

## Upper Lemon Bay Condition Report for 2016



### CAUTION



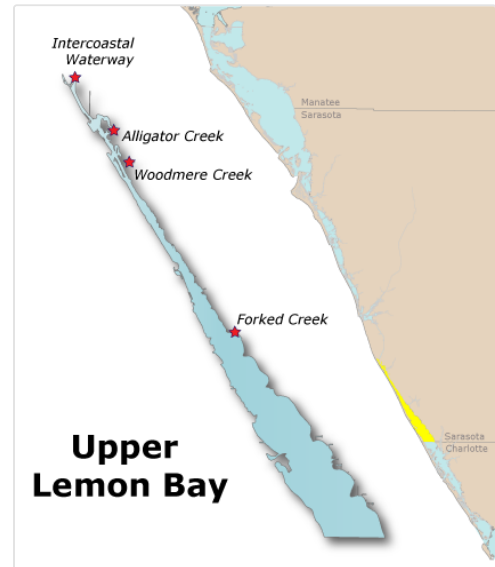
1 out of 3  
indicators were  
rated as **PASS**.

All three  
indicators must pass for the bay to be rated as **PASS**.

### Summary:

Water quality indicators for Upper Lemon Bay showed deterioration in 2016. After an improvement in chlorophyll a concentration in 2014, this water quality measure continued the worsening trend observed in 2015 with further increases in 2016. The mean concentration of both total nitrogen and total phosphorus also showed an increasing trend. The higher chlorophyll a and nitrogen levels continued the rating for those water quality measures as "Caution", causing the overall rating for Upper Lemon Bay also to remain as "Caution".

Water Quality: Chlorophyll a mean concentration in 2016 was of 0.0136 mg/l, exceeding the threshold of 0.0089 mg/l. Mean nitrogen concentration increased to 0.6362 mg/l, exceeding the threshold of 0.560 mg/l. Mean phosphorus concentration also elevated, and at 0.138 mg/l is "Excellent" The mean for chlorophyll a was calculated as an arithmetic mean and the means for nitrogen and phosphorus were calculated as



**Bays included in this report:**  
**Lemon Bay**

geometric means (per the Numeric Nutrient Criteria outlined in the Florida Administrative Code, section 62-302.532).

Biotic Indicator: Measurement of the biotic indicator, seagrass, was performed in 2016 by the Southwest Florida Water Management District. Between 2014 to 2016, seagrass coverage in Lemon Bay (including both the Upper and Lower segments) remained at 3,913 acres, exceeding the combined target value of 3,890 acres. Lower Lemon Bay was not surveyed separately, but has a target level of 1,010 acres.

## Water Chemistry Ratings

Total nitrogen, total phosphorus, and chlorophyll *a* levels are monitored carefully by water resource managers and used by regulatory authorities to determine whether a bay meets the water quality standards mandated by the Clean Water Act. The trend graphs for these indicators are shown below, along with their target and threshold values. A target value is a desirable goal to be attained, while a threshold is an undesirable level which is to be avoided. An individual indicator receives an "Excellent" rating if its mean value is below the target, a "Good" rating if its mean value is above the target but does not exceed the threshold, and a "Caution" rating if the mean value exceeds the threshold.

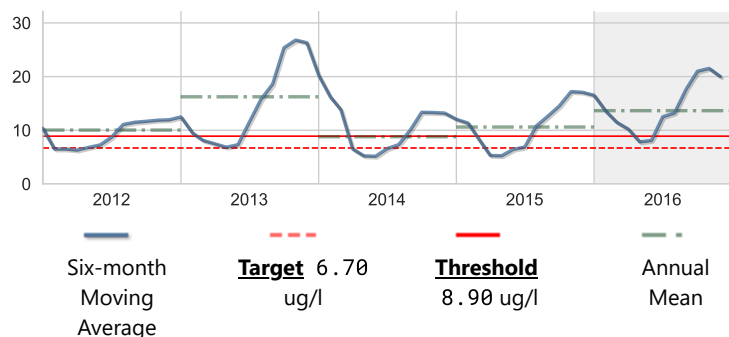
The charts below illustrate the general trend of water quality parameters. They show a six-month running average, which moderates high and low values in the data.



