Annual Assessment of Florida's Water Resources: Quality

2023 Edition
Chapter 4

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Abstract

As of December 2022, 459 Total Maximum Daily Loads (TMDLs) have been established on impaired waterbody segments by the state of Florida, 8 of which were adopted in calendar year 2022. There are another 1,428 TMDLs that could be developed if Alternative Restoration Plans (ARPs) are not undertaken. The Office of Economic and Demographic Research (EDR) estimates that this would cost $39.81 million each year the next 5 years and $23.92 million in each of the following 5 years to comply with state law. Over the next 10 years, this is a state investment of $318.7 million. The Statewide Annual Report (STAR report), released by Florida's Department of Environmental Protection in June 2022, provides progress reports on the 33 adopted Basin Management Action Plans (BMAPs). Those BMAPs include 4 types: Fecal Indicator Bacteria, Northern Everglades and Estuaries Protection Programs, Outstanding Florida Springs, and Surface Water Nutrients. EDR forecasts that it will cost $11.6 billion to comply with laws governing BMAP programs between fiscal year (FY) 2022-23 and FY 2039-40, a near 10% increase from the previous edition. Of this total, 53% or $6.1 billion will be a state responsibility. Projection models take inflation into account, which is one causal factor for the major increase. Another cause for the increase resulted from 3 BMAP projects that began the implementation phase since the last report. Moreover, the Suwannee River BMAP calls for record high TMDL reduction goals compared to every other project previously adopted. According to the Department of Environmental Protection (DEP), the early implementation of ARPs are a more cost-effective and a more efficient alternative to BMAPs. Unfortunately, the data available for these approaches is less developed, and no estimates of the cost difference can be provided at this time. Finally, key pieces of legislation are still in the rule development stage. When this process is completed, there may be a significant impact on projected costs. Future editions will expand the water quality analysis to include expenditure forecasts for other activities required by or implemented pursuant to federal or state law, including ARPs for impaired waters and water quality monitoring. The degree to which the assumed timeframes and cost-shares underlying those expenditure forecasts are legally required is still being evaluated.

4. Estimating Future Expenditures Necessary to Comply with Laws and Regulations Governing Water Quality Protection and Restoration

The Office of Economic and Demographic Research (EDR) is required to forecast expenditures necessary to comply with laws and regulations associated with water quality protection and restoration. This edition further estimates future expenditures relating to state programmatic costs to implement the total maximum daily loads program and basin management action plans. Future editions will continue to refine the existing analyses as better data becomes available and will begin to analyze relevant compliance costs of local governments and public and private utilities to meet requirements related to water quality protection and restoration. While this chapter largely focuses on the primary water quality improvement initiatives required by the federal Clean Water Act and the Florida Watershed Restoration Act, future editions will incorporate other important state and regional water quality protection and restoration initiatives.

4.1 State and Federal Laws and Regulations Governing Surface Water Quality

Florida has an abundance of surface water resources. The protection of these resources is vitally important. Water pollution not only affects Florida's inland and coastal waters, it can also impact the public health of residents and visitors who use and enjoy Florida's waters. According to the United States Environmental Protection Agency (EPA), nonpoint sources of pollution are reported as the leading cause of surface waterbody impairment nationwide[1] and are the largest contributor of pollutants to surface and groundwater in Florida.[2] Unlike point sources of pollution that are conveyed to waterbodies by discrete means, nonpoint pollution comes from many diffuse sources that are generally transported to waterbodies through stormwater runoff.[3] Potential sources of nonpoint source pollution include runoff from agricultural and urban landscapes, septic tanks, and atmospheric deposition. The most significant surface water quality issue identified statewide is excessive nutrients (nitrogen and phosphorus) from both point and nonpoint sources. The Florida Department of Environmental Protection (DEP) is responsible for implementing various surface water quality-related directives under federal and state law. Much of this effort is undertaken in coordination with other state agencies, the water management districts (WMDs), local governments, universities, and other public and private stakeholders.

In 1972, Congress passed the Clean Water Act (CWA) with a purpose to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[4] Two national goals were also declared: (1) the elimination of pollutant discharges into navigable waters by 1985; and (2) fishable and swimmable waters by 1983.[5] Although water pollution remains an issue nationwide, the intent behind these ambitious goals is still relevant to the implementation of the CWA.

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[1] U.S. Environmental Protection Agency, Basic Information about Nonpoint Source (NPS) Pollution, Overview, available at: https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution (Accessed December 2022.)
[2] Florida Department of Environmental Protection, Nonpoint Source Program Update, April 2015 at 9, available at: https://floridadep.gov/sites/default/files/NPS-ManagementPlan2015.pdf (Accessed December 2022.)
[3] Hydromodification activities can also cause nonpoint source pollution.
[4] 33 U.S.C. § 1251(a).
[5] 33 U.S.C. § 1251(a).

While the CWA establishes the federal framework governing water quality protection and restoration, it is structured in a manner that recognizes the primary responsibilities and rights of states to control water pollution.[6] To this end, the CWA imposes various wide-scale requirements on states with regard to water quality management. These initiatives include establishing and periodically reviewing surface water quality standards, assessing the condition of waterbodies, and establishing water quality goals through the adoption of total maximum daily loads (TMDLs) for waterbody segments which do not meet water quality standards, and implementing controls for permitted sources of pollution. This federal and state partnership is further demonstrated by the availability of federal grants to assist states with the implementation of various water quality programs and initiatives.

In even numbered years, states are required to meet reporting requirements under CWA sections 303(d), 305(b), and 314, which identify impaired waters, provide a description of the water quality of all waters in the state, and provide an assessment of the status and trends of significant publicly owned lakes, respectively.[7] DEP prepares the Integrated Water Quality Assessments for Florida, which are available on its website.[8] The most recent report was released in April 2022.

The main regulatory components of the CWA prohibit discharges of pollutants into waters of the United States except in compliance with the CWA provisions. This includes the regulation of pollutants discharged from point sources under the National Pollutant Discharge Elimination System (NPDES) permit program[9] and discharges of dredged or fill material.[10] The CWA also regulates the use and disposal of biosolids from wastewater treatment processes.[11] Although most nonpoint sources of pollution are not controlled through regulatory measures, the CWA incentivizes nonpoint source management through federal grants to address nonpoint source pollution.[12]

Recent Legislation

In 2020, the Florida Legislature passed the Clean Waterways Act[13] addressing many environmental issues related to water quality improvement in the state. The act requires the Department of Agriculture and Consumer Services (DACS) to inspect agricultural producers enrolled in best management practices at least once every two years, prioritizing operations in certain Basin Management Action Plan (BMAP) areas. Further, it transfers the Onsite Sewage Program from the Department of Health to DEP and allows DEP to provide grants for certain wastewater treatment projects in BMAP areas. The act additionally addresses water quality improvements related to stormwater, biosolids, and golf courses, including setting new expectations for water quality monitoring.[14] A number of the act's provisions are forward looking,

[6] 33 U.S.C. § 1251(b).
[7] 33 U.S.C. §§ 1313, 1315, and 1324.
[8] https://floridadep.gov/dear/dear/content/integrated-water-quality-assessment-florida. (Accessed December 2022.)
[9] 33 U.S.C. § 1342
[10] 33 U.S.C. § 1344.
[11] 33 U.S.C. § 1345.
[12] 33 U.S.C. § 1329.
[13] *See* Ch. 2020-150, Laws of Florida, available at: http://laws.flrules.org/2020/150.
[14] For a concise summary of the bill see: https://www.flsenate.gov/PublishedContent/Session/2020/BillSummary/Community_CA0712ca_00712.pdf. (Accessed December 2022.) For a more thorough analysis, see:

the full impact of which will follow rule development, appropriations, and study results. Much of the rulemaking process is still underway.[15]

In 2021, the Legislature passed Committee Substitute for Senate Bill 64,[16] relating to reclaimed water. It requires each local wastewater utility to submit a plan to the DEP to eliminate harmful surface water discharge. The plans must include timeframes to meet requirements outlined in this and other related legislation. Depending on how the local wastewater utility plans proceed, they will be eligible to receive funding from existing programs including the Water Protection and Sustainability Program and the Drinking Water State Revolving Fund. The bill also incentivizes the implementation of authorized graywater technology under certain circumstances. The department has determined that rulemaking is not necessary for the amendments to S.403.067 (17) Florida Statutes. To date, 129 plans have been approved.

Several bills also passed during the 2022 Session that directly or indirectly addressed water quality. Most importantly, CS/CS/CS/HB 965 relating to environmental management created the concept of water quality enhancement areas (WQEAs) that address contributions of one or more pollutants or other constituents in the watershed, basin, sub-basin, targeted restoration area, waterbody, or section of waterbody that do not meet applicable state water quality criteria. According to the 2022 Senate Summary of Legislation Passed[17]: "A WQEA is a natural system that is constructed, operated, managed, and maintained pursuant to a permit to provide offsite, compensatory, regional treatment within an identified enhancement service area and enhancement credits." Further, "construction, operation, management, and maintenance of a WQEA must be approved through the environmental resource permitting (ERP) process." Implementation is dependent on rulemaking which has yet to be completed.

In addition, CS/CS/SB 1000 authorizes citrus producers to use site-specific nutrient management, which is the application of nutrients at a different rate than the published nutrient application rates, under certain circumstances.

Water Quality Assessment and Total Maximum Daily Loads for Impaired Waters

Water quality assessment begins with water quality standards. The Clean Water Act directs states to establish surface water quality standards, or if the state fails to act, requires the EPA to do so.[18] Florida's surface water quality standards are adopted by rule in chapter 62-302 of the Florida Administrative Code, and consist of designated uses,[19] numeric and narrative criteria necessary to safely support such uses, the state's anti-degradation policy, and moderating provisions (such as

https://www.myfloridahouse.gov/Sections/Documents/loaddoc.aspx?FileName=h1343z1.ANRS.DOCX&DocumentType=Analysis&BillNumber=1343&Session=2020 . (Accessed December 2022.)

[15] For the current status of DEP's rulemaking activities, see https://floridadep.gov/water/domestic-wastewater/content/water-reuse-news-rulemaking-information.

[16] Chapter 2021-168, Laws of Florida. See http://laws.flrules.org/2021/168. (Accessed December 2022.)

[17] 2022 Senate Summary of Legislation Passed, available at: https://www.flsenate.gov/PublishedContent/Session/2022/BillSummary/CombinedPDF/EN.pdf.

[18] 33 U.S.C. § 1313(a)-(c).

[19] The term "designated use" is defined as "the present and future most beneficial use of a body of water as designated by the Environmental Regulation Commission by means of the Classification system contained in [rule chapter 62-302]." Fla. Admin. Code R. 62-302.200(9).

variances, mixing zone rules, or exemptions).[20] See Table 4.1.1 which identifies the seven classes of designated uses in Florida, beginning with the classification having the highest degree of protection (*i.e.,* Class I – Potable Water Supplies).

