



Cedar Creek Bacteria Pollution Control Plan

**City of Dunedin
2015**

DUN^{WAVES}DIN
Home of Honeymoon Island

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Introduction

Background

The Florida Department of Environmental Protection (FDEP) listed Cedar Creek on the 303 (d) list of impaired waterbodies for a fecal coliform Total Maximum Daily Load (TMDL). Cedar Creek Freshwater (WBID 1556A) was included on the verified listed in 2009, and Cedar Creek Tidal (WBID 1556) was included in 2012. The adopted TMDL requires a fecal coliform load reduction of 88% for Cedar Creek Tidal and 87% for Cedar Creek Freshwater.

The City of Dunedin maintains 100% jurisdiction over the tidal portion of Cedar Creek, and 98% jurisdiction over the freshwater portion of Cedar Creek. In 2013, the City of Dunedin prioritized Cedar Creek due to its jurisdictional coverage.

Description of Cedar Creek

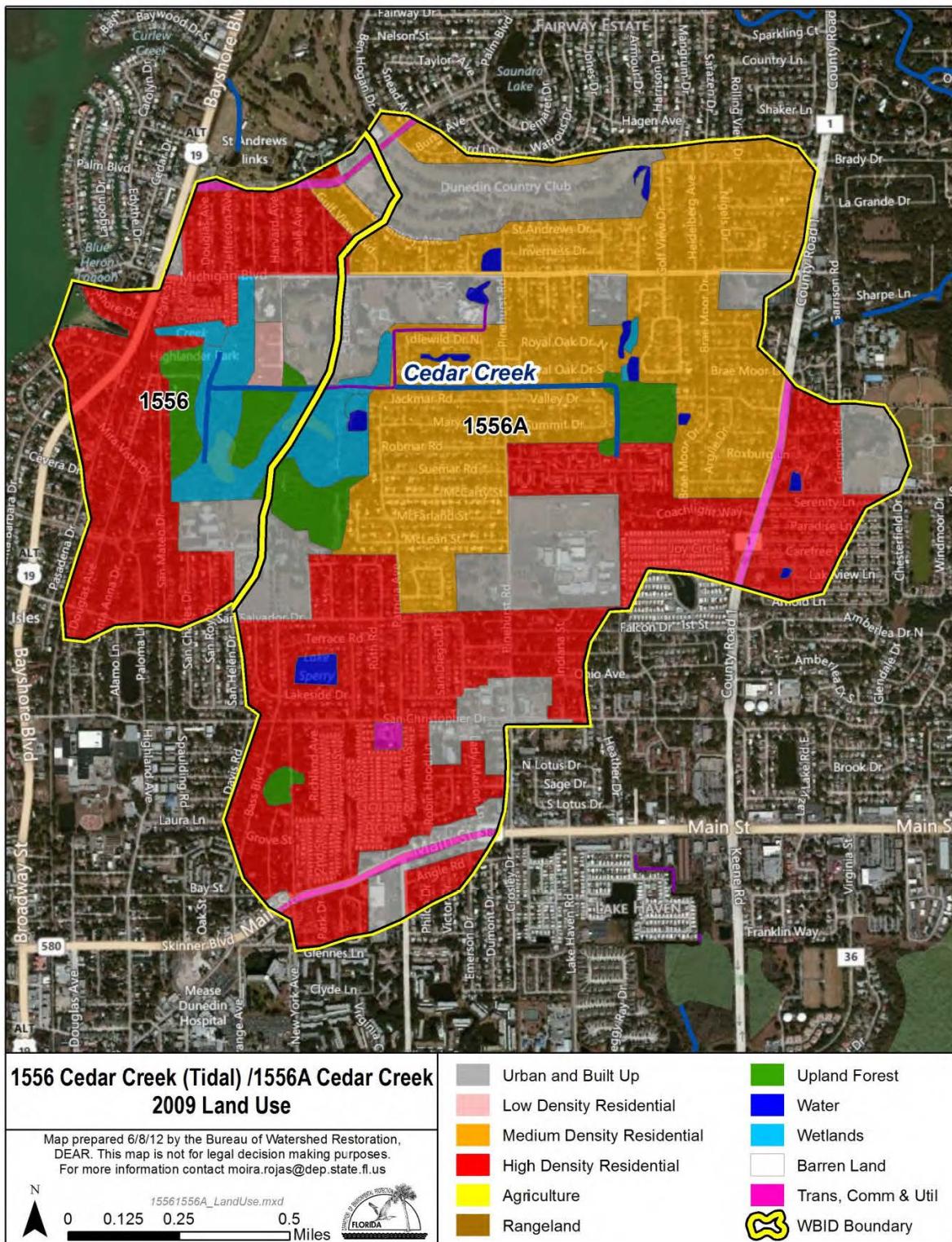
The Cedar Creek watershed is a 1,393 acre drainage basin located in northwest Pinellas County and within the Springs Coast Basin (Figure 1). Cedar Creek is divided into a tidal segment (WBID 1556) and a freshwater segment (WBID 1556A). Cedar Creek Tidal comprises approximately 319 acres of the watershed, and Cedar Creek Freshwater comprises the remaining 1,074 acres of the watershed. The basin is located solely within the City of Dunedin and land uses are predominately residential with areas of commercial, institutional, and recreational open space.