### Chlorophyll a

**Score:** Caution

Units: ug/l	Year 2016	Historical period of record
<b>High</b>	60.30	88.00
<b>Mean</b>	13.65	9.44
<b>Low</b>	2.46	0.37
<b>No. of Samples</b>	82	1636

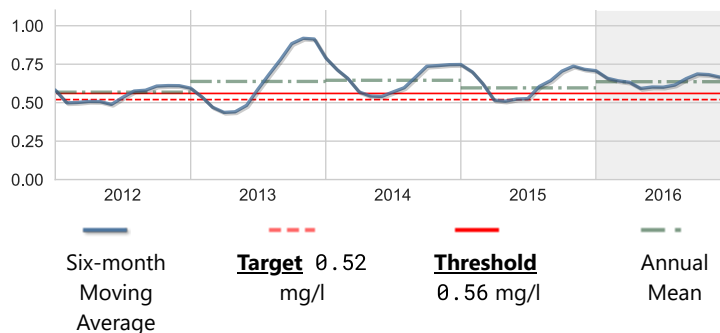


**N**

**Nitrogen, Total**

**Score:** Caution

Units: mg/l	Year 2016	Historical period of record
<b>High</b>	1.266	2.800
<b>Mean</b>	0.636	0.575
<b>Low</b>	0.385	0.000
<b>No. of Samples</b>	82	1635

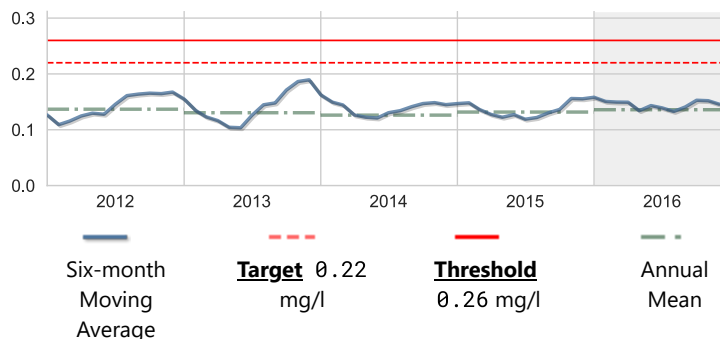


**P**

**Phosphorus, Total**

**Score:** Excellent

Units: mg/l	Year 2016	Historical period of record
<b>High</b>	0.260	0.880
<b>Mean</b>	0.136	0.169
<b>Low</b>	0.050	0.050
<b>No. of Samples</b>	74	1294

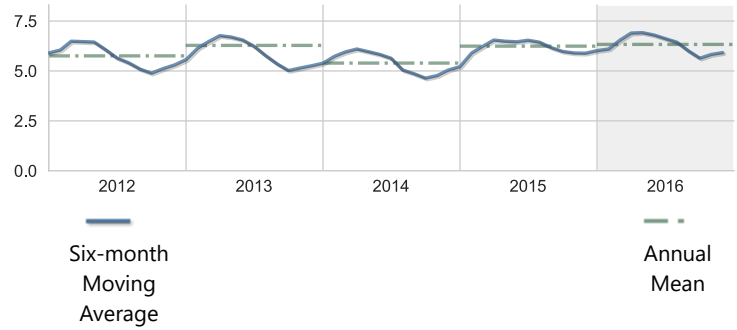


**Other Measures of Bay Health**

In addition to nutrient levels and chlorophyll concentration, dissolved oxygen levels, and water clarity are also objective indicators of bay health. These have complex interactive cycles which are affected by rainfall, temperature, and tidal action, as well as other factors. High nutrient levels (nitrogen and phosphorus) can stimulate excessive growth of marine algae (indicated by chlorophyll *a* level), resulting in reduced water clarity (and increased light attenuation) and depleted oxygen levels. Both plants and animals in a bay need oxygen to survive, and the seagrasses which provide food and cover for bay creatures need light for photosynthesis.

