2018 Tampa Bay Water Quality Assessment

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

TBEP TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

For additional info visit:
www.tbeptech.org

Original Reference:
Janicki, A., D. Wade, & R.J. Pribble. 2000. TBEP Technical Report # 04-00.

Historic Results:

Year	Old TB	Hills. Bay	Middle TB	Lower TB
1975	Red	Red	Red	Green
1976	Red	Red	Red	Yellow
1977	Red	Red	Red	Red
1978	Red	Red	Red	Yellow
1979	Red	Red	Red	Red
1980	Red	Red	Red	Red
1981	Red	Red	Red	Red
1982	Red	Red	Red	Red
1983	Red	Yellow	Red	Red
1984	Red	Green	Red	Yellow
1985	Red	Red	Red	Yellow
1986	Red	Yellow	Red	Green
1987	Red	Yellow	Red	Green
1988	Yellow	Green	Yellow	Green
1989	Red	Yellow	Red	Yellow
1990	Red	Green	Red	Yellow
1991	Green	Yellow	Yellow	Yellow
1992	Yellow	Green	Yellow	Yellow
1993	Yellow	Green	Yellow	Yellow
1994	Yellow	Yellow	Red	Red
1995	Red	Yellow	Red	Yellow
1996	Yellow	Green	Yellow	Green
1997	Yellow	Green	Red	Yellow
1998	Red	Red	Red	Red
1999	Yellow	Green	Yellow	Yellow
2000	Green	Green	Yellow	Yellow
2001	Yellow	Green	Yellow	Yellow
2002	Yellow	Green	Green	Green
2003	Red	Yellow	Green	Yellow
2004	Red	Green	Green	Yellow
2005	Green	Green	Yellow	Yellow
2006	Green	Green	Green	Green
2007	Green	Green	Green	Green
2008	Yellow	Green	Green	Yellow
2009	Yellow	Yellow	Green	Green
2010	Green	Green	Green	Green
2011	Red	Green	Yellow	Green
2012	Green	Green	Green	Green
2013	Green	Green	Green	Green
2014	Green	Green	Green	Green
2015	Yellow	Green	Yellow	Green
2016	Yellow	Green	Green	Green
2017	Yellow	Green	Green	Green
2018	Yellow	Green	Green	Green

Continuing water quality monitoring support provided by the EPCHC.

Consulting support provided by Janicki Environmental, Inc.

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 1) and reduce 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).

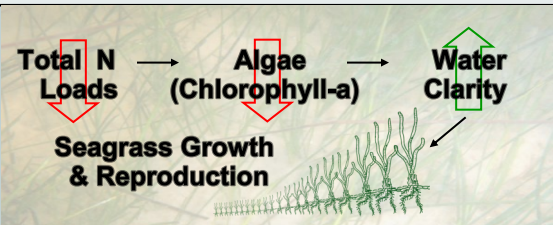

Figure 1: Guiding paradigm for Tampa Bay seagrass restoration through the management of nitrogen loads.

Decision Support Approach

Year to year algae abundance (measured as chlorophyll-a concentrations) and visible light penetration through the water column (depth of secchi disk 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 from which bay management actions are developed & initiated. TBEP management actions adopted in response to the annually-assessed decision support results are shown to the right.

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

2018 Decision Matrix Results

Water quality (chlorophyll-a and light penetration) remained supportive of seagrass in Hillsborough Bay (HB), Middle Tampa Bay (MTB), and Lower Tampa Bay (LTB) (Table 1; Figure 2). The nuisance alga, *Pyrodinium bahamense,* was again reported in Old Tampa Bay (OTB) during the Summer and Fall 2018, contributing to a small magnitude chlorophyll-a exceedance. In all bay segments, separate algal bloom events contributed to individual stations exceeding the bay segment chlorophyll-a targets (Figure 3). However, effective light penetration was supportive of seagrass in all bay segments (Table 1).