The Watershed contains nine major stormwater conveyance systems, and one outfall to St. Joseph Sound. The nine major conveyance systems are identified as Channels A, B, C, D, E, F, G, H, and J. Cedar Creek flows from east to west, discharging into St. Joseph Sound from Channel A.

Bacteria Pollution Control Plan

The City of Dunedin's Bacteria Pollution Control Plan (BPCP) for Cedar Creek is intended to provide a 5 year implementation plan as to how the City will address the corresponding fecal coliform TMDL. The BPCP will create a phased approach for the City of Dunedin to follow with action plans and long term goals to aid in meeting the fecal coliform TMDL within Cedar Creek.

Figure 1



Data Collection and Evaluation

Water Quality Monitoring

The City of Dunedin began in 2013 with the implementation of monthly surface water quality monitoring in Cedar Creek. The water quality monitoring carried out by the City is intended to augment water quality monitoring data provided by Pinellas County and the FDEP. The data collected from Pinellas County, the FDEP, and the City of Dunedin will be utilized to track long term fecal coliform counts within Cedar Creek.

The City of Dunedin utilizes a contractor for collection and analysis of the surface water quality monitoring data. Samples are collected twelve times per year and analyzed for a suite of parameters including fecal coliform at seven locations (Figure 2) along Cedar Creek. Pinellas County collects samples within Cedar Creek once per year at one location, sample site 09-03 (Figure 3). The FDEP will periodically collect samples from thirteen sites (Figure 4) within Cedar Creek to test for parameters such as fecal coliform and DNA markers.

