

2023 Tampa Bay Water Quality Assessments

A Tampa Bay Estuary Program Initiative to Maintain and Restore the Bay's Seagrass Resources



Historic results:

	OTB	HB	MTB	LTB
1975	R	R	R	G
1976	R	R	R	Y
1977	R	R	R	R
1978	R	R	R	Y
1979	R	R	R	R
1980	R	R	R	R
1981	R	R	R	R
1982	R	R	R	R
1983	R	Y	R	R
1984	R	G	R	Y
1985	R	R	R	Y
1986	R	Y	R	G
1987	R	Y	R	G
1988	Y	G	Y	G
1989	R	Y	R	Y
1990	R	G	R	Y
1991	G	Y	Y	Y
1992	Y	G	Y	Y
1993	Y	G	Y	Y
1994	Y	Y	R	R
1995	R	Y	R	Y
1996	Y	G	Y	G
1997	Y	G	R	Y
1998	R	R	R	R
1999	Y	G	Y	Y
2000	G	G	Y	Y
2001	Y	G	Y	Y
2002	Y	G	G	G
2003	R	Y	G	Y
2004	R	G	G	Y
2005	G	G	Y	Y
2006	G	G	G	G
2007	G	G	G	G
2008	Y	G	G	Y
2009	Y	Y	G	G
2010	G	G	G	G
2011	R	G	Y	G
2012	G	G	G	G
2013	G	G	G	G
2014	G	G	G	G
2015	Y	G	Y	G
2016	Y	G	G	G
2017	Y	G	G	G
2018	Y	G	G	G
2019	Y	G	G	G
2020	Y	G	G	G
2021	Y	G	G	G
2022	G	G	G	G
2023	G	G	G	G

*Incomplete data for 2023 estimated by five year average

Background

Light availability to seagrass is the guiding paradigm for TBEP's Nitrogen Management Strategy. Because excessive nitrogen loads to the bay generally lead to increased algae blooms (higher chlorophyll-a levels) (Figure 2) and reduced light penetration to seagrass, an evaluation method was developed to assess whether load reduction strategies are achieving desired water quality results (i.e. reduced chlorophyll-a concentrations and increased water clarity).



Figure 2: Seagrass restoration with N management.

Decision Support Approach

Year to year algae abundance (measured as chlorophyll-a concentrations) and visible light penetration through the water column (secchi disk depth visibility) have been identified as critical water quality indicators in Tampa Bay. Tracking the attainment of bay segment specific targets for these indicators provides the framework for developing and initiating bay management actions. TBEP management actions adopted in response to the annually-assessed decision support results are shown to the right.

G	"Stay the Course" Continue planned projects. Report data via annual progress reports and Baywide Environmental Monitoring Report.
Y	"Caution" Review monitoring data and nitrogen loading estimates. Begin/continue TAC and Management Board development of specific management recommendations.
R	"On Alert" Finalize development and implement appropriate management actions to get back on track.

2023 Decision Matrix Results

Water quality remained supportive of seagrass in Hillsborough Bay (HB), Middle Tampa Bay (MTB), and Lower Tampa Bay (LTB) (Table 1, Figure 3). Unlike the past seven years, 2022 water quality conditions in Old Tampa Bay (OTB) were also supportive of seagrass with annual averages of chlorophyll and light penetration remaining below management targets. Chlorophyll and light penetration was supportive of seagrass in all other segments using existing targets (Table 1). However, water quality conditions in OTB and HB remain under investigation based on recent seagrass coverage trends.

Table 1: Water quality outcomes for 2023.

Segment	Chl-a (ug/L)		Light Penetration (m^{-1})	
	2023	target	2023	target
OTB	6.8	8.5	0.75	0.83
HB	7.6	13.2	0.79	1.58
MTB	3.8	7.4	0.45	0.83
LTB	2.7	4.6	0.52	0.63

Annual Mean Management Target +1 se (small exceedance) +2 se (large exceedance)

