


Documentation in Support of Category 4e

Waterbody/Watershed Identification

Organization	
Point of Contact	Maria Romero Principal Planner/TMDL Coordinator Department of Natural Resources 239-533-8139
Waterbody(s)	WBID ID 3240EA, Yellow Fever Canals. WBID ID 3240EB, Yellow Fever Creek. WBID ID 3240E1, Hancock Creek.
No. Waterbody / Pollutant Combinations	- WBID ID 3240EA Yellow Fever Canals. Verified Impaired for <i>Escherichia coli</i> . Study list for Dissolved oxygen (percent saturation). - WBID ID 3240EB Yellow Fever Creek. Verified Impaired for <i>Escherichia coli</i> and Nutrients (Total Phosphorus). - WBID ID 3240E1 Hancock Creek. Verified Impaired for <i>Enterococci</i> and Copper.
EPA Completed TMDL	EPA has not completed a TMDL for any of the impaired waterbody segments listed in this document.

Description of Baseline Conditions

Watershed(s)	These waterbodies are located within the Caloosahatchee River Estuary Basin Group 3 (downstream of S-79). The Caloosahatchee Basin Group 3 is part of a five-group basin rotation schedule for the South District office of the Florida Department of Environmental Protection (FDEP). Yellow Fever Creek (3240EB) and Yellow Fever Canals (3240EA) are freshwater systems. Hancock Creek (3240E1) is predominantly marine. Yellow Fever Creek and Yellow Fever Canals are head waters of Hancock Creek. All the creeks in this Alternative Restoration Plan (ARP) are tributaries to the Caloosahatchee Estuary Tidal Segment 1.
Baseline Data	These waterbodies are verified impaired based on the number of exceedances for the sample size and anthropogenic sources have been confirmed:

- Yellow Fever Creek is verified impaired for Nutrients (Total Phosphorus) and Escherichia coli. In addition, it is also in the study list for Dissolved Oxygen (Percent Saturation).
- Hancock creek is impaired for Enterococci and copper. Caloosahatchee Estuary (Tidal Segment2) is on the Study list for Nutrients (Total Phosphorus).
- Yellow Fever Canals is impaired for Escherichia coli. In addition, it is also in the study list for Dissolved Oxygen (Percent Saturation).

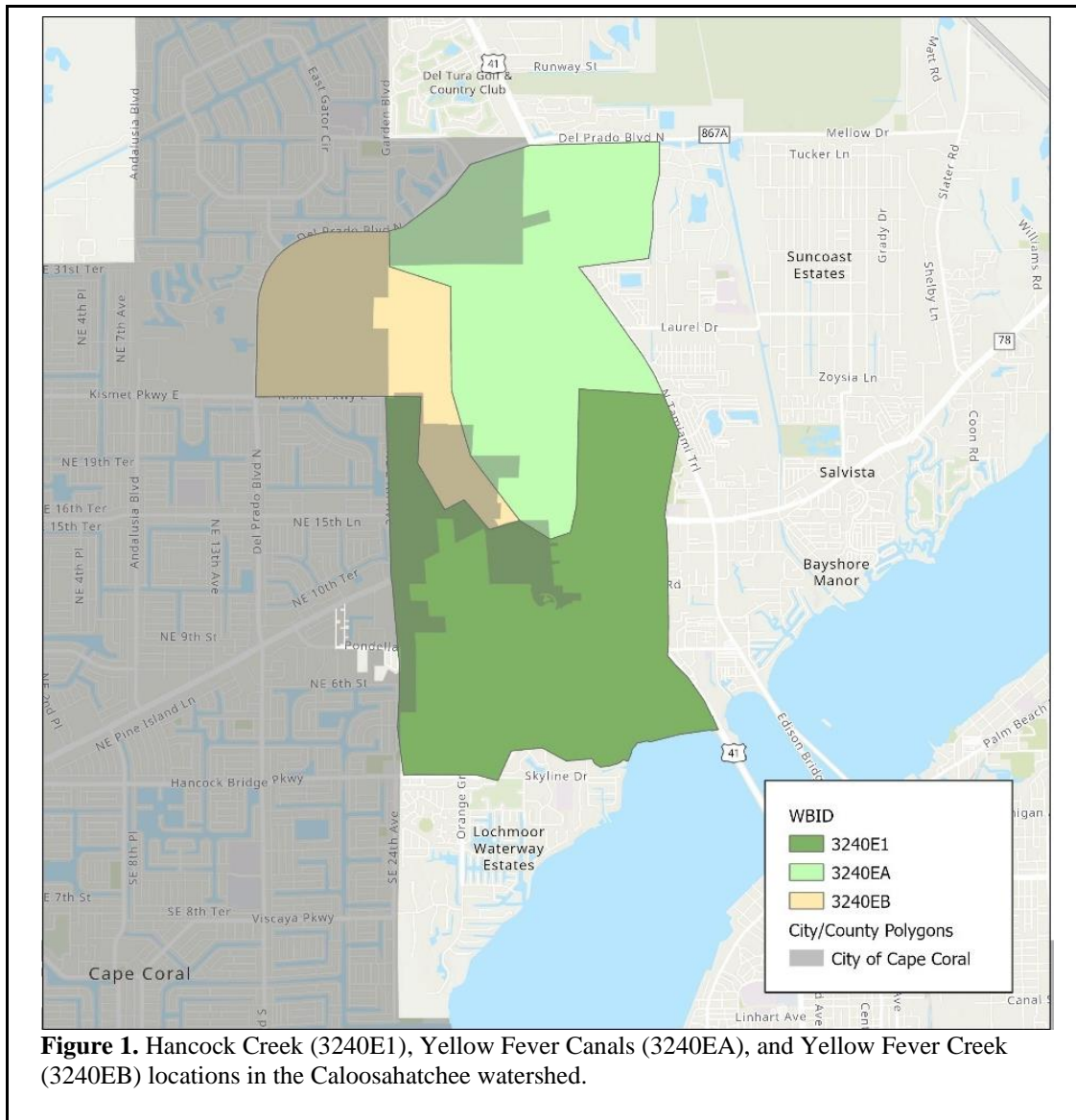
All these watersheds discharge into the Caloosahatchee Estuary (Tidal Segment2), which is on the Study list for Nutrients (Total Phosphorus).