Figure 2

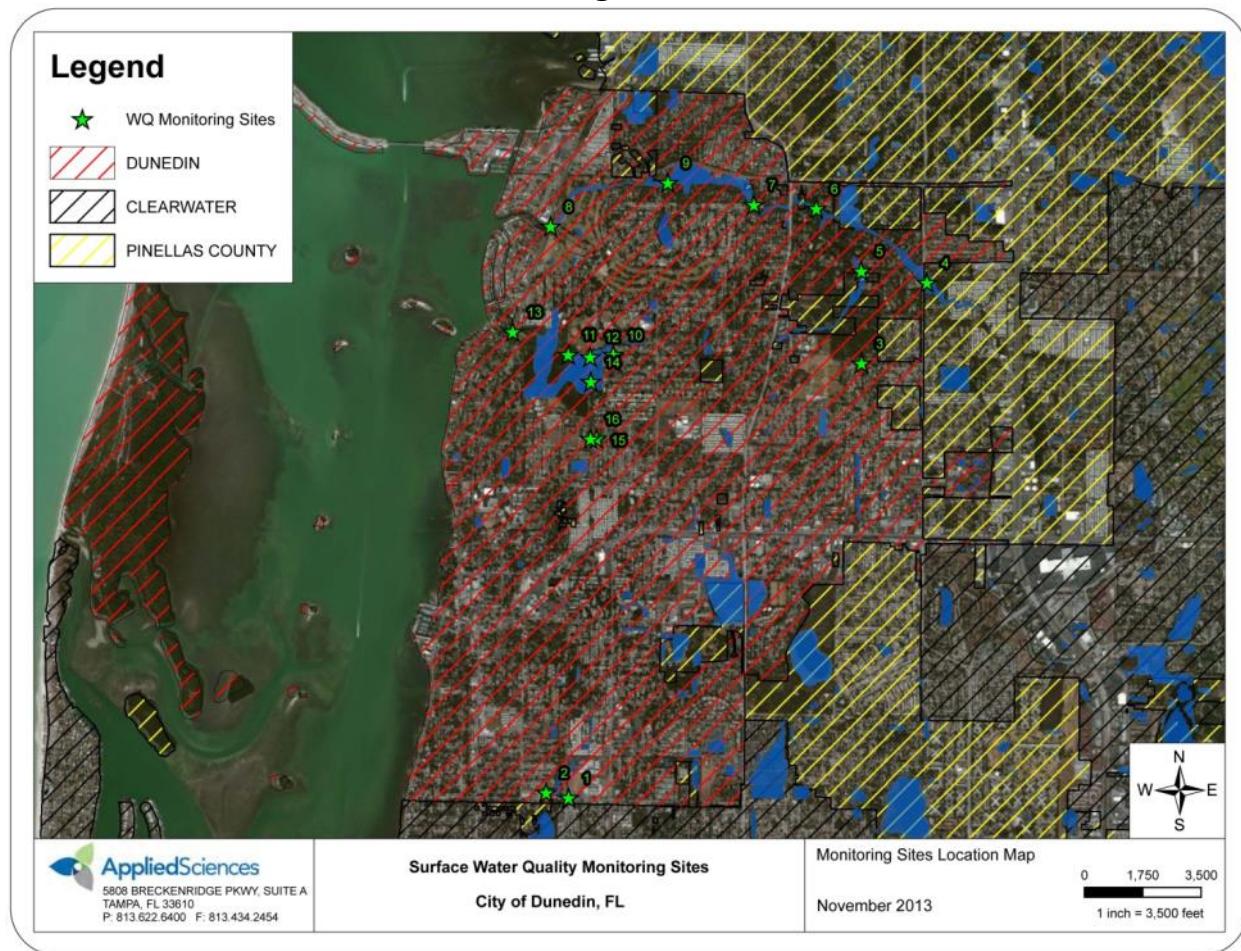


Figure 3

Pinellas County Ambient Water Quality Fixed Sites

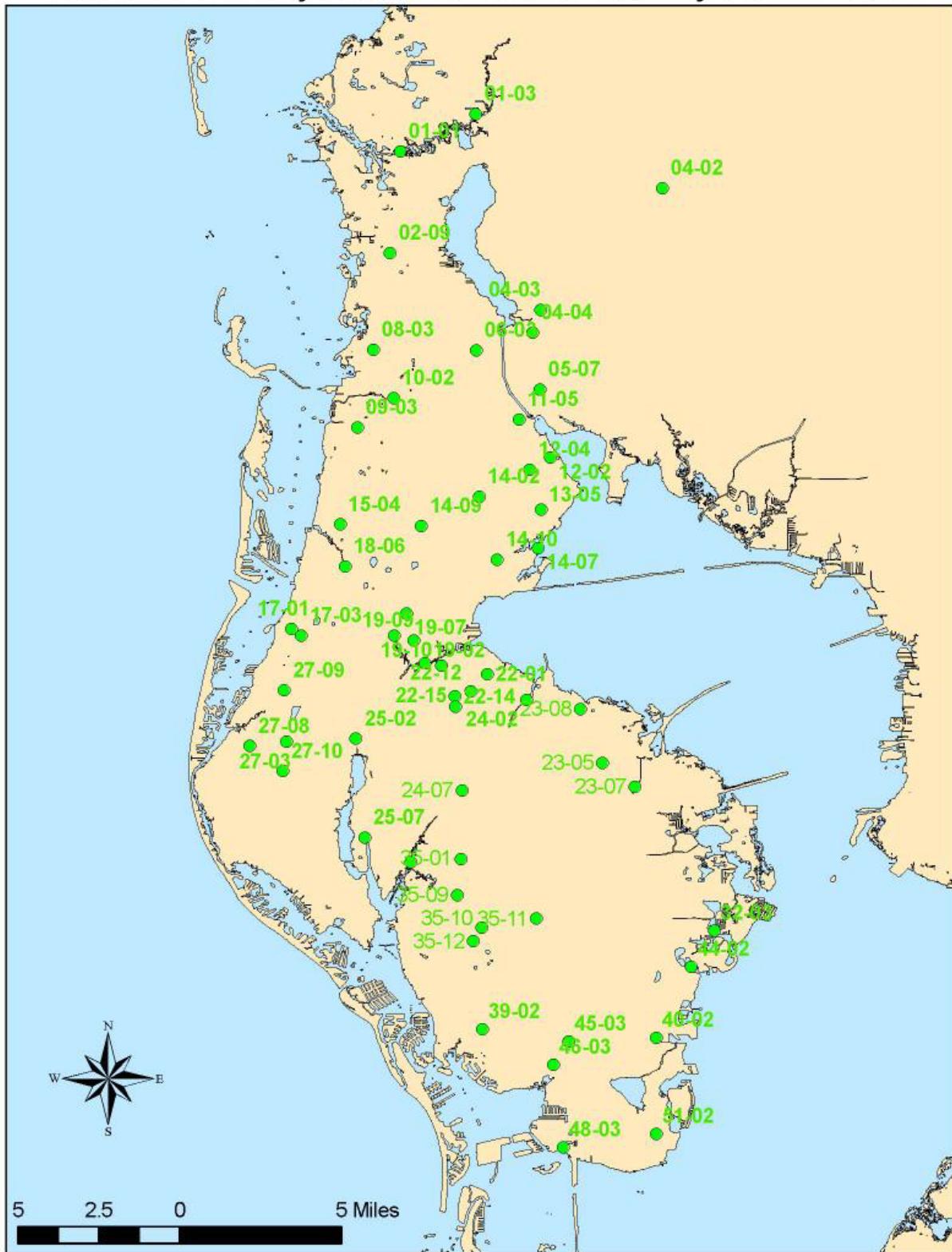


Figure 4



Walk the WBID

In February of 2013, the City of Dunedin along with the Pinellas County Department of Health, the FDEP, and the Pinellas County School Board participated in the Walk the WBID exercise. The Walk the WBID process was utilized to gain a better understanding of conditions within the watershed, including the hydrology of the creek and its contributing ditches and channels, flood-prone areas, the locations of sewer and stormwater infrastructure, and other potential sources of fecal coliform bacteria.

Fecal coliform contributors were identified during the Walk the WBID exercise including but not limited to: wildlife, pet waste, proximity of sanitary sewer structures, illicit discharges, citrus trees, and reclaimed water utilization. The major wildlife contributors of fecal coliform to Cedar Creek are waterfowl, coyotes, raccoons, squirrels, and other animals found within a forested park setting.

Since the Walk the WBID exercise in 2013, measures have been taken to reduce fecal coliform within Cedar Creek by addressing the source problems. Pet waste stations have been added in various places in Hammock Park along Cedar Creek. Smoke testing has taken place to identify any sources of sanitary sewer overflows (SSOs). Storm drain markers that include City of Dunedin ordinance language designating what is an illicit discharge have been added to catch basins. The City of Dunedin Parks Department is utilizing a contractor to remove the wild citrus trees found within Hammock Park, beginning with the trees located closest to Cedar Creek.

Reclaimed Water

