BACTERIA TOTAL MAXIMUM DAILY LOADS (TMDLS) UPDATE

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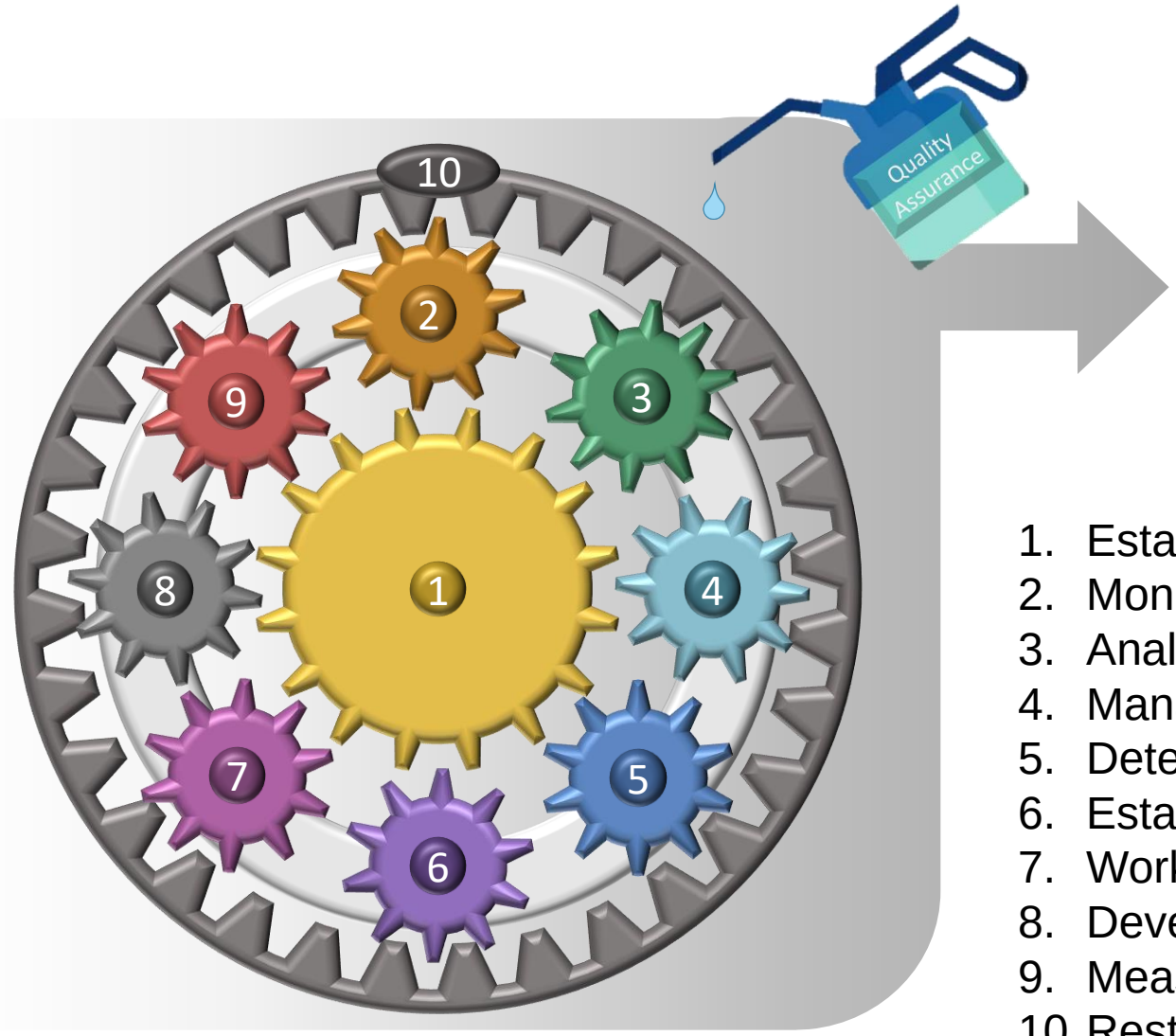
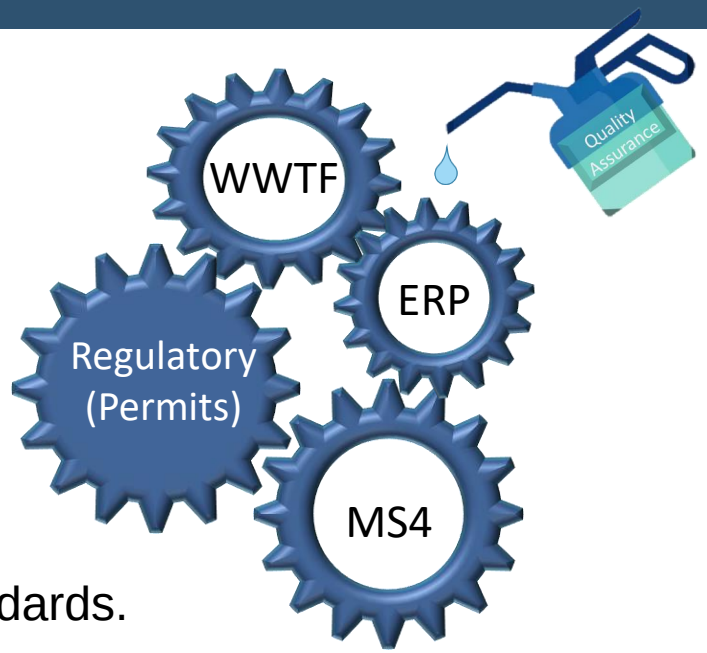
AGENDA

- Water Quality Framework Overview.
- Federal and State Requirements.
- Total Maximum Daily Load (TMDL) Components and Current Status.
- TMDL Next Steps.

PROTECT, ASSESS AND RESTORE
FLORIDA'S WATERS





1. Establish water quality standards.
2. Monitor waters.
3. Analyze samples.
4. Manage and evaluate data.
5. Determine pollution problems.
6. Establish restoration targets.
7. Work with community leaders.
8. Develop and implement restoration plans.
9. Measure success and adapt.
10. Restoration – attain water quality standards.

FEDERAL TMDL PROGRAM RESPONSIBILITIES

The Federal Clean Water Act (1972) established requirements for states in Section 303(d).

States must:

- Assess and provide lists of their impaired waters to the U.S. Environmental Protection Agency (EPA).
- Develop TMDLs for impaired waters.
- Identify pollutant reductions for point and nonpoint sources.

FLORIDA WATERSHED RESTORATION ACT

Section 403.067, Florida Statutes (F.S.), establishes a state framework for identifying impaired waters, developing TMDLs, and developing and implementing restoration plans:

- Authorizes DEP to develop and adopt TMDLs and restoration plans in collaboration with stakeholders and other governmental entities.
- Authorizes the Florida Department of Agriculture and Consumer Services (DACS) to work with agriculture to implement best management practices (BMPs).

APPLICABLE BACTERIA CRITERIA

Bacteriological Parameter	Surface Water Classification	Criterion
Enterococci	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	Class I and Class III Fresh	MPN or MF counts 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	Class II	MPN or MF counts shall not exceed a median value of 14 with not more than 10% of the samples exceeding 43 MPN or 31 MF.

TMDL

A TMDL is defined as:

The maximum amount of a pollutant that a waterbody can receive and still maintain its designated uses (e.g., drinking, fishing, swimming, shellfish harvesting).

TMDL = WLA Wastewater + WLA NPDES Stormwater + LA + MOS

WLA = Waste Load Allocations – Includes **Wastewater Facilities** and **NPDES MS4 Stormwater Discharges**

LA = Load Allocation to nonpoint sources

MOS = Margin of Safety

NPDES – National Pollutant Discharge Elimination System
MS4 – Municipal Separate Storm Sewer System

BACTERIA TMDLS

- TMDLs can be expressed in terms of mass per time (e.g., pounds per day), toxicity, or other appropriate measure.
- Fecal Indicator Bacteria (FIB) TMDLs are expressed as:
  - Concentration-based (counts/100mL) restoration targets, consistent with the expression of the bacteriological criteria.
  - Percent reductions in existing concentrations necessary to meet the targets for each water segment.