Table 1. shows the impairments in Yellow Fever Creek, Yellow Fever Creek Canals, and Hancock Creek as listed in the Statewide Comprehensive Verified List of Impaired Waters.

WBID	Water Segment Name	Status	Assessment Class	Parameters Assessed	Criterion or Threshold Not Met	IWR run
3240EA	Yellow Fever Canals	Impaired	3F	Escherichia coli	≤ 410 Counts / 100 mL	64
3240EA	Yellow Fever Canals	Study list	3F	Dissolved oxygen (percent saturation)	$\geq 38\%$	64
3240EB	Yellow Fever Creeks	Impaired	3F	Escherichia coli	≤ 410 Counts / 100 mL	64
3240EB	Yellow Fever Creeks	Impaired	3F	Nutrients (Total Phosphorus)	AGM ≤ 0.12 mg/L	64
3240E1	Hancock Creek	Impaired	3M	Enterococci	≤ 130 Counts / 100 mL	64
3240E1	Hancock Creek	Impaired	3M	Copper	≤ 3.7 $\mu\text{g/L}$	64

Table 1. Impairments in Yellow Fever Canals, Yellow Fever Creek, and Hancock Creek as listed in the Statewide Comprehensive Verified List of Impaired Waters.

Map



Evidence of Watershed Approach

Area of Effort

The combined watersheds Hancock Creek, Yellow Fever Creek, and Yellow Fever Canals cover 13.3 square miles. They are located in the central North portion of Lee County, west of US41. A portion of all these watersheds is within the City of Cape Coral (Figure 1). They drain into the Caloosahatchee Estuary Tidal Segment 1.

Key Stakeholders Involved and Their Roles

The projects proposed in this ARP are being executed solely by Lee County within Unincorporated Lee County jurisdictional boundaries. Hancock Creek (3240E1), Yellow Fever Canals (3240EA) and Yellow Fever Creek (3240EB) are mostly in Unincorporated Lee County. A small portion of both watersheds is within the jurisdiction of the City of Cape Coral (Figure 1).

The selected area includes the watershed drainage area to the Caloosahatchee River Tidal Segment 1 which includes the WBIDs:

- Yellow Fever Canals (3240EA)
- Yellow Fever Creek (3240EB)
- Hancock Creek (3240E1)

The impairments in these WBIDs are for Phosphorus, Copper, and Escherichia coli or Enterococci sp. based on the number of exceedances for the sample size. The projects already in place and the objectives outlined by this alternative restoration plan will address these impairments.

