



# OVERVIEW OF THE STATUS AND TREND MONITORING NETWORKS

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Division of Environmental Assessment and Restoration  
Florida Department of Environmental Protection

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# PRESENTATION OUTLINE

1. Division monitoring and the Water Quality Monitoring Program.
2. Watershed Monitoring Section.
3. Status and trend monitoring networks.
4. Uses of status and trends 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:

- Chapters 376 and 403, Florida Statutes (F.S.), authorize DEP to monitor water quality through state programs.
- Chapters 62-302 and 62-303, Florida Administrative Code (F.A.C.), assess whether Florida waters meet 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).
- Vacant position manages North ROCs.

### **South Sampling Operations.**

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



# WATERSHED MONITORING SECTION

## STAFF

### Section Administration.

- **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.
- **Lana Kolonay:** 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 Alisha Kadiri:** 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

QA/QC: Quality Assurance and  
Quality Control





# 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.

## **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. Used to infer the characteristics of the target population via a subset 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>



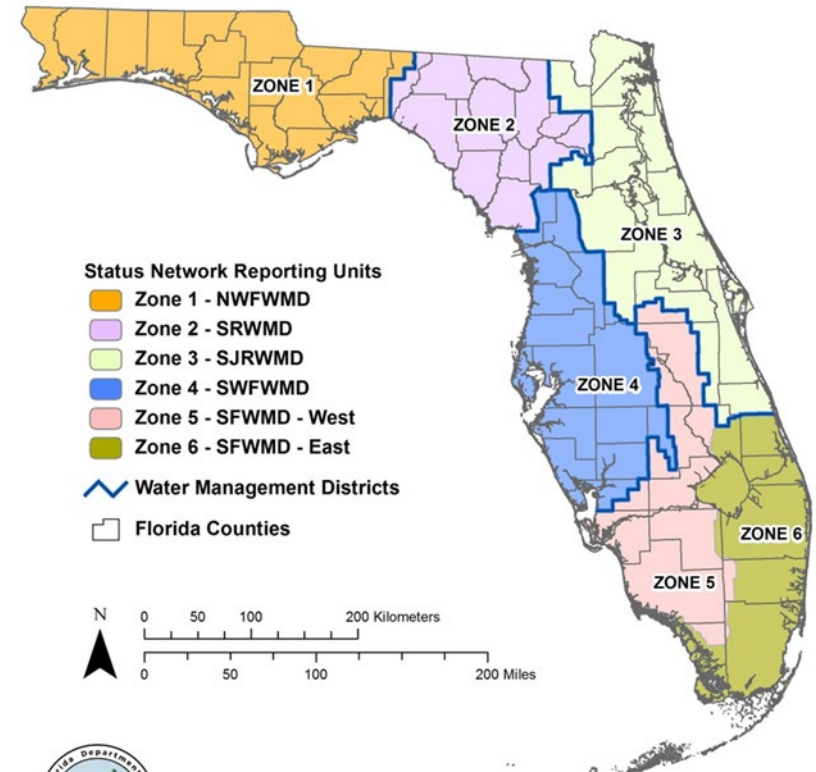
# STATUS MONITORING NETWORK

## 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 $\geq 4$ and $< 10$ hectares	Selected as centroid of single lake
Large Lakes $\geq 10$ 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.

