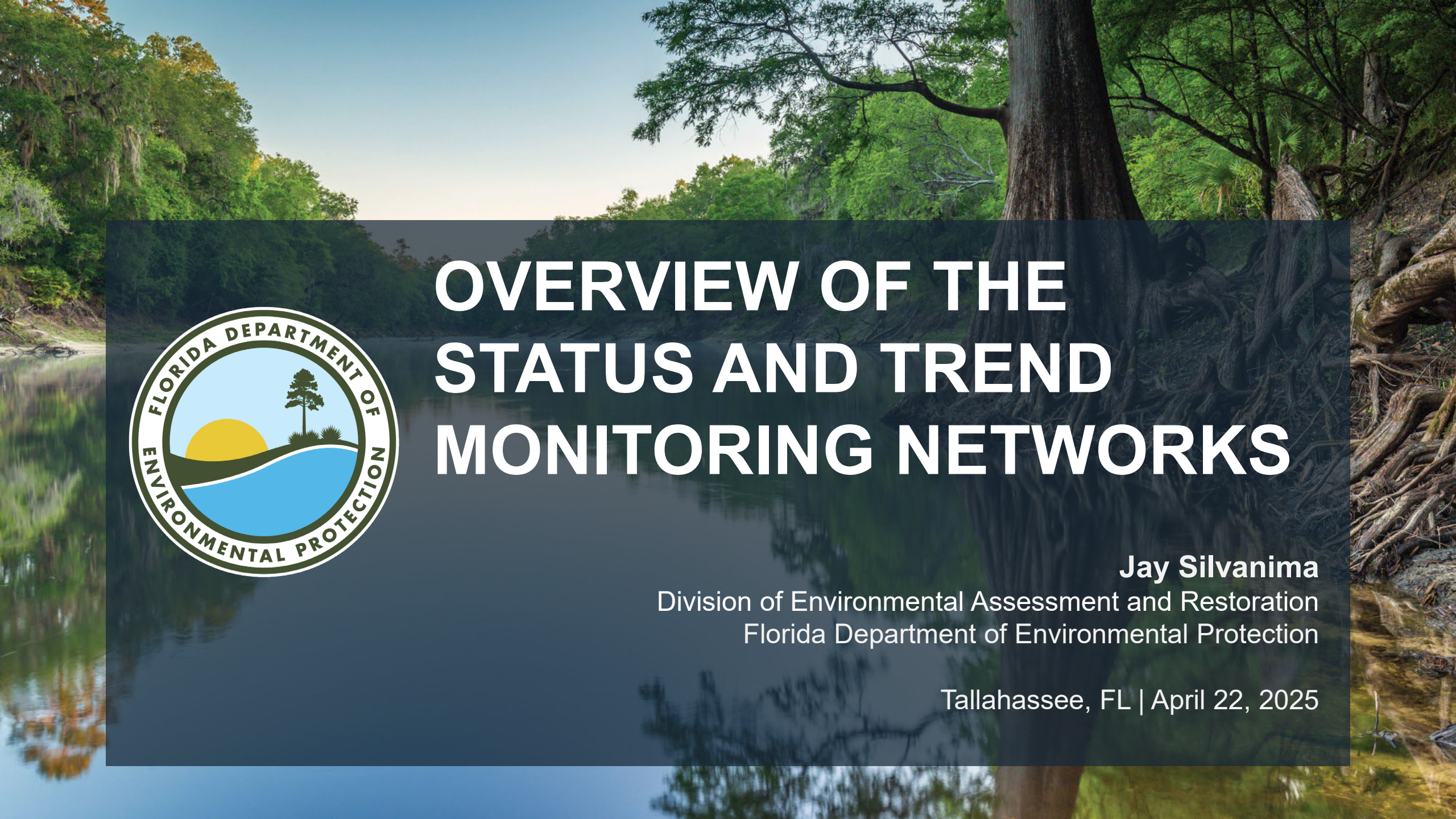


OVERVIEW OF THE STATUS AND TREND MONITORING NETWORKS

Jay Silvanima
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

Tallahassee, FL | April 22, 2025

PRESENTATION OUTLINE

1. Division monitoring and water quality monitoring programs.
2. Watershed Monitoring Section.
3. Status and trend monitoring networks.
4. Uses of status and trends monitoring data and online resources.