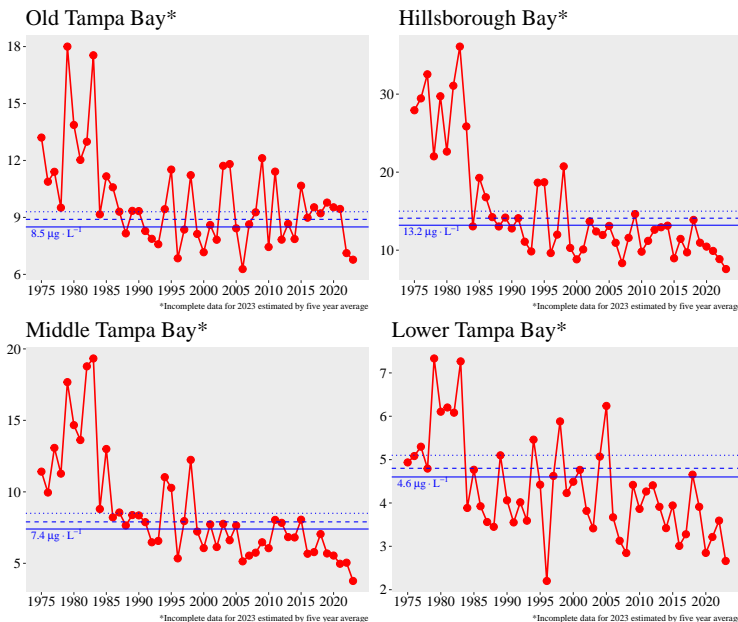


Figure 3: Historic chlorophyll-a annual averages for the four bay segments.

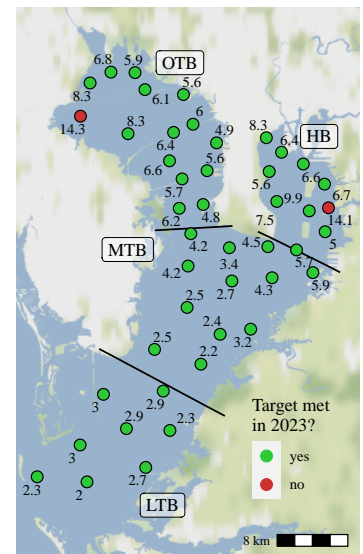


Figure 4: Chlorophyll attainment outcomes by site for 2023.

Note: Continuing water quality monitoring support provided by the Environmental Protection Commission of Hillsborough County. Consulting support provided by Janicki Environmental, Inc. Full methods in Janicki et al. 2000. TBEP Technical Report #04-00. Points in map above show site-specific attainment of a bay segment target and are for reference only.

Figure 1: Decision matrix results for 1975 to 2023 (April, May data missing for 2020).

Progress Towards Meeting Regulatory Goals

An Initiative of the Tampa Bay Nitrogen Management Consortium to Maintain and Restore the Bay's Resources



FDEP Criteria:

	OTB	HB	MTB	LTB
1975	R	R	R	G
1976	R	R	R	G
1977	R	R	R	R
1978	R	R	R	G
1979	R	R	R	R
1980	R	R	R	R
1981	R	R	R	R
1982	R	R	R	R
1983	R	R	R	R
1984	G	G	R	G
1985	R	R	R	G
1986	R	R	G	G
1987	R	G	R	G
1988	G	G	G	G
1989	R	G	G	G
1990	R	G	G	G
1991	G	G	G	G
1992	G	G	G	G
1993	G	G	G	G
1994	R	R	R	R
1995	R	R	R	G
1996	G	G	G	G
1997	G	G	G	G
1998	R	R	R	R
1999	G	G	G	G
2000	G	G	G	G
2001	G	G	G	G
2002	G	G	G	G
2003	R	G	G	G
2004	R	G	G	G
2005	G	G	G	R
2006	G	G	G	G
2007	G	G	G	G
2008	G	G	G	G
2009	R	G	G	G
2010	G	G	G	G
2011	R	G	G	G
2012	G	G	G	G
2013	G	G	G	G
2014	G	G	G	G
2015	R	G	G	G
2016	G	G	G	G
2017	R	G	G	G
2018	G	G	G	G
2019	R	G	G	G
2020	R	G	G	G
2021	R	G	G	G
2022	G	G	G	G
2023	G	G	G	G

*Incomplete data for 2023 estimated by five year average

Figure 5: Bay segment attainment of chlorophyll criteria from 1975 to 2023 (April, May data missing for 2020).

Maintaining Reasonable Assurance & TMDL Compliance

On behalf of the Tampa Bay Nitrogen Management Consortium, TBEP submitted the 2022 Reasonable Assurance (RA) Update for the 2017-2021 period to FDEP in December 2022. FDEP concluded that the RA Update satisfied requirements for approval during the next five year period. During 2022, all bay segments met FDEP criteria for chlorophyll. Tampa Bay Nitrogen Management Consortium participants continue to pursue actions that ensure water quality criteria are met for the next RA period from 2022-2026. The first RA annual assessment report for the 2022-2026 period will be submitted in April 2023.

2023 Chl-a Monthly Variation Compared to 1974-2022

Chlorophyll-a concentrations were evaluated within the bay on a monthly basis during 2023 and compared to prior years' levels (Figure 6). Summer concentrations in Old Tampa Bay were lower in 2022 compared to years prior, which allowed the chlorophyll criteria to be met for the first time in three years. Understanding and mitigating summer blooms of *Pyrodictum bahamense* in OTB continue to be the focus of research and management efforts for improving water quality in OTB.