Table 4.1.1 Classification of Surface Waters

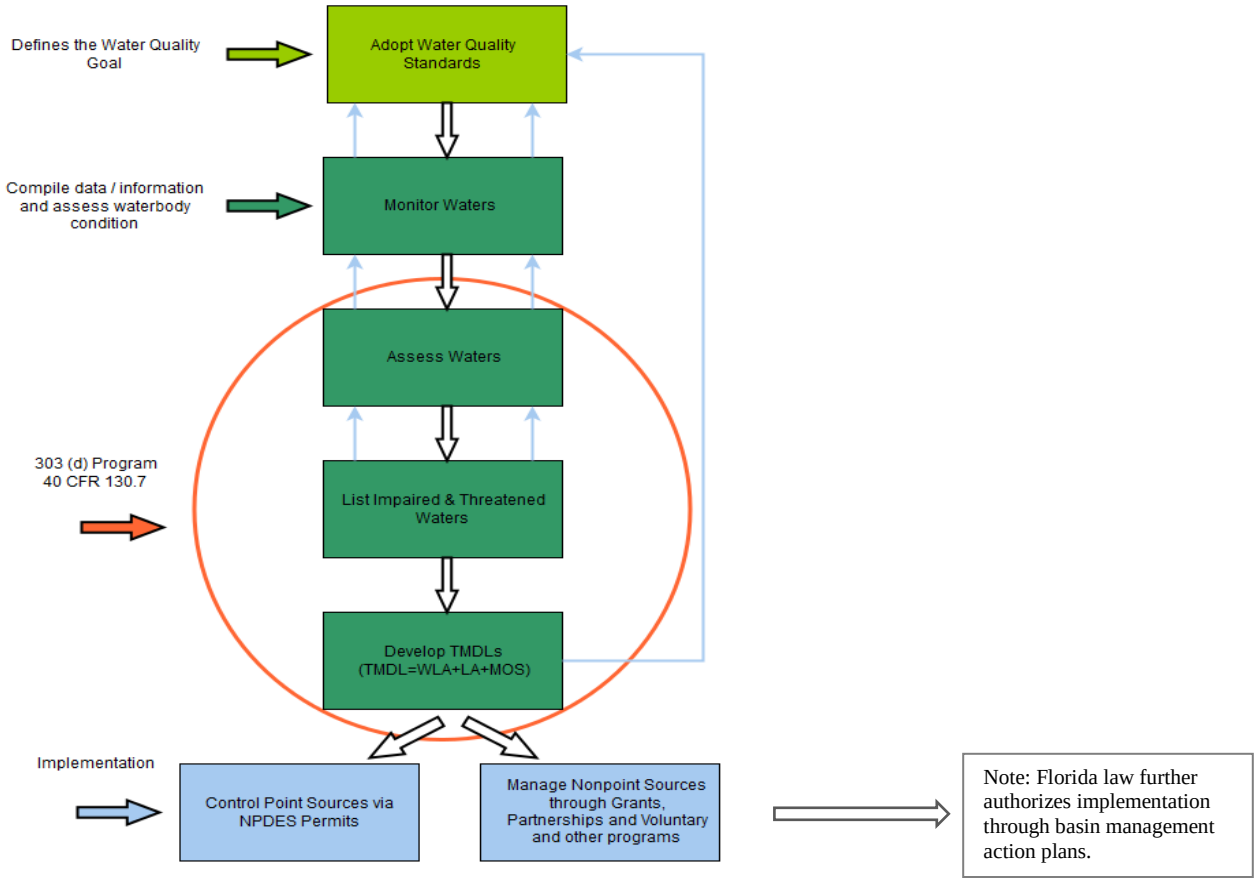
CLASS I	Potable Water Supplies
CLASS I-Treated	Treated Potable Water Supplies
CLASS II	Shellfish Propagation or Harvesting
CLASS III	Fish Consumption; Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife
CLASS III-Limited	Fish Consumption; Recreation or Limited Recreation; and/or Propagation and Maintenance of a Limited Population of Fish and Wildlife
CLASS IV	Agricultural Water Supplies
CLASS V	Navigation, Utility, and Industrial Use

Source: Fla. Admin. Code R. 62-302.400(1).

The cornerstone of water quality restoration under the CWA is the development and implementation of total maximum daily loads for waterbodies or waterbody segments that are not fully meeting their designated uses. In 1999, the Florida Legislature passed the Florida Watershed Restoration Act, section 403.067, Florida Statutes, which established the state's TMDL program to implement the requirements in section 303(d) of the federal Clean Water Act.[21] Under this program, waters identified as impaired are placed on DEP's Verified List of impaired waterbodies for which TMDLs must be developed.[22] The list is adopted by DEP secretarial order and is submitted to the EPA biennially pursuant to 303(d) of the Clean Water Act.[23] The EPA must approve or disapprove the 303(d) list and may independently add additional waterbodies not identified by the state. Figure 4.1.1 illustrates the general approach for water quality restoration under the CWA.

[20] Fla. Admin. Code R. 62-302.200(42).
[21] 33 U.S.C. § 1313(d). DEP is the lead agency for administering section 303(d).
[22] *See generally* Fla. Admin. Code Ch. 62-303 (establishing the methodology for identifying impaired waters to be included on the state's Verified List of impaired waters, as well as the Planning List and Study List identifying potentially impaired waters and waters where additional information is needed, respectively).
[23] *See* Fla. Admin. Code R. 62-303.100(1); *see also* Fla. Admin. Code R. 62-303.150(1). The current Statewide Comprehensive Verified List of Impaired Waters is available at: https://floridadep.gov/dear/watershed-assessment-section/content/assessment-lists. (Accessed December 2022.)

Figure 4.1.1 Water Quality-Based Approach of the Federal Clean Water Act



Note: WLA refers to wasteload allocation for point sources, LA refers to load allocations for nonpoint sources, and MOS refers to the margin of safety to account for uncertainty.
Source: U.S. Environmental Protection Agency, Overview of Identifying and Restoring Impaired Waters under Section 303(d) of the CWA, https://www.epa.gov/tmdl/overview-identifying-and-restoring-impaired-waters-under-section-303d-cwa. (Accessed December 2022.)

The DEP utilizes a statewide watershed management approach for water resource management in Florida. First, DEP has delineated the state into assessment units with unique water body identification numbers (WBIDs) that represent waterbodies at the watersheds or sub-watershed scale.[24] These WBIDs include "drainage basins, lakes, lake drainage areas, springs, rivers and streams, segments of rivers and streams, coastal, bay and estuarine waters in Florida."[25] The WBIDs are used by DEP in implementation of a number of responsibilities including impaired waters assessment and the total maximum daily loads and basin management action plan programs.[26] Currently, EDR can identify 6,727 WBIDs in Florida.

Second, as part of the watershed management approach, Florida's 52 basins have been historically divided into five basin groups that continuously move through a five-year, five-phase cycle of

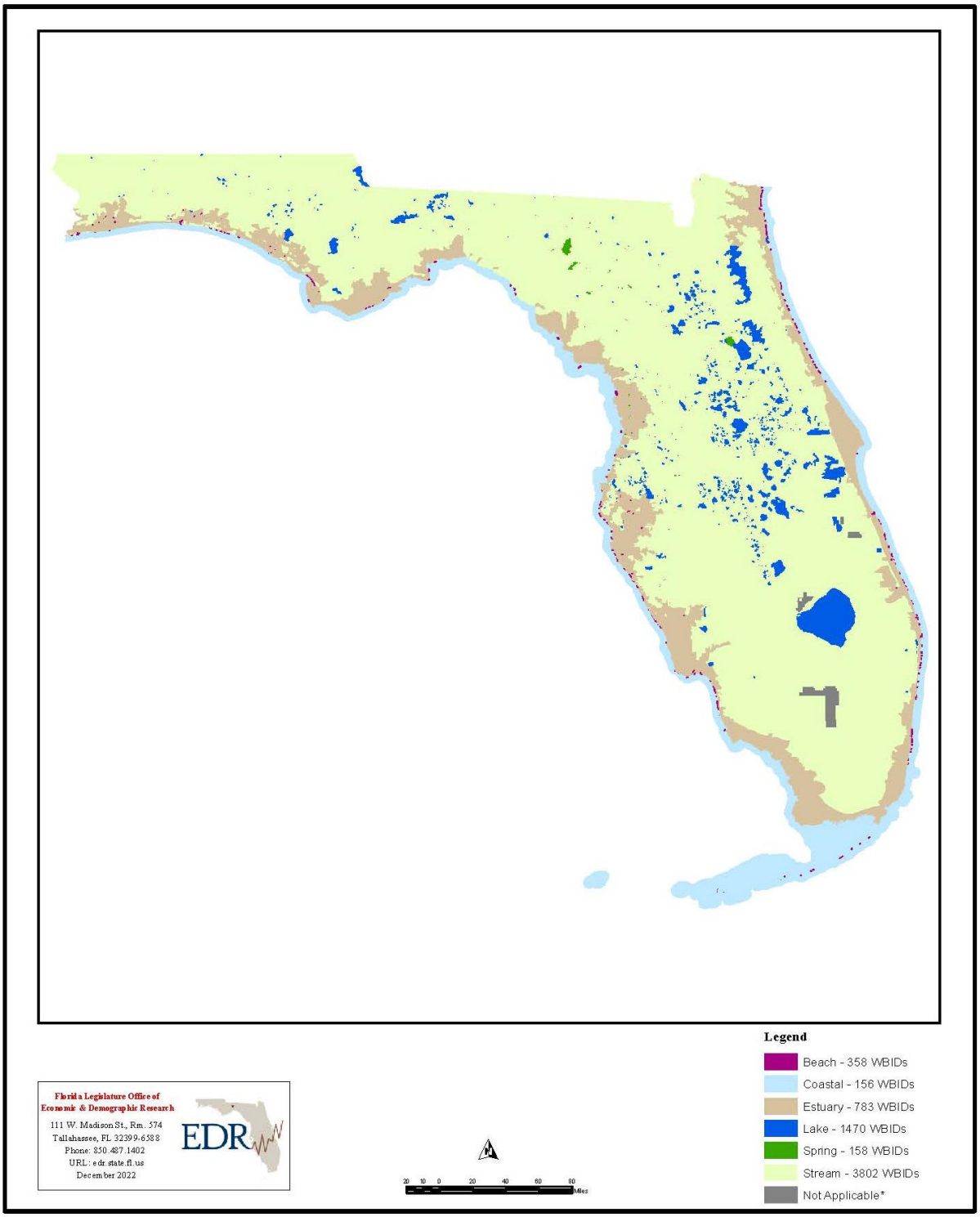
[24] Florida Department of Environmental Protection, Basin 411, What is a WBID?, https://floridadep.gov/dear/watershed-assessment-section/content/basin-411-0. (Accessed December 2022.)
[25] *Id.*
[26] *Id.*

restoration activities that begins with the first phase of preliminary basin evaluation.[27] The department has recently transitioned to a statewide biennial assessment process whereby all waterbody segments are assessed every two years instead of using the five-year basin rotation cycle. According to DEP, "All assessments will have the same data assessment period, the consistent application of water quality criteria, and essentially equal timeframes." These results will first be in full use in 2024. Under both approaches, the assessed WBIDs are placed in assessment categories or subcategories from one through five. See Figure 4.1.2 for a map of WBIDs statewide. See Figure 4.1.3 for a map of the five basin groups. See Figure 4.1.4 for an illustration of the previous rotating watershed management approach. See Table 4.1.2 for the assessment categories.

[See figures and tables on following pages]

[27] *See* Florida Department of Environmental Protection, Final Integrated Water Quality Assessment for Florida: 2016 Sections 303(d), 305(b), and 314 Report and Listing Update, Table 6.2. Phases of the basin management cycle at 168, available at: https://floridadep.gov/sites/default/files/2016-Integrated-Report.pdf. (Accessed December 2022.) *See also* Florida Department of Environmental Protection, Final Integrated Water Quality Assessment for Florida: 2018 Sections 303(d), 305(b), and 314 Report and Listing Update, at 136-39 (describing the watershed management approach), available at: https://floridadep.gov/sites/default/files/2018_integrated_report.pdf. (Accessed December 2022.)

Figure 4.1.2 Water Body IDs (WBIDs)



*The six areas shown as not applicable are identified in DEP's GIS data as Hollywood Indian Reservation, Miccosukee Indian Reservation, Big Cypress Indian Reservation, Brighton Indian Reservation, Fellsmere Stick Marsh, and C-52 (Blue Cypress Watershed Management Area).