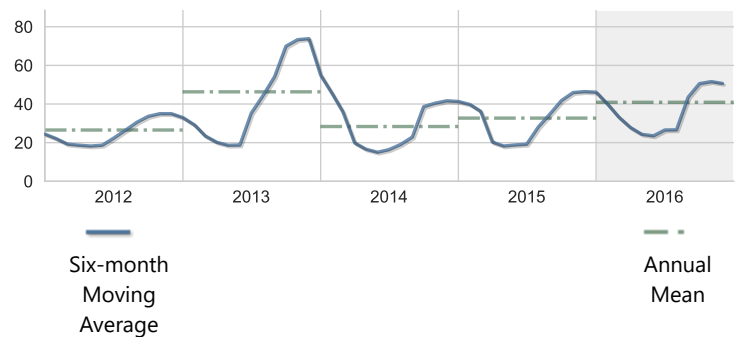
## Dissolved Oxygen

Units: mg/l	Year 2016	Historical period of record
<b>High</b>	10.10	12.00
<b>Mean</b>	6.33	6.04
<b>Low</b>	1.60	1.20
<b>No. of Samples</b>	78	3121



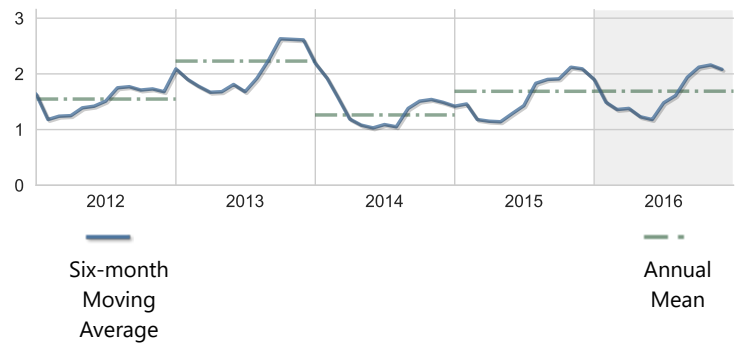
## Apparent Color

Units: PCU	Year 2016	Historical period of record
<b>High</b>	140.00	280.00
<b>Mean</b>	40.89	31.88
<b>Low</b>	10.00	5.00
<b>No. of Samples</b>	74	1293



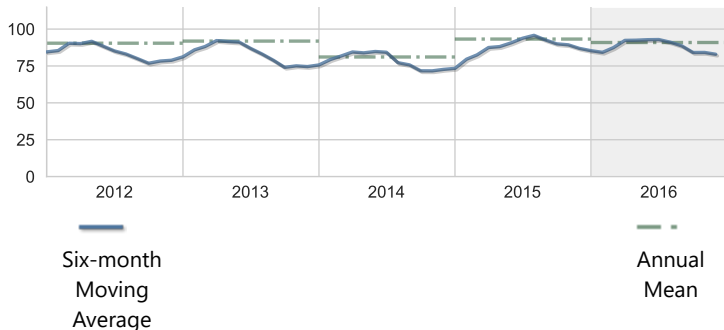
## BOD, Biochemical oxygen demand

Units: mg/l	Year 2016	Historical period of record
<b>High</b>	4.70	7.60
<b>Mean</b>	1.69	1.76
<b>Low</b>	0.50	0.50
<b>No. of Samples</b>	74	1151



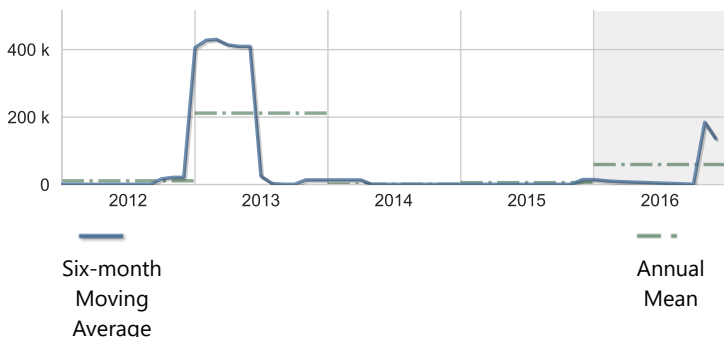
## Dissolved oxygen saturation

Units: percent (%)	Year 2016	Historical period of record
<b>High</b>	128.00	180.07
<b>Mean</b>	90.90	89.39
<b>Low</b>	62.00	21.60
<b>No. of Samples</b>	60	2724



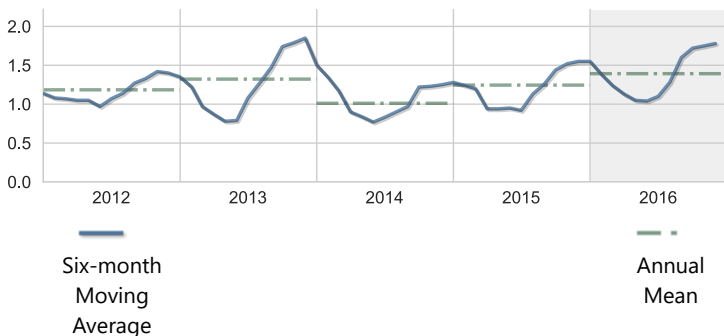
## Karenia brevis ("red tide")