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.), authorizes 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).
- Mike King 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 NWFWMD, 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.

NWFWMD: 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.

- NWFWMD, SJRWMD, SFWMD, and Alachua County.

NWFWMD: 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.

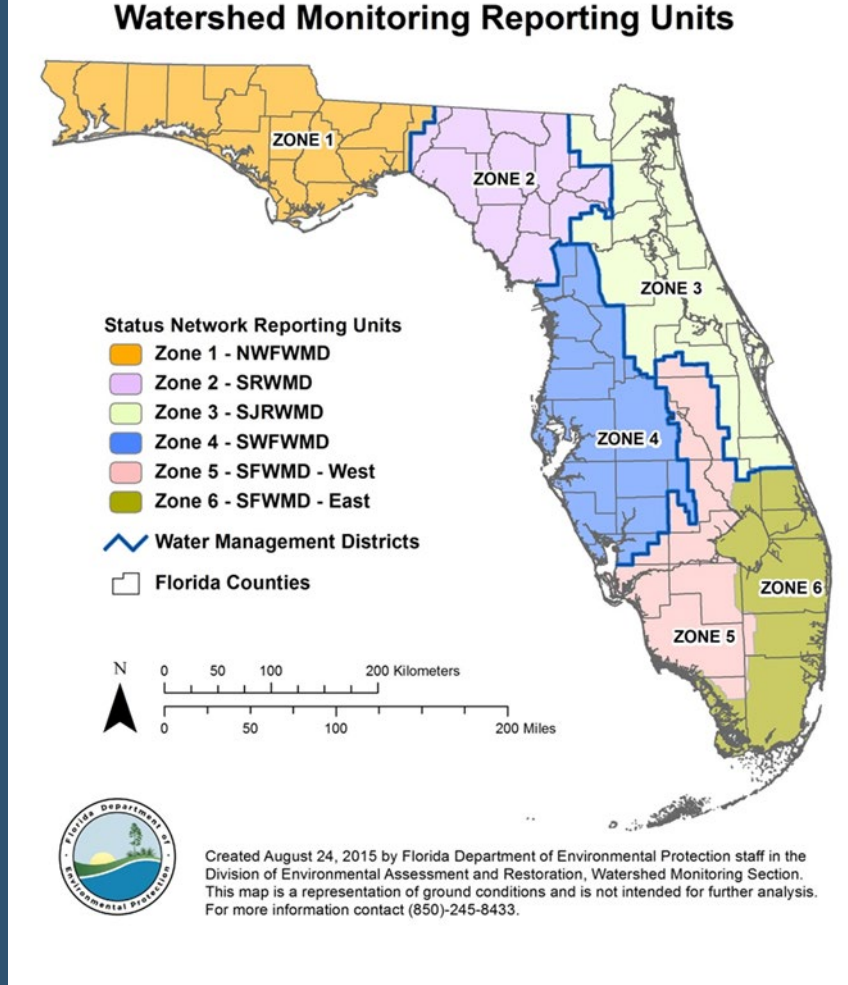
https://floridadep.gov/dear/watershed-monitoring-section/documents/watershed-monitoring-design-document

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).



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.

2025 calendar year Status Monitoring.

- Algal toxins in all Status surface water resources.

