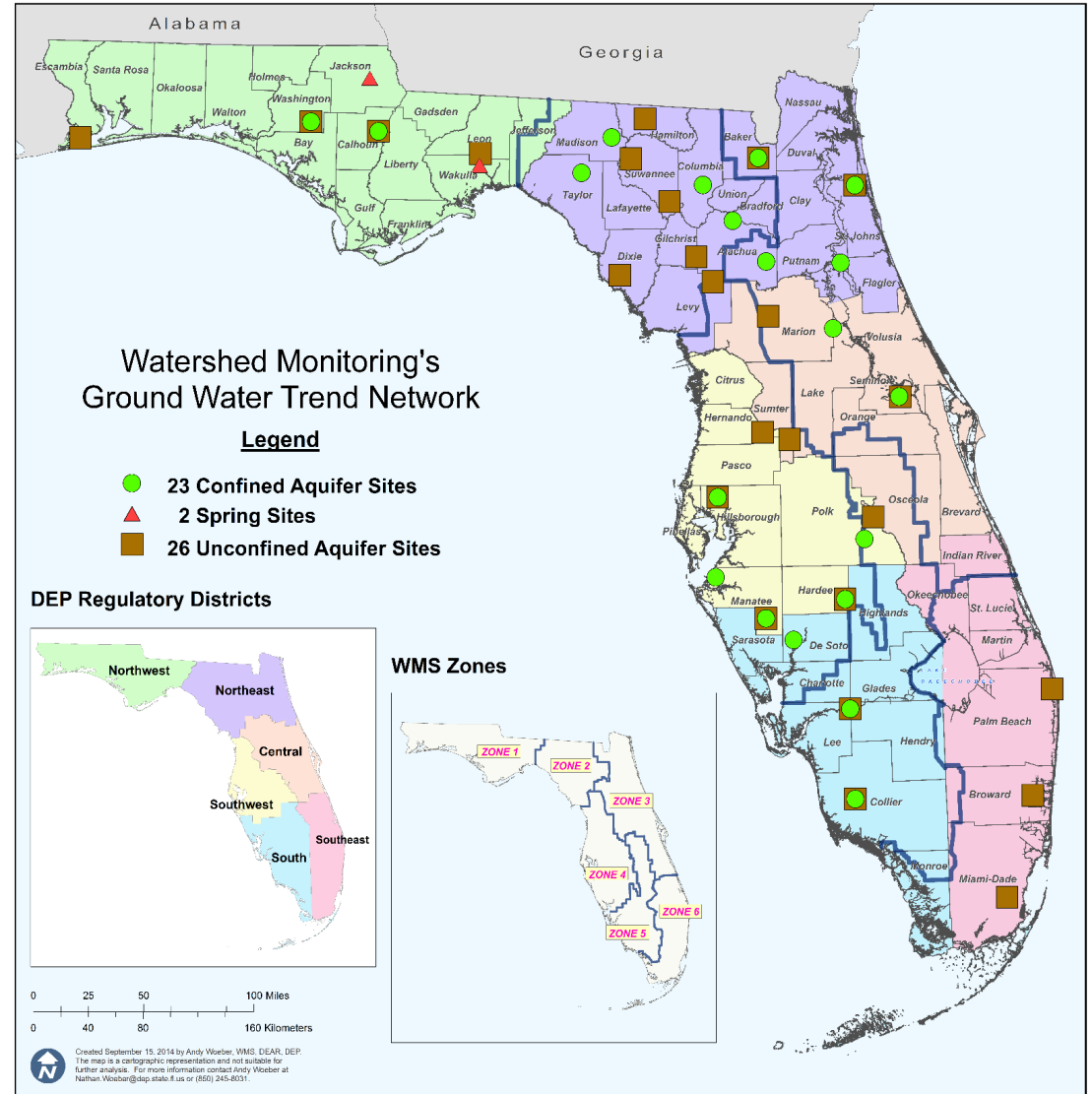
TREND MONITORING NETWORK

GROUNDWATER TREND NETWORK

51 Trend Stations

Confined aquifers sampled four times per year for field measurements and water quality sample collection.

Unconfined aquifers 12 times per year for field measurements, four times per year for both field and water quality sample collection.





TREND MONITORING NETWORK

GROUNDWATER TREND WATER QUALITY INDICATORS

2022 Sampling Manual page 131.

- Onsite measurements monthly at unconfined aquifer wells and quarterly at confined aquifer wells.
- Standard suite of lab analytes quarterly.
- Trace metals collected during October quarterly sampling.



USES OF STATUS AND TREND DATA

- Report for section 305(b) of the Clean Water Act Section.
- Supply data for the determination of impairment.
- Create Statewide and Region-wide (Zone) Water Quality Reports for the public and other members of DEP.
- Support for DEP and other water quality monitoring programs.

<https://floridadep.gov/dear/water-quality-assessment/content/reports-documents-sops-and-links>.