Figure 4.1.3 Basin Groups

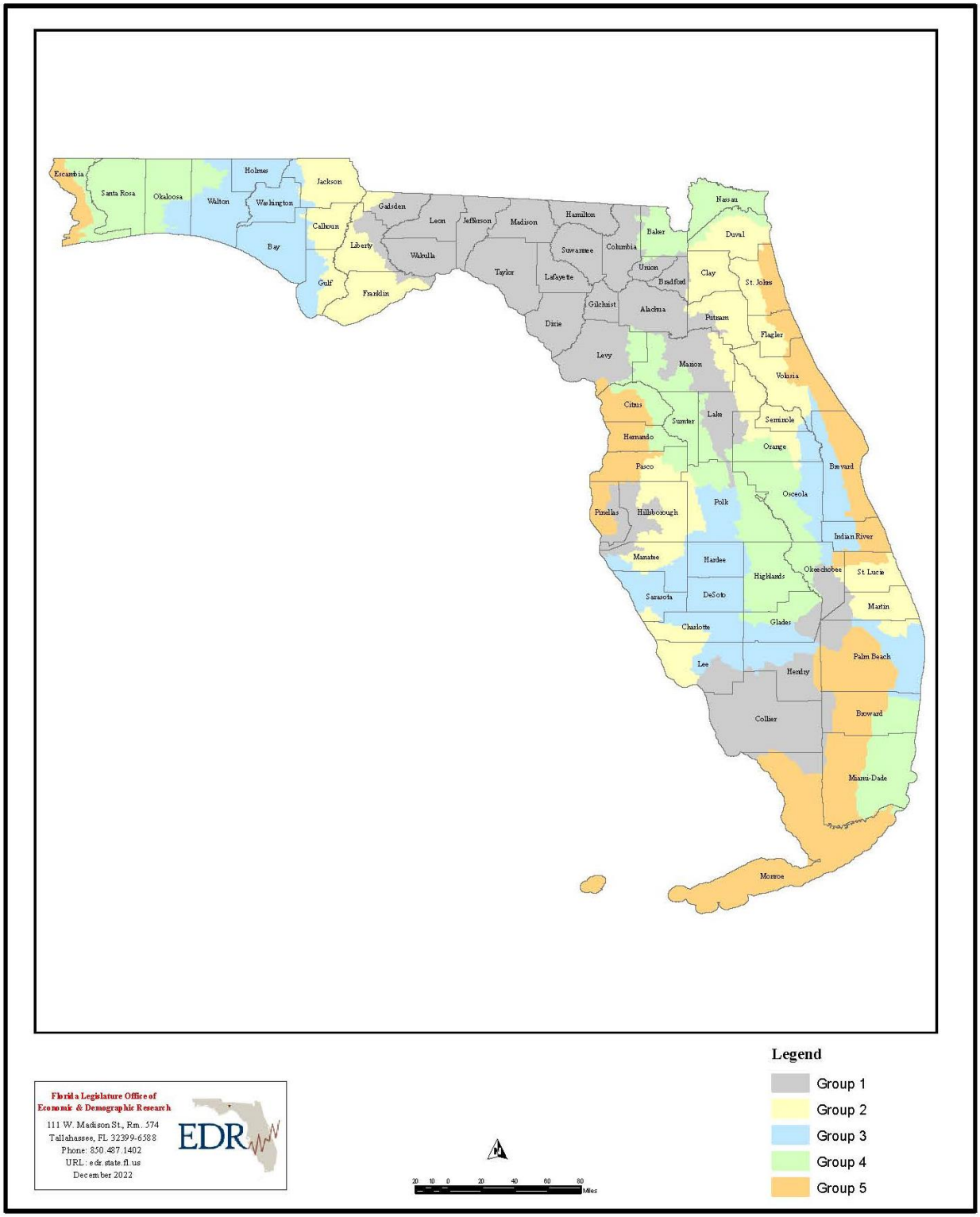


Table 4.1.2 Assessment Categories

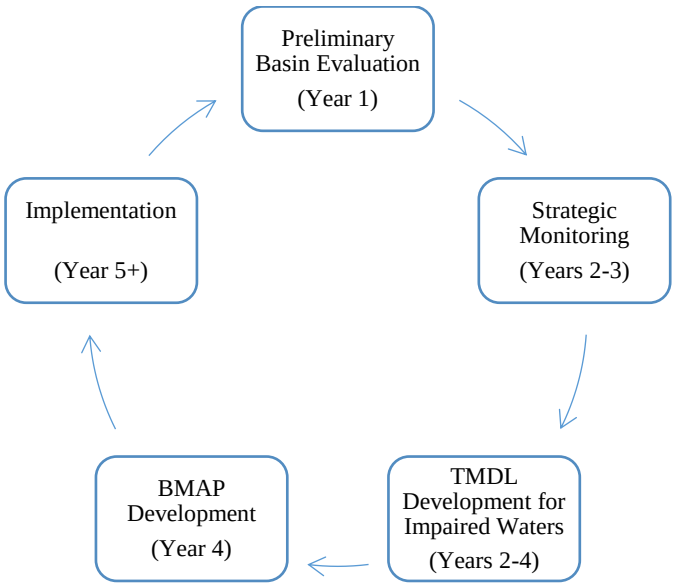
Assessment Category	Assessment Category Definitions
1	Attains all designated uses
2	Attains some designated uses and insufficient or no information or data are present to determine if remaining uses are attained
3a	No data and information are present to determine if any designated use is attained
3b	Some data and information are present but not enough to determine if any designated use is attained
3c	Enough data and information are present to determine that one or more designated uses may not be attained according to the Planning List methodology in Chapter 62-303 of the Florida Administrative Code
4a	Impaired for one or more designated uses but does not require TMDL development because a TMDL has already been completed
4b*	Impaired for one or more designated uses but does not require TMDL development because the water will attain water quality standards due to existing or proposed measures
4c	Impaired for one or more criteria or designated uses but does not require TMDL development because impairment is not caused by a pollutant
4d	Waterbody indicates non-attainment of water quality standards, but the Department does not have enough information to determine a causative pollutant; or current data show a potentially adverse trend in nutrients or nutrient response variables; or there are exceedances of stream nutrient thresholds, but the Department does not have enough information to fully assess non-attainment of the stream nutrient standard.
4e**	Waterbody indicates non-attainment of water quality standards and pollution control mechanisms or restoration activities are in progress or planned to address non-attainment of water quality standards, but the Department does not have enough information to fully evaluate whether proposed pollution mechanisms will result in attainment of water quality standards.
5	Water quality standards are not attained and a TMDL is required.

Source: Florida Department of Environmental Protection, Watershed Assessment Section, available at: https://floridadep.gov/dear/watershed-assessment-section. (Accessed December 2022.) *See also* Memorandum from Robert H. Wayland III, Director, Office of Wetlands, Oceans and Watersheds to EPA Regional Directors et al. dated November 19, 2001, 2002 Integrated Water Quality Monitoring and Assessment Report Guidance, available at: https://www.epa.gov/sites/production/files/2015-10/documents/2002_02_13_tmdl_2002wqma.pdf. (Accessed December 2022.)

*Water segments in the 4b assessment category have Reasonable Assurance Plans in place and are not included in the state's 303(d) list.

** Water segments categorized in the 4e assessment category have Alternative Restoration Plans (also referred to as Pollutant Reduction Plans) in place and are included in the state's 303(d) list. Note that Florida's 4e category is comparable to EPA's 5-alternative (or 5-alt) category as they both recognize ongoing restoration activities for otherwise impaired waterbody segments.

Figure 4.1.4 Historic Watershed Management Approach



Assessed water segments that are identified as impaired and placed in assessment category 5 require TMDL development.[28] Establishing TMDLs for impaired waters represents a major first step towards restoring water quality. A TMDL is a water quality restoration goal that represents the maximum amount of a specific pollutant that a waterbody or waterbody segment can assimilate from all sources while still maintaining applicable water quality standards.[29] Using the TMDL as the maximum value, DEP then assigns individual wasteload allocations for point sources, load allocations for nonpoint sources, and a margin of safety to account for uncertainty in the scientific analysis.[30] Existing point sources may include wastewater treatment facilities, industrial facilities, and municipal separate storm sewer systems (known as MS4s). Existing nonpoint sources may include agricultural runoff and atmospheric deposition. These allocations along with other management and restoration strategies are intended to achieve the pollutant reductions necessary to meet the TMDL.[31]

Expressed mathematically, the TMDL is the summation of the wasteload for existing NPDES wastewater facilities and NPDES stormwater systems, the load allocation for existing nonpoint sources and natural background, and a margin of safety:

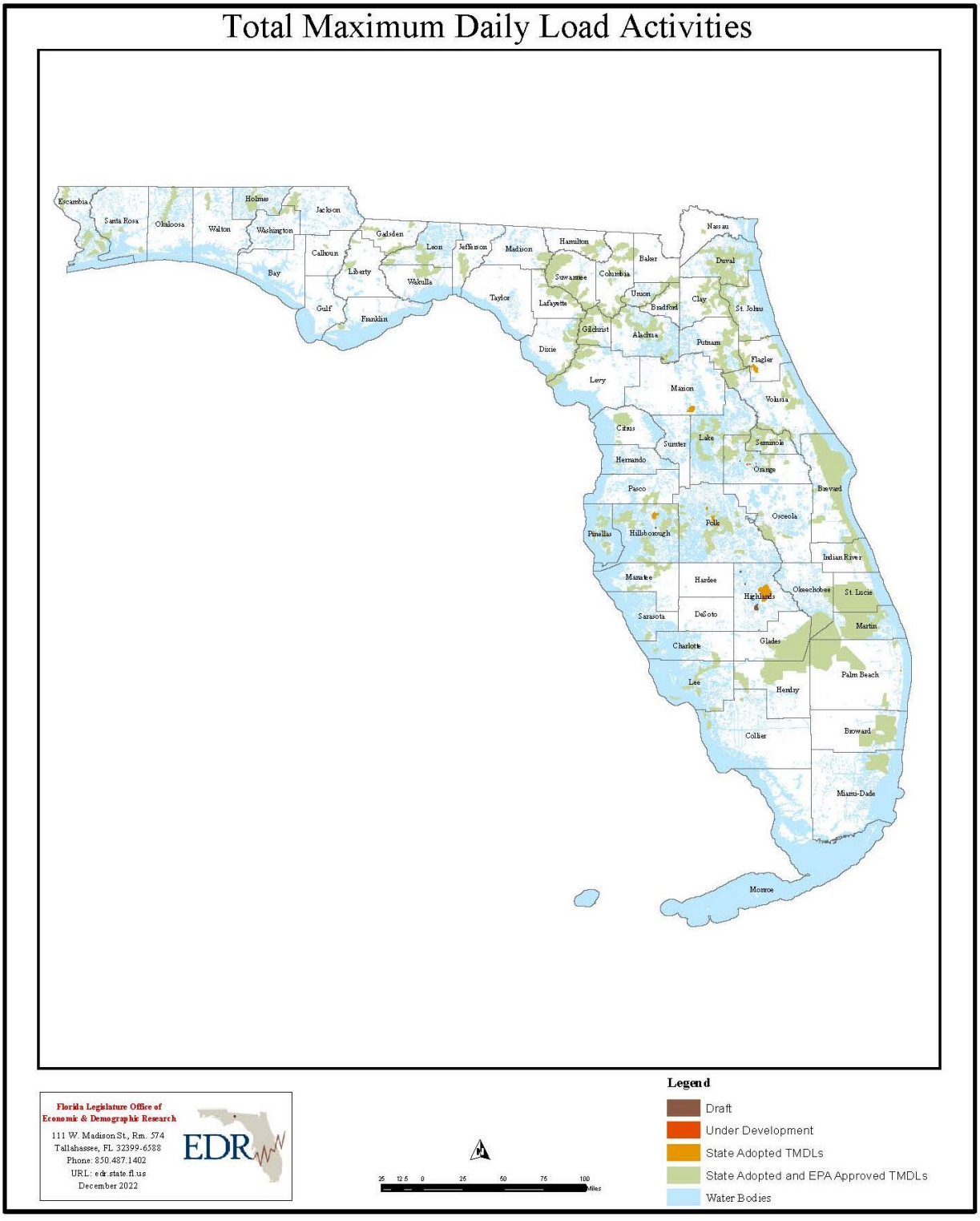
$$\mathbf{TMDL} = \sum \mathbf{WLA_{NPDES}} + \sum \mathbf{WLA_{NPDES\ Stormwater}} + \sum \mathbf{LA_{Nonpoint\ Sources}} + \mathbf{MOS}$$

As of December 31, 2021, DEP has adopted a total of 453 TMDLs for impaired WBIDs (446 site-specific TMDLs and one statewide TMDL).[32] Specifically, there are 268 TMDLs for dissolved oxygen (DO), nutrients, and/or un-ionized ammonia; 179 TMDLs for bacteria; and five for other parameters (iron, lead, and turbidity).[33] In addition to these site-specific TMDLs, in 2013, DEP adopted a single statewide TMDL for mercury that affects over 1,100 waterbody segments in fresh and marine waters previously listed for mercury impairment.[34] For a map of TMDL activities in the state, see Figure 4.1.5.

