






Water Quality Monitoring For Bacteria

A Presentation to the Sustainability Advisory Board




CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

May 26, 2020 Page 1

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Florida Healthy Beaches Program

Beach Samples for: Broward County





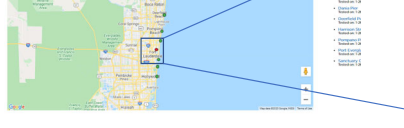
- ❖ Targets swimming beaches
- ❖ Sampling 2x/wk Mon, Wed
- ❖ Data posted to web
- ❖ EPA Std used (MPN/100ml)
 - ❖ Good: 0-35.4
 - ❖ Moderate: 35.5-70.4
 - ❖ Poor: >70.5
- ❖ Recreational Advisories issued until sampling results meet standards

Period	Location	Date	Enterococcus Count (calc)	Advisory	?
973	BAHAMAR	3/9/2020	Poor	No	View Samples
973	BAHAMAR	3/11/2020	Good	No	View Samples
973	BIRCH STATE PARK	3/11/2020	Good	No	View Samples
973	BIRCH STATE PARK	3/9/2020	Moderate	No	View Samples
973	COMMERCIAL BLVD PIER	3/9/2020	Moderate	No	View Samples
973	COMMERCIAL BLVD PIER	3/9/2020	Moderate	No	View Samples
973	COMMERCIAL BLVD PIER	3/11/2020	Good	No	View Samples
973	CUSTER ST BEACH	3/11/2020	Good	No	View Samples
973	CUSTER ST BEACH	3/9/2020	Moderate	No	View Samples
973	DANNA BEACH	3/9/2020	Moderate	No	View Samples

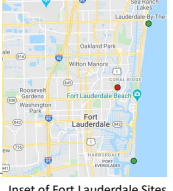
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Inset of Fort Lauderdale Sites




SAMPLE SITE	TEST DATE	ENTERO	INDICATION OF
Commercial Blvd Pier	1-26-20	0	Low Bacteria
Danna Pier	1-26-20	10	Low Bacteria
Deepfield Pier	1-26-20	10	Low Bacteria
Harrison Street, Hollywood	1-26-20	0	Low Bacteria
Pompano Pier	1-26-20	0	Low Bacteria
Port Everglades	1-26-20	0	Low Bacteria
Sunshine Church	1-26-20	154	High Bacteria

- ❖ Monthly
- ❖ Data posted to web
- ❖ FDOH beach standards
- ❖ No advisories issued

 Low Bacteria (0 - 35)

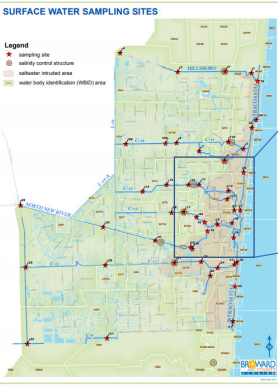
 Medium Bacteria (36 - 70)

 High Bacteria (> 70)


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Broward County Quarterly Surface Water Quality Monitoring Network



Inset of Fort Lauderdale Sites

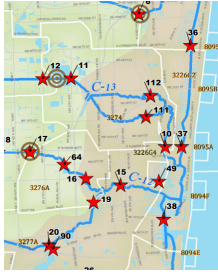


- ❖ Extensive network
- ❖ Quarterly
- ❖ Data posted to web
- ❖ No advisories issued
- ❖ Note: Fort Lauderdale is downstream of urban sources to the west.