The WBID drainage area corresponds to the current and future key projects as follows:

- Hydrological restoration projects: Yellow Fever Creek / Gator Slough Transfer Facility Project.
- Land purchase and conversion to conservation land use: Yellow Fever Creek Preserve; Judd Creek Preserve. More details are available in our website [Conservation 2020 Status Map \(arcgis.com\)](http://www.lee-county.com/Conservation/2020-Status-Map.aspx)
- Septic to sewer conversion: Lee County Utilities (LCU) has finished the Countywide Wastewater Management Plan (CWMP) for septic to sewer conversions in these and other watersheds around the County.
- Street Sweeping. Street cleaning is one of the Best Management Practice (BMP) for preventing pollutants such as nutrients, metals, and organics from entering stormwater systems.
- Keep Lee County Beautiful litter collection. The mission of Keep Lee County Beautiful is to inspire, educate, and engage the Lee County community in improving, beautifying, and protecting our environment. Lee County is a partner with this non-profit organization. We will work with them to organize clean ups in identified hot-spots areas in the watershed.
- Fertilizer Ordinance and Pet Waste Ordinance outreach campaign. New buses with advertisement were added to the routes this year to promote pet waste best management practices. Buses wrapped with new advertisement were added some of the routes this year to promote the summer fertilizer ban from June 1st to September 30th.
- WETPLAN program: WETPLAN (Watershed Education Training - Ponds, Lakes & Neighborhoods) is a partnership of water quality and lake management experts including members from the Lee County Natural Resources, Lee County Hyacinth Control District, the Florida Native Plant Society, Florida Gulf Coast University, and others. WETPLAN will increase outreach efforts to explain the dangers of Copper Sulfates in ponds.
- Water quality monitoring conditions for new developments: New developments inside the Hancock Creek watershed that apply for a new Zoning or Development Order may be asked to monitor for copper as a condition of the approval.

*Point
Sources and
Indirect
Source
Monitoring
(Sites)*

- Walk the WBID exercise: This is a low-cost, effective alternative to help with identification of potential sources of fecal coliform pollution as well as outline measures to address identified sources, to help it meet state water quality standards. Lee County will develop a Walk-the-WBID exercise in 2025 as part of this Alternative Restoration Plan response.
- Clean and Snag Program. One of the goals of this creek maintenance program is to preserve a balance between reducing flood risks and protecting the environment. Creek maintenance generally includes the following operations:
 1. Removing blockages that could prevent water from flowing over banks.
 2. Trimming or removing vegetation within creek banks.
 3. Install measurers to prevent wash outs and protect water quality at the vicinity of creeks.

More details about these projects can be found on the restoration work section of this document and the attachments.

These watersheds are proactively inspected by the NPDES and Pollution Prevention programs for illicit discharges and spills. The entire area is regulated by the Municipal Separate Storm Sewer System (MS4) permit # FLS000035-004. The most recent MS4 annual report is attached to this document - Attachment number 1.

For information regarding additional source control efforts, please refer to the “Countywide Wastewater Management Plan (CWMP)” - Attachment number 2, “North Fort Myers Nutrient and Bacteria Source Identification Study” - Attachment number 3, and the “Microbial Source Tracking in Lee County Waterways” - Attachment number 4.

Information about the source monitoring (sites) can be found at the “Monitoring component” section of this alternative restoration plan.

*Nonpoint
Sources*

The combined sub-watersheds of Hancock Creek, Hancock-Powell Creek Divide, Yellow Fever Creek, and Yellow Fever Creek East Branch cover 13.3 square miles. Overall, the watershed is 50 percent urban land uses, with the greatest urbanization in Hancock-Powell Creek Divide (72 percent) and the least in Yellow Fever Creek (20 percent). Existing conservation land projects in this watershed include Yellow Fever Creek Preserve and Prairie Pines Preserve. There is one hydrological restoration project called “Yellow Fever Creek / Gator Slough Transfer Facility”. Lee County has also expanded outreach efforts in this area to minimize non-point pollution.