The City of Dunedin provides reclaimed water to residential and commercial properties found within the Cedar Creek watershed. Due to the use of reclaimed water, sucralose detection was anticipated in surface water samples and was believed to not be a reliable indicator of untreated sewage. The presence of acetaminophen would indicate untreated sewage, and point to SSOs as a potential source of fecal coliform to the creek.

A sampling event carried out by the FDEP on July 7, 2014 at five locations within the Cedar Creek Watershed tested for sucralose and acetaminophen. The data results (Table 1) indicate that non-detects (U) on Acetaminophen support the theory that bacteria is most likely not coming from raw sewage. The sucralose levels suggest reclaimed water is making its way to the stormwater system and Cedar Creek.

Table 1

FDEP Field ID	Site Name	Fecal Coliform	Sucralose	Acetaminophen
41153	Site #4	590	0.28	U
41154	Site #4- sediment	153	0.21	U
41159	Site #2	570	0.30	U
41160	Site #2- sediment	162	0.20	U
41156	Site #5	220	0.11	U
41157	Site #5- sediment	1000	0.090	U
41165	Site#1	530	0.068	U
41166	Site #1- sediment	5500	0.077	U
41162	Site #3	180	0.79	U
41163	Site #3- sediment	1260	0.68	U
41164	Site #3- vegetation	711	0.57	U

Action Plan

E. Coli analysis, which has been recommended by the FDEP as the new standard for bacteria analysis in freshwater, will be added to the City of Dunedin surface water quality monitoring program beginning in 2016. Enterococci analysis, which is recommended for bacteria analysis in saltwater, will be added for analysis beginning in 2016. The City of Dunedin will also be looking to utilize DNA source tracking in the upcoming years.

Data collected over time on fecal coliform, E. Coli, Enterococci, and DNA sourcing will be utilized to provide a bacterial analysis of Cedar Creek. This will aid in the determination of potential pollutant sources and provide an overall understanding of the Cedar Creek system.

