



Florida Department of Environmental Protection

What is the Study List?

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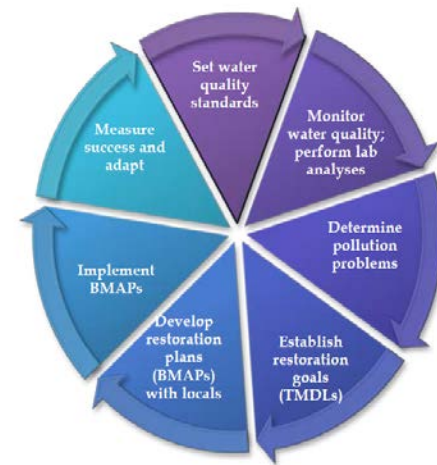
Watershed Assessment Section





Presentation Overview

- **The Watershed Management Approach**
- **The Impaired Waters Listing Process**
 - 303(d) list update to EPA
- What is the Study List?
 - How does a waterbody/parameter combination “get” on OR be “removed” from the Study List?
 - What are the data sufficiency needs for the Study List?
 - Where is the Study List?





Watershed Management Approach

- **DEP implements TMDL Program as part of Watershed Management Approach**
 - Started in July, 2000
 - Assessment
 - TMDL Development
 - BMAP Implementation
 - Watershed Restoration
- **Watershed Approach established five-phase cycle that rotates through all basins in the state over five-year period**
 - Divided state's basins into groups



Watershed Management Cycle

Phase 1 - Preliminary Assessment

- Produce Planning List

Phase 2 - Targeted Monitoring and Listing

- Monitor, Verify impairment, and Adopt Verified List by Secretarial Order
- Group 3 in this phase now

Phase 3 - Develop and Adopt TMDLs

Phase 4 – Implement TMDL

- Develop Basin Management Action Plan or
- Other Implementation Option

Phase 5 - TMDL Implementation



Watershed Management Cycle

- **Assessment Process:**
 - **Previous Cycle Summary Assessment**
= (Cycle 1 + Cycle 2)
 - **Evaluate Cycle 3 Assessment**
Previous Cycle Summary Assessment
+ Cycle 3 Assessment
= Cycle 3 Summary Assessment

Parameters Assessed Using the Impaired Surface Waters Rule (IWR)	[†] Previous Cycle Summary Assessment Category ³	[†] Cycle 3 Assessment Category ⁴	[†] Integrated Report Category Summary Assessment	Summary Assessment Status
Biology	4d	2	2	Not Impaired



Assessment Category Descriptions

- **Category 1 – Not Impaired (attains ALL uses)**
- **Category 2 – Meets standards; Not Impaired**
- **Category 3 – Insufficient data to verify**
- **Category 4 – Does not meet standards, but a
TMDL is not needed**
- **Category 5 – Does not meet standards;
Impaired by a pollutant**



Study List Categories

- **Category 4d –**
 - Waters that are impaired, but no pollutant has been identified; applies to biology and dissolved oxygen
 - Adverse trend for nutrients or a nutrient response variable expected to become impaired in 10 years
 - Bacteria parameters
- **Category 4e –**
 - Waters that are identified as impaired, but where the department has documentation that an on-going restoration initiative have begun, but is not completed.

(Not covered by a Reasonable Assurance Plan.)
- **Guidance on Developing Restoration Plans as Alternatives to TMDLs – Assessment Category 4b and 4e Plans**
<http://www.dep.state.fl.us/water/watersheds/assessment/docs/4b4ePlansGuidance.pdf>



303(d) Listing Requirements

- **Section 303(d) of the Federal Clean Water Act requires states to:**
 - **Submit lists of waters that do not meet applicable water quality standards, including designated uses**
 - **“Water Quality Limited Segments”**
 - **However, the department shall not establish TMDLs for these waters until placed on the Verified List**



Study List Definition

- **What is the Study List?**
 - **Impaired Waters Rule methodology (62-303, F.A.C.) based on data that meets the listing thresholds in 62-303.390, F.A.C.**
 - By definition: 62-303.200(29), F.A.C. "Study List" shall mean the list of surface waters or segments where additional information is needed, as identified in Rule 62-303.390, F.A.C.
 - Waters that do not attain water quality standards.
 - **Additional information/data or department review is needed to evaluate attainment of water quality standards.**
 - For example, nutrient data needed to determine causative pollutant or other factors contributing to the impairment.



