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Environmental Protection Commission of Hillsborough County
Tampa Bay

Surface area = 1,030 km$^2$
Watershed = 5,700 km$^2$
Population = 4.5 million
EPC Water Monitoring Network

- 259 Total Stations
  - 121 Monthly Stations
  - 80 Quarterly Stations
  - 53 Monthly Profile Stations
  - 2 Fixed Continuous Recorders
  - 3 Monthly PLE Stations

- >2500 Sampling Events / Year

- >120 Total Analytes
Surface Water Quality
2001-2010

Hillsborough County, Florida

http://www.epchc.org
Water Quality Metrics

- TBEP “Stop Light”
  - Chl a
  - Effective Light Penetration
- EPC 1984-1985 Water Quality Report (Boler 1987)
  - Water Quality Index formulated from 7 parameters:
    - %D.O. saturation; BOD; Chl a; TKN, TP; Total coliform; effective light penetration
Chesapeake Bay:
Bay Health Index

- Williams et al. 2009
- Composite Index
  - Biotic Index
    - Benthic Index
    - Plankton
    - SAV
  - Water Quality Index
    - Chl a
    - Secchi
    - Dissolved Oxygen
- Bay Report Card
Proposed Tampa Bay WQI

- Based on 7 parameters: Chl a; TN; TP; Bottom D.O.; Fecal Coliform; Secchi depth; Turbidity
- Parameter targets
  - State criteria (Water Class specific)
  - TBEP targets (Bay segment specific)
  - Calculated targets (historical mean; regression analysis)
- Pass/Fail:
  - Meets target = 1
  - Does not meet target = 0
Chlorophyll a

- **Tampa Bay**
  - **TBEP Segment Targets** (Janicki et al. 2000)
    - HB = 13.2 µg/L
    - OTB = 8.5 µg/L
    - MTB = 7.4 µg/L
    - LTB = 4.6 µg/L

- **Tributaries**
  - Estuarine = Bay Targets
  - Freshwater = TSI (Paulic et al. 1996)
    - 20 µg/L
  - > = Fail (0); ≤ = Pass (1)
Total Nitrogen

- TBEP Proposed targets (Janicki Environmental 2010)
  - HB = 1.02 mg/L
  - OTB = 0.94 mg/L
  - MTB = 0.88 mg/L
  - LTB = 0.72 mg/L
- Freshwater = State NNC for West Central Florida (FDEP 2013)
  - 1.65 mg/L
- > = Fail (0); <= Pass (1)
Total Phosphorus

- TBEP Proposed targets (Janicki Environmental 2010)
  - HB = 0.45 mg/L
  - OTB = 0.32 mg/L
  - MTB = 0.29 mg/L
  - LTB = 0.10 mg/L
- Freshwater = State NNC for West Central Florida (FDEP 2013)
  - 0.49 mg/L
- $\geq$ Fail (0); $\leq$ Pass (1)
Bottom Dissolved Oxygen

- **State Criteria**
  - **Tampa Bay**: 4 mg/L
  - **Tributaries**:
    - Estuarine = 4 mg/L
    - Freshwater = 5 mg/L
- $\geq$ =Pass (1); $\leq$ = Fail (0)
Fecal Coliform

- State Criteria
  - Class III: 400 cfu/100 ml
  - Class II: 43 cfu/100 ml
- ≥ = Fail (0); ≤ = Pass (1)
Effective Light Penetration (Secchi depth)

- TBEP Bay Targets (Janicki et al. 2000)
  - HB = 1.0 meter
  - OTB = 1.8 meters
  - MTB = 1.8 meters
  - LTB = 2.9 meters
- Freshwater
  - Historical avg. 1974-2012
  - 0.77 meters
- >=Pass (1); <= Fail (0)
- Secchi > bottom = 1
Turbidity

- Calculated from Secchi depth targets
- Power function:
  \[ NTU = 5.0941(\text{secchi})^{-0.736} \]
- Turbidity Targets:
  - HB = 5.0 NTU
  - OTB & MTB = 3.3 NTU
  - LTB = 2.3 NTU
  - Freshwater = 6.2 NTU
- \( > \) = Fail (0); \( < \) = Pass (1)
WQI Calculation

- \( \text{WQI} = (\text{mean of the 7 parameters}) \times 100 \)
  - Sample WQIs averaged by location and/or time period
- Final Scale 0 – 100
- WQI Report Card:
  - **A**: \( \text{WQI} = 90 – 100 \)
  - **B**: \( \text{WQI} = 80 – 90 \)
  - **C**: \( \text{WQI} = 60 – 80 \)
  - **D**: \( \text{WQI} = 30 – 60 \)
  - **F**: \( \text{WQI} < 30 \)
WQI Trends (Bay sites)

Tampa Bay
1974 - 2015

Tampa Bay Water Quality Index

- Hillsborough Bay
- Old Tampa Bay
- Middle Tampa Bay
- Lower Tampa Bay
- Bay-wide Trend Line

Year
## Bay Segment Report Card

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Summary

- Water Quality Index
  - Still in “beta test phase”
    - We welcome feedback for improvement
  - Simple calculations
  - Easily interpretable measure of water quality trends
  - Specific to Tampa Bay water quality targets
  - Easily adaptable to other regions or other parameters
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Questions?
References:


