1976 Florida's previous water quality criteria for fecal indicator bacteria (FIB) were based on EPA's 1976 fecal coliform criteria.

1986 EPA published *E. coli* and enterococci criteria recommendations in 1986.

DEP did not adopt EPA's 1986 bacteria criteria due to concerns with EPA's analysis of the epidemiological data.

2003 to 2009

EPA conducted the National Epidemiological and Environmental Assessment of Recreational Water studies.

2012 EPA published new recreational water quality criteria based on *E. coli* and enterococci in 2012.

2016 DEP adopted revised FIB criteria to protect recreational uses.

Fecal coliform still in use?

Florida's Shellfish Harvesting Program by FDACS uses fecal coliform counts to monitor its shellfish harvesting areas.

Criteria were designed to protect human health from exposure to pathogenic organisms during recreational activities.

- Geometric mean (GM) is indicative of long-term impacts.
- Ten percent threshold value (TPTV) approximates the 90th percentile of the water quality distribution.

DEP Adopted Criterion 2016
Based on EPA's estimated illness rate per 1000 primary contact recreators: 36

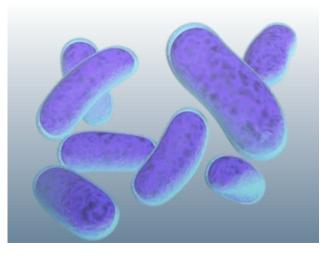| FIB	GM cfu/100 mL	TPTV cfu/100 mL	Surface Water Classification	Criterion Description
Enterococci	35	130	Class II and Class III Marine	Most Probable Number (MPN) or Membrane Filter (MF) counts (number/100 ml) shall not exceed a monthly geometric mean of 35 nor exceed the Ten Percent Threshold Value (TPTV) of 130 in 10% or more of the samples during any 30-day period.
E. coli	126	410	Class I and Class III Fresh	MPN or MF counts (number/100 ml) shall not exceed a monthly geometric mean of 126 nor exceed the TPTV of 410 in 10% or more of the samples during any 30-day period.
Fecal Coliform	median 14	43 (for MPN) 31 (for MF)	Class II	MPN or MF counts shall not exceed a median value of 14 with not more than 10% of the samples exceeding 43 (for MPN) or 31 (for MF).

*cfu – colony forming units

ASSESSMENT OF FIB WBID EVALUATION

Primary determinations are made using

BACTERIA DATA

sample size & exceedance ratio

+

GENETIC MARKER DATA
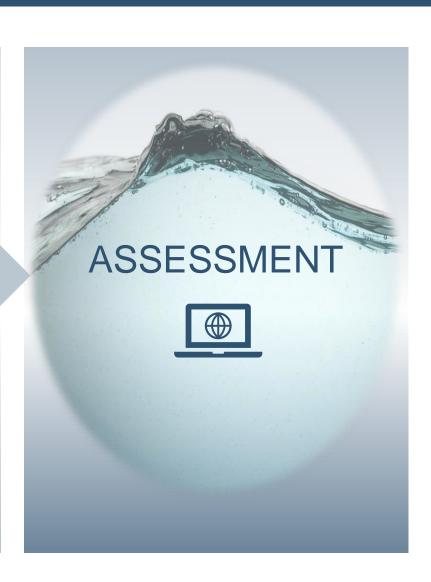number of samples and detections

CHEMICAL TRACER DATA
number of samples and detections

LAND USE
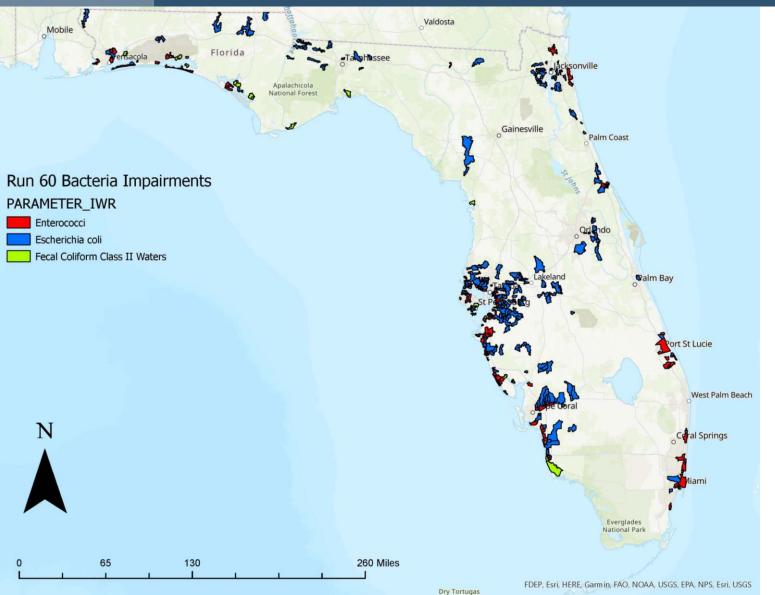natural areas v. urban or agricultural

SEPTIC TANKS
presence within waterbody and location related to stations

=
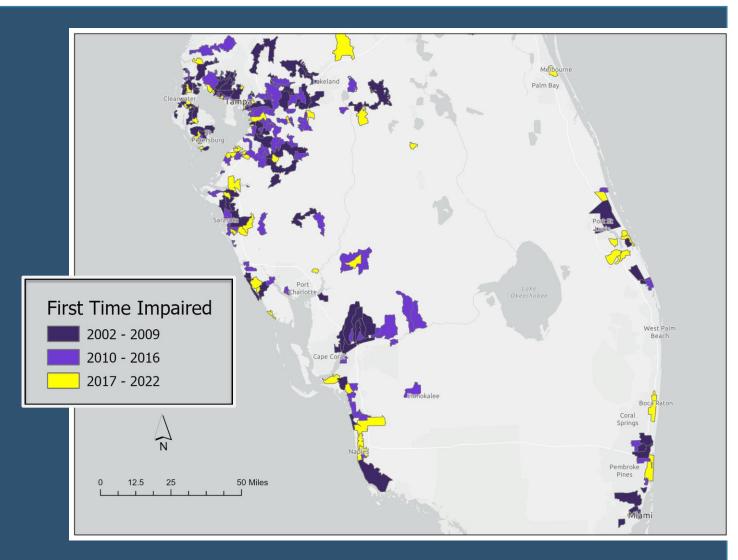
ASSESSMENT

STATEWIDE BACTERIA IMPAIRMENTS

- DEP started using revised FIB criteria in the group 4, cycle 3 (2017) impaired waters assessment.
- All basins assessed using the revised criteria, where there were sufficient data.
- Number of Verified Impairments
  - Enterococci: 137
  - *E. coli*: 240
  - Class II fecal coliform: 33

- Local entities are encouraged to participate in data review.
  - Impaired Waters Assessments.
  - Biennial Review.
  - Opportunity to opt-in for pollutant reduction plan (4e).

- Many of the waterbodies for FIB TMDL development have been listed for an FIB impairment for many years.

First Time Impaired
- 2002 - 2009
- 2010 - 2016
- 2017 - 2022

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First Time Impaired
- 2002 - 2009
- 2010 - 2016
- 2017 - 2022

N

0   12.5   25   50 Miles

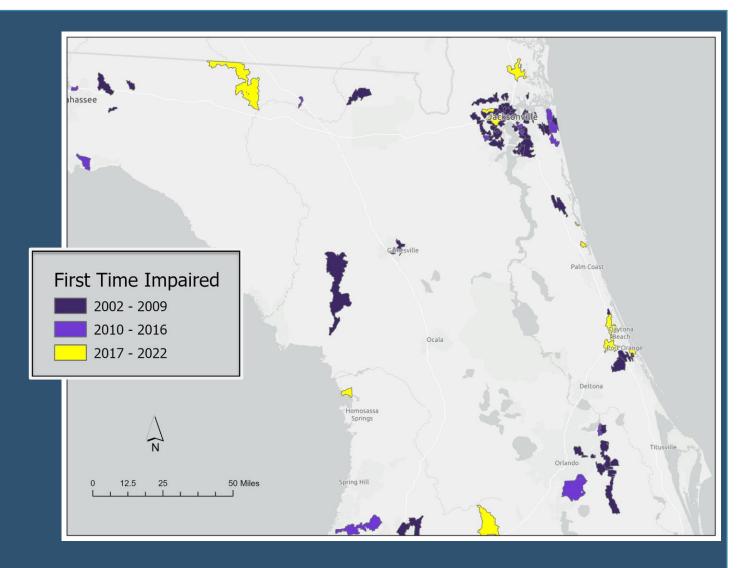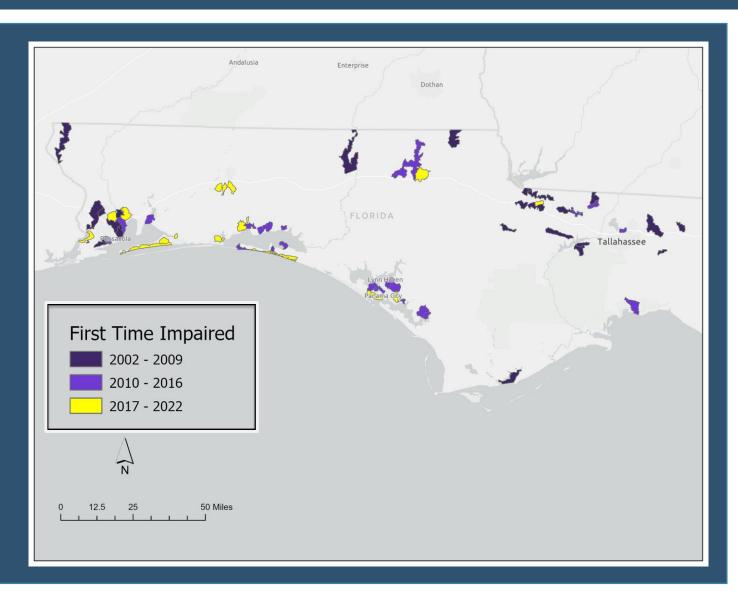- Local entities are encouraged to participate in data review.
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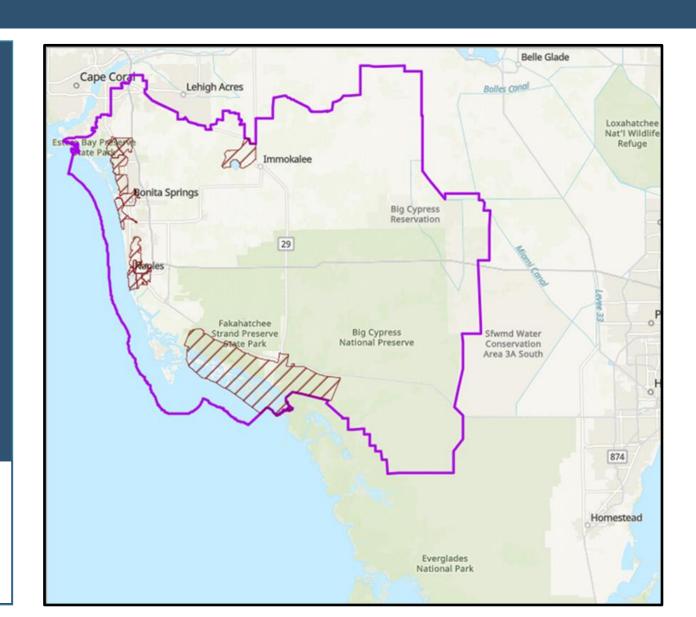
- DEP proposed a consolidated report covering all new bacteria impairments in March 2022.

- Replace prior approach of developing TMDLs for individual or small groups of waterbodies.

- Initiated as a pilot study for the Everglades West Coast Basin.

- Proposed to complete new consolidated bacteria TMDL every two years in the year following the adoption of the biennial assessment.

PILOT STUDY
TMDL PROJECT

- Everglades West Coast Basin.

- Used to refine process and documentation.

- Address implementation issues with regulated entities.

- Template for the new approach to document bacteria TMDLs throughout the state.

Finalization is delayed due to impacts of Hurricane Ian.

FIB TMDL EXPRESSION

- TMDLs may be expressed in terms of mass per time (e.g., pounds per day), toxicity, or other appropriate measure.

- FIB TMDLs are expressed as concentration-based (counts/100mL) restoration targets

  - Consistent with the expression of the bacteriological criteria.

  - Load is not meaningful or useful for bacteriological measures.

- FIB criteria can be converted to counts per day if a load-based value is needed.

- Percent reductions in existing concentrations necessary to meet the targets are calculated for each impaired water segment.

Flickr.com

BACTERIAL TMDL CALCULATION

- **90th percentile** value used to calculate percent reductions necessary to attain applicable TPTV for enterococci, *E. coli*, and fecal coliform impaired waters.