[See figure on following page]

[28] A single WBID may be impaired for multiple analytes, generating more than one TMDL. Conversely, some analytes can be combined, reducing the number of TMDL's.
[29] *See* Fla. Admin. Code R. 62-303.200(31).
[30] All TMDLs include either an explicit margin of safety (*i.e.*, a specified amount of loading held in reserve) or implicit margin of safety (*i.e.*, conservative assumptions made and documented during TMDL development).
[31] § 403.067(6), Fla. Stat.
[32] Florida Department of Environmental Protection, 2021 Statewide Annual Report on Total Maximum Daily Loads, Basin Management Action Plans, Minimum Flows or Minimum Levels, and Recovery or Prevention Strategies, available at: https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report. (Accessed December 2022.)
[33] *Id*.
[34] *Id*. Note that mercury impairment is based upon potential risks to human health through consumption of fish with elevated levels of mercury in their tissues and not on an exceedance of the state's water quality criterion for mercury. *See* Final Report, Mercury TMDL for the State of Florida, October 24, 2013, available at: https://floridadep.gov/sites/default/files/Mercury-TMDL.pdf (Accessed December 2022.)

Figure 4.1.5 Status of TMDL Development in Florida



Based on DEP's statewide Comprehensive Verified List of impaired waters, which includes the most recent updates published on June 11, 2022, there are approximately 1,846 waterbody-parameter combinations in Florida that are listed as impaired and require a TMDL.[35] Overall, the most frequently identified pollutants causing water impairment relate to excessive nutrients.

In 2015, DEP set forth a priority framework document addressing how Florida's TMDL program will implement the new long term vision that EPA announced for section 303(d) of the Clean Water Act.[36] The TMDL priority setting focuses on impaired waters where site-specific TMDLs are the best available option for water quality restoration.[37] Where appropriate, alternatives to the TMDL approach are implemented through alternative restoration plans.

Forecast of Future Expenditures Necessary to Comply with Laws Governing TMDLs

The DEP's statewide Comprehensive Verified List of impaired waters provides a list of WBIDs over which TMDLs will need to be established.[38] Further, they are prioritized into high, medium, or low priority.[39] While these priorities are not associated with a legally required time to completion, the list indicates that high priority are to be addressed within 5 years, medium within 5 to 10 years, and low within 10 years. As of the June 2022 update, there were 372 WBIDs with high priority for TMDL development, 1,121 with medium priority, and 353 with low priority.[40] The methodology for TMDL establishment provided by DEP suggests that for each WBID, impairments for dissolved oxygen, total nitrogen, total phosphorus, chlorophyll-a, macrophytes, biology, algal mats, nitrates-nitrites, total ammonia, and un-ionized ammonia could be combined into a single TMDL and that all other impairments would require individual TMDLs.

As of December 2022, the DEP further provided a history of the 459 existing TMDLs, identifying the year they were established and the pollutant parameter. This reporting differs from the most recent version of the STAR report which indicated 453 TMDLs because an additional 6 were adopted between July 2022 and December 2022. The history can be found in Table 4.1.3; the DEP has indicated 8 additional TMDLs were established in the 2022 calendar year.

[35] Florida Department of Environmental Protection, Statewide Comprehensive Verified List of Impaired Waters, available at: https://floridadep.gov/dear/watershed-assessment-section/content/assessment-lists. (Accessed December 2022.) Note that a waterbody or waterbody segment not meeting more than one water quality standard would be identified more than once on the State's Verified List as separate waterbody-parameter combinations.

[36] Letter from Gregory P. DeAngelo, P.E.., Florida Department of Environmental Protection, to Gracy Danois, Chief, U.S. Environmental Protection Agency (September 1, 2015), available at: https://floridadep.gov/sites/default/files/PriorityFrameworkDocument.pdf. (Accessed December 2022.)

[37] Letter from Gregory P. DeAngelo, P.E.., Florida Department of Environmental Protection, to Gracy Danois, Chief, U.S. Environmental Protection Agency (September 1, 2015) at 2, available at: https://floridadep.gov/sites/default/files/PriorityFrameworkDocument.pdf. (Accessed December 2022.)

[38] Available at: https://floridadep.gov/dear/watershed-assessment-section/documents/comprehensive-verified-list. (Accessed December 2022.)

[39] Less than 1 percent of the WBIDs on the verified list are not assigned a priority. EDR categorizes them as low priority.

[40] According to DEP staff, the state's bacteria water quality criteria for fresh waters in Florida Administrative Code Rule 62-302.530 were updated from fecal coliform to E. coli to be consistent with EPA recommendations. As DEP begins assessing waters under the new E. coli criteria, waterbody segments currently identified as impaired for fecal coliform and requiring a TMDL may be updated accordingly to reflect E. coli impairment or delisted for fecal coliform.

Table 4.1.3 TMDLs Established by Parameter and Year

	2004 & prior	CY 2005	CY 2006	CY 2007	CY 2008	CY 2009	CY 2010	CY 2011	CY 2012	CY 2013
DO, Nutrients, Unionized Ammonia	10	1	28	8	53	46	2	-	2	37
Fecal Coliform	6	1	18	5	21	40	31	-	39	1
Iron	-	-	1	-	-	-	-	-	-	-
Lead	-	-	-	-	-	3	-	-	-	-
Mercury in Fish Tissue (statewide)	-	-	-	-	-	-	-	-	-	1
Turbidity	-	-	-	-	-	-	-	-	-	1
Total	**7**	**2**	**47**	**13**	**74**	**89**	**33**	**-**	**41**	**40**

	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022	All Years
DO, Nutrients, Unionized Ammonia	10	10	4	13	17	12	9	4	8	274
Fecal Coliform	17	-	-	-	-	-	-	-	-	179
Iron	-	-	-	-	-	-	-	-	-	1
Lead	-	-	-	-	-	-	-	-	-	3
Mercury in Fish Tissue (statewide)	-	-	-	-	-	-	-	-	-	1
Turbidity	-	-	-	-	-	-	-	-	-	1
Total	**27**	**10**	**4**	**13**	**17**	**12**	**9**	**4**	**8**	**459**

*The one TMDL for Mercury covers 1,131 WBIDs.
**There were also 9 "DO, Nutrients, Unionized Ammonia" in 2001; The historical total is 459.

Finally, DEP provided internal expenditure data that allowed a breakdown between TMDL development expenditures and other TMDL-related expenditures (*e.g.*, funding for restoration efforts). This series was produced with confidence going back to Fiscal Year 2012-13. Between that time and Fiscal Year 2021-22, the state of Florida has expended $27.8 million on TMDL development. Using the consumer price index to adjust each year, this represents $32.1 million in Fiscal Year 2021-22 dollars.[41] Over that same time period, 144 TMDLs were established. Assuming similar costs going forward, this suggests an average cost per TMDL of $223,163.10. Applying this cost to the anticipated 1,428 TMDLs from the verified list as adjusted by EDR, and considering the timing differences between priority groups, produces the expenditure forecast shown in Table 4.1.4.

[41] CPI-All Urban Consumers (Current Series) was used. Series Id: CUUR0000AA0; Not Seasonally Adjusted (Series Title: All items - old base in U.S. city average, all urban consumers, not seasonally adjusted; Area: U.S. city average).

Table 4.1.4 Forecast of TMDL Development Expenditures Necessary to Comply with the Law (in $millions)

	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30	FY 30-31	FY 31-32
Total	$39.81	$39.81	$39.81	$39.81	$39.81	$23.92	$23.92	$23.92	$23.92	$23.92

Underlying this forecast is an assumption of approximately 178 TMDLs established per year for the first five years of the forecast and approximately 107 TMDLs established per year for the last five years of the forecast, given appropriate funding. This assumption is becoming increasingly implausible. DEP staff indicates that under their current staffing and funding they are capable of developing TMDLs for approximately 20 WBIDs per year. At that rate, the state would need to expend approximately $4.5 million annually through Fiscal Year 2090-91 to establish TMDLs over WBIDs on the current verified list. Even DEP's assumption of 20 WBIDs per year appears questionable based on the past 10 years of history where an annual average of 14 TMDLs were established. Establishing a TMDL, however, is not the only method through which waterbodies can be removed from the verified list. The Comprehensive Delist List is also maintained by DEP[42] and indicates a wide variety of reasons for a WBID being removed from the Verified List, including becoming part of an alternative restoration approach, identifying analysis flaws, meeting a TMDL, and no longer being impaired.

Basin Management Action Plans

In 2005, the Florida Watershed Restoration Act was amended to authorize DEP to adopt basin management action plans (BMAPs), which are water quality restoration plans that are unique to Florida. The BMAPs provide the state's primary mechanism and blueprint for restoring impaired waters by meeting TMDLs. Addressing surface waters and groundwater-fed springs, they provide an opportunity to manage nonpoint sources of pollution. The plans are intended to integrate all of the management strategies committed to by state, regional, local, and private stakeholders to reduce pollutant sources, and thereby achieve water quality standards for the pollutants causing impairment. BMAPs are adopted by DEP secretarial order and are enforceable by law.[43]

A BMAP includes an equitable allocation of pollutant reductions to individual basins, as a whole to all basins, or to each identified point source or category of nonpoint sources.[44] Through participation from governmental and private stakeholders, DEP identifies appropriate management strategies, schedules for implementation, feasible funding strategies, plans for evaluating the effectiveness of the management strategies, and strategies to address potential future increases in pollutant loadings.[45] A BMAP must include milestones for implementation and water quality improvement, as well as an associated water quality monitoring component to evaluate the

[42] Available at: https://floridadep.gov/dear/watershed-assessment-section/documents/comprehensive-delist-list. (Accessed december 2022.)
[43] § 403.067(7)(d)1., Fla. Stat. (providing that BMAPs are enforceable pursuant to sections 403.067, 403.121, 403.141, and 403.161, Florida Statutes).
[44] § 403.067(7)(a)2., Fla. Stat.
[45] *See* § 403.067(7)(a), Fla. Stat.

progress of pollutant reductions. Except as discussed below, while the implementation of a BMAP is not required to achieve the associated TMDLs within a particular time frame, an assessment of the progress toward meeting the milestones is conducted every five years and revisions to BMAPs are made when deemed necessary or appropriate. Special treatment has been established in law for the Outstanding Florida Springs BMAPs[46] and the BMAPs adopted for Lake Okeechobee, the Caloosahatchee Estuary Basin, and the St. Lucie Estuary Basin under the Northern Everglades and Estuaries Protection Program.[47] To ensure expeditious implementation of those BMAPs, a 20-year target to achieve the TMDLs is identified, with 5-year, 10-year, and 15-year intermediate milestones.[48]

In June 2022, DEP submitted its fifth statewide annual report (STAR Report) to the Governor and Florida Legislature, which, in part, provides the status of each TMDL and BMAP as of December 31, 2021.[49] In the STAR Report, DEP must include the status of projects within adopted BMAPs, and, if applicable, an explanation of possible causes and potential solutions for any unmet 5-year, 10-year, or 15-year milestone, or 20-year target.[50] The report must also include project descriptions, estimated costs, proposed priority project ranking, and funding needs to achieve the TMDLs.[51]

The latest STAR Report provides a progress report on 33 adopted BMAPs, the majority of which address nutrient impairments. Note that EDR has not included in its analysis any BMAPs or revisions to BMAPs that were not included in DEP's STAR Report.[52] For a list of adopted BMAPs included in the STAR Report see Table 4.1.5. For a map of all adopted BMAPs as of December 31, 2022, see Figure 4.1.6.