BACTERIA TMDL COMPONENTS

WBID	Waterbody Segment Name	Waterbody Class	Para-meter	TMDL (TPTV of MPN or MF counts/ 100mL)	WLA for Wastewater (counts/ 100mL)	WLA for NPDES Stormwater (Percent Reduction)	LA (Percent Reduction)
3278D	Cocohatchee (Inland Segment)	III-F	*E. coli*	410	Must meet permit limits	33	33

410 - Restoration target (criterion) – The main objective for TMDL implementation is to reduce bacteria sources to meet the applicable criterion.

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Must meet permit limits - Permit effluent limitations for bacteria serve as the WLA for wastewater facility discharges. The state requires all NPDES-permitted wastewater point source dischargers to meet bacteria criteria contained in subsection 62-302.530(6), Florida Administrative Code (F.A.C.), and the disinfection requirements of Rule 62-600.440, F.A.C.

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33% reductions of surface water current condition bacteria counts necessary to meet the applicable criterion is used to express the NPDES stormwater WLA and nonpoint source LA. The percent reductions are intended to provide an estimate of the magnitude of reductions necessary to achieve the applicable criterion.

BACTERIA TMDL MARGIN OF SAFETY

Implicit MOS is applied, based on the following conservative assumptions:

- Upstream and tributary bacterial concentrations are at the maximum allowable limit (i.e., criterion);
- Although all sources are provided an allocation at the applicable water quality criterion, not all sources discharge at this maximum allocation at the same time;
- There is no bacteria die-off accounted for, when bacteria concentrations diminish downstream from their source; and
- All wastewater sources must meet both the applicable TPTV and geometric mean (as single sample maxima) at all times.

TMDL OUTREACH AND COORDINATION

- Public workshops held in Fort Myers on March 29, 2022, and April 4, 2024, received comments on the FIB TMDLs for the Everglades West Coast Basin.
- Joint meetings held between several DEP programs and local governments in the basin to address their comments and questions on the 2022 draft report and TMDL implementation.
- Response letters sent to stakeholder public comments in September 2024 on the 2024 revised draft report.
- DEP continues ongoing coordination with the EPA Region IV Office on the TMDL development approach.
- Revisions made to the TMDL documentation (report and StoryMap) based on feedback from stakeholders and EPA.

BASINWIDE TMDL PILOT PROJECT

- Focus on the Everglades West Coast Basin.
- Addressing impairments for *E. coli,* enterococci bacteria and fecal coliform bacteria for Class II waters.
- Serves as the template for the new approach to document bacteria TMDLs for basins or regions throughout the state.
- After the pilot basin is completed, progress through the state and document TMDLs in reports covering impairments in select basins or regions of the state.

TMDL DOCUMENTATION

Content:

- TMDL reports similar in structure those prepared in the past.
- Includes general bacteria source descriptions and a link to geographic information (statewide data layers) provided in a StoryMap**.**
- Existing bacteria conditions and percent reductions calculated using common analysis methodology.
- Bacteria analysis results and other relevant information documented in appendices.

POTENTIAL BACTERIA SOURCES

- Degraded sewer infrastructure.
- Sanitary sewer overflows.
- Failing on-site sewage treatment and disposal systems (OSTDS).
- Transient camps.
- Direct illicit connections from homes or businesses.
- Improper management of agricultural animal waste.
- Mismanagement of biosolids and animal manure land application.
- Solid waste storage and disposal.
- Marinas and vessel anchorage locations.
- Improper management of pet waste.
- Wildlife.

BACTERIA TMDL CALCULATIONS

- The waterbody specific TMDL calculations are based on a minimum number of samples in a 10-year period that are representative of current conditions. The 10-year period (2013-22) is the same for all water segments.