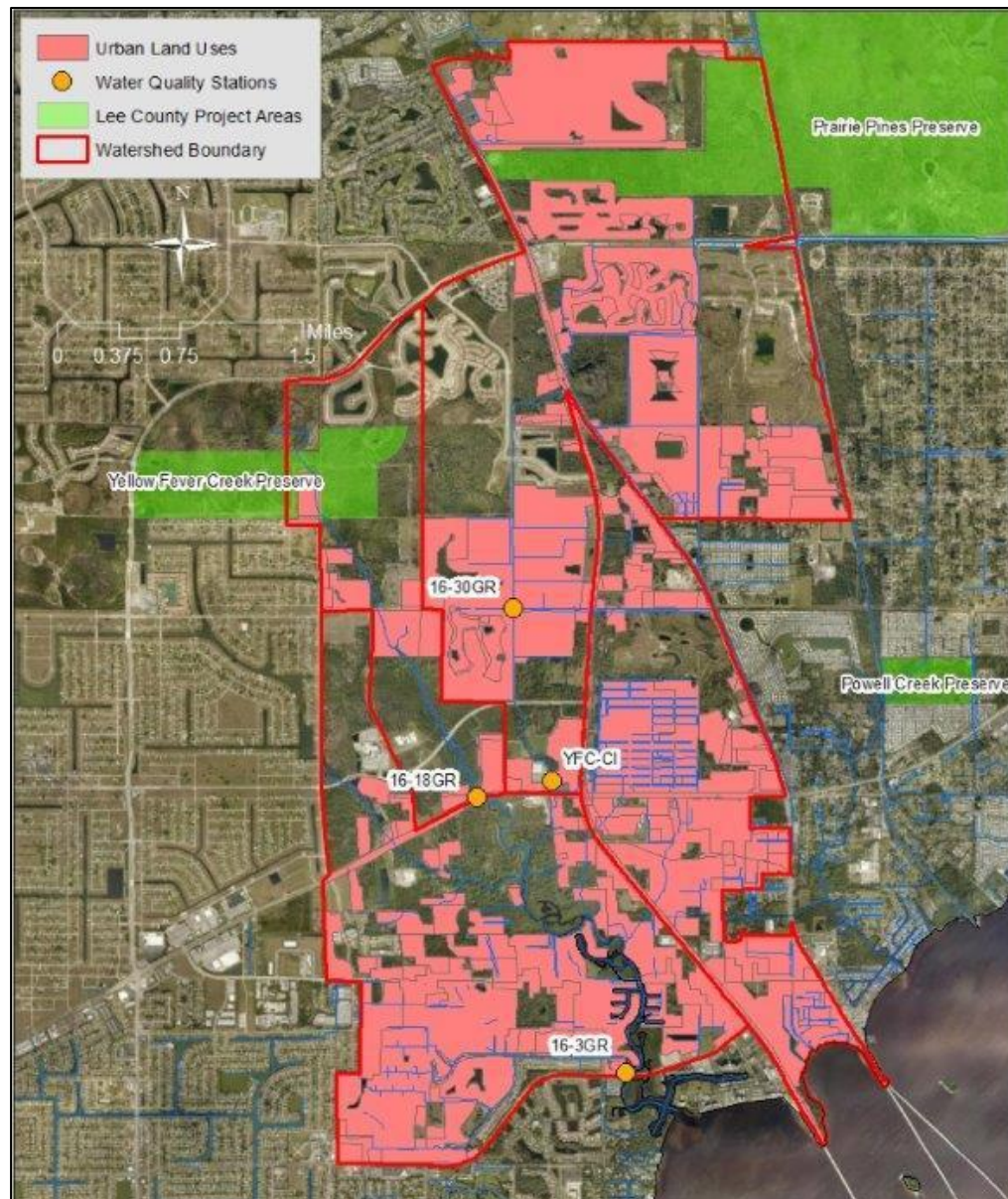


Figure 2: Land uses in Yellow Fever Creek and Hancock Creek watersheds.

Wastewater Facilities in Area: There are no wastewater facilities within these watersheds.

Solid Waste Facilities in area: There are no Solid Waste Facilities within these watersheds.

*Water
Quality
Criteria*

It is expected that the Class III water quality standards derived from the Narrative Nutrient Criteria associated with estuary waterbody types for bacteria (fecal coliforms) and nutrients (nitrogen and phosphorus) will be attained upon implementation of the specified watershed improvement projects.