[See table and figure on following pages]

[46] *See* Florida Springs and Aquifer Protection Act, §§ 373.801 – 373.813, Fla. Stat.
[47] § 373.4595, Fla. Stat.
[48] *See* § 373.4595, Fla. Stat. (requiring DEP to develop a schedule establishing 5-year, 10-year, and 15-year milestones and targets to achieve the TMDL within 20 years after adoption of the Lake Okeechobee BMAP, Caloosahatchee Estuary BMAP, and the St. Lucie River and Estuary BMAP; or else provide an explanation of the constraints that prevent achievement within 20 years, an estimate of the time needed, and additional 5-year measurable milestones); *see also* § 373.807, Fla. Stat. (requiring DEP to develop a schedule establishing 5-year, 10-year, and 15-year milestones and targets to achieve the nutrient TMDLs within 20 years of adopting a BMAP for an Outstanding Florida Spring).
[49] Florida Department of Environmental Protection, 2021 Statewide Annual Report on Total Maximum Daily Loads, Basin Management Action Plans, Minimum Flows or Minimum Water Levels, and Recovery or Prevention Strategies, published June 2022, available at: https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report. (Accessed December 2022.)
[50] § 403.0675(1), Fla. Stat.
[51] *Id.*
[52] A current list of adopted BMAPs is available at: https://floridadep.gov/dear/water-quality-restoration/content/basin-management-action-plans-bmaps. (Accessed December 2022.)

Table 4.1.5 BMAPs Included in Analysis

BMAP Type	BMAP Name	FY* Original Document	FY* Document Updated	Starting FY* for DEP's Milestones
Fecal Indicator Bacteria	Alafia River Basin	2014		N/A**
	Bayou Chico	2012		N/A**
	Hillsborough River Basin	2010		N/A**
	Long Branch***	2008		N/A**
	Lower St. Johns River Tributaries I and II****	2009 and 2011	2016 (both)	N/A**
	Manatee River Basin	2014		N/A**
Northern Everglades and Estuaries Protection Program	Caloosahatchee Estuary Basin	2013	2020	2013
	St. Lucie River and Estuary	2013	2020	2013
	Lake Okeechobee	2015	2020	2015
Outstanding Florida Springs	Crystal River/Kings Bay	2018		2019
	DeLeon Springs	2018		2019
	Gemini Springs	2018		2019
	Homosassa and Chassahowitzka Springs Groups	2018		2019
	Jackson Blue Spring and Merritts Mill Pond Basin	2016	2018	2019
	Santa Fe River	2012	2018	2021
	Silver Springs and Upper SilverRiver and Rainbow Spring Group and rainbow River	2016	2018	2021
	Suwannee River	2016	2018	2021
	Upper Wakulla River and Wakulla Springs	2016	2018	2019
	Volusia Blue Spring	2016	2018	2021
	Wacissa River and Wacissa Spring Group	2018		2019
	Weeki Wachee	2018		2019
	Wekiva River, Rock Springs Run, and Little Wekiva Canal	2016		2021
Surface Water: Nutrients	Everglades West Coast Basin	2013		N/A**
	Indian River Lagoon Basin: Banana River Lagoon	2013	2021	N/A**
	Indian River Lagoon Basin: Central Indian River Lagoon	2013	2021	N/A**
	Indian River Lagoon Basin: North Indian River Lagoon	2013	2021	N/A**
	Lake Jesup	2010	2020	N/A**
	Lakes Harney, Monroe, Middle St. Johns River, and Smith Canal	2013		N/A**
	Lower St. Johns River Main Stem	2009		N/A**
	Orange Creek	2008	2020	N/A**
	Upper Ocklawaha River Basin	2008	2020	N/A**
	Wekiva Spring and Rock Spring	2018		N/A**

* The Fiscal Year ends in the listed year. For example, 2014 represents Fiscal Year 2013-14.

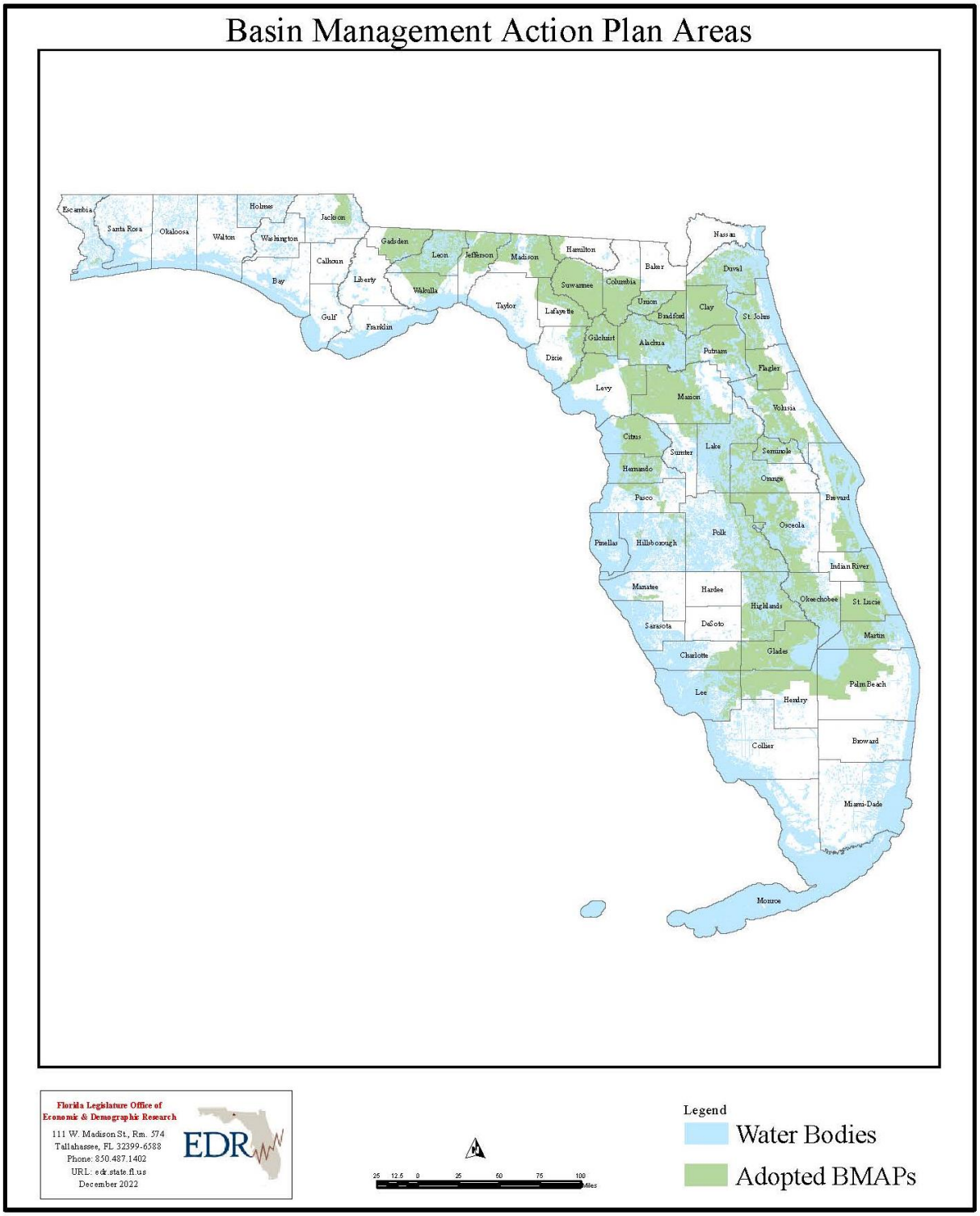
** The 5, 10, 15, and 20-year milestones are only applicable to BMAPs for the Northern Everglades and Estuaries Protection Program and Outstanding Florida Springs. For timing of expenditures for the other BMAPs in EDR's analysis, the fiscal year of the original document is used. In the case of the Lower St Johns River Tributaries I and II, the average of 2010 is used.

*** See DEP's interactive BMAP map at https://floridadep.gov/dear/water-quality-restoration/content/impaired-waters-tmdls-and-basin-management-action-plans. In the Long Branch BMAP Story Map, the assessment status indicates "[t]here are no longer standards for fecal coliform assessment, so this parameter is now listed Not Applicable (NA). The new bacteria parameter, E. coli, was placed into Category 4e (Ongoing Restoration Activities) for this waterbody and will be placed on the Statewide Comprehensive Study List. DO, Chlorophyll-a, Total Nitrogen (TN), and Total Phosphorus (TP) are not impaired." See https://fdep.maps.arcgis.com/apps/MapSeries/index.html?appid=f8adf3667af645bcaf4d65384d5154c0. (Accessed December, 2022.)

****Although displayed here under one BMAP name, Tributaries I and II are actually addressed by separate BMAPs.

[See figure on following page]

Figure 4.1.6 Basin Management Action Plans



While TMDLs are implemented through timely changes in NPDES permit conditions (such as new discharge limits) for point sources of pollution, the reduction of nonpoint sources of pollution is primarily achieved through the implementation of best management practices (BMPs). Nonpoint source dischargers included in BMAPs are required to implement BMPs or conduct water quality monitoring approved by DEP or the applicable WMD to demonstrate compliance with pollutant load reductions.[53]