USES OF STATUS AND TREND DATA

2026 INTEGRATED REPORT

**Statewide percentage of 2022-2024 flowing waters
(streams, rivers, and canals) meeting threshold values.**

Analyte	Target Population (miles)	Number of Samples	% Meeting Threshold	Meeting Threshold 95% CB	Assessment Period
TAN	20016	681	100	100	2022-2024
TN	20016	615	71.5	66.1-76.9	2022-2024
TP	20016	615	82.3	79.3-85.2	2022-2024
Chlorophyll a	20016	673	93.5	92.2-94.9	2022-2024
E. coli bacteria	20016	669	73.6	68.8-78.4	2022-2024
DO	20016	681	79.1	74.6-83.7	2022-2024
pH ¹	20016	681	69.7	64.1-75.3	2022-2024
TN_TP_DO ²	20016	615	51.5	45.7-57.4	2022-2024

CB = Confidence bounds; TAN = Total ammonia nitrogen; TN = Total nitrogen; TP = Total phosphorus; E. coli = Escherichia coli; DO = Dissolved oxygen. ¹ 105/681 failures were below the pH threshold; 5/681 failures were above the pH threshold. ² Combined metric representing extent of resource expected to fail any of the three metrics for TN, TP or DO.

Indicator Summary View

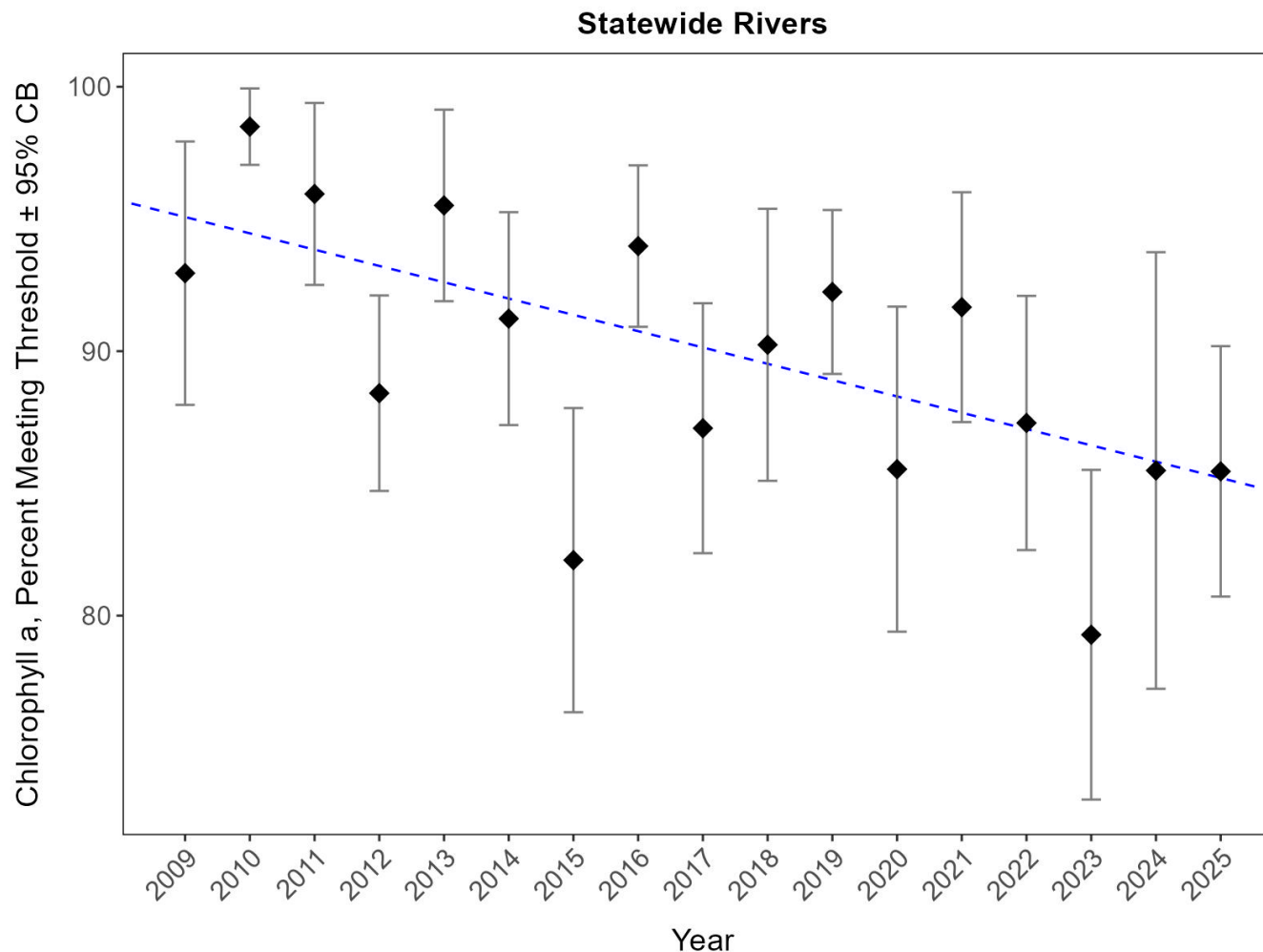
Point Estimate





2009 – 2025 Statewide Percentage of River Kilometers Expected to Pass the Chlorophyll *a* Threshold of 20 µg/L

- Whiskers are 95% confidence bounds
- Dashed blue line is the linear model regression line for the percentiles.



Population	Slope Estimate	Slope LCB95Pct	Slope UCB95Pct	p_Value	R Squared	n
State	-0.617	-1.045	-0.188	0.008	0.386	1369



QUESTIONS?

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Florida Department of Environmental Protection

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