Moving forward, bacteria data collection and analysis by the City of Dunedin, Pinellas County, and the FDEP will aid in the planning process for stormwater improvement projects, public education and outreach, and maintenance activities.

Planning

Policy

The City of Dunedin Ordinance Number 10-20, § 1 Section 78-453 addresses illicit discharges to surface waters and the City stormwater system. The ordinance states that it shall be unlawful and considered an illicit discharge if any material entering the MS4 is not composed entirely of stormwater (Appendix I).

One intention of the illicit discharge ordinance is to eliminate potential sources of fecal coliform to City of Dunedin waterbodies. By eliminating pet waste, lawn clippings, and other sources of fecal coliform found within illicit discharges, these actions should aid in the reduction of fecal coliform bacteria.

The Comprehensive Plan

The City of Dunedin's Comprehensive Plan encompasses thirteen elements such as Stormwater, Solid Waste, Wastewater, Potable Water, and Conservation and Coastal Management to name a few. For each element, the plan sets qualitative goals, measurable targets, and level of service standards. Thereby, including report cards by which the City can grade its future performance. The goal for the Stormwater element is that "adequate drainage facilities shall be provided to ensure flood protection and to protect water quality".

By focusing on both flood protection and the protection of water quality with all planning efforts, the City of Dunedin is working towards the reduction of fecal coliform bacteria found in its waterbodies. Areas that continually flood have a greater risk for SSOs, septic tank failures, and other sources of fecal coliform washing into nearby waterbodies. By encompassing water quality into future planned facilities, these structures help to actively reduce fecal coliform loads.

New Development Standards

The City of Dunedin is reviewing a Sustainability Matrix that will require Low Impact Development and sustainable design elements to be included in new development and significant redevelopment projects on private and public sites. The Sustainability Matrix will aid in the reduction of pollutant loads from development by incorporating measures to reduce stormwater flows offsite, and to develop a site in an environmentally friendly manner.

The City of Dunedin is also reviewing a new floodplain management ordinance. The new ordinance will require improved V-Zone construction standards and additional freeboard. These standards may help to reduce fecal coliform loads by protecting nearby waterbodies from the hazards of flooded structures and facilities.

Action Plan

The City of Dunedin utilizes a Master Drainage Plan (Plan), created in 2003, to plan its Capital Improvement Projects (CIPs). The CIP outlook has allowed for financial planning, proper adjustment of the stormwater utility, and the receipt of grant funds. In the past, the Plan has created a checklist of improvements to address flooding and water quality. With the 2003 Master Drainage Plan, the City of Dunedin was able to address the majority of the flooding issues.

In 2017, the City of Dunedin will be contracting a new Master Drainage Plan. Moving forward with the new Plan, the City of Dunedin will be focusing on water quality improvement projects and quality of life improvement projects. The new Plan will create the checklist for CIP planning over the next ten years.

Education

Education is an integral piece of the puzzle in the reduction of fecal coliform within Cedar Creek. Through both internal training and public education, the City of Dunedin strives to reduce bacteria loads into its waterbodies.

Public education is important to water quality by expanding the public's understanding of the challenges faced with environmental protection and how proper behavior can enhance the health of nearby waterbodies. Many of the identified sources of bacteria can be reduced or eliminated with proper public behavior. Both pet waste and illicit discharges are a direct result of human actions. By actively reaching out to the public, it is the hope to provide the public with positive ways to help their community.

Internal Training

The first step of public outreach is to ensure that employees who may deal with illicit discharges have received the proper education. All employees of the Stormwater and Streets Divisions receive yearly training concerning illicit discharges. All City employees who are FDEP Stormwater, Erosion, and Sedimentation Control Inspectors receive refresher training annually.

Public Markings

The City of Dunedin has installed 24 pet waste stations throughout City parks. The station includes information about the importance of picking up after your pet, and includes bags as well as a location for disposal. The pet waste stations have been strategically placed in locations along the trails that neighbor Cedar Creek in hopes of reducing fecal coliform bacteria.

The Stormwater Division currently places storm drain markers on all catch basins that do not have an existing marker. The information that is included on the marker states to allow only rain to enter the storm drain as well as the corresponding City ordinance.

In the past, a Boy Scout troop volunteered to place storm drain markers and pass out door hangers to neighborhood homes. The brochures included information on picking up after your pet, allowing only rain to enter the storm drains, and how to properly dispose of lawn clippings.