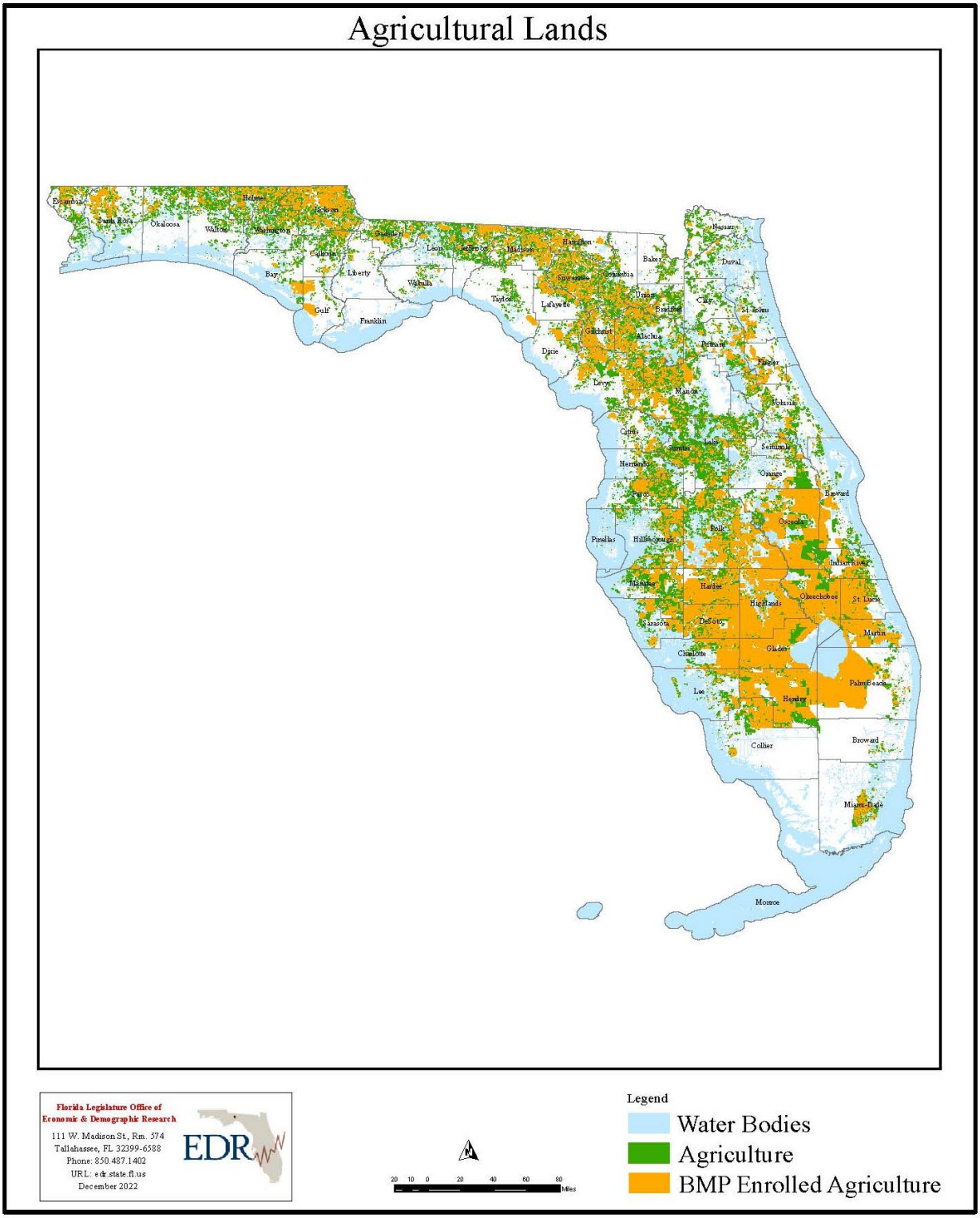
To address nonpoint source pollution from urban and suburban areas (*i.e.*, non-agricultural areas) within BMAPs, responsible stakeholders have identified structural and non-structural BMPs to address stormwater runoff and discharges to receiving waterbodies. Structural BMPs involve constructed systems that are generally intended to reduce the volume of stormwater discharge or reduce concentrations of pollutants. This includes wet or dry detention ponds. Non-structural BMPs focus on preventing, controlling, and treating pollutants at their source before they enter the environment. This includes land conservation, local ordinances (such as fertilizer ordinances), land use planning, watershed planning, and low impact development strategies. According to the BMAP project list provided with the STAR Report, wet detention ponds comprise the most widely identified structural BMP, while education efforts are the most common non-structural practice.[54] Combining structural and non-structural projects, the most common project type is stormwater practices related to fecal indicator bacteria ("FIB-Stormwater").

Agricultural BMPs are intended to be practical, cost-effective measures that agricultural producers can undertake to conserve water and reduce the amount of pollutants that enter water resources.[55] An agricultural producer who implements and maintains verified, DACS-adopted BMPs receives a presumption of compliance with state water quality standards for the pollutants addressed by the BMPs.[56] According to the DACS Office of Agricultural Water Policy, approximately 61 percent of the agricultural acreage in Florida with the greatest impact on water resources is enrolled in the BMP program.[57] Moreover, 82 percent of the state's irrigated agricultural acreage are enrolled in the BMP program. See Figure 4.1.7 for a map of BMP-enrolled agricultural lands statewide, excluding silviculture and aquaculture.

[See figure on following page]

[53] *See* § 403.067(7)(b)2.g., Fla. Stat.
[54] Available at: https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report. (Accessed December 2022.)
[55] *See* DACS, Agricultural Best Management Practices, What Are Agricultural Best Management Practices?, https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices. (Accessed December 2022.)
[56] § 403.067(7)(c), Fla. Stat.
[57] DACS, Status of Implementation of Agricultural Nonpoint Source Best Management Practices, July 1, 2021, available at: https://www.fdacs.gov/Divisions-Offices/Agricultural-Water-Policy. (Accessed December 2022.)

Figure 4.1.7 Map of BMP-enrolled Agricultural Lands (Excluding Silviculture & Aquaculture)



Forecast of Future Expenditures Necessary to Implement Adopted BMAPs

The STAR Report contains a full list of completed, underway, and planned projects within each BMAP. Project costs and nutrient load reductions are included when available. For some projects, a cost estimate or load reduction may not be applicable. For the instances where costs were unavailable but applicable, EDR estimates them based on average costs of projects of the same type that included cost information.[58]

The duration and timing of the expenditure forecast is unique to each BMAP. Nutrient reduction achieved through completed projects is compared to the initial load reduction requirement in the BMAP to calculate how much progress has been made. Then, the reductions that are still needed are spread across the remaining years expected for that BMAP. EDR caps each BMAP at 20 years from its adoption, assuming projects identified as planned will be completed within five years and that the funding for costs associated with underway projects has already been spent.[59]

For BMAPs whose reduction goal(s) are not met by the planned projects, expenditure projections are continued into the subsequent years using that BMAP's most cost-efficient strategy as a basis for the calculations.[60] Once the reduction goal is met in its entirety, the expenditures end. Fecal Indicator Bacteria BMAPs are assumed to be achieved once the existing underway and planned projects are completed.

The forecast of expenditures necessary to comply with laws governing the BMAP program is provided in Table 4.1.6. This forecast has increased by nearly 10% since the previous Edition, in part due to inflation. It will change further in future years–perhaps substantially–as more project data becomes available and more BMAPs are adopted. In compiling the list of projects, DEP is likely more informed regarding projects involving state funds than those that do not, and as such the state share may be overestimated. Further, it is likely that the cheaper or more cost effective projects would be completed first, meaning that future projects would be more expensive. As such, EDR's methodology based on historical and existing projects may underestimate future project costs.

[58] Project types used are those identified in the project list and consist of 88 different types.
[59] Alternatively, assuming the underway projects have not been funded results in a total expenditure increase of $4,760.20 million, or an increase of 45 percent
[60] For additional information regarding TN and TP projects and cost efficiency, see the 2021 Edition.

Table 4.1.6 Forecast of BMAP Expenditures Necessary to Comply with the Law (in $millions)

	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30	FY 30-31	FY 31-32
Local	$305.89	$298.59	$289.96	$235.66	$235.66	$127.92	$127.79	$127.79	$124.27	$114.22
Regional	$171.71	$167.62	$162.77	$132.29	$132.29	$71.81	$71.73	$71.73	$69.76	$64.12
State	$768.61	$750.29	$728.59	$592.16	$592.16	$321.43	$321.10	$321.10	$312.26	$287.01
Federal	$204.59	$199.71	$193.94	$157.62	$157.62	$85.56	$85.47	$85.47	$83.12	$76.40
Private	$2.55	$2.49	$2.42	$1.97	$1.97	$1.07	$1.07	$1.07	$1.04	$0.95
Total	$1,453.35	$1,418.70	$1,377.66	$1,119.71	$1,119.71	$607.78	$607.15	$607.15	$590.45	$542.71

	FY 32-33	FY 33-34	FY 34-35	FY 35-36	FY 36-37	FY 37-38	FY 38-39	FY 39-40	Total
Local	$112.45	$92.65	$92.65	$38.84	$38.84	$38.84	$19.03	$19.03	**$2,440.07**
Regional	$63.13	$52.01	$52.01	$21.80	$21.80	$21.80	$10.68	$10.68	**$1,369.76**
State	$282.57	$232.81	$232.81	$97.59	$97.59	$97.59	$47.81	$47.81	**$6,131.29**
Federal	$75.21	$61.97	$61.97	$25.98	$25.98	$25.98	$12.73	$12.73	**$1,632.03**
Private	$0.94	$0.77	$0.77	$0.32	$0.32	$0.32	$0.16	$0.16	**$20.35**
Total	$534.30	$440.21	$440.21	$184.53	$184.53	$184.53	$90.40	$90.40	**$11,593.50**

There was a $196.6 million increase in the needed BMAP expenditures for the current fiscal year relative to the previous Edition. Additionally, the overall total for the forecast horizon contained in the table increased by over $1.03 billion. In addition to higher inflation, the forecast increase is due to 2 "Outstanding Florida Springs" BMAPs (Suwannee River and Volusia Blue Spring) and 1 additional "Surface Water for Nutrients" BMAP (Wekiwa and Rock Spring). The Suwannee River BMAP has the highest total nitrogen reduction goal compared to any other BMAP.

Alternative Restoration Plans

The EPA recognizes that under certain circumstances, the TMDL development approach required under the CWA may not be the most efficient and effective strategy to attain water quality standards.[61] In some limited cases, water quality standards may be attained through (1) technology-based effluent limitations for permitted point sources, (2) more stringent effluent limitations required by the local, state, or federal authority, or (3) other pollution requirements such as best management practices.[62] As a result, the EPA created assessment category 4b for CWA reporting

[61] *See* Integrated Reporting Guidance under CWA Sections 303(d), 305(b) and 314 for the years 2004, 2008 (providing, in part, guidance on the use of assessment category 4b) available at: https://www.epa.gov/tmdl/integrated-reporting-guidance-under-cwa-sections-303d-305b-and-314. (Accessed December 2022.)
[62] *See* 40 C.F.R § 130.7(b)(1).

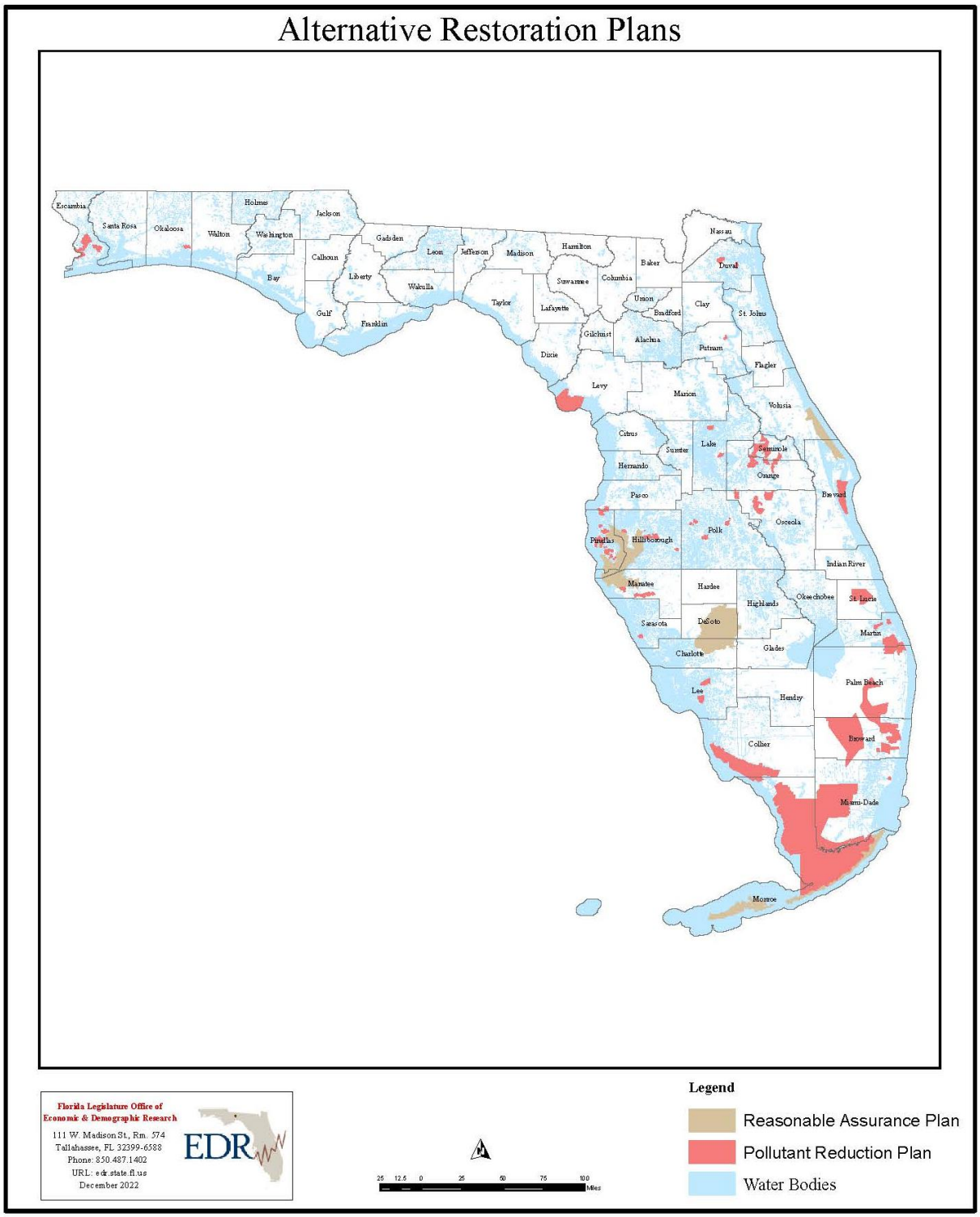
purposes,[63] which recognizes that other pollution control mechanisms in lieu of TMDL development may result in the attainment of applicable water quality standards in the near-term. The 4b waters are not included in a state's 303(d) impaired waters list, and therefore, are not prioritized for TMDL development. The EPA also recognizes a 5-alternative category of waters that are included in a state's 303(d) list and prioritized for TMDL development but are being addressed in the near-term through alternative restoration efforts.