"Getting on Study List"

- **How does a waterbody/parameter combination "get" on the Study List?
Summarized from 62-303.390(2)(a-h), F.A.C. -**
 - a. **An evaluation of adverse trend in nutrients or nutrients response variables, this includes dissolved oxygen AND expectation the water will become impaired within 10 years.**
 - b. **Waters that fail for Biological Health Assessments – Stream Condition Index or Lake Vegetation Index , but no causative pollutant(s).**
 - c. **Waters that fail for dissolved oxygen, but no causative pollutant(s).**



"Getting on Study List"

- **How does a waterbody/parameter combination "get" on the Study List?
Summarized from 62-303.390(2)(a-h), F.A.C. -**
 - d. Waters where a restoration plan is in place or planned that meet requirements of 62-303.600(1) and (3), but there is uncertainty of attainment.
 - e. Streams that have TN or TP annual geometric means that exceed the nutrient thresholds and lack "other" data needed to fully assess.



"Getting on Study List"

- **How does a waterbody/parameter combination "get" on the Study List?
Summarized from 62-303.390(2)(a-h), F.A.C. -**



- f) Waters that have < 20 samples and ≥ 5 samples that exceed the bacterial water quality criterion, based on data from at least five temporally independent samples
- g) Waters that exceed the bacterial water quality criterion, but additional study of whether exceedances are due to natural sources through an evaluation of the predominant land uses in the watershed or other information provided to the department.
- h) Waters that exceed generally applicable criteria, but the department "receives" a petition for a Site-Specific Alternative Criterion (SSAC).



“Removal from the Study List”

- **How is a waterbody/parameter combination “removed” from the Study List?**

Summarized from 62-303.390, F.A.C. -

3) Nutrient (TN or TP) and Chlorophyll *a* Trends -

- I. Development of a site-specific interpretation of the narrative nutrient criteria addressing the trend;**
- II. Determination of a flaw in the original analysis;**
- III. Determination that the trend is no longer statistically significant;**
- IV. Development of a restoration plan (depending on the type of plan);**
- V. Placement on the Verified List - this applies only to chlorophyll *a*.**



“Removal from the Study List”

- **How is a waterbody/parameter combination “removed” from the Study List?**

Summarized from 62-303.390, F.A.C. -

- 4) Waters identified for failing Biological Health Assessments or dissolved oxygen exceedances –**
 - I. Conclusion of stressor identification study identifies causative pollutant(s) or other factor(s) contributing to nonattainment; this includes the collection and analysis of physical, chemical, and biological data necessary to evaluate site specific conditions.**



“Removal from the Study List”

- **How is a waterbody/parameter combination “removed” from the Study List?**

Summarized from 62-303.390, F.A.C. -

- 5) **Waters where there is an approved restoration plan -**
 - I. **An evaluation of progress towards attainment of water quality standards. Is the waterbody no longer impaired for the parameter of concern?**
- 6) **Streams that exceeded the nutrient thresholds -**
 - I. **Sufficient data is collected to determine whether the stream attains the nutrients standard in paragraph 62-302.532(2)(c), F.A.C. -**

Nutrient Watershed Region	Total Phosphorus Nutrient Threshold ¹	Total Nitrogen Nutrient Threshold ¹
Panhandle West	0.06 mg/L	0.67 mg/L
Panhandle East	0.18 mg/L	1.03 mg/L
North Central	0.30 mg/L	1.87 mg/L
Peninsular	0.12 mg/L	1.54 mg/L
West Central	0.49 mg/L	1.65 mg/L
South Florida	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.