Educational Outreach

City of Dunedin Staff participates in various events hosted in the City to provide educational information to the public. Staff has a threefold approach for spreading knowledge to the public during events. Brochures passed out detail the importance of picking up after your pet, proper

lawn maintenance techniques such as fertilizer application, illicit discharge information, and other details pertaining to ways to protect the environment. A Scoop-the-Poop pledge is available for the public to sign that states the individual will always pick up after their pet to aid in the reduction of bacteria making its way into waterbodies. A giveaway such as a pet waste bag dispenser is utilized as an incentive to sign the pledge.

City of Dunedin Staff also participates in school presentations throughout the City. These presentations are geared towards the respective age group and may include reading a children's book, hands on science based activities, or games. All the activities, books, and games have a central theme of only allowing rain to enter a storm drain and how everyday actions can prevent the spread of bacteria in the environment.

Social Media

A pet waste Public Service Announcement (PSA) was created in 2013 as a joint venture between the City of Dunedin and an Eagle Scout working on his Service Project. The PSA highlighted the importance of picking up after your pet, including the spread of fecal coliform bacteria to waterbodies. The video was featured on Dunedin TV, YouTube, and through various other social media outlets such as Facebook.

Social media has also been utilized to advertise when City of Dunedin employees will be at public education events. Information is included in the social media posts about the Scoop the Poop Pledge, and giveaways such as pet waste bag dispensers.

Action Plan

The City of Dunedin will continue with its educational outreach throughout the community in years to come. The importance of educating the public has a twofold impact. It alters everyday actions that can reduce fecal coliform loads, and also helps to keep the public informed about water quality improvement projects and why they're place. Information passed out to the public may alter with time depending on the long term results of bacteria tracking.

An Adopt-A-Road program was in place within the City in years past, but has become inactive. Utilizing citizen volunteers for clean-up efforts throughout the community helps with public outreach, as well as reducing debris that may reach waterbodies. The City of Dunedin is looking to reimplement the Adopt-A-Road program in the near future.

Maintenance

Maintenance activities are largely dictated by routine maintenance needs, discoveries found during proactive inspections, emergency repairs, and CIPs. Proactive maintenance is a large factor in the workload for multiple City departments, and these everyday actions aid in the reduction of fecal coliform loads into waterbodies.

Litter and Debris Removal

The City of Dunedin street sweeping program maintains residential roadways at least four times per year and FDOT roadways weekly. Downtown roadways are swept weekly, and an emphasis is placed on heavy leaf collection areas during the spring. Active street sweeping aids bacterial loads by reducing fecal coliform sources from entering into waterbodies.

The Solid Waste Department has put in place a once-a-week yard debris collection service. All yard waste collected from residential properties may be placed curbside for collection to allow for proper disposal and the reduction of bacteria entering into waterbodies.

Twelve CDS units have been installed throughout the City of Dunedin. The units collect debris and sediments, and help to separate out the solids from stormwater. These CDS units are maintained on a quarterly basis.

The Stormwater Division operates a vactor truck to clean both the CDS units as well as the catch basins found throughout the City. The maintenance goal is to clean all catch basins of the City annually.

Citrus

Bacteria associated with citrus are often falsely identified as fecal coliform, and its presence could impact water quality monitoring results. Because of this, the City of Dunedin Parks Department is utilizing a contractor to remove the wild citrus trees found within Hammock Park, beginning with the trees located closest to Cedar Creek.

Surface Waterbody Maintenance

The City of Dunedin inspects and maintains its surface waterbodies annually. Based on need, certain waterbodies are cleared of excess sediment, and regraded for proper capacity and function.

Action Plan

Although many maintenance activities are complaint driven and reactive in nature, the City of Dunedin would like to achieve a level of service in which the majority of activities are scheduled maintenance with minimal reactive or unforeseen emergency repairs. The benefits of reducing emergency repairs include increased safety for citizens and employees, a reduction in bacteria entering the system, and long-term cost savings.

Various proactive measures are in place to help reduce the amount of emergency repairs needed. These proactive measures include pipelining, gabion basket repairs, and large scale scheduled maintenance work. All of these planned projects are being carried out in anticipation of reducing bacteria loads within Cedar Creek as well as reducing the number of emergency repairs that may be needed.

The City of Dunedin has an active stormwater pipe lining contract in place. This work will continue through 2020, at which time most of the stormwater pipes within the City will have been lined.