Units: #/l	Year 2016	Historical period of record
<b>High</b>	1480000.00	4480000.00
<b>Mean</b>	59500.00	30182.86
<b>Low</b>	1000.00	1000.00
<b>No. of Samples</b>	41	741



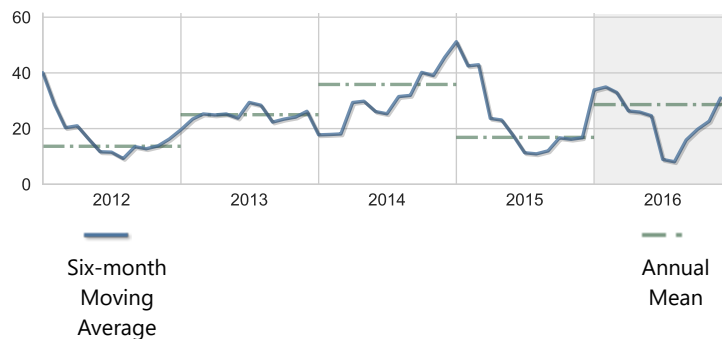
## Light Attenuation

Units: K(1/m)	Year 2016	Historical period of record
<b>High</b>	3.79	3.85
<b>Mean</b>	1.39	1.12
<b>Low</b>	0.53	0.16
<b>No. of Samples</b>	54	1100



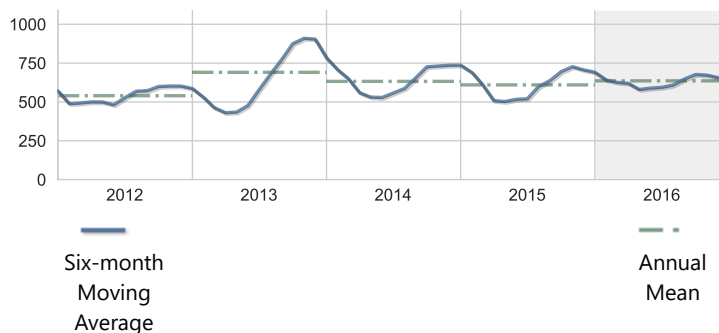
## Nitrogen, Ammonia + Ammonium as N

Units: ug/l	Year 2016	Historical period of record
<b>High</b>	177.00	359.00
<b>Mean</b>	28.62	26.09
<b>Low</b>	5.00	5.00
<b>No. of Samples</b>	74	1295



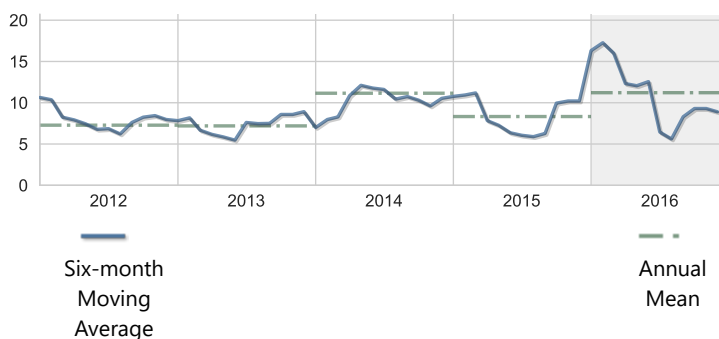
## Nitrogen, Kjeldahl

Units: ug/l	Year 2016	Historical period of record
<b>High</b>	990.00	1330.00
<b>Mean</b>	635.81	555.16
<b>Low</b>	380.00	0.05
<b>No. of Samples</b>	74	1294