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Broward County Surface Water Quality Monitoring



Bacteria Sampling (Enterococci) from 2017 – 2019

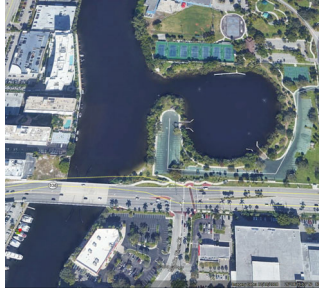
- A. Middle River Basin
 - i. 32 Samples
 - ii. Average reading – 107 MPN/100 ml
 - iii. 22% failure rate using 130 MPN/100ml
- B. New River Basin
 - i. 50 Samples
 - ii. 370 MPN/100 ml
 - iii. 62% failure rate
- C. Fort Lauderdale Saltwater Sites
 - i. 145 Samples
 - ii. 303 MPN/100 ml
 - iii. 46% failure rate
- D. All other Broward County sites excluding FTL Saltwater Sites (C)
 - i. 113 Samples
 - ii. 304 MPN/100 ml
 - iii. 41% failure rate

<https://www.broward.org/NaturalResources/Tab/Documents/surfacewatersamplingsitesada.pdf>

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Fort Lauderdale Water Quality Sampling at George English



- ❖ Monthly
- ❖ Data held internally
- ❖ No advisories issued

Bacteria Data (Enterococci) from 2019

- A. Four sample sites
 - i. 48 Samples
 - ii. Average reading: 52 MPN/100 ml
 - iii. 15% failure rate (FDEP 130 std)
 - iv. 27% failure rate (FDOH 70 std)



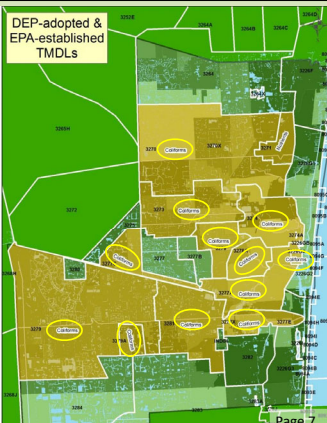
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Total Maximum Daily Loads (TMDLs)

“A calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.”

The majority of water bodies in Broward County are impaired for fecal coliform bacteria (FDEP 2012).




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Broward County Water Resources Fact Book June 2015

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Historic Concentrations of Fecal Coliform in City Waterways



Samples taken from 1973-1997
Water Quality Site 15 = Andrews Avenue and New River.

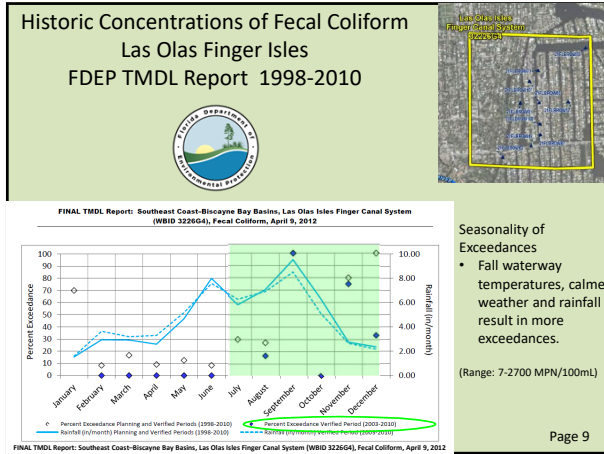
Figure IV-32 (Cont.). Fecal Coliform (FC) Concentrations Observed in the New River Basin over Three Time Periods. Concentrations are categorized in terms of compliance with the Broward County maximum FC standards which state the monthly average shall be equal to or less than 250 colonies/100 ml (good rating) and no single reading shall be above 800 colonies/100 ml (poor rating). Values between 201 and 800 colonies per 100 ml are defined as fair.

c) Site 15

Time Period	Good (%)	Fair (%)	Poor (%)
1973-1983 (n=103)	58.3%	33.0%	8.7%
1984-1988 (n=20)	35.0%	50.0%	15.0%
1989-1997 (n=36)	50.0%	30.6%	19.4%

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What Causes Bacteria in Coastal Waterways?

- Birds, manatees and other wildlife
- Stormwater runoff
- Pet waste and landscaping debris
- Homeless populations near waterways
- Septic tanks
- Boat discharges
- Sanitary sewage releases (POINT source)

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Designing a monitoring network for a POINT Source Discharge

RED – Point of Entry

YELLOW – Anticipated area of impact

GREEN – Outer boundary of impacted area

George English Park Sewer Break

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Samples results that reflect a POINT source

Site 5 - George English Park

Feb 2 - Bypass Installed - Feb 6 - End of discharge

MPN/100 ml Enterococcus

Date of Collection

Bact std

Site 2 - Las Olas & S. Gordon Rd.

Feb 2 - Bypass Installed - Feb 6 - End of discharge

MPN/100 ml Enterococcus

Date of Collection

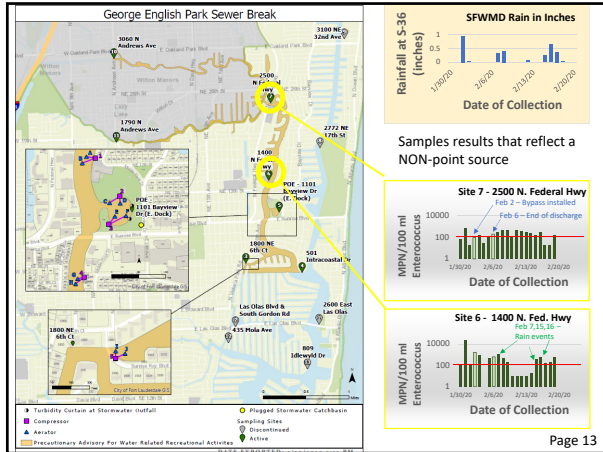
Logarithmic scale

George English Park Sewer Break

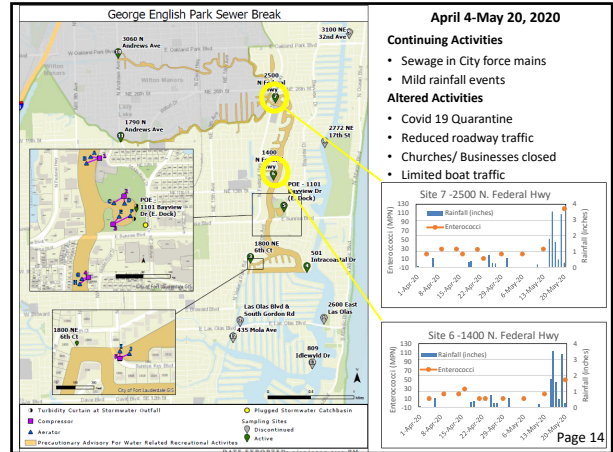
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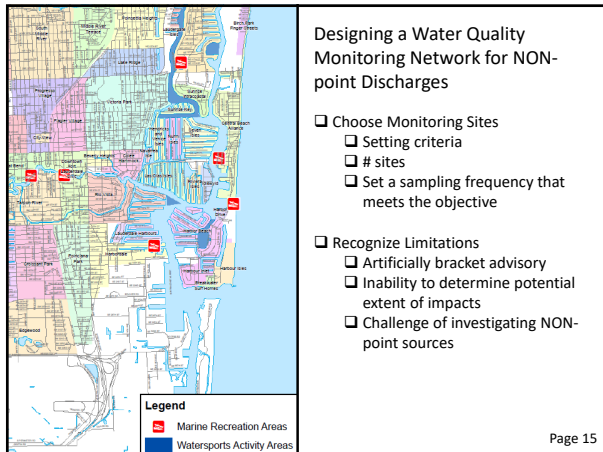
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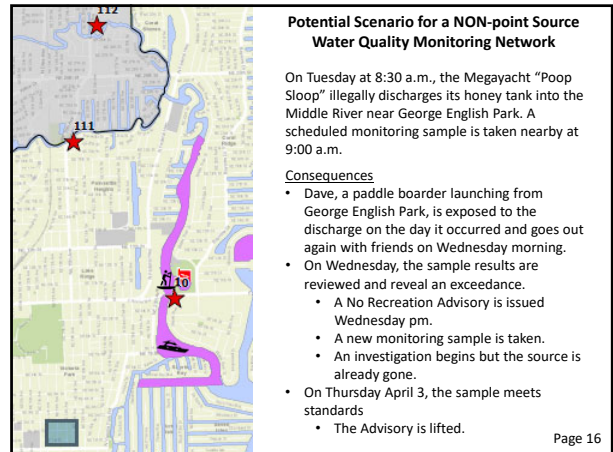
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Benefits of a Fort Lauderdale Monitoring Network that Results in “No Recreation” Advisories

- Supplements existing monitoring data
- Could provide more frequent sampling
- Supports transparency and open government
- Allows waterway users to make a more informed choice
- May encourage confidence in local government’s ability to identify and eliminate sources if improvements are demonstrated
- May reveal previously undetected point sources of bacterial pollution
- May guide resource allocation for addressing sources (investigation, outreach etc)
- Increased data available to support operational decisions



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Concerns with Establishing a Fort Lauderdale Monitoring Network that Results in “No Recreation” Advisories

- WQ data would reflect only City waterways and not the greater watershed
- Creates a false perception that public health is protected
 - Diversion of waterway users to unmonitored areas of unknown risk
- Exceedances will occur after every rainfall (2019: 59 Days \geq 0.25 inches rain)
- Historical failure rates (20-60%) suggest that an advisory would be required after every sampling event
- Advisories create perception that the “Venice of America” is not a good place to enjoy the waterways
- Impact on the tourist economy and waterway industries (e.g. paddleboard, jet ski or kayak rentals)
- Known expense of bacteria sampling and analysis (General Fund)
- Unknown expense of establishing/removing advisories and source investigation which may be inconclusive (General Fund)
- No Recreation Advisories are not a regulatory requirement


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FDEP Direction on Addressing Bacteria Impaired Waterways

- FDEP Manual “Restoring Bacteria-Impaired Waters – A Toolkit to Help Local Stakeholders Identify and Eliminate Potential Pathogen Problems”
- Use order of magnitude to determine need to investigate fecal indicator bacteria:
 - A low level exceedance (mid-hundreds)
 - Not usually associated with chronic sources of untreated human waste
 - Don’t warrant immediate action
 - Plan to address them when higher priority areas are remediated.
 - Difficult to discern (high hundred to low thousands)
 - Actions same as for low level exceedance
 - Very concerning level (tens of thousands)
 - Potential ‘hot spot’
 - Possible Emergency (hundreds of thousands)
 - Potential source needs to be investigated.

❖ Under the five-year NPDES Permit, North Fork sources of bacteria under investigation.




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Examples of Fort Lauderdale PAST Actions to Improve Waterways

- Septic Systems
 - Waterworks 2011 – eliminate septic systems, especially near waterways
- Boat Discharges
 - Pump out stations installed at all City marinas
 - Zoning districts with habitable boats require connection to pump outs
- Stormwater Runoff
 - Established the Stormwater Utility in 2012
 - Expanded catch basin inspection and cleaning crew in FY2019
 - Implementing National Pollution Discharge Elimination System MS4 (NPDES) permit to address NON-point discharges



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Examples of Fort Lauderdale PAST Actions to Improve Waterways (cont)

- Pet Waste and Landscaping Debris**
 - Existing ordinances with prohibitions
 - Installation of pet waste stations in public spaces
 - Canal cleaning program - debris
- Sanitary Sewage Releases**
 - Installed a redundant 30 inch Sewer Force Main near N. Fork of New River
 - Updated grease trap ordinance and increased outreach on FROG (fats, rags, oil and grease) to reduce blockages and sewer overflows

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Examples of Fort Lauderdale PRESENT Actions to Address Sources

- Stormwater Runoff**
 - Watershed Asset Management Program supports increased level of service
 - NDPES Bacterial Pollution Control Plan to address bacteria in North Fork
 - Amended ordinance to reduce fertilizer inputs to waterways in wet season
- Homeless Populations near Waterways**
 - Focus on effort to house the homeless
- Sanitary Sewage Releases**
 - Replacement of multiple force mains throughout the City
 - Change in operational protocols to replace full runs of damaged pipe
 - Inflow/Infiltration program - lining of leaking gravity sewer mains
 - Smoke testing of gravity sewer mains to identify breaks in both public and private sewer pipes

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Proactive Stormwater Catch Basin Inspections

Stormwater Proactive Inspections (SWOPS) Dashboard

6,020 Inspections Completed on City Owned Inlets

153 Need Cleaning

27 Need Repair

42 Inspections Completed on Newly Identified Inlets

City Owned Inlets Not Need Cleaning
 ST1N-04896
 CR #11206
 Needs to be reconstructed and resurfaced
 Inspection by city staff/inspector
 ST1N-04895
 CR #08970
 Inspection by city staff/inspector
 ST1N-04916
 CR #11206
 Call needs cleaning
 Inspection by city staff/inspector
 ST1N-04452
 CR #13079
 Inspection by city staff/inspector
 ST1N-04473
 CR #12057
 Above being installed inspection in current map
 (see only)

City Owned Inlets that Need Repair
 ST1N-04899
 CR #11206
 Needs to be reconstructed and resurfaced
 Inspection by city staff/inspector
 ST1N-01420
 CR #11202
 Inspection by Johnny
 ST1N-04854
 CR #11206
 Grate to be replaced
 Inspection by city staff/inspector
 ST1N-04857
 CR #11206
 Grate to be replaced
 Inspection by city staff/inspector
 ST1N-04859
 CR #13032
 Inspection by Johnny
 ST1N-04854
 CR #13032
 Inspection by Johnny

• Memorial Weekend rains (> 7 inches) resulted in only three flooding complaints.
 • Streetsweeping removing tons of debris annually.

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Black lines represent the current projects to replace sanitary sewer force mains.


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Additional Action Items to Consider for Future Action


- **Stormwater Runoff**
 - Engage County and State on increased frequency of storm drain cleaning
 - Conduct walking inspection of potential inputs to Middle River
- **Boat Discharges**
 - Implement Marine Advisory Board recommendation to form a vessel gray and black water management subcommittee
- **Sanitary Sewage Releases**
 - Use Asset Management program to proactively maintain sewer systems
- **Work Plans for Commission 2020 Top Priorities**
 - Waterway Quality
 - Infrastructure

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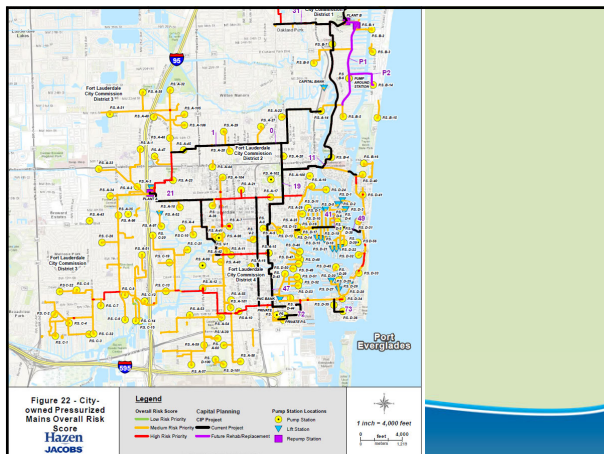
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QUESTIONS?

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5 - What Can We Do About Harmful Algal Blooms (HABs)?

WHAT CAN WE DO? 

REDUCE NUTRIENT POLLUTION

- Reduce agricultural runoff
- Reduce residential runoff
- Improve wastewater treatment



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