**2025 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

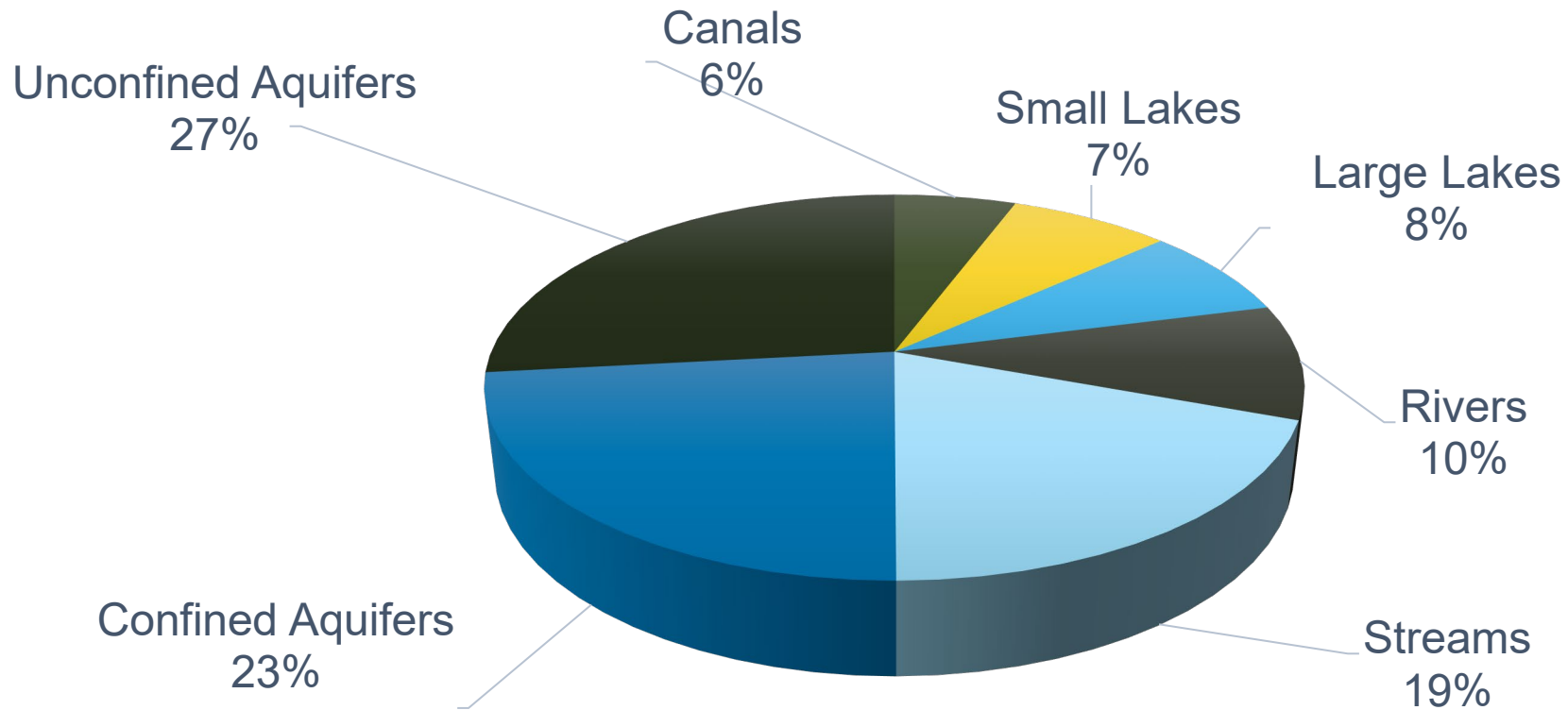
Water Resource	Resource Size - Number in Population	Resource size - Length (miles)	Resource size - Area (acres)	Sites Assessed	Sites Sampled	(%) Sampled	(%) Dry	(%) Inaccessible	(%) Wrong Resource
Large Lakes	1,684	N/A	934,109	323	268	83	3	13	1
Small Lakes	1,574	N/A	24,796	320	182	57	4	34	5
Rivers	N/A	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