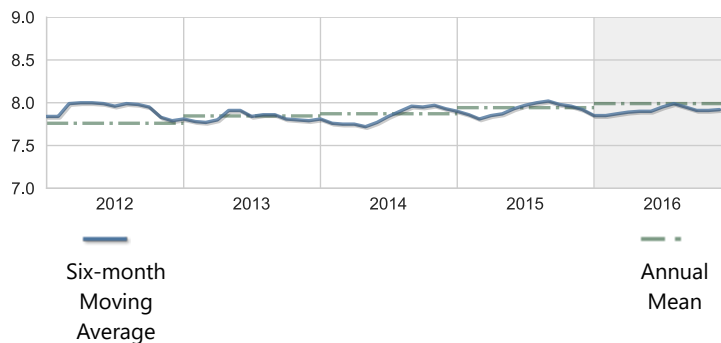
## Nitrogen, Nitrite + Nitrate as N

Units: ug/l	Year 2016	Historical period of record
<b>High</b>	58.00	130.00
<b>Mean</b>	11.22	9.14
<b>Low</b>	5.00	5.00
<b>No. of Samples</b>	74	1725



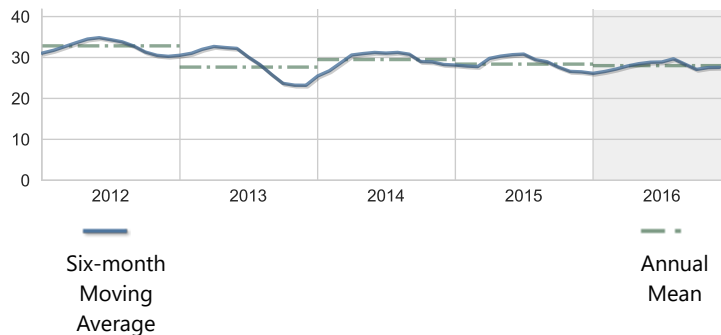
## pH

Units: None	Year 2016	Historical period of record
<b>High</b>	8.60	8.90
<b>Mean</b>	7.99	7.97
<b>Low</b>	7.30	4.80
<b>No. of Samples</b>	90	2421



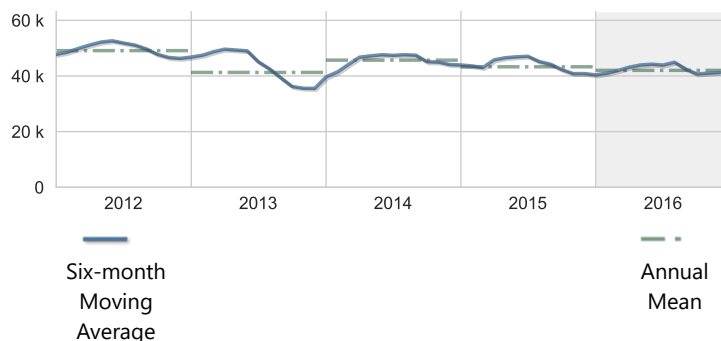
## Salinity

Units: PSS	Year 2016	Historical period of record
<b>High</b>	35.80	41.50
<b>Mean</b>	28.01	29.86
<b>Low</b>	9.60	2.80
<b>No. of Samples</b>	81	3444



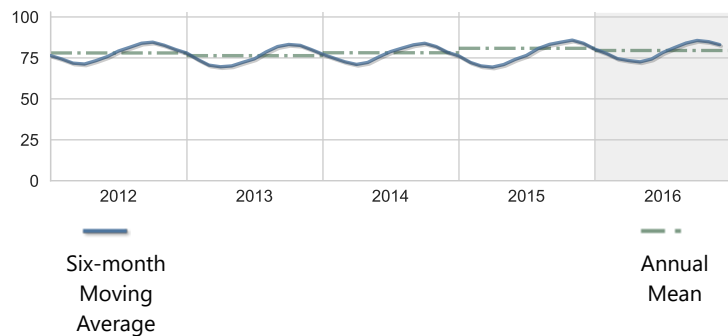
## Specific conductance

Units: umho	Year 2016	Historical period of record
<b>High</b>	52910.00	60590.00
<b>Mean</b>	42021.50	45821.39
<b>Low</b>	18500.00	5800.00
<b>No. of Samples</b>	60	1303