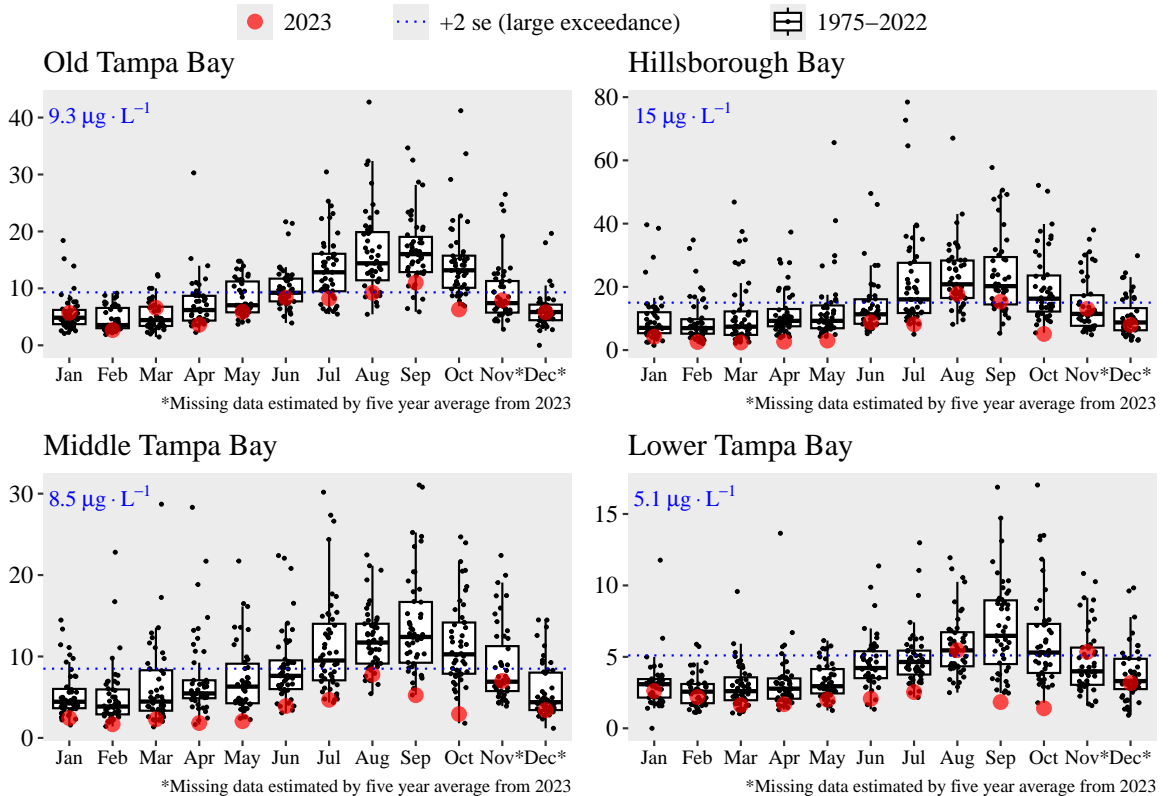


Figure 6: Chlorophyll-a monthly averages from 1975-2022 for the four bay segments. The monthly averages for 2023 are shown in red.

Tampa Bay Seagrass Recovery

2022 results showed that Tampa Bay's seagrass coverage remained below the 40,000 acre recovery goal defined in the [Habitat Master Plan Update](#). The 2022 baywide estimate was 30,137 acres, representing a decrease of 4,161 acres from 2020 or 11,518 acres lost since peak conditions in 2016 (Figure 7). This marks the first time that seagrass losses have been observed for three consecutive assessment periods since the District's aerial mapping program began in 1988. Large coverage decreases were observed in Old Tampa Bay and Hillsborough Bay. Increases in the attached algae *Caulerpa prolifera* have also been noted in this region and elsewhere. Research and management plans are currently being developed to address these losses. More information on the bay's seagrass trends using transect monitoring data can be found at <https://shiny.tbep.org/seagrass-transect-dash/> and using the coverage estimates can be found at <https://shiny.tbep.org/seagrass-analysis/>.

Note: 2022 nutrient management compliance assessment available from Beck, M.W., Burke, M., Sherwood, E. 2023. TBEP Technical Report #05-23. Please cite this document as Beck, M.W., Burke, M., Sherwood, E. 2023. 2022 Tampa Bay Water Quality Assessment. TBEP Technical Report #03-23, St. Petersburg, FL.

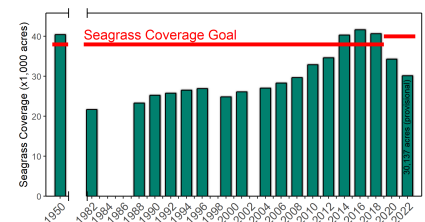


Figure 7: Seagrass estimates from 1950-2022 (Source: TBEP & SWFWMD)