# STATUS MONITORING NETWORK

## STATUS SITE EVALUATIONS 2020 – 2022

### Percentage of All Sites Assessed



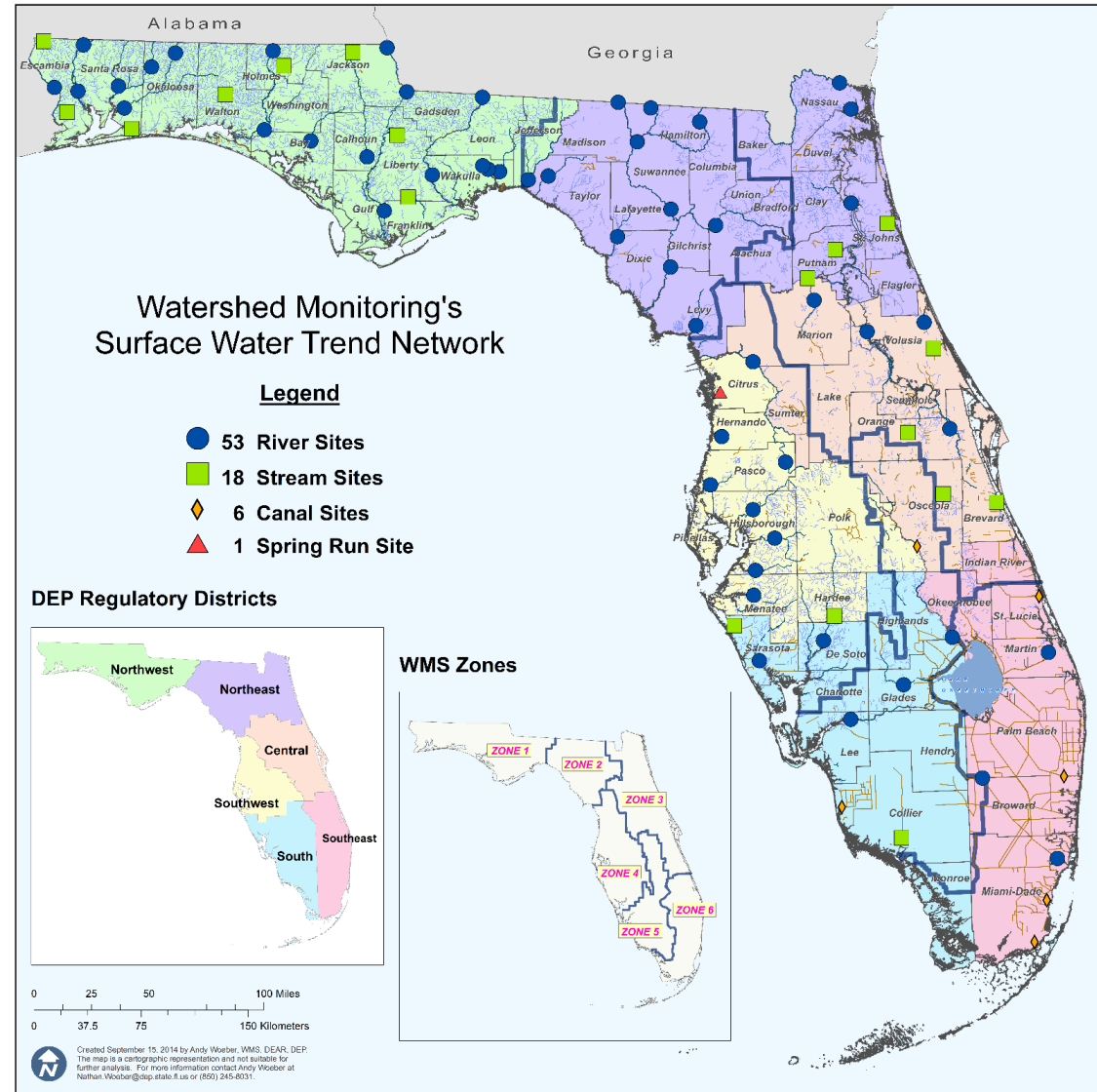
■ Canals ■ Small Lakes ■ Large Lakes ■ Rivers ■ Streams ■ Confined Aquifers ■ Unconfined Aquifers



# 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.



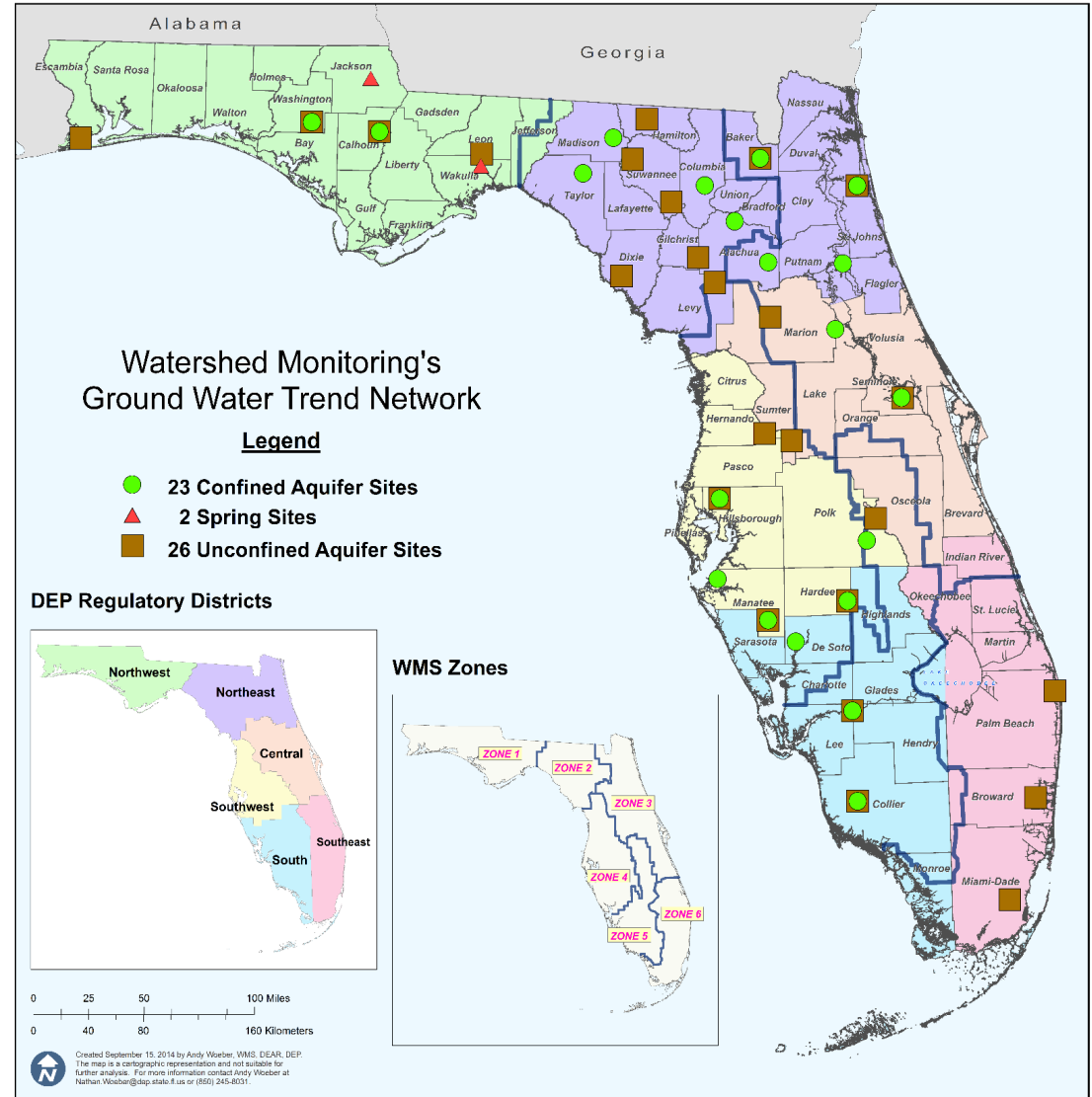
# TREND MONITORING NETWORK

## GROUNDWATER TREND NETWORK

### 51 Trend Stations

**Confined aquifers** sampled four times per year for **in situ** measurements and water quality sample collection.

**Unconfined aquifers** 12 times per year for **in situ** measurements, four times per year for 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 Clean Water Act Section 305(b).
- Supply data for the determination of impairment.
- Create Statewide and Region-wide (Zone) 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

## For 2026 INTEGRATED REPORT

**Statewide percentage of 2022-2024 streams meeting threshold values for indicators calculated using probabilistic monitoring design.**

Analyte	Target Population (miles)	Number of Samples	% Meeting Threshold	% Meeting Threshold 95% CB	Assessment Period
TAN	14998	259	100	100	2022-2024
TN	14998	254	70.6	63.6-77.7	2022-2024
TP	14998	254	81.4	77.8-85.0	2022-2024
Chlorophyll a	14998	258	96.7	95.3-98.1	2022-2024
E. coli bacteria	14998	256	66.9	60.5-73.2	2022-2024
DO	14998	259	76.5	70.8-82.1	2022-2024
pH <sup>1</sup>	14998	259	63.1	55.4-70.9	2022-2024

CB = Confidence bounds; TAN = Total ammonia nitrogen; TN = Total nitrogen; TP = Total phosphorus; E. coli = Escherichia coli; DO = Dissolved oxygen. <sup>1</sup> 69/259 failures were below the pH threshold; 0/259 failures were above the pH threshold.