Many of the channels of Cedar Creek are hard armored with gabion baskets. A CIP project for ongoing gabion basket repair and replacement is planned to begin in 2017.

Channel A of Cedar Creek currently has various measures in place to protect against erosion such as hard armoring with rip rap and vegetative cover. An Alternatives Analysis is currently planned to evaluate what may be the best long term cohesive solution for this area.

The Lake Suemar Environmental Enhancement Project was a designed flood protection and water quality project built in 2010. The project created treatment wetlands and installed two sediment sumps in an already existing waterbody at the confluence of Channel A and Channel C of Cedar Creek. The maintenance work will involve cleaning of the two sediment sumps and regrading of the area around the two sumps.

Inspection

Inspection activities are largely driven by routine maintenance work performed throughout the City of Dunedin. Occasionally, inspections are complaint driven or post-incident related. If so, they are typically handled in an assessment type fashion of whether to repair/clean the area, or if an adjustment to the routine maintenance schedule is needed. At times, an enforcement measure may be required.

Stormwater Inspections

Functions performed by the City of Dunedin Stormwater Division include street sweeping, vactor truck operations for CDS unit cleanings and catch basin cleanings, ditch mowing, and pond maintenance. Each of the routine activities results in an inspection of the corresponding structure. Inspections also include the utilization of a TV camera for stormwater pipes to confirm proper function and no illicit connections. By performing this routine maintenance and inspections, sources of fecal coliform may be identified and eliminated prior to entering the waterbody.

Sanitary Sewer Inspections

The City of Dunedin Wastewater Department is responsible for the inspection and maintenance of the sanitary sewer system. A proactive inspection measure that began in 2014 is the utilization of smoke testing for all sanitary sewers within the City of Dunedin. This aids in the identification of potential sources of fecal coliform.

Action Plan

The City of Dunedin logs all maintenance and inspection activities through a work order system. This system allows previous maintenance work and inspections to be retrieved, and thus could be utilized in the identification of potential problem areas.

The Stormwater Division vactor truck operations began tracking additional activities while cleaning and inspecting areas in 2015. This collected data includes information about a pipe being lined or unlined, if a catch basin has received an education storm drain marker, known problem areas, and changes that need to be made to the stormwater atlas system. This data, along with work order system data will be used to properly plan maintenance activities, identify problem areas, and aid in the prioritization of CIP projects.

Enforcement

NPDES Enforcement

The City of Dunedin currently has the ability to issue warning letters, notices of violation, and stop work orders in the event a contractor is not following state accepted protocol for environmental protection measures. These serve to help contractors on both public and private projects to be mindful of their actions in relation to illicit discharges and other actions that may be detrimental to nearby waterbodies.

Applicable development projects are also required to procure Environmental Resource Permits (ERPs) from the Southwest Florida Water Management District (SWFWMD) and/or Construction General Permits (CGPs) from the FDEP. All records of these permits must be submitted to City staff. These documents serve as evidence that a contractor has accepted all applicable protocol for environmental protection.

Action Plan

Currently, the City of Dunedin does not have a fine structure in place for illicit discharge enforcement. Stop work orders will suffice in most cases for a contractor to fix an illicit discharge. However, private homeowners do not have any repercussions to actions that may result in an illicit discharge.

An interlocal agreement between the municipalities and the County has been proposed to allow for Pinellas County to assume responsibility for enforcement, thus putting a fine structure in place. Article VI of the County Code addresses stormwater and surface pollution including illicit discharges and connections. Fines of up to \$10,000 per violation, plus cleanup costs can be levied.

Long Term Goals

The City of Dunedin would like to perform an overall analysis of the data collected from bacterial tracking in conjunction with efforts intended to improve water quality. The analysis would compare major stormwater improvement projects, new design and performance standards in place, public education and outreach, maintenance activities, inspection activities, and enforcement actions with bacteria levels found in Cedar Creek.

Data comparing fecal coliform bacteria counts to E. Coli and Enterococci will help to analyze the overall TMDL. Comparing the three bacteria may determine if an outside source of bacteria is entering into the Cedar Creek system, or if the fecal coliform bacteria present is naturally occurring.

These types of analyses will require long-term bacteria tracking as well as long-term tracking of water quality improvement efforts. A comparison of these various efforts with an overall trend in bacteria would help to understand what may be the most effective measures for bacterial reduction in Cedar Creek.

Appendix I

Sec. 78-453. - Definitions and interpretations.