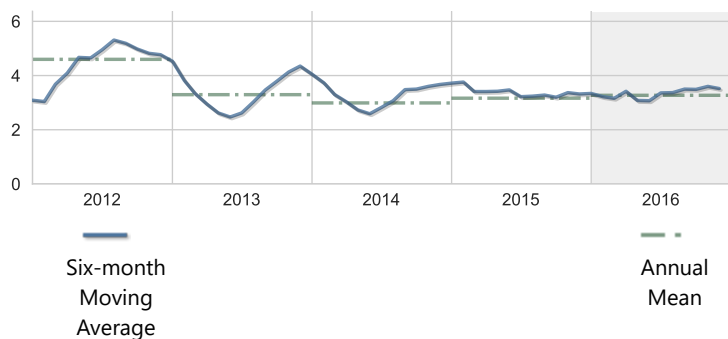
## Temperature, water

Units: deg F	Year 2016	Historical period of record
<b>High</b>	90.50	107.60
<b>Mean</b>	79.52	77.86
<b>Low</b>	64.22	46.76
<b>No. of Samples</b>	68	3134



## Turbidity

Units: NTU	Year 2016	Historical period of record
<b>High</b>	7.60	66.00
<b>Mean</b>	3.27	2.97
<b>Low</b>	0.92	0.21
<b>No. of Samples</b>	82	2881



## Annual Averages

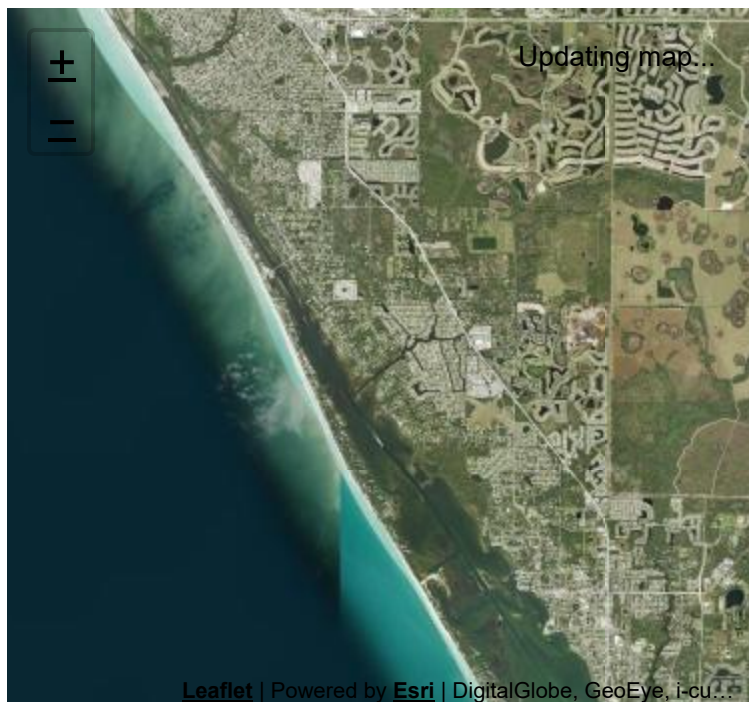
Indicator	Units	2012	2013	2014	2015	2016	Trend
Dissolved Oxygen	mg/l	5.76	6.28	5.39	6.24	6.33	
Dissolved oxygen saturation	percent (%)	90.43	91.86	81.08	93.23	90.90	
Light Attenuation	K(1/m)	1.18	1.32	1.01	1.25	1.39	
Salinity	PSS	32.84	27.65	29.50	28.38	28.01	
Turbidity	NTU	4.60	3.29	2.99	3.16	3.27	



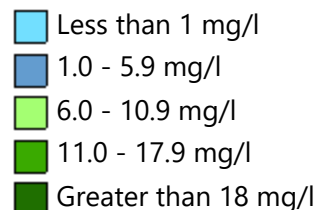
## Bay Contour Maps (2016)

Contour mapping is one of the best ways to visualize spatial differences in coastal water quality. The interactive map shown below presents monthly data for one selected water quality indicator atop an aerial view of the bay. Choose a different water quality parameter from the list at the top to change the map.

Showing 2016 Monthly Contour Maps for: Chlorophyll a ▼  
January



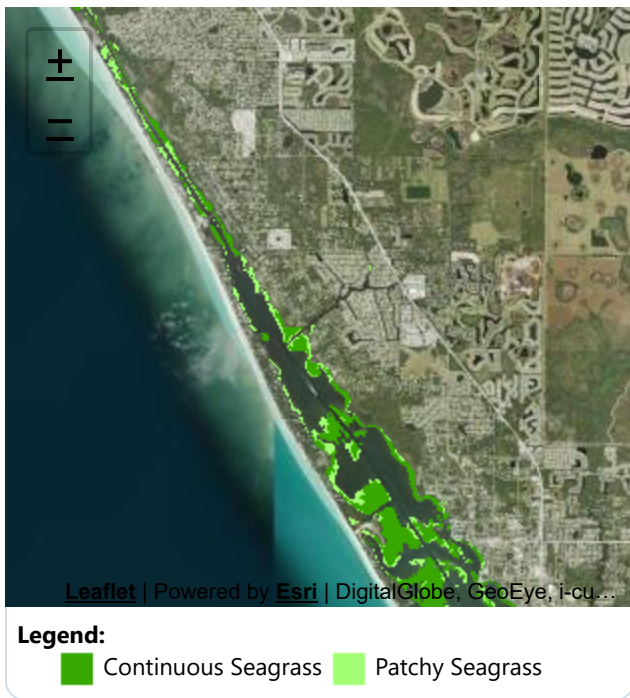
### Contour Legend:



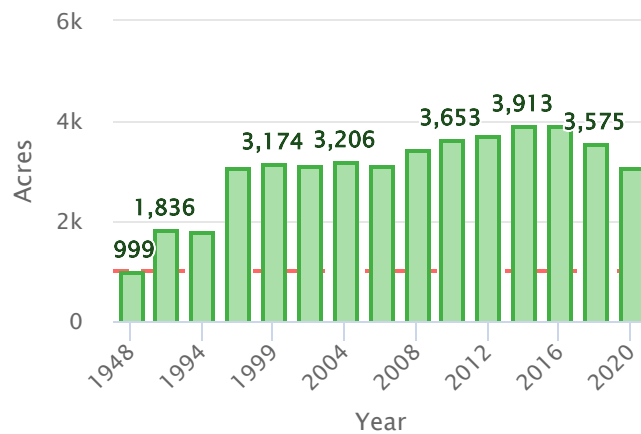
## Seagrasses

Among the most important habitats in Florida's estuarine environments, seagrass beds are indispensable for the role they play in cycling nutrients, supplying food for wildlife, stabilizing sediments, and providing habitat for juvenile and adult finfish and shellfish. Use the interactive map below to observe the size, density and location of seagrass beds from year to year. The graph shows how the total amount of seagrass in the bay has changed over time. Seagrass calculations are aggregates of patchy and continuous seagrass measurements only. Recordings of attached algae are not included in these summaries.

Showing Seagrass Coverage for 2020:



### Seagrass Acreage Variation within Lemon Bay\*



--- Target 1,010 acres

**\*Note:** Seagrass acreage values shown above are for Lemon Bay in its entirety. The target for seagrass acreage for Upper Lemon Bay is 1,010 acres; for Lower Lemon Bay it is 2,880 acres.

## Impervious Features

Rain that falls on land that is in a natural state is absorbed and filtered by soils and vegetation as it makes its way into underground aquifers. However, in developed areas, "impervious surfaces" impede this process and contribute to polluted urban runoff entering surface waters. These surfaces include human infrastructure like roads, sidewalks, driveways and parking lots that are covered by impenetrable materials such as asphalt, concrete, brick and stone, as well as buildings and other permanent structures. Soils that have been disturbed and compacted by urban development are often impervious as well.