- The 90th percentile is consistent with the criteria expression.

- Median used to calculate percent reductions for Class II waters impaired for exceeding the Fecal Coliform Bacteria criterion of 14 counts/100 mL (median criterion).

Percentile	Sample Results Ranked	Notes
100	10,400	
	5,500	
90	2,600	Used to calculate percent reduction.
	2,400	
80	1,900	
	1,200	
70	1,200	
	990	
60	800	
	600	
50	450	Median Calculated Geometric Mean: 322
	300	
40	200	
	105	Ranking and percentile data includes data below TPTV, Class III.
30	105	
	105	
20	90	
	70	
10	10	
	10	

- DEP verified that the percent reductions for enterococci and *E. coli* will attain the monthly applicable monthly geometric mean criteria.

- TMDL must ensure attainment of all parts of the criteria.

- Demonstrated that long-term geometric mean will attain the monthly geometric mean.

EXAMPLE TMDL WATER SEGMENTS
TMDL EXPRESSION (LOADING BASED ALTERNATIVE)

Waterbody	Parameter	TMDL (MPN or MF counts/100mL)	WLA for Wastewater (counts/100mL)	WLA for NPDES Stormwater (Percent Reduction)	LA (Percent Reduction)
Cow Slough	*E. coli*	410	Must meet permit limits	68	68
Cocohatchee River	Enterococci	130	Must meet permit limits	31	31
Naples Bay (Coastal Segment)	Fecal Coliform	43 (for MPN counts)	Must meet permit limits	80	80
Naples Bay (Coastal Segment)	Fecal Coliform	14 (for MPN counts)	Must meet permit limits	22	22

TMDL would only list the most stringent component based on percent reduction.

- Permit limits pursuant the WLA for discharges subject to NPDES wastewater permitting shall be set based on the applicable bacteriological water quality criteria.

- The daily load for fecal indicator bacteria TMDLs shall equal the applicable water quality criterion multiplied by the daily average volumetric flow representative of the water segment and the appropriate conversion factor.

Pilot Study Bacteria TMDLs

- Public workshop on draft pilot TMDLs – held March 29, 2022.
- Discuss comments with stakeholders and revise document – Ongoing.
- Second public workshop – On hold.
- Rule adoption – On hold.
- DEP is considering a second pilot in an area outside of SW Florida with numerous FIB impairments.
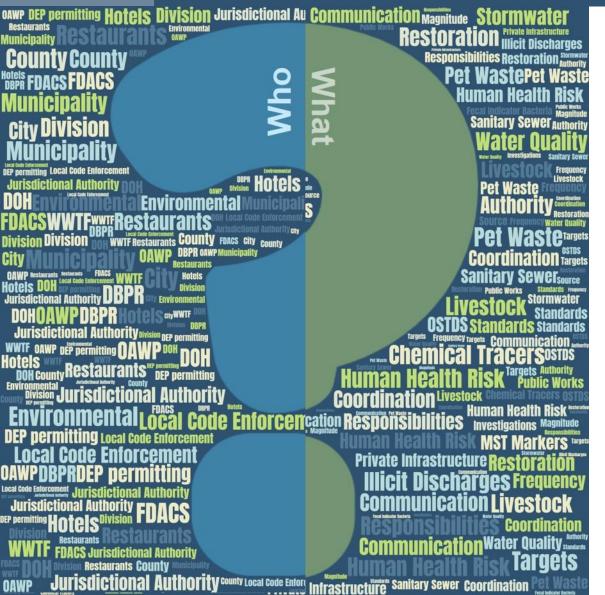

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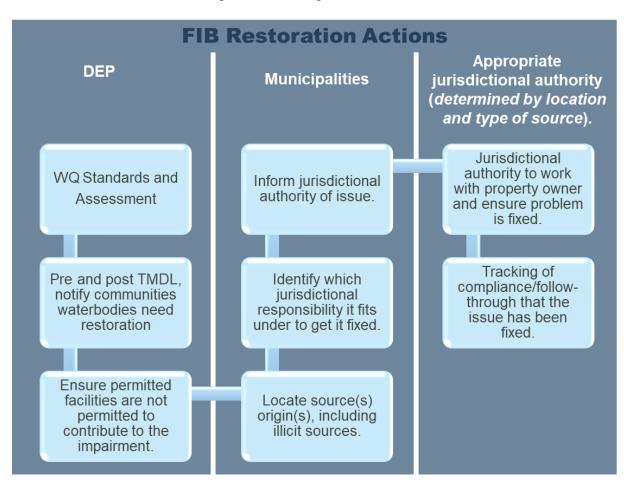
Phase 2 Bacteria TMDLs

- Geographical scale will be determined based on the outcome of the pilot.
  - Statewide appears less likely.
  - Considering a basin-by-basin approach.
  - Potential prioritization based on landuse and/or markers and tracers.
- Begin after Pilot TMDL project is completed.

TMDL IMPLEMENTATION

Preventative and reactive oversight described in federal acts, state rules, state issued permits, and local county and city ordinances.

FIB Restoration Actions

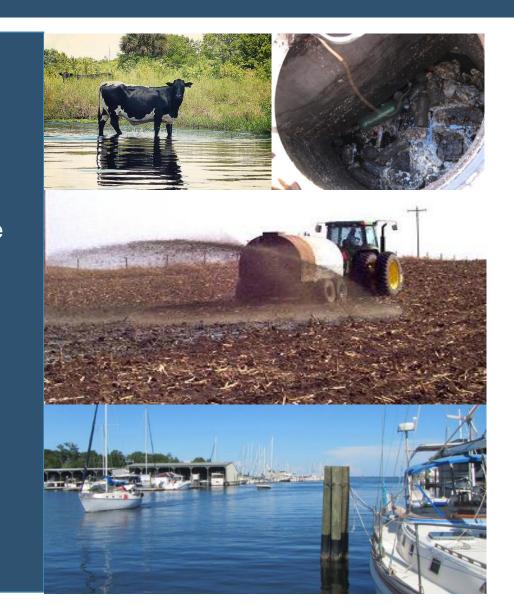| DEP	Municipalities	Appropriate jurisdictional authority (*determined by location and type of source*).
WQ Standards and Assessment	Inform jurisdictional authority of issue.	Jurisdictional authority to work with property owner and ensure problem is fixed.
Pre and post TMDL, notify communities waterbodies need restoration	Identify which jurisdictional responsibility it fits under to get it fixed.	Tracking of compliance/follow-through that the issue has been fixed.
Ensure permitted facilities are not permitted to contribute to the impairment.	Locate source(s) origin(s), including illicit sources.	

- Wastewater facilities must not cause or contribute to exceedances of water quality standards.

  - Permit limit set based on criteria.

  - Geometric mean criterion typically controls.

  - Wastewater collection systems must be maintained to prevent leakage.

- Counties and cities ordinances and code.

  - Pet waste ordinances.

  - Dumpster and trash management.

SHARED RESPONSIBILITES
IMPLEMENTATION

- Florida Department of Business and Professional Regulation.
  - Permits require rodent prevention for restaurants, hotels, and multi-housing units.
- Florida Department of Health (FDOH) permits and inspects mobile home parks, which manage sewage collection lines.
- DEP implements the Florida Statutes and regulations applicable to septic systems.
  - FDOH investigates human waste (seen or smelled) at the land's surface.
- FDACS, IFAS or DEP address dairy and livestock waste issues.
  - BMP manuals offer guidance on reducing livestock waste discharges to surface waters.

- Discharges from MS4 shall not cause or contribute to surface water quality violations.

  - Goal to reduce the discharge of pollutants to maximum extent practical.

  - Prohibition of non-stormwater discharges into the MS4.

- Inspections include the identification of the presence of illicit discharges, illicit connections, or illegal dumping.

- Permittee ensure adequate financial resources to effectively implement their Storm Water Management Program.

- The department recognizes that TMDLs are best implemented at the watershed scale.

  - No single entity is responsible for addressing all load reductions specified in a TMDL.

  - Permittees are encouraged to collaborate with other MS4 permittees that have assigned WLAs, and other stakeholders within the drainage basin of applicable TMDL waterbodies.

- Identification of potential sources using maps and field investigations.

- Bacteria source tracking and monitoring to identify bacterial source(s).

- Adoption of a pet waste management ordinance or program.

- The implementation of an educational program directed at reducing bacterial pollution.

- Identification of structural or nonstructural BMPs or program activities needed to reduce bacterial loadings from the MS4 to the maximum extent practicable.

- MS4 may alternatively, demonstrate that discharge at outfall structures does not exceed the applicable FIB criteria.