- For Class I, II, and III waters impaired for exceeding the TPTV applicable to Enterococci, *E. coli*, and Fecal Coliform Bacteria criteria, the Hazen method was used to determine the 90th percentile value that was applied in calculating the percent reduction needed to meet criterion.

- The 90th percentile is also referred to as the 10% exceedance event because it will be exceeded with the probability of 0.10, which is consistent with the 10% threshold value expression of the criteria.

- For Class II waters impaired based on exceeding the Fecal Coliform Bacteria median count criterion of 14 counts/100 mL, the existing median value of results is used in calculating percent reductions.

DATA SUFFICIENCY CHECK

- Data collected in the defined 10 years are used in calculating the 90th percentile and median values.

- Percent reductions were only calculated for waterbodies with at least three years of data and 20 samples taken in the last 10 years, with at least five samples collected during the months of June through September.

- The daily median value was used for multiple station results collected on the same day.

90TH PERCENTILE CALCULATION
HAZEN METHOD

- Used by EPA to develop TMDLs.
- Hazen method described in Hunter, 2002.

  Applied Microbiology (34): 283–286.
- The Hazen equation for determining the rank equivalent to the 90th percentile in a data set is as follows:

$$Hazen\ (r) = ½ + P*n/100$$

r = rank of the relevant percentile
n = number of data points in the data set
P = percentile value (90^{th} in this case)

- To determine the 90^{th} percentile value in a data set, all the available results are ranked (ordered) from the lowest to the highest, and the result that equates to the Hazen rank identifies the 90th percentile.
- If no results equate to the 90^{th} percentile value, it is calculated by interpolation using rank of results below and above 90^{th} percentile.

CALCULATION OF TPTV REDUCTIONS

- Allowable concentration is the criterion.
- Apply Hazen method non-parametric 90th percentile concentration.
- Calculate percent reduction from 90th percentile to the ten percent threshold value (TPTV) from the criteria:

$$\textbf{Needed \% Reduction} = \frac{(\textbf{Existing 90}^{th}\textbf{ Percentile Concentration} - \textbf{Allowable Concentration}) * 100}{\textbf{Existing 90}^{th}\textbf{ Percentile Concentration}}$$

CALCULATION OF MEDIAN REDUCTIONS

CLASS II

- Only applicable to Class II fecal coliform impairments exceeding 14 counts/ml.
- The percent reduction from the median value to meet the criteria is calculated as:

$$\text{Needed \% Reduction} = \frac{(\text{Existing Median Concentration} - 14)}{\text{Existing Median Concentration}} * 100$$

- If waterbody is impaired based on exceeding the TPTV and median value fecal coliform criteria, the percent reduction set at most stringent (highest) value.

TMDL IMPLEMENTATION

NPDES Permit Requirements:

- Wastewater facilities must meet permit limits.
- MS4 (stormwater) develop restoration plans: refer to DEP's Restoring Bacteria-Impaired Waters Toolkit available on the department's webpage and Chapter 7 of the draft report.

Collection Systems and Transmission Facilities Rule:

- Collection and transmission systems must be maintained and operated in accordance with Rule 62-604.500, F.A.C., so that sanitary overflows or leaks do not cause or contribute to violations of the applicable FIB criteria.

Other water quality initiatives:

- Stakeholder driven efforts.
- Surface water improvement and management (SWIM) plans.
- Basin management action plans (BMAPs).
- Site-specific focus.
- New initiatives.

NEXT STEPS

- Proceed with Secretarial adoption of the Everglades West Coast Basin FIB TMDLs.
- Submit TMDLs to EPA for review and approval.
- Develop and propose regional bacteria TMDLs approach for a second basin.
  - Throughout the state, DEP will develop bacteria using a regional basin approach.
- Impaired Waters Assessment Update – Address FIB impairments for beaches.
  - IWR Run 66 has Florida Department of Health beach monitoring stations assigned to beach WBIDs. Future beach impairments will result in the placement of enterococci on the Verified List of Impaired Waters.

THANK YOU

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