*Restoration
Work*

Existing and ongoing restoration work in this watershed:

- Hydrological restoration projects: Yellow Fever Creek / Gator Slough Transfer Facility Project; This project was designed to reduce nutrients as part of the Caloosahatchee BMAP. In addition to nutrient removal, there is a bacterial reduction benefit from the creation of wetlands. Wetlands are known to act as excellent biofilters through a complex of physical, chemical, and biological factors which all participate in the reduction of the number of pathogenic bacteria. The construction phase of this project finished in 2022. The created wetlands are being maintained by the Lee County Department of Natural Resources. Three times a year exotic and invasive species are removed from the wetlands.
- Pet waste ordinance 14-22: The owner of every animal shall be responsible for the removal of any excreta deposited by the animal on public walks, recreation areas, private property, or any other place where such excreta deposits may create a nuisance injurious to the public health. This Pet Waste Ordinance was adopted in 2014. During 2022, the department of Natural Resources sent 2,829 post cards to residential addresses in the zip code 33903.
- Clean and Snag Program: Trash and litter contribute to bacteria impairments by transporting waste and impeding flow. These changes in flow create shaded, stagnant pockets of water and increase surface areas. Each of these factors promotes bacteria proliferation. This program removes excess aquatic vegetation and takes out any debris in the canal that may impede water flow. Through the process of removing snags and debris this program also reduces areas conducive to bacteria breeding grounds that could impact water quality.
 - Budget \$280,000/year
 - The average annual miles cleaned change every year based on project requirements and available access.
- Street Sweeping: Several streets within the selected watersheds are cleaned by the Lee County Department of Transportation sweeping program on a 2 to 3 month schedule (Figure 3). In 2023, about 175 miles of County roads are considered hurricane related sweeping. There are 12.5 miles of sweeping in these 3 watersheds. The average price for this area in normal conditions is \$2,250. The annual final price is influenced by traffic and spills response.

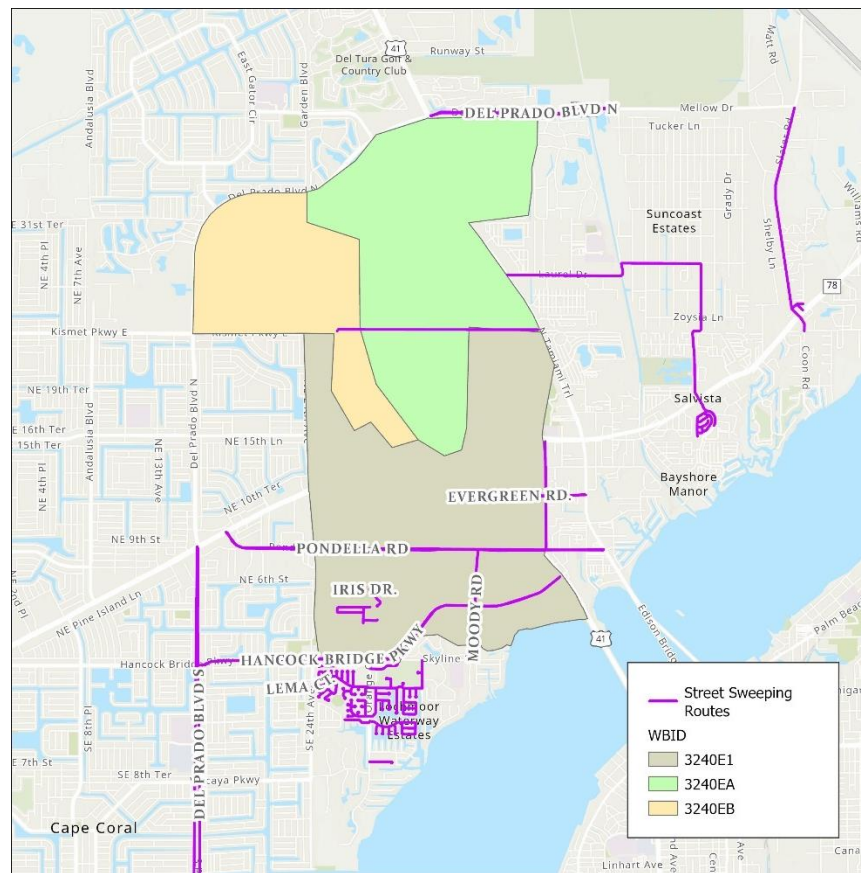


Figure 3: Street Sweeping in the Yellow Fever Creek and Hancock Creek watersheds.