Table 1: Observed water quality indicators & recommended management outcomes for 2018.

Bay Segment	Chlorophyll-a (ug/L)		Effective Light Penetration (m^{-1})		Management Response
	2018	Target	2018	Target	
OTB	9.2	8.5	0.68	0.83	Yellow
HB	13.9	13.2	1.09	1.58	Green
MTB	7.0	7.4	0.57	0.83	Green
LTB	4.7	4.6	0.59	0.63	Green

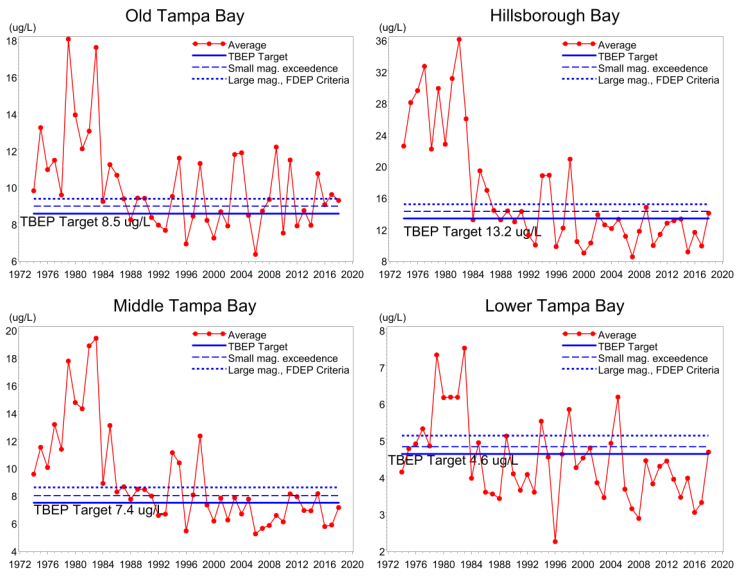

Figure 2: Historic chlorophyll-a annual averages for the four bay segments. Chl-a concentrations exceeded the management target for Old Tampa Bay in 2018.

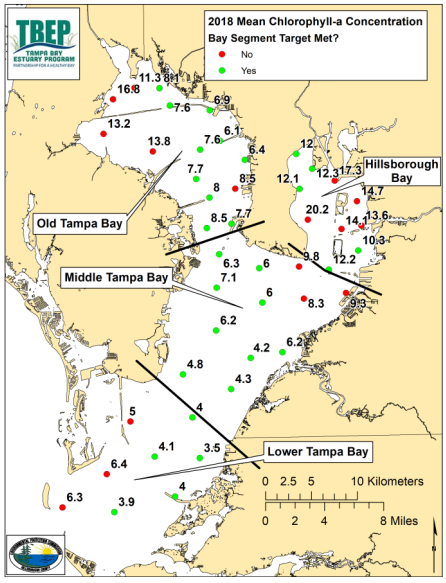

Figure 3: Map depicting 2018 individual station chlorophyll-a annual values in Tampa Bay.

Burke, M. and G. Raulerson. 2019. 2018 Tampa Bay Water Quality Assessment. Tampa Bay Estuary Program Technical Report #01-19 TBEP, St. Petersburg, FL.

Progress Towards Meeting Regulatory Goals

An initiative of the Tampa Bay Nitrogen Management Consortium (NMC)

FDEP Criteria Met:

Year	Old TB	Hills. Bay	Mid. TB	Low. TB
1978	No	No	No	Yes
1979	No	No	No	No
1980	No	No	No	No
1981	No	No	No	No
1982	No	No	No	No
1983	No	No	No	No
1984	Yes	Yes	No	Yes
1985	No	No	No	Yes
1986	No	No	Yes	Yes
1987	No	Yes	No	Yes
1988	Yes	Yes	Yes	Yes
1989	No	Yes	Yes	Yes
1990	No	Yes	Yes	Yes
1991	Yes	Yes	Yes	Yes
1992	Yes	Yes	Yes	Yes
1993	Yes	Yes	Yes	Yes
1994	No	No	No	No
1995	No	No	No	Yes
1996	Yes	Yes	Yes	Yes
1997	Yes	Yes	Yes	Yes
1998	No	No	No	No
1999	Yes	Yes	Yes	Yes
2000	Yes	Yes	Yes	Yes
2001	Yes	Yes	Yes	Yes
2002	Yes	Yes	Yes	Yes
2003	No	Yes	Yes	Yes
2004	No	Yes	Yes	Yes
2005	Yes	Yes	Yes	No
2006	Yes	Yes	Yes	Yes
2007	Yes	Yes	Yes	Yes
2008	Yes	Yes	Yes	Yes
2009	No	Yes	Yes	Yes
2010	Yes	Yes	Yes	Yes
2011	No	Yes	Yes	Yes
2012	Yes	Yes	Yes	Yes
2013	Yes	Yes	Yes	Yes
2014	Yes	Yes	Yes	Yes
2015	No	Yes	Yes	Yes
2016	Yes	Yes	Yes	Yes
2017	No	Yes	Yes	Yes
2018	Yes	Yes	Yes	Yes

Maintaining Reasonable Assurance & TMDL Compliance

In November 2017, the FDEP accepted the 2017 Reasonable Assurance Update (2017 RA Update) as submitted by TBEP in partnership with the Tampa Bay Nitrogen Management Consortium. FDEP concluded that the RA Update demonstrated both attainment of seagrass targets and total nitrogen numeric criteria for 2012-2016. During 2018, all bay segments were in compliance with the FDEP regulatory criteria for chlorophyll-a concentrations (matrix to the left). The second compliance report for the 2017-2021 period will be submitted by March 2019.

2018 Chl-a Monthly Variation Compared to 1974-2017

Chlorophyll-a concentrations were evaluated within the bay on a monthly basis during 2018 and compared to prior years' levels (Figure 4) . Elevated concentrations in Old Tampa Bay and Lower Tampa Bay were primarily due to *Pyrodinium bahamense* and *Karenia brevis* blooms, respectively. Hillsborough Bay also showed elevated concentrations during two months in 2018 — the fall event coincided with blooms of the nonharmful alga, *Tripos hircus*. Monthly values above 'historic' levels are indicated by yellow ovals.

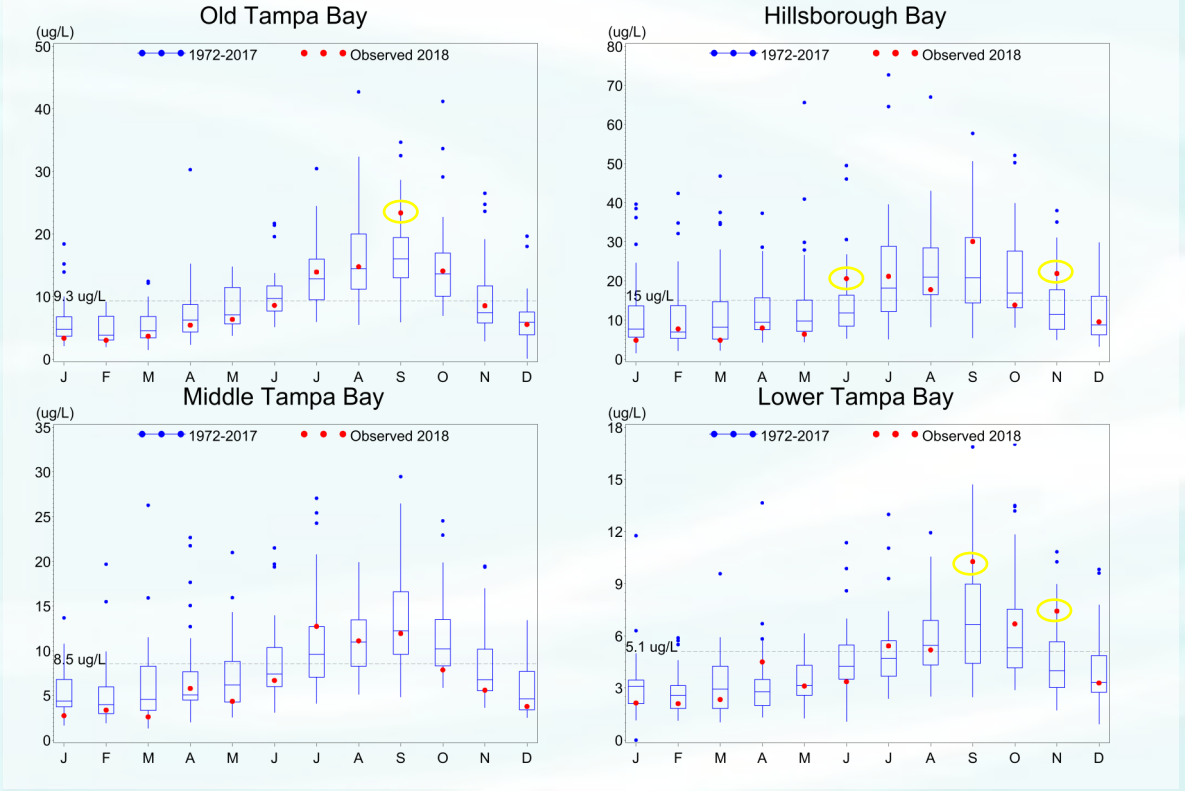

Fig. 4: 2018 monthly chlorophyll-a bay segment averages (red dots) compared to monthly distributions from 1974-2017 (blue box plots). Boxes encompass the 25th and 75th percentiles, while whiskers bound points within 1.5 interquartiles from the box. Blue dots represent outliers.

Tampa Bay Seagrass Recovery

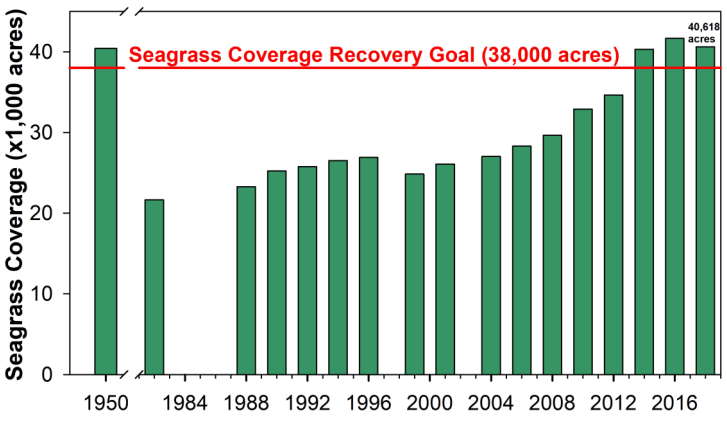

Figure 5: Historic seagrass acreage estimates for Tampa Bay from 1950-2018 (Source: TBEP & SWFWMD).

Tampa Bay's total seagrass coverage continues to remain above the recovery goal, though a slight decrease in acreage was observed from 2016 to 2018. The baywide coverage was estimated to be 40,618 acres as of 2018 (Figure 5). As in 2016, total seagrass coverage remains above both the baywide target (38,000 acres) and the total estimated historic seagrass coverage of the 1950s (40,420 acres). The next SWFWMD seagrass coverage estimates will be developed from aerial photographs acquired over the winter 2019-20 period, following the extensive red tide event that plagued the region throughout 2018 (note: the 2018 coverage estimate for Tampa Bay was developed prior to the red tide affecting the Bay). More information on the Bay's seagrass recovery utilizing transect monitoring data can also be found in TBEP Technical Publication #08-16.