(a) For the purposes of this article, the following interpretations shall apply:

- (1) Words used in the singular shall include the plural and the singular; words used in the present tense shall include the future tense.
- (2) The words "shall" and "will" are mandatory.
- (3) The words "may" and "should" are permissive.
- (4) The phrase "used for" shall include the phrases "arranged for," "designed for," "intended for," "maintained for" and "occupied for."
- (5) Words not defined in this section shall be construed to have the meaning given by the common contemporary dictionary definition.

(b) For the purposes of this article, the following definitions shall apply:

Authorized official means any employee or agent of the city authorized by the city manager to administer or enforce the provisions of this article.

Construction means any alteration of land for the purpose of achieving its development or changed use, including particularly the preparation for, building of, or erection of a structure.

Detention refers to holding the surface water runoff for a short period of time and then releasing it to a watercourse or waterway where it returns to the hydrological cycle.

Developer means any person who acts in his own behalf or as an agent of an owner of property and engages in alteration of land or vegetation.

Development means any action which results in alteration of land.

Discharge means any direct or indirect introduction of any solid, liquid or gaseous matter.

Floodway means the channel of a watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a specified amount.

Illicit discharge means any discharge to the municipal separate storm sewer system that is not composed entirely of stormwater except:

- (1) Discharges pursuant to a NPDES permit; and
- (2) Discharges resulting from the following:
 - a. Flows from firefighting;
 - b. Water line flushing and other contributions from potable water sources;
 - c. Landscape irrigation and lawn watering;
 - d. Irrigation water;
 - e. Diverted stream flows;
 - f. Rising groundwater;
 - g. Direct infiltration to the municipal separate storm sewer system;
 - h. Uncontaminated pumped groundwater;
 - i. Foundation and footing drains;
 - j. Water from crawl space pumps;
 - k. Air conditioning condensation;
 - l. Springs;
 - m. Individual residential car washings;
 - n. Flows from riparian habitats and wetlands; and
 - o. Swimming pools (not including pool filter backwash water).

Municipal separate storm sewer system means the system of conveyances and facilities owned by the city used for collecting, storing, and transporting stormwater but not including any facilities intended to be used in accordance with applicable law for collecting and transporting sanitary or other wastewater.

NPDES means the National Pollutant Discharge Elimination System.

Retention refers to facilities whereby water is held for a considerable length of time for aesthetic, agricultural, consumptive or other purposes. This water is not designed to be discharged to a watercourse or storm sewer system, but may be consumed by plants, evaporation, or infiltration into the ground.

Site of industrial activity means any area or facility used for manufacturing, processing or raw materials storage, as defined under 40 CFR 122.26(b) (14) of regulations of the U.S.

Environmental Protection Agency, as amended.

Storm sewer refers to a pipe (or other conduit) and appurtenances enclosing the path or route of flow of collected surface waters and are manmade structures, usually below ground, to transport runoff or surface water from a given area to an outfall or receiving point.

Stormwater means any water runoff resulting from rainfall.

Watercourse/waterway means the terms are interchangeable and refer to the location of the defined open path or open route of the flow of surface water as established by topography and the force of gravity, regardless of the frequency or quantity of water being conveyed.

(Ord. No. 10-20, § 1, 12-16-2010)

Sec. 78-454. Unlawful discharges.

- (a) It shall be unlawful to discharge the following to any outlet or to the municipal separate storm sewer system within the city, or in any area under the jurisdiction of the city:
 - (1) Any sanitary sewage, industrial waste or other waste materials or a discharge containing any materials in violation of municipal, state or federal administrative agencies, water management district, or other laws, rules, regulations, orders or permits;
 - (2) Any organic or inorganic matter which causes the water quality of the receiving water to fall below the standards as set forth in Florida Administrative Code, Chapter 62-302;
 - (3) Any discharge that is not composed entirely of stormwater; or
 - (4) Any illicit discharge as defined in § 78-453

- (5) In no case shall grass clippings, vegetative material, and/or vegetative debris either intentionally or accidentally, be washed, swept or blown off into stormwater drains, ditches, drainage conveyances, surface waters, or roadways.

Exceptions to the above prohibitions are those set forth in the definition of illicit discharge in [§ 78-453](#).

- (b) No person may maintain, use or establish any direct or indirect connection to the municipal separate storm sewer system that results in any discharge in violation of this article. This prohibition applies to connections made in the past, regardless of whether made under a permit, or other authorization, or whether permissible under laws or practices applicable or prevailing at the time the connection was made.

(Ord. No. 10-20, § 1, 12-16-2010)