# USES OF STATUS AND TREND DATA

## For 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 <sup>1</sup>	20016	681	69.7	64.1-75.3	2022-2024
TN_TP_DO <sup>2</sup>	20016	615	51.5	45.7-57.4	2022-2024

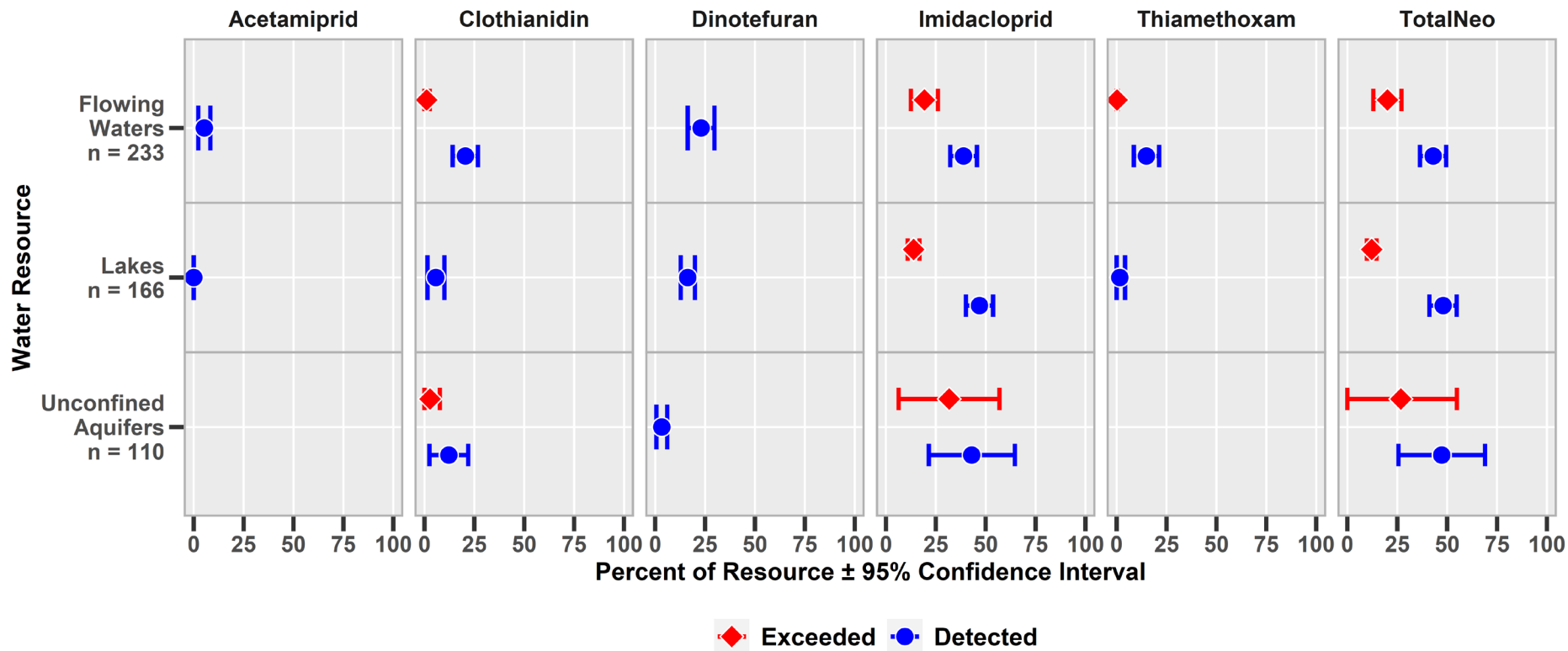
CB = Confidence bounds; TAN = Total ammonia nitrogen; TN = Total nitrogen; TP = Total phosphorus; E. coli = Escherichia coli; DO = Dissolved oxygen. <sup>1</sup> 105/681 failures were below the pH threshold; 5/681 failures were above the pH threshold. <sup>2</sup> Combined metric representing extent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



# USES OF STATUS AND TREND DATA

## 2022-23 STATUS ASSESSMENTS FOR FIVE NEONICS

### Estimated Extent and Potential Toxicity of Neonics in Florida's Freshwater Resources 2022-2023



Method detection limit = 2 ng/L

Chronic invertebrate aquatic life benchmarks used for toxicity estimates

TotNeo = sum of detections and concentrations used for estimates

US EPA IALB used for Individual compounds. Morrissey et al.'s 2015 chronic threshold of 35 ng/L used for total neonics. (<https://doi.org/10.1016/j.envint.2014.10.024>)





# QUESTIONS?

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