In Florida, DEP encourages local stakeholders to develop and implement water quality restoration activities as soon as practicable, which may obviate the need to use limited state resources to develop TMDLs and implement BMAPs.[64] At a minimum, effectively addressing water quality concerns ahead of these regulatory steps may reduce the state and local expenditures necessary restore water quality.[65] In Florida, there are two types of restoration plans that are intended to promote water quality improvements prior to development of a TMDL: 4b reasonable assurance plans (4b plans or RAPs) and 4e water quality restoration plans (4e plans). Both types of alternative approaches are initiated and driven by stakeholder involvement. The main difference between the 4b and 4e plans concerns the level of certainty regarding when applicable water quality standards will be attained, with 4b plans having greater certainty that reasonable progress will be made by the next assessment cycle for that basin.[66] For a full list of the state's assessment categories, see Table 4.1.2. See Figure 4.1.8 for a map of the 4b and 4e plans currently being implemented in Florida.

[See figure on following page]

[63] As discussed previously, the state water quality reporting requirements are under sections 303(d), 305(b), and 314 of the CWA. These reports are often referred to as integrated reports since a single report meeting all of the requirements are submitted to EPA.
[64] *See* Florida Department of Environmental Protection, *Guidance on Developing Plans as Alternatives to TMDLs – Assessment Category 4b and 4e Plans*, June 2015, at 1, available at: https://floridadep.gov/sites/default/files/4b4ePlansGuidance.pdf. (Accessed December 2021.)
[65] Florida Department of Environmental Protection, *Category 4e Assessments and Documentation*, https://floridadep.gov/dear/alternative-restoration-plans/content/category-4e-assessments-and-documentation. (Accessed December 2021.)
[66] Florida Department of Environmental Protection, *Category 4e Assessments and Documentation*, https://floridadep.gov/dear/alternative-restoration-plans/content/category-4e-assessments-and-documentation. (Accessed December 2021.)

Figure 4.1.8 Alternative Restoration and Reasonable Assurance Plans



For 4b plans, there is reasonable assurance that, due to pollution control mechanisms, the waterbody is "expected to attain water quality standards in the future and is expected to make reasonable progress towards attainment of water quality standards by the time the next section 303(d) list for the basin is scheduled to be submitted to EPA."[67] The 4b plans are developed by local stakeholders, approved by DEP, and adopted by DEP secretarial order. As of December 2022, there are five 4b plans that are being implemented in Florida.[68] See Table 4.1.7 for project implementation costs identified in 4b plans. According to DEP staff, while not required, DEP may try to track 4b project implementation data in a similar format as basin management action plan projects, which may include cost estimates and timeframes for completion. As this data becomes available, EDR will refine the expenditure analysis to include 4b plans.

Table 4.1.7 Reasonable Assurance Plans (4b Plans)

Reasonable Assurance Plans	Lead Entity	Year of Plan and Updates	Total Identified Expenditures*
Lake Seminole	Pinellas County	2007, 2011, 2015, 2019	$47.78
Florida Keys	DEP	2008, 2011, 2018	$721.99
Shell, Prairie, and Joshua Creeks	Southwest Florida WMD	2004, 2006, 2008, 2010, 2012, 2014	$47.22
Tampa Bay Estuary	Tampa Bay Estuary Program	2002, 2007, 2009, 2012, 2014	$-
Mosquito Lagoon	City of Edgewater, City of New Smyrna Beach, City of Oak Hill, THE Department of Transportation, and Volusia County	2019	$20.92

*These expenditures are in millions of dollars and may be historical or planned.

DEP's 4e category is comparable to EPA assessment category 5-alternative (or 5-alt). This category recognizes that there are recently completed or ongoing water quality restoration activities being implemented to address impairment.[69] The 4e waters are included in the state's 303(d) list and the state's study list (for additional data gathering),[70] but the decision to develop a TMDL is deferred until the next assessment cycle. As explained above, 4e plans involve less certainty of when water quality standards will be attained than the 4b plans.[71] The goal of an approved 4e plan "is to implement appropriate restoration activities and, if necessary, additional study so that by the next assessment cycle either a 4b plan can be approved [by DEP] or the

[67] Fla. Admin. Code R. 62-303.600.
[68] *See* Florida Department of Environmental Protection, *Reasonable Assurance Plans (RAPs): Category 4b Assessments and Documentation*, https://floridadep.gov/dear/alternative-restoration-plans/content/reasonable-assurance-plans-raps-category-4b-assessments. (Accessed December 2022.)
[69] Florida Department of Environmental Protection, *Category 4e Assessments and Documentation*, https://floridadep.gov/dear/alternative-restoration-plans/content/category-4e-assessments-and-documentation. (Accessed December 2022.)
[70] Fla. Admin. Code R. 62-303.390(2)(d).
[71] *Ibid*.

waterbody attains water quality standards for the parameter causing impairment."[72] As of December 2022, there are 135 waterbodies listed as 4e. This is 18 more than reported last year.

In future editions, EDR will work with DEP staff to identify the likely path of the 1,428 waterbody segments needing TMDLs for the purpose of estimating future expenditures. At this point, it is unknown how many of these impaired waters will proceed to the BMAP stage or move under a 4e plan. For those that are ultimately under a 4e plan, project data will be needed to forecast expenditures. In this Edition, that data is still not available.

Table 4.1.8 Water Quality Restoration Plans (Category 4e)

GROUP NAME	WBID	WATERBODY	WATER TYPE	PARAMETER
Caloosahatchee:	3240J1	BILLY CREEK (MARINE SEGMENT)	ESTUARY	Enterococci
	3240J2	BILLY CREEK (FRESHWATER SEGMENT)	STREAM	Escherichia Coli
	3240J3	FORD STREET CANAL	STREAM	Escherichia Coli
	3240J4	SHOEMAKER AND ZAPATO CANALS	STREAM	Escherichia Coli
	3240V	MANUEL BRANCH	STREAM	Escherichia Coli
Charlotte Harbor:	2030	ALLIGATOR CREEK (TIDAL SEGMENT)	ESTUARY	Nutrients (Chlorophyll-a), Dissolved Oxygen (Percent Saturation)
Choctawhatchee - St. Andrew:	722	ROCKY BAYOU	ESTUARY	Nutrients
Everglades:	3289	SHARK SLOUGH (EVERGLADES NATIONAL PARK)	STREAM	Dissolved Oxygen
	3252B	WCA 1 (NORTH SECTOR)	STREAM	Dissolved Oxygen, Nutrients (Total Phosphorus)
	3252D	WCA 1 (WEST SECTOR)	STREAM	Dissolved Oxygen, Nutrients (Total Phosphorus)
	3252E	WCA 1 (SOUTH SECTOR)	STREAM	Nutrients (Total Phosphorus)
	3265F	WCA 2A (WEST SECTOR)	STREAM	Nutrients (Total Phosphorus)
	3265G	WCA 2A (CENTRAL SECTOR)	STREAM	Dissolved Oxygen, Nutrients (Total Phosphorus)
	3268H	WCA 3A (EAST SECTOR)	STREAM	Nutrients (Total Phosphorus)

[72] Florida Department of Environmental Protection, *Guidance on Developing Plans as Alternatives to TMDLs – Assessment Category 4b and 4e Plans*, June 2015, at 10, available at: https://floridadep.gov/sites/default/files/4b4ePlansGuidance.pdf. (Accessed December 2020.)

Everglades:	3268I	WCA 3A (CENTRAL SECTOR)	STREAM	Dissolved Oxygen, Nutrients (Total Phosphorus)
	3289E	CHEVELIER BAY	ESTUARY	Nutrients (Total Nitrogen)
	3289G	CANNON BAY	ESTUARY	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	3289H	LOSTMANS BAY (EVERGLADES NATIONAL PARK)	ESTUARY	Nutrients (Total Nitrogen)
	3289IA	WHITEWATER BAY/PONCE DE LEON BAY	ESTUARY	Nutrients (Total Nitrogen)
	3289IB	EVERGLADES WEST LAKES	ESTUARY	Nutrients (Total Nitrogen)
	3289L	ALLIGATOR BAY	ESTUARY	Nutrients (Total Nitrogen)
	3289M	DADS BAY	ESTUARY	Nutrients (Total Nitrogen)
	3289R1	SHARK SLOUGH A (EVERGLADES NATIONAL PARK)	ESTUARY	Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	3289X	EVERGLADES LAKES	ESTUARY	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	3303G	JOE BAY (EAST SEGMENT)	ESTUARY	Nutrients (Total Nitrogen)
Everglades West Coast:	3258B2	HENDRY CREEK	ESTUARY	Enterococci
	3259M	TEN THOUSAND ISLANDS	ESTUARY	Dissolved Oxygen (Percent Saturation), Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	3278U	ROOKERY BAY (COASTAL SEGMENT)	ESTUARY	Nutrients (Total Nitrogen)
Florida Keys:	6002	MANATEE BAY	ESTUARY	Nutrients (Total Nitrogen)
	6003	BARNES SOUND	ESTUARY	Nutrients (Chlorophyll-a)
	6005	LONG SOUND	ESTUARY	Nutrients (Total Nitrogen)
	8077	FLORIDA BAY (MIDDLE KEYS)	COASTAL	Nutrients (Total Nitrogen)
	8078	FLORIDA BAY (UPPER KEYS)	COASTAL	Nutrients (Total Nitrogen)
	6005A	LITTLE BLACKWATER SOUND	ESTUARY	Nutrients (Total Nitrogen)
	6005B	BLACKWATER SOUND	ESTUARY	Nutrients (Total Nitrogen)
Indian River Lagoon:	3057A	BANANA RIVER BELOW 520 CAUSEWAY	ESTUARY	pH
	3057B	BANANA RIVER ABOVE 520 CAUSEWAY	ESTUARY	pH