“Removal from the Study List”

- **How is a waterbody/parameter combination “removed” from the Study List?**



Summarized from 62-303.390, F.A.C. -

- 7) **Waters that have < 20 samples and ≥ 5 samples that exceed the bacterial water quality criterion.**
 - I. **Collect additional samples to acquire at least 20 samples and re-assess the waterbody. During the additional data collection process, an evaluation of potential sources and other indicators can be included. Is the waterbody not impaired for bacteria based on the additional data? If so, place into assessment category 2 (Not Impaired). If not, place on the Verified List.**



"Removal from the Study List"

- **How is a waterbody/parameter combination "removed" from the Study List?**



Summarized from 62-303.390, F.A.C. -

- 8) Waters that exceed the bacterial water quality criterion potentially due to natural sources. If sufficient data (> 20 samples) already existed...
 - I. Conduct a bacterial source tracking study to evaluate anthropogenic sources;
 - II. Water shall be removed if the department confirms the exceeds are due to non-anthropogenic sources; or
 - III. Water shall be verified as impaired if at least 10% of the exceedances are demonstrated to be due to anthropogenic sources.



“Removal from the Study List”

- **How is a waterbody/parameter combination “removed” from the Study List?**



Summarized from 62-303.390, F.A.C. -

- 9) **Waters that exceed generally applicable criteria, but the department “receives” a petition for a SSAC.**
 - I. **Allow for sufficient time complete the review and evaluation of the merits of a petition for a SSAC .**
 - II. **Re-assess the waterbody during the next applicable assessment cycle for the basin.**



Assessing for Numeric Nutrient Criteria

- [NNC Implementation Document](#)
- **Necessity of biological data**
 - **For Streams (excluding South Florida canals)**
 - **Stream Condition Index (SCI)**
 - **Rapid Periphyton Survey (RPS)**
 - **Linear Vegetation Survey (LVS)**
 - **For Lakes**
 - **Lake Vegetation Index (LVI) – not required for attainment**
 - **Lake Classification Needed**
- **To Verify Impairment Need:**
 - **At least 2 years of NO₃-NO₂, TN, TP and chlorophyll-a data in a three year period**



Assessing for Numeric Nutrient Criteria

- **Data Sufficiency**
 - **For biological data, minimum of 2 temporally independent samples ($\geq$ three months apart)**
 - Stream Condition Index (SCI)
 - Rapid Periphyton Survey (RPS)
 - Linear Vegetation Survey (LVS)
 - Lake Vegetation Index (LVI)
 - **To calculate annual geometric or arithmetic mean for NO₃-NO₂, TN, TP and chlorophyll-a data**
 - **At least 4 temporally independent samples per year ($\geq$ one week)**
 - **Need 2 Seasons: At least 1 sample collected from each season**
 - **May 1 – September 30**
 - **All other months in year**



Assessing for Numeric Nutrient Criteria

- **Data Sufficiency**
 - **For lake classification:**
 - Lake color and alkalinity shall be long-term geometric means
 - Minimum of 10 samples from at least 3 years, at least 1 sample per year.
 - If there is insufficient alkalinity, can use specific conductance data

Lake Classification Code Used in the IWR Assessment Processing	Long Term Geometric Mean Lake Color and Alkalinity	Annual Geometric Mean Chlorophyll a	Minimum calculated numeric interpretation -- Annual Geometric 2Mean Total Phosphorus	Minimum calculated numeric interpretation -- Annual Geometric Mean Total Nitrogen	Maximum calculated numeric interpretation -- Annual Geometric Mean Total Phosphorus	Maximum calculated numeric interpretation -- Annual Geometric Mean Total Nitrogen
1	> 40 Platinum Cobalt Units	20 µg/L	0.05 mg/L	1.27 mg/L	0.16 mg/L ¹	2.23 mg/L
3	≤ 40 Platinum Cobalt Units and > 20 mg/L CaCO ₃	20 µg/L	0.03 mg/L	1.05 mg/L	0.09 mg/L	1.91 mg/L
3	≤ 40 Platinum Cobalt Units and ≤ 20 mg/L CaCO ₃	6 µg/L	0.01 mg/L	0.51 mg/L	0.03 mg/L	0.93 mg/L