- Website: <https://Fertilizesmart.com/pet-waste-info.html>.
- Fertilizer Ordinance and Pet waste Ordinance outreach campaigns. Flyers and other educational materials are distributed by the NPDES inspectors. In 2022, the inspectors distributed 645 storm water educational handouts, 6,265 dog waste bags, and 2,580 Fertilizer Smart educational handouts. More information can be found in the most recent MS4 annual report (Attachment #1).
- Master Wastewater Treatment Feasibility Analysis: Study to support the development of a Countywide Wastewater Management Plan (CWMP) (Attachment #2).
- Other outreach efforts: Lee County's Water Initiative website at leegov.com/water
- Land purchase: Lee County has preserved 361 acres of Conservation Lands in these watersheds. These acres are shared between two properties: Yellow Fever Creek Preserve (339 acres) and Judd Creek Preserve (22 acres). Please see the County's story map for more information:

- Microbial Source Tracking in Lee County Waterways: Watershed study to investigate interactions between OSTDS and surface water in the Caloosahatchee Estuary (Attachment #4).

Planned restoration work in this watershed:

- Septic to sewer conversions: Yellow Fever Creek is in “Grouping 8A and 8B” for the recommended septic conversion areas in the Countywide Wastewater Management Plan (CWMP). Four hundred twenty-six septic tanks will be transferred to a sewer system. (Attachment 2). The proposed current deadline for the completion of Tier 2 is 2040.

Priority Tiers	Priority Grouping No.	WWTP Area/ Service Area	Area Name	FDOH Septic Count	TN Loading to Groundwater: Residential Septic Systems (lbs/yr)	Resident Impact (Cost for Construction Per Parcel in Millions)	Utility Impact (in Millions)	Total Impact (in Millions)
2	8A	FGUA - Del Prado WWT P	Aqua Cove	12	128	\$0.76	\$0.070	\$0.83
			Blue Water Shores	46	491	\$2.72	\$0.420	\$3.14
			Edgewater Gardens	157	917	\$6.89	\$1.085	\$7.98
			Hancock Estates	7	75	\$4.81	\$0.070	\$4.88
			Wards Landing	22	235	\$5.22	\$0.175	\$5.40
2	8B		Gulf Acres	102	853	\$2.07	\$0.805	\$2.88
			Over River Shores	80	1088	\$8.32	\$0.595	\$8.92

Table 2. Details of the Countywide Wastewater Management Plan,

- Fertilizer Ordinance and Pet waste Ordinance outreach campaigns: Enhanced efforts that will target the Yellow Fever Creek and Hancock Creek tributaries in

this ARP. Pet waste outreach campaign advertisement will be displayed on LeeTran buses with routes in the targeted areas. The fixed route “140 - Merchants Crossing/Bell Tower” was chosen because it borders the East side of the Hancock Creek watershed. The design can be seen in Figure 4.

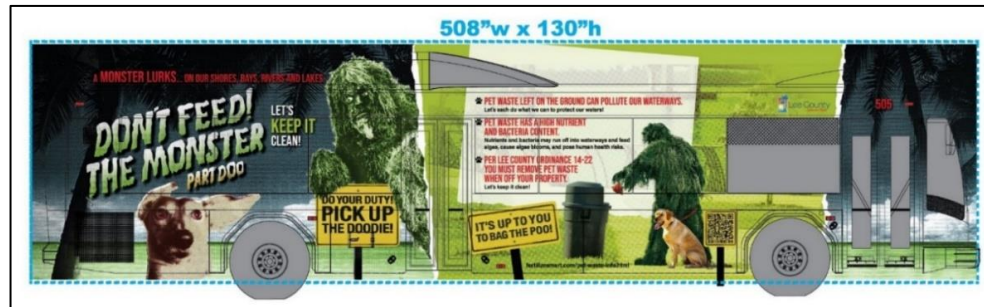


Figure 4. Proposed bus design.

Two paratransit buses will also display pet waste advertisement on their tails as shown in Figure 5.



Figure 5. Proposed design to be displayed on the tails of the paratransits.