STATUS MONITORING NETWORK

STATUS RECONNAISSANCE / SITE EVAULATIONS

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

- 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

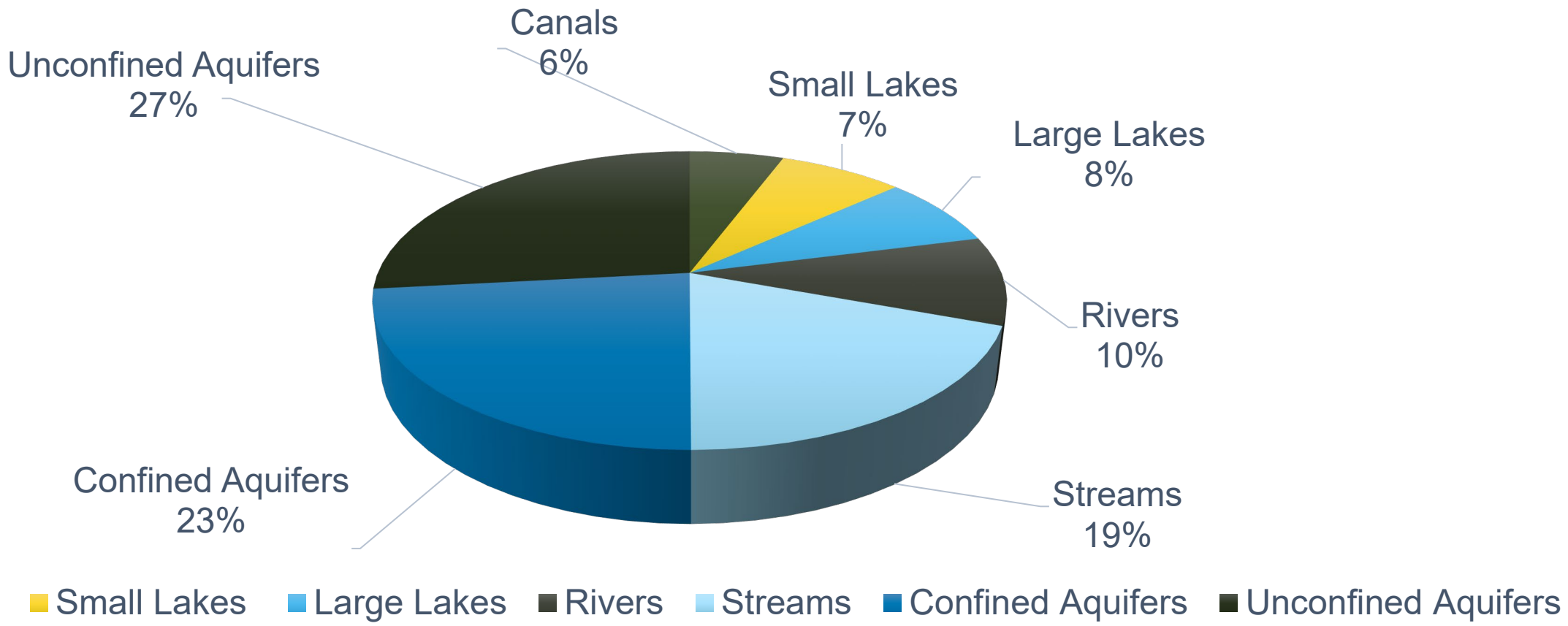
STATUS SITE EVALUATIONS 2020 - 2022

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

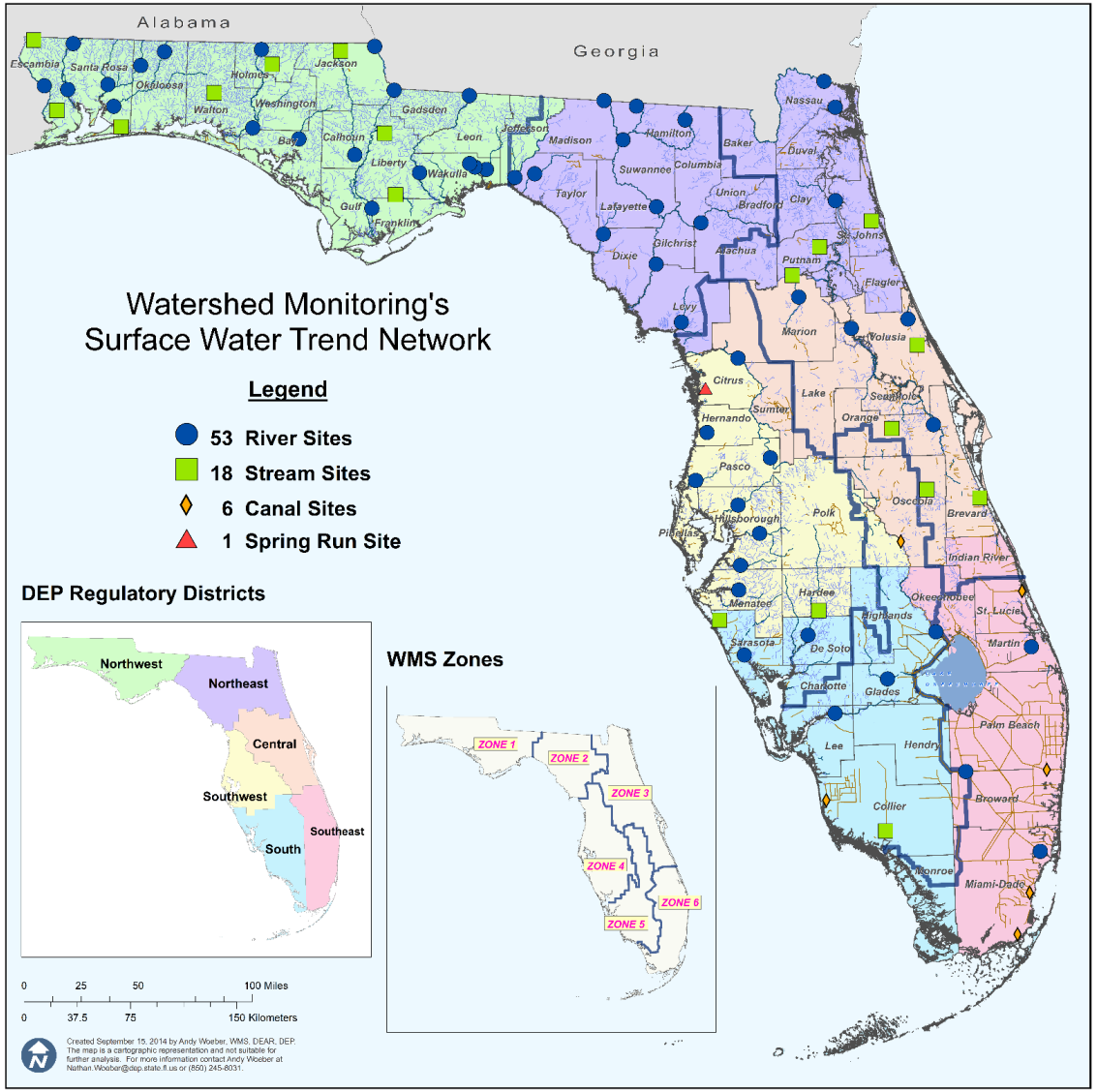
Percentage of All Sites Assessed



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.
- 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.