Assessing for Numeric Nutrient Criteria

- Data Sufficiency for nutrients, chlorophyll a
 - For the Mann's One-sided, trend test:
 - Sufficient data to calculate annual geometric means for a minimum of 4 years.

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A. TABLES AND CHARTS

TABLE A.30. Upper-Tail Probabilities for the Null Distribution of the Kendall K Statistic:
 $n = 4(1)40$

For a given n , the entry in the table for the point x is $P_0\{K \geq x\}$. Under these conditions, if x is such that $P_0\{K \geq x\} = \alpha$, then $k_\alpha = x$. For certain n , the entries are terminated at x_n , where x_n is the smallest possible value of x such that $P_0\{K \geq x\}$ is zero to three decimal places. (For $n = 4(4)40$ or $n = 5(4)37$, all even integers between $-n(n-1)/2$ and $n(n-1)/2$ have positive probability and for $n = 6(4)38$ or $n = 7(4)39$ all odd integers between $-n(n-1)/2$ and $n(n-1)/2$ have positive probability.)

x	n								
	4	5	8	9	12	13	16	17	20
0	.625	.592	.548	.540	.527	.524	.518	.516	.513
2	.375	.408	.452	.460	.473	.476	.482	.484	.487
4	.167	.242	.360	.381	.420	.429	.447	.452	.462
6	.042	.117	.274	.306	.369	.383	.412	.420	.436
8		.042	.199	.238	.319	.338	.378	.388	.411
10		.008	.138	.179	.273	.295	.345	.358	.387
12			.089	.130	.230	.255	.313	.328	.362
14			.054	.090	.190	.218	.282	.299	.339
16			.031	.060	.155	.184	.253	.271	.315



Assessing for Numeric Nutrient Criteria

- **Data Sufficiency for dissolved oxygen**
 - **For the Seasonal Kendall test:**
 - When product of number of seasons and number of years is more than 25.

Trend Analysis

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When the product of number of seasons and number of years is more than about 25, the distribution of S_k can be approximated quite well by a normal distribution with expectation equal to the sum of the expectations (zero) of the individual S_i under the null hypothesis, and variance equal to the sum of their variances. S_k is standardized (eq. 12.2) by subtracting its expectation $\mu_k = 0$ and dividing by its standard deviation σ_{S_k} . The result is evaluated against a table of the standard normal distribution.



"Where is Study List"

- **Where is the Study List?**

- 1) Found on the most recent basin master list.
 - a) During each basin assessment, draft Study List is provided.
- 2) Environmental Protection Agency's Group Decision Document.
- 3) Many are identified on the strategic monitoring plans.

Parameter	Count (IWR Run 51)
Chlorophyll a Trend	39
Nitrate-Nitrite Trend	5
Total Nitrogen Trend	39
Total Phosphorus Trend	106
Dissolved Oxygen Trend	633
Biology (Floral and Fauna)	135 (from 2016 SMP)



Data Sources – THANK YOU!!

- **Data Sources for biological and water quality data**
 - **Internal**
 - **Water Quality Assessment Program (ROCs)**
 - **Water Quality Standards Program**
 - **Watershed Evaluation and TMDL Program**
 - **Biology Program**
 - **External**
 - **Seminole County**
 - **Highlands County**
 - **Jones Edmunds**
 - **Mosaic**
 - **Pinellas County**



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