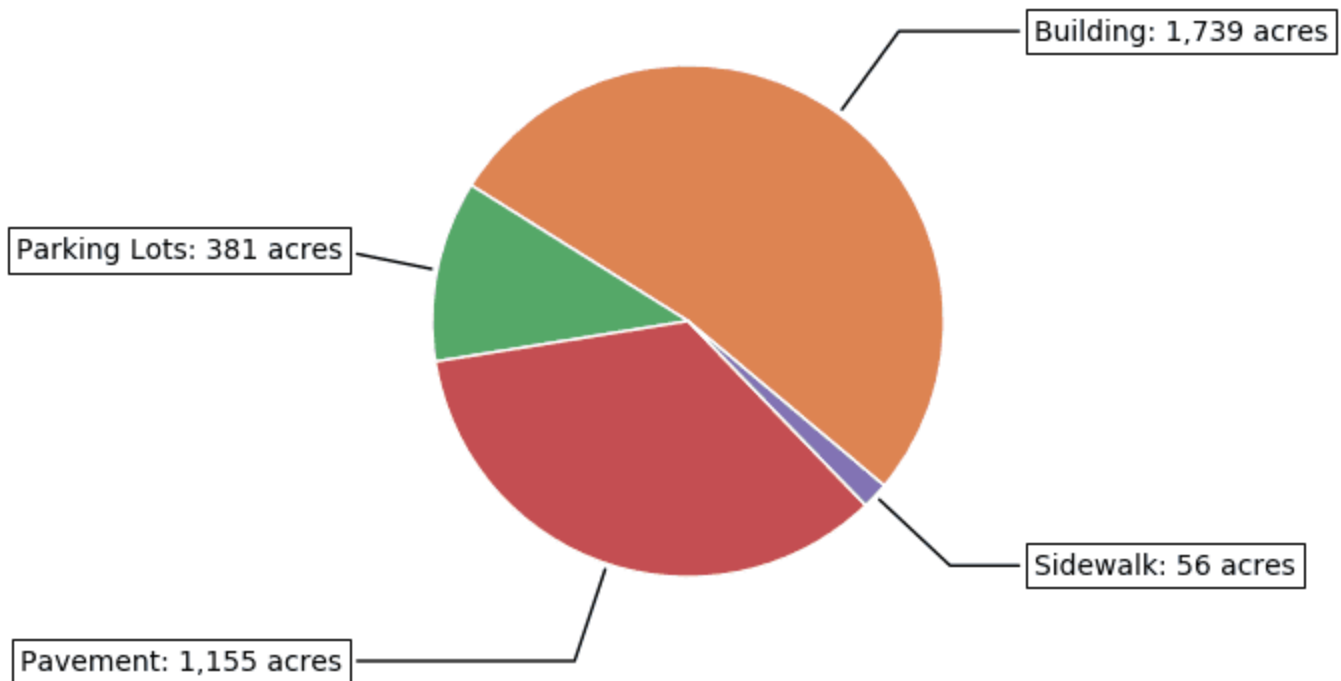


**10%** of the land area within the **Lemon Bay Watershed** is covered by impervious

surfaces

## 2014 Impervious Surface Coverage by Type

in acres, within the Lemon Bay Watershed











### Land Use / Land Cover

Land use within a bay's watershed has a major effect on its water quality. In general, less development means better water quality. Land Cover/Land Use classifications categorize land in terms of its observed physical surface characteristics (upland or wetland, e.g.), and also reflect the types of activity that are taking place on it (agriculture, urban/built-up, utilities, etc.). Florida uses as its standard a set of statewide classifications which were developed by the Florida Department of Transportation.

Upper Lemon Bay is located within the Lemon Bay Watershed. The chart below shows the land use / land cover characteristics for Lemon Bay Watershed within the boundary of this Water Atlas. [\*\*View details about the Lemon Bay Watershed »\*\*](#)

**Acreeage and Percentage within each Land Use / Land Cover Category for Lemon Bay Watershed**

2016 Bay Conditions Report for Upper Lemon Bay

Land Use Classification	1990	2005	2011	2014	2017	2020	Trend
<b>Urban &amp; Built-up</b>	11,331 33.6%	12,872 38.2%	13,589 40.4%	13,589 40.4%	14,050 41.7%	22,467 47.1%	
<b>Agriculture</b>	2,515 7.5%	2,325 6.9%	2,255 6.7%	2,255 6.7%	2,075 6.2%	2,023 4.2%	
<b>Rangeland</b>	2,209 6.6%	4,479 13.3%	4,115 12.2%	4,115 12.2%	3,662 10.9%	3,544 7.4%	
<b>Upland Forests</b>	9,360 27.8%	5,637 16.7%	5,109 15.2%	5,109 15.2%	5,231 15.5%	6,168 12.9%	
<b>Water</b>	3,104 9.2%	3,437 10.2%	3,501 10.4%	3,501 10.4%	3,586 10.6%	7,284 15.3%	
<b>Wetlands</b>	4,689 13.9%	4,265 12.7%	4,375 13%	4,375 13%	4,355 12.9%	5,144 10.8%	
<b>Barren Land</b>	29 0.1%	0 0%	0 0%	0 0%	0 0%	6 0%	
<b>Transportation and Utilities</b>	443 1.3%	655 1.9%	726 2.2%	726 2.2%	723 2.1%	1,071 2.2%	

### 2020 Land Use / Land Cover for Lemon Bay Watershed

as a percentage of land area for this watershed

