## 2019 Tampa Bay Water Quality Assessments







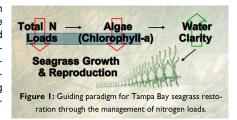
A Tampa Bay Estuary Program Initiative to Maintain and Restore the Bay's Seagrass Resources

## Historic results:

Historic results:					
	OTB	HB	MTB	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	green	yellow	
2006 2007	green	green	green	green	
2007	green	green	green	green vellow	
2009	yellow yellow	green yellow	green	3	
2010			green	green	
2010	green red	green	green yellow	green	
2011	_	green	-	green	
2012	green	green green	green	green	
2013	green green		green green	green	
2014	yellow	green	yellow	green	
2015	yellow	green	-	green	
2010	yellow	green	green	green	
2017	yellow	green green	green green	green green	
2019	yellow				
2019	yenow	green	green	green	

#### **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 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 4). However, effective light penetration was 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)	Effect Light etration (m <sup>-1</sup> )	Pen- on	
	2019	target	2019	target	outcome
ОТВ	10.64	8.5	0.76	0.83	yellow
HB	11.31	13.2	0.97	1.58	green
MTB	5.83	7.4	0.59	0.83	green
LTB	4.05	4.6	0.61	0.63	green

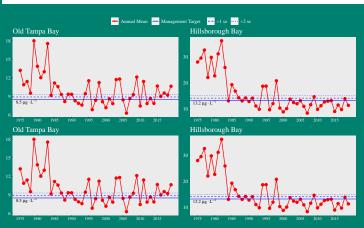


Figure  $\Im$  Historic chlorophyll-a annual averages for the four bay segments.

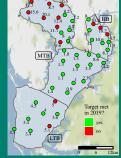


Figure 4. Chlorophyll attainment outcomes by site for 2019.

Figure 2: Decision matrix results for 1975 to 2019.

Acknowledgments: Continuing water quality monitoring support provided by the Environmental Protection Commission of Hillsborough County.

# **Progress Towards Meeting Regulatory Goals**

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

## FDEP Criteria Met:

	rucr	Cinen		
	OTB	HB	MTB	LTB
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
	U	υ	υ	)
1997	green	green	green	green
1997 1998				
	green	green	green	green
1998	green red	green red	green red	green red
1998 1999	green red green	green red green	green red green	green red green
1998 1999 2000	green red green green	green red green green	green red green green	green red green green
1998 1999 2000 2001	green red green green green	green red green green green	green red green green green	green red green green green
1998 1999 2000 2001 2002	green red green green green green	green red green green green green	green green green green green	green green green green green
1998 1999 2000 2001 2002 2003 2004 2005	green red green green green green green green	green red green green green green green green	green green green green green green green	green green green green green green
1998 1999 2000 2001 2002 2003 2004 2005 2006	green red green green green green green green	green red green green green green green green green	green red green green green green green green green	green green green green green green green green
1998 1999 2000 2001 2002 2003 2004 2005	green red green green green green green green green green	green red green green green green green green green green green	green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008	green red green green green green green green green green green	green	green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009	green red green	green red green	green red green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010	green red green	green red green	green red green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011	green red green green green green green green green green red green green green green	green red green	green red green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012	green red green green green green green green red green green green green green green green green	green red green	green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013	green red green	green red green	green red green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014	green red green green green green green red green	green red green	green red green	green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015	green red green green green green green red green	green red green	green red green	green red green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016	green red green	green red green	green red green	green red green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2010 2011 2012 2013 2014 2015 2016 2017	green red green red green green red green green red	green red green	green red green	green red green
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016	green red green red green green red green green green green	green red green	green red green	green  red green

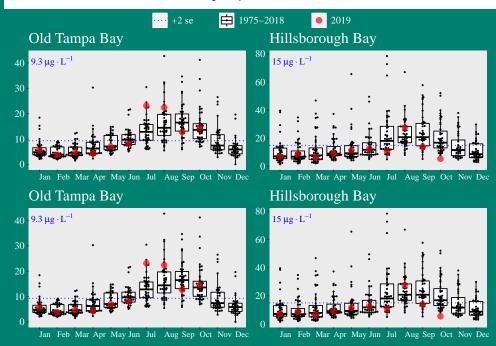
Figure 5. Attainment of bay segments for chlorophyll criteria from 1975 to 2019.

### 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 'r maxyr' and compared to prior years' levels (Figure 6). 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*.



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 20118 baywide coverage was estimated at 40,618 acres (Figure 7). As in 2016, coverage remains above both 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 #0816.

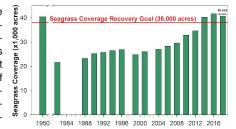


Figure 7: Historic seagrass acreage estimates for Tampa Bay from 1950-2018 (Source: TBEP & SWFMD)

Additional info: 2019 nutrient management compliance assessment available from Sherwood, E., Burke, M. 2019. TBEP Technical Report #1119.