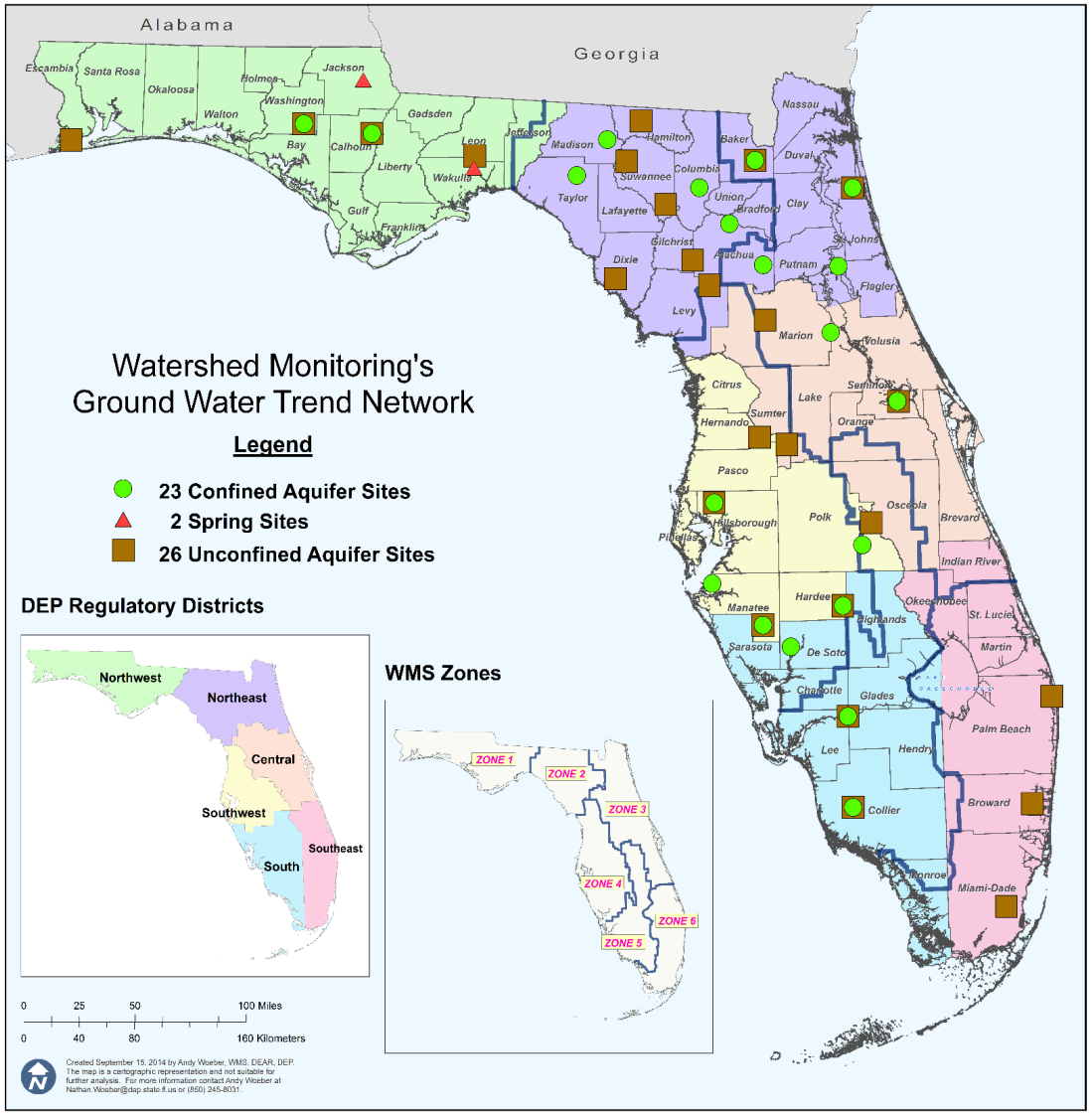
TREND MONITORING NETWORK

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.
- 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.

Statewide percentage of 2020-2022 streams meeting threshold values for indicators calculated using probabilistic monitoring design.

	15066	203	100	100	2020-2022
	15066	193	71.1	64.0-78.2	2020-2022
	15066	194	78.7	73.0-84.4	2020-2022
	15066	203	95.7	92.9-98.6	2020-2022
	15066	202	68.9	61.6-76.2	2020-2022
	15066	203	76.1	69.3-82.8	2020-2022
	15066	203	52.3	45.1-59.5	2020-2022
	15066	190	86.9	82.0-91.9	2020-2022

CB = Confidence bounds; TAN = Total ammonia nitrogen; TN = Total nitrogen; TP = Total phosphorus; E. coli = Escherichia coli; DO = Dissolved oxygen; HA = Habitat Assessment. [1] 62/203 failures were below the pH threshold; 0/203 failures were above the pH threshold.