- Keep Lee County Beautiful (KLCB) partnership to clean the watershed –Trash and litter contribute to bacteria impairments by transporting waste and impeding flow. These changes in flow create shaded, stagnant pockets of water and increase surface areas. Each of these factors promotes bacteria proliferation. Targeting these watersheds when needed will potentially reduce the bacterial concentration numbers.
- Walk-the-WBID: Lee County Natural Resources will organize a walk-the-WBID with stakeholders and interested parties to evaluate the success of the program and to identify point source pollution problems in the selected

watersheds in 2025. Potential sources or other issues identified while in the field will be reported to the proper jurisdiction and cataloged while in the field. A record will be kept of major findings, including observations about the waterbody, potential sources, follow-up items and the responsible entity, and any areas that should be added to the monitoring plan or that required additional investigation.

- WETPLAN program: WETPLAN (Watershed Education Training - Ponds, Lakes & Neighborhoods) is an education program and resource for anyone interested in improving and caring for their neighborhood lakes and ponds. Short videos to explain to homeowners the risks of the use of copper sulfate in ponds will be post in WETPLAN's YouTube channel, social media, and at www.wetplan.org.
- New Developments: Developments within unincorporated Lee County must demonstrate compliance with Lee Plan policies 125.1.2 and 125.1.4. These policies maintain that development must not degrade surface and ground water quality and that developments which have the potential of lowering existing water quality below State and Federal water quality standards will provide standardized appropriate monitoring data. To demonstrate compliance with these policies, new development applications within the Hancock Creek watershed may be required to monitor for copper as a condition of approval.

Critical Milestones/Monitoring

*Anticipated
Critical
Milestone(s) and
Completion
Dates:*

- Septic to sewer conversion: The CWMP has been submitted and approved by DEP. The implementation order and exact schedule for the recommended improvements identified in the CWMP have not been approved by the Lee County Commissioners. The deadline for the implementation of all the phases in the CWMP is 2040. The order of implementation for each area depends on budgets and funding.
- Public transportation advertisement: The new ads were launched in April of 2023.
- KLCB will organize clean ups in these watersheds as needed starting in 2024.

Monitoring
Component

Lee County conducts monthly sampling at four water quality monitoring stations in the combined watershed. They are Hancock Creek at Hancock Boulevard (16-3GR), Yellow Fever Creek at State Road 78 (16-18GR), Yellow Fever Creek East Branch at Merchants Crossing (YFC-CI) and Yellow Fever Creek at Littleton Road (16-30GR). Stations 16-3GR and 16-18GR have data from 1992 to present. Station YFC-CI has data from 1997 to present, and station 16-30GR has data from 2013 to present. The grab samples taken at these sites is sufficient for the hot spot analysis, and no additional data collection is recommended at this time.

<u>Analysis</u>	<u>Parameters</u>	<u>Units</u>	<u>MDL</u>	<u>Method</u>
\$CHLOROA_ Chlorophyll a - corrected for Pheophytin	Chlorophyll a, corrected	mg/M3	0.5	SM21 10200 H
\$CHLOROA Pheophytin	Pheophytin	mg/M3	0.5	SM21 10200 H
%DOSAT	Dissolved Oxygen, % Saturation	%	0.1	FDEP FT1500
AL-ICPMS	Aluminum	µg/L	5	EPA 200.8
AS-ICPMS	Arsenic	µg/L	0.5	EPA 200.8
BA-ICPMS	Barium	µg/L	0.5	EPA 200.8
BE-ICPMS	Beryllium	µg/L	0.25	EPA 200.8
BOD	Biological Oxygen Demand	mg/L	0.3	SM 5210 B
CA-ICP	Calcium	mg/L	0.25	EPA 200.7
CD-ICPMS	Cadmium	µg/L	0.3	EPA 200.8
CL_P	Chloride	mg/L	1.6	SM 4500-Cl ⁻ D
COLOR	True Color	CU	1.25	SM21 2120 C
CONDF	Conductivity by field instrument	µmhos/cm		FDEP FT1200
CR-ICPMS	Chromium	µg/L	0.5	EPA 200.8
CU-ICPMS	Copper	µg/L	0.5	EPA 200.8
DOFIELD	Dissolved Oxygen, mg/L	mg/L	0.1	FDEP FT1500
FE-ICP	Iron	mg/L	0.005	EPA 200.7
MG-ICP	Magnesium	mg/L	0.25	EPA 200.7
E. coli	Escherichia Coli	MPN/100mL		SM9223B
MN-ICPMS	Manganese	µg/L	0.5	EPA 200.8
MO-ICPMS	Molybdenum	µg/L	0.5	EPA 200.8
NH3	Ammonia	mg/L as N	0.014	EPA 350.1
NI-ICPMS	Nickel	µg/L	0.75	EPA 200.8

NO2	Nitrite, as N	mg/L as N	0.003	EPA 353.2
NO3	Nitrate, as N	mg/L as N	0.01	EPA 353.2
NOX	Nitrite + Nitrate	mg/L as N	0.01	EPA 353.2
ONIT	Organic Nitrogen	mg/L as N	0.05	TKN - NH3
O-PO4	Ortho-phosphorus	mg/L as P	0.004	EPA 365.1
PB-ICPMS	Lead	µg/L	0.5	EPA 200.8
PHF	pH by field instrument	units	0.1	FDEP FT1100
SB-ICPMS	Antimony	µg/L	1	EPA 200.8
SE-ICPMS	Selenium	µg/L	0.5	EPA 200.8
SILICA	Silica	mg/L as SiO2	0.1	SM4500-SiO2 C
TEMPF	Temperature by field instrument	°C	0.1	FDEP FT1400
THARDC	Total Hardness by calculation	mg/L as CaCO3		SM 2340 B
TKN	Total Kjeldahl Nitrogen	mg/L as N	0.1	EPA 351.2
TL-ICPMS	Thallium	µg/L	0.3	EPA 200.8
TN	Total Nitrogen	mg/L as N	0.05	TKN + NOX
T-PO4	Total Phosphorus	mg/L as P	0.006	EPA 365.1
TSS	Total Suspended Solids	mg/L		SM 2540 D
TURB	Turbidity	NTU	0.2	EPA 180.1
V-ICPMS	Vanadium	µg/L	1	EPA 200.8
ZN-ICPMS	Zinc	µg/L	1	EPA 200.8

Table 3. Analysis performed in each sampling site in the selected watersheds.

Other Key Dates

Estimated Date for Delisting from Verified List or Removal from Study List

WBIDs 3240EA, 3240EB, and 3240E1 (Yellow Fever Creek Canals, Yellow Fever Creek, and Hancock Creek) are in the State's Group 3 Caloosahatchee River basin. The most recent review and assessment cycle was completed in 2022. The impairments described in these Alternative Restoration Plan are Escherichia coli, Enterococci, nutrients (total phosphorus) and copper. The earliest opportunity for delisting would happen during the upcoming biennial assessment (2024), although this is prior to the implementation of the projects described in this report. Once all the proposed projects are implemented, an improvement in water quality within this watershed is expected. If determined that the parameters in question are no longer impaired, DEP may request these WBIDs to be delisted from the federal 303(d) list (if applicable).

Financial Commitments

Estimated
Implementation
Cost

- The total project cost of the Yellow Fever Creek - Gator Slough Transfer Facility, was \$992,000.00. The estimated 20-year operation and maintenance cost is \$180,000 approximately.
- The total project cost of the Septic to Sewer conversions based on the CWMP for this watershed is estimated to be \$43,240,000.
- Last fiscal year (October 2021 to October 2022), street sweeping had a countywide annual budget of \$196,553.30.
- Educational outreach \$270,000.00 (County Wide budget).
- Clean and snag program has a countywide annual budget of \$280,000.00.

Land Acquisition
(if applicable)

Funding Source: Lee County BOCC – Conservation Lands “20/20 Program”.

Total.....\$4,808,506

Design and
Construction
(if applicable)

Funding Source:

Total.....\$_____

References:

- MS4 annual report (permit # FLS000035-004) - Attachment number 1.
- Countywide Wastewater Management Plan (CWMP) - Attachment number 2.
- Microbial Source Tracking in Lee County Waterways - Attachment number 3.
- North Fort Myers Nutrient and Bacteria Source Identification Study - Attachment number 4.
- North Fort Myers Surface Water Management Plan - Attachment number 5.

Submitted by: The Lee County Department of Natural Resources to Florida Department of Environmental Protection Division of Environmental Assessment and Restoration – Watershed Assessment Section

DATE