Kissimmee River:	3172	EAST LAKE TOHOPEKALIGA	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus), Biology
	3168F	LAKE BASS	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	3168Z3	LAKE ARNOLD	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	3170F7	REEDY CREEK IN WCID (LOWER)	STREAM	Escherichia Coli
	3173A	LAKE TOHOPEKALIGA	LAKE	Biology
Lower St. Johns:	2239	STRAWBERRY CREEK	STREAM	Escherichia Coli
	2224A	RIBAULT RIVER (MARINE SEGMENT)	ESTUARY	Enterococci
	2224B	RIBAULT RIVER (TIDAL SEGMENT)	ESTUARY	Enterococci
	2224C	PALMDALE TRIBUTARY	STREAM	Escherichia Coli
	2567A	RICE CREEK	STREAM	Dioxin (In Fish Tissue)
Middle St. Johns:	2962	SMITH CANAL	STREAM	Escherichia Coli
	2986	SOLDIER CREEK	STREAM	Escherichia Coli
	2987	LITTLE WEKIVA RIVER	STREAM	Escherichia Coli
	3004	LITTLE WEKIVA CANAL	STREAM	Escherichia Coli
	3014	CRANE STRAND DRAIN	STREAM	Escherichia Coli
	2994A	GEE CREEK	STREAM	Escherichia Coli
	2994K	LAKE CONCORD	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus)
	2997B	LAKE HOWELL	LAKE	Biology, Nutrients
	3001B	LITTLE ECONLOCKHATCHEE RIVER ABOVE MICHAEL'S RESERVOIR	STREAM	Escherichia Coli
	3001C	LITTLE ECONLOCKHATCHEE RIVER BELOW MICHAEL'S RESERVOIR	STREAM	Escherichia Coli
	3002E	LAKE PRIMA VISTA	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Biology
	3004K	LAKE ORLANDO	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus), Biology
	3011A	LAKE WESTON	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus)

Ochlockonee - St. Marks:	647F	LAKE KANTURK	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	647J	LAKE KILLARNEY	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus), un-ionized Ammonia
	647K	LAKE KINSALE	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	756F	LAKE LAFAYETTE (UPPER SEGMENT)	LAKE	Dissolved Oxygen, Fecal Coliform, Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus)
Ocklawaha:	2809	SOUTHWEST EMERALDA MARSH CONSERVATION AREA	LAKE	Dissolved Oxygen (Percent Saturation)
	2811	WEST EMERALDA MARSH CONSERVATION AREA	LAKE	Dissolved Oxygen (Percent Saturation), Nutrients
	2856	APOPKA MARSH	STREAM	Dissolved Oxygen (Percent Saturation)
Pensacola:	676	CARPENTER CREEK	STREAM	Escherichia Coli
Perdido:	489	ELEVENMILE CREEK	STREAM	Escherichia Coli
	797	PERDIDO BAY (UPPER SEGMENT)	ESTUARY	Nutrients (Chlorophyll-a)
	462A	PERDIDO RIVER (SOUTH MARINE)	ESTUARY	Nutrients (Chlorophyll-a)
	489A	TENMILE CREEK	STREAM	Escherichia Coli
Sarasota Bay - Peace - Myakka:	15001	LITTLE LAKE HAMILTON	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	15002	MIDDLE LAKE HAMILTON	LAKE	Biology, Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	15041	LAKE HAMILTON	LAKE	Biology, Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	15101	LAKE EVA	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	1497A	CRYSTAL LAKE	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	1497B	LAKE PARKER	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus), Biology

	1497G	LAKE MIRROR	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
Sarasota Bay - Peace - Myakka:	1497H	LAKE MORTON	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	1623K	SADDLE CREEK BELOW LAKE HANCOCK	STREAM	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Dissolved Oxygen (Percent Saturation)
Southeast Coast - Biscayne Bay:	3270	C-14 (CYPRESS CREEK CANAL/POMPANO CANAL)	STREAM	Escherichia Coli
	3274	C-13 EAST (MIDDLE RIVER CANAL)	ESTUARY	Escherichia Coli
	3276	C-12	STREAM	Escherichia Coli
	3281	C-11 (EAST)	STREAM	Escherichia Coli
	3276A	NEW RIVER (NORTH FORK)	ESTUARY	Escherichia Coli
	3277E	DANIA CUTOFF CANAL	ESTUARY	Escherichia Coli
	3279A	SNAKE CREEK CANAL (NORTH FORK)	STREAM	Escherichia Coli
	3288A	WAGNER CREEK	ESTUARY	Enterococci
	3303B1	TAYLOR SLOUGH	ESTUARY	Nutrients (Total Nitrogen)
Springs Coast:	1440	ANCLOTE RIVER TIDAL	ESTUARY	Enterococci, Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	1556	CEDAR CREEK (TIDAL)	ESTUARY	Enterococci
	1633	MCKAY CREEK (TIDAL)	ESTUARY	Enterococci
	1440A	ANCLOTE RIVER BAYOU COMPLEX (SPRING BAYOU)	ESTUARY	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen)
	1556A	CEDAR CREEK	STREAM	Escherichia Coli
	1618D	SEMINOLE BYPASS CANAL	STREAM	Nutrients (Chlorophyll-a)
	1633B	MCKAY CREEK	STREAM	Escherichia Coli
	1668A	JOE'S CREEK	STREAM	Nutrients (Macrophytes)
	1668B	PINELLAS PARK DITCH NO 5 (BONN CREEK)	STREAM	Escherichia Coli
	1716A	34TH STREET BASIN	STREAM	Escherichia Coli
	1716D	CLAM BAYOU DRAIN (TIDAL)	ESTUARY	Escherichia Coli
St. Lucie - Loxahatchee:	3215	DANFORTH CREEK	STREAM	Nutrients (Total Phosphorus), Dissolved Oxygen (Percent Saturation)

	3224	LOXAHATCHEE RIVER (JONATHAN DICKINSON STATE PARK)	ESTUARY	Dissolved Oxygen (Percent Saturation), Nutrients, Enterococci, Fecal Coliform, Fecal Coliform (3)
	3226	JUPITER INLET	ESTUARY	Dissolved Oxygen, Nutrients (Chlorophyll-a)
	3230	LOXAHATCHEE RIVER ABOVE CYPRESS CREEK	STREAM	Dissolved Oxygen, Nutrients (Algal Mats)
	3232	UNNAMED DRAIN TO LOXAHATCHEE RIVER	STREAM	Dissolved Oxygen, Nutrients
St. Lucie - Loxahatchee:	3194A	TENMILE CREEK	STREAM	Nutrients (Chlorophyll-a), Nutrients (Macrophytes), Nutrients (Total Phosphorus), Dissolved Oxygen (Percent Saturation), Biology
	3208B	WILLOUGHBY CREEK	ESTUARY	Nutrients (Chlorophyll-a), Enterococci
	3224A1	LOXAHATCHEE RIVER (NORTH FORK LOWER)	ESTUARY	Dissolved Oxygen, Nutrients, Enterococci, Fecal Coliform, Fecal Coliform (3)
	3224B	KITCHINGS CREEK	STREAM	Escherichia Coli
	3224C1	CYPRESS CREEK	STREAM	Dissolved Oxygen, Nutrients
	3224C2	MOONSHINE CREEK	STREAM	Dissolved Oxygen, Nutrients
	3226A	LOXAHATCHEE RIVER (NORTHWEST FORK)	ESTUARY	Dissolved Oxygen, Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus), Fecal Coliform, Fecal Coliform (3)
	3226C	LOXAHATCHEE RIVER (SOUTHWEST FORK)	ESTUARY	Dissolved Oxygen, Nutrients (Chlorophyll-a), Enterococci
	3226D	NORTH FORK LOXAHATCHEE RIVER (MARINE SEGMENT)	ESTUARY	Dissolved Oxygen, Nutrients, Enterococci, Fecal Coliform
	3230A1	LOXAHATCHEE RIVER (NORTHWEST FORK)	STREAM	Dissolved Oxygen, Nutrients
	3232A	TIDAL CREEK TO LOXAHATCHEE RIVER	ESTUARY	Dissolved Oxygen, Nutrients, Enterococci
Suwannee:	8037D	GULF OF MEXICO (CEDAR KEY)	COASTAL	Nutrients (Chlorophyll-a)
	1574	ALLIGATOR CREEK	STREAM	Escherichia Coli
	1605	DELANEY CREEK	STREAM	Escherichia Coli
Tampa Bay:	1627	LONG BRANCH	STREAM	Dissolved Oxygen (Percent Saturation), Biology, Escherichia coli, Nutrients (Macrophytes), Nutrients (Total Phosphorus)
	1570A	SWEETWATER CREEK (TIDAL SEGMENT)	ESTUARY	Dissolved Oxygen (Percent Saturation)

Tampa Bay:	1577A	PEPPER MOUND CREEK	ESTUARY	Nutrients (Chlorophyll-a), Dissolved Oxygen (Percent Saturation)
	1579A	BELLOWS LAKE (EAST LAKE)	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	1587A	WOODS CREEK	ESTUARY	Dissolved Oxygen (Percent Saturation)
	1601A	TAMPA BAY CHANNEL	ESTUARY	Nutrients (Chlorophyll-a)
	1627B	LONG BRANCH (TIDAL)	ESTUARY	Enterococci
	1700A	CRESCENT LAKE	LAKE	Biology, Nutrients (Chlorophyll-a), Nutrients (Total Phosphorus)
	1731A	LAKE MAGGIORE	LAKE	Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus), Specific Conductance
	1731B	SALT CREEK	ESTUARY	Nutrients (Chlorophyll-a)
Tampa Bay Tributaries:	1675	OWENS BRANCH	STREAM	Nutrients (Chlorophyll-a), Dissolved Oxygen (Percent Saturation)
	1914	BRADEN RIVER ABOVE WARD LAKE	STREAM	Nutrients (Chlorophyll-a), Dissolved Oxygen (Percent Saturation)
	1537A	LAKE BONNET	LAKE	Biology, Lead, Nutrients (Chlorophyll-a), Nutrients (Total Nitrogen), Nutrients (Total Phosphorus)
	1848D1	WARES CREEK (ESTUARINE SEGMENT)	ESTUARY	Escherichia Coli
	1848D2	WARES CREEK (FRESHWATER SEGMENT)	STREAM	Escherichia Coli

Source: DEP website at https://geodata.dep.state.fl.us/datasets/FDEP::alternative-restoration-plans-2/explore?location=27.544873%2C-83.729450%2C6.54&showTable=true. (Accessed December 2022.)

4.2 Next Steps and Recommendations

Future editions of this report will continue to improve upon the TMDL development and BMAP implementation forecasts. This will include development costs for TMDLs over any water segments added to the Comprehensive Verified List and BMAP implementation costs for any newly adopted BMAPs identified in DEP's STAR Report. In addition, discussion with DEP staff indicates that project lists, similar to those used to develop the cost estimates for BMAP implementation, will be developed for the Alternative Restoration Plans. Once that data is available, EDR will produce a forecast of the expenditures necessary to comply with laws regarding those plans. EDR will also begin working with DEP staff to better understand the slow adoption rate of TMDLs and the potential impact on EDR's expenditure forecast.

Regarding the BMAP expenditure forecast, DEP added a new project status two years ago in the 2020 and 2021 STAR Reports. The "ongoing" status is defined as "[p]roject or activity which requires action each year to continue providing water quality benefits. These projects are typically non-structural and continuous."[73] This year, there were just over 1,200 projects that were considered completed in the prior STAR Report that are now classified as ongoing. Over the next year, EDR will work with DEP staff to better understand the use of this designation and how those annual costs should be incorporated into future expenditure forecasts. In this Edition, EDR treats nutrient reductions for ongoing projects in the same manner as reductions from completed projects, consistent with DEP's current treatment of these statuses.

Lastly, EDR will work toward identifying the water quality monitoring costs to be presented as a separate expenditure forecast or as a component of other applicable programs.[74] This includes water quality monitoring programs such as the state's Status and Trend monitoring networks for surface waters and the groundwater monitoring network.

At this time, EDR has no formal recommendations for legislative consideration regarding water quality protection and restoration.

[73] Available at: https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report. (Accessed December 2022.)
[74] Note that EDR has identified DEP's watershed monitoring expenditures from Fiscal Years 2010-11 to 2019-20 in Table 2.3.1 of Chapter 2.