USES OF STATUS AND TREND DATA

2024 INTEGRATED REPORT

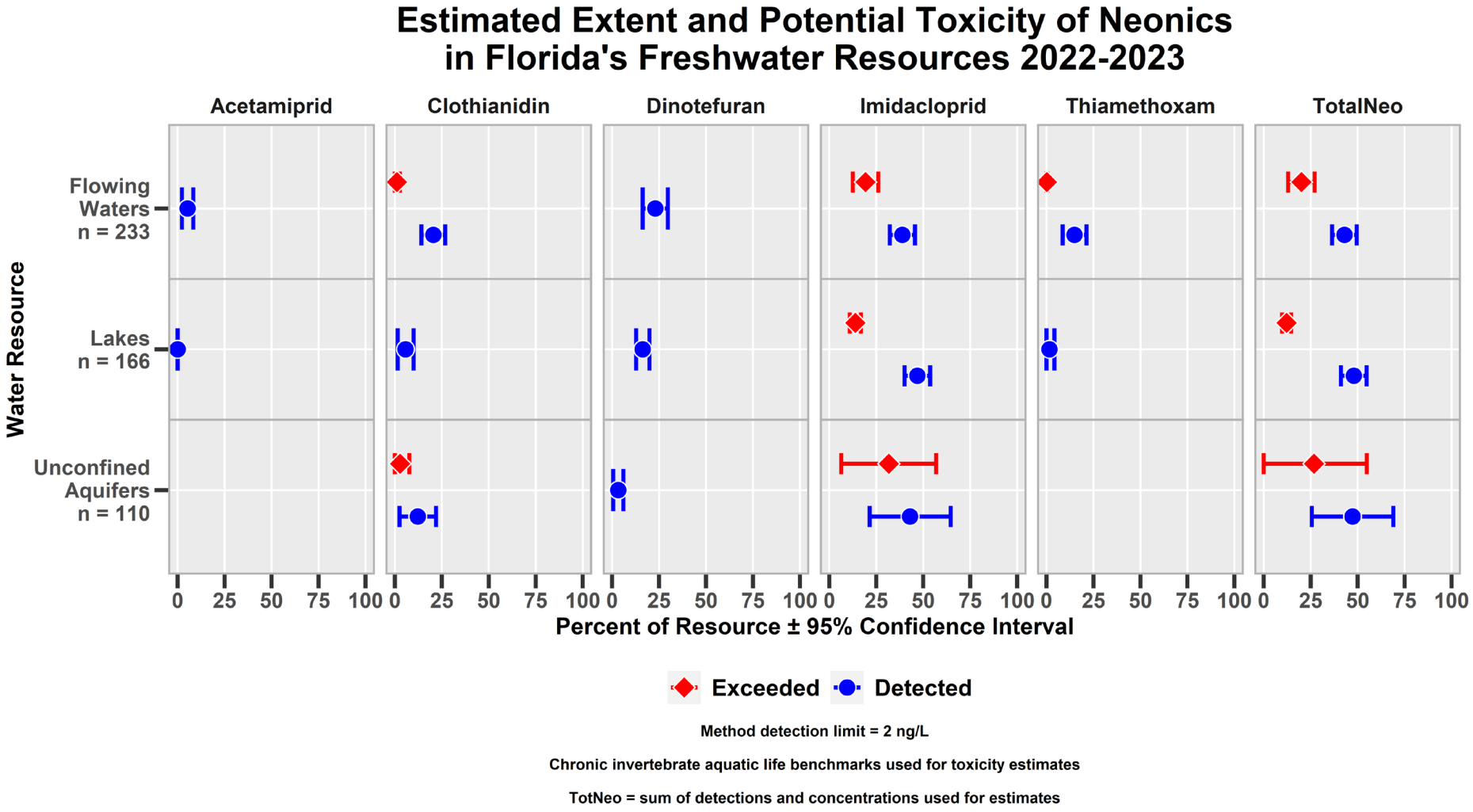
Statewide percentage of 2020-2022 flowing waters (streams, rivers, and canals) meeting threshold values.

Analyte	Target Population (miles)	Number of Samples	% Meeting Threshold	Meeting Threshold 95% CB	Assessment Period
TAN	20064	645	100	100	2020-2022
TN	20064	576	73.1	67.5-78.7	2020-2022
TP	20064	577	81.0	76.8-85.2	2020-2022
Chlorophyll a	20064	641	93.4	91.2-95.5	2020-2022
E. coli bacteria	20064	563	75.6	70.3-80.8	2020-2022
DO	20064	646	79.5	74.6-84.3	2020-2022
pH[1]	20064	645	62.7	57.6-67.7	2020-2022
TN_TP_DO[2]	20064	576	53.4	47.5-59.3	2020-2022

CB = Confidence bounds; TAN = Total ammonia nitrogen; TN = Total nitrogen; TP = Total phosphorus; E. coli = Escherichia coli; DO = Dissolved oxygen; HA = Habitat Assessment. [1] 95/645 failures were below the pH threshold; 4/645 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.

USES OF STATUS AND TREND DATA

2022-23 STATUS ASSESSMENTS FOR FIVE NEONICS



US EPA IALB used for Individual compounds. Morrisey 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?

Jay Silvanima
Division of Environmental Assessment and Restoration/Water Quality Monitoring Program
Florida Department of Environmental Protection

Contact Information:
850-245-8507
James.Silvanima@FloridaDEP.gov


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION