2019 Tampa Bay Water Quality Assessments

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



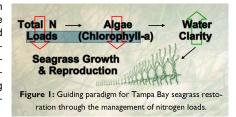
Historic results:

Historic results:					
	OŢB	ΗB	MŢB	LŢB	
1975	red	red	yellow	yellow	
1976	red	red	yellow	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	yellow	green	
1987	yellow	yellow	yellow	green	
1988-	green	green	green	green	
1989-	red	yellow	yellow	yellow	
1990-	yellow	green	yellow	green	
1991-	green	yellow	green	yellow	
1992-	green	green	green	yellow	
1993	yellow	green	green	yellow	
1994-	yellow	yellow	yellow	red	
1995	red	yellow	yellow	yellow	
1996-	yellow	green	green	green	
1997-	green	green	yellow	green	
1998-	red	yellow	red	red	
1999-	yellow	green	green	yellow	
2000	green	green	green	yellow	
2001	yellow	green	yellow	yellow	
2002	yellow	green	green	green	
2003	red	green	green	green	
2004	yellow	green	green	yellow	
2005		green	green	yellow	
2006		green	green	green	
2007	green	green	green	green	
2008 - 2009 -	yellow	green	green	yellow	
2010-		yellow	green	green	
2010	green red	green	green yellow	green	
2011		green		green	
2012		green	green green	green green	
2013		green green	green	green	
2014			yellow		
2016		green green	green	green green	
2017		green	green	green	
2018	yellow	green	green	green	
2019		green	green	green	
2017	ychow	green	green	green	

Figure 2: Decision matrix results for 1975 to 2019.

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).



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 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.

Green	projects. Report data via annual progress reports and Baywide Environmental Monitoring Report.
Yellow	"Caution" 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.

"Stay the Course" Continue planned

2019 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 3). The nuisance alga, *Pyrodinium bahamense*, was again reported in Old Tampa Bay (OTB) during the Summer and Fall 2019, contributing to a large magnitude and duration (5 yrs) chlorophyll-a exceedance. However, effective light penetration was observed to be supportive of seagrass in all bay segments (Table 1).

Table 1: Observed water quality indicators & recommended management outcomes for 2019.

Bay seg- ment	Chl-a (ug/L)		Light	Effective Light Peneration (m^{-1})	
	2019	target	2019	target	outcome
ОТВ	10.09	8.5	0.74	0.83	yellow
НВ	11.10	13.2	0.94	1.58	green
MTB	5.87	7.4	0.57	0.83	green
LTB	4.02	4.6	0.60	0.63	green

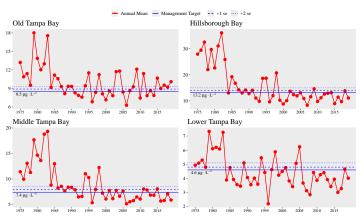


Figure 3: Historic chlorophyll-a annual averages for the four bay segments.

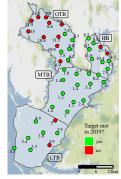


Figure 4: Chlorophyll attainment outcomes by site for 2019.

Acknowledgments: 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, A., Wade, D., Pribble, R.J. 2000. TBEP Technical Report #0400.

Progress Towards Meeting Regulatory Goals

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



FDEP Criteria Met:

FDEF CHIEHA MEI.					
,	OŢB	HВ	MTB	LŢB	
1975-	red	red	red	green	
1976-	red	red	red	green	
1977 -	red	red	red	red	
1978-	red	red	red	green	
1979-	red	red	red	red	
1980-	red	red	red	red	
1981 -	red	red	red	red	
1982-	red	red	red	red	
1983-	red	red	red	red	
1984	green	green	red	green	
1985	red	red	red	green	
1986-	red	red	green	green	
1987 -	red	green	red	green	
1988-	green	green	green	green	
1989-	red	green	green	green	
1990-	red	green	green	green	
1991-	green	green	green	green	
1992	green	green	green	green	
1993-	green	green	green	green	
1994-	red	red	red	red	
1995-	red	red	red	green	
1996-	green	green	green	green	
1997-	green	green	green	green	
1998-	red	red	red	red	
1999-	green	green	green	green	
2000-	green	green	green	green	
2001 -	green	green	green	green	
2002	green	green	green	green	
2003	red	green	green	green	
2004	red	green	green	green	
2005	green	green	green	red	
2006	green	green	green	green	
2007-	green	green	green	green	
2008	green	green	green	green	
2009-	red	green	green	green	
2010-	green	green	green	green	
2011	red	green	green	green	
2012-	green	green	green	green	
2013-	green	green	green	green	
2014	green	green	green	green	
2015	red	green	green	green	
2016	green	green	green	green	
2017-	red	green	green	green	
2018-	green	green	green	green	
2019-	red	green	green	green	

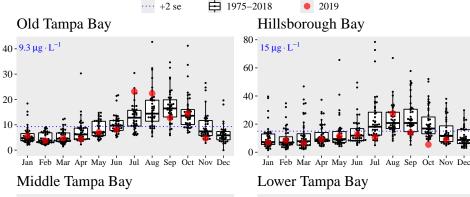
Figure 5: Attainment of bay segments for chlorophyll criteria from 1975 to 2019.

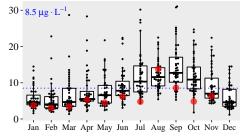
Maintaining Reasonable Assurance & TMDL Compliance

In November 2017, the Florida Department of Environmental Protection (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 2019, all bay segments, excluding Old Tampa Bay, were in compliance with the FDEP regulatory criteria for chlorophyll-a concentrations (Figure 5). The second compliance report for the 2017-2021 period was submitted March 2019.

2019 Chl-a Monthly Variation Compared to 1974-2018

Chlorophyll-a concentrations were evaluated within the bay on a monthly basis during 2019 and compared to prior years' levels (Figure 6). Elevated concentrations in Old Tampa Bay were primarily due to *Pyrodinium bahamense*. Lower Tampa Bay also showed elevated concentrations in August.





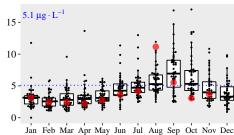


Figure 6: Chlorophyll-a monthly averages from 1975-2018 for the four bay segments. The monthly averages for 2019 are shown in red.Historic chlorophyll-a annual averages for the four bay segments.

Tampa Bay Seagrass Recovery

Tampa Bay's total seagrass coverage remains above the recovery goal, though a slight decrease was observed from 2016 to 2018. The 2018 baywide coverage was estimated at 40,652 acres (Figure 7). As in 2016, coverage remains above the target (38,000 acres) and the estimated historic coverage of the 1950s (40,420 acres). The next SWFWMD coverage estimates will be developed from aerial photographs acquired over the winter 2019-20 period, following the extensive red tide event observed throughout 2018 (note: the 2018 coverage estimate was developed prior this event). More information can be found in TBEP technical publication #08-16 and #09-17.

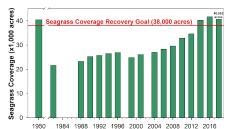


Figure 7: Historic seagrass acreage estimates for Tampa Bay from 1950-2018 (Source: TBEP & SWFWMD)

Additional info: 2019 nutrient management compliance assessment available from Sherwood, E., Burke, M. 2019. TBEP Technical Report #11-19.