# Documentation in Support of Category 4e

## Waterbody/Watershed Identification

| | |
|---|---|
| *Organization* | Florida Department of Environmental Protection |
| *Point of Contact* | Kevin O'Donnell, 2600 Blairstone Rd Tallahassee, FL 32399<br>Kevin.ODonnell@dep.state.fl.us, (850) 245-8469 |
| *Waterbody(s)* | WBID 15101 – Lake Eva |
| *No. Waterbody / Pollutant Combinations* | **Group 3 Cycle 3**<br>WBID 15101 – Nutrients (Chlorophyll-a) and Nutrients (Total Nitrogen) |
| *EPA Completed TMDL* | EPA has not completed a TMDL for the impaired waterbody segment listed in this document. |

## Description of Baseline Conditions

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| *Watershed(s)* | Sarasota Bay – Peace – Myakka – Group 3<br>Southwest Coast – FDEP Central District<br>WBID 15101 – Lake Eva |
| *Baseline Data* | Group 3 Cycle 3 – IWR Run 52, 2016<br>(Verification Period: January 1, 2008 through June 30, 2015)<br><br>**15101 - Nutrients (Chlorophyll-a)**<br>Lake Criterion for a lake assessment type 2: AGM ≤ 20 µg/L, annual geometric mean chlorophyll-a values exceeded the criterion in 2009, 2010, 2011, 2012, 2013 and 2014, with values of 41 µg/L, 30 µg/L, 31 µg/L, 33 µg/L, 32 µg/L, and 34 µg/L, respectively.<br><br>Stations used in the Chlorophyll-a assessment:<br><br>21FLPOLKEVA1N, 21FLPOLKEVA1S, 21FLGW47176<br><br>**15101 - Nutrients (Total Nitrogen)**<br>Lake Criterion for a lake assessment type 2: AGM ≤ 1.05 mg/L, annual geometric mean total nitrogen values exceeded the criterion in 2009, 2010, 2011, 2012, 2013 and 2014 with values of 2.00 mg/L, 1.83 mg/L, 1.68 mg/L, 1.67 mg/L, 1.69 mg/L, and 1.62 mg/L, respectively.<br><br>Stations used in the Total Nitrogen assessment:<br><br>21FLPOLKEVA1N, 21FLPOLKEVA1S, 21FLGW47176 |

**15101 - Nutrients (Total Phosphorus)**
Lake Criterion for a lake assessment type 2: AGM ≤ 0.03 mg/L, annual geometric mean total phosphorus values did not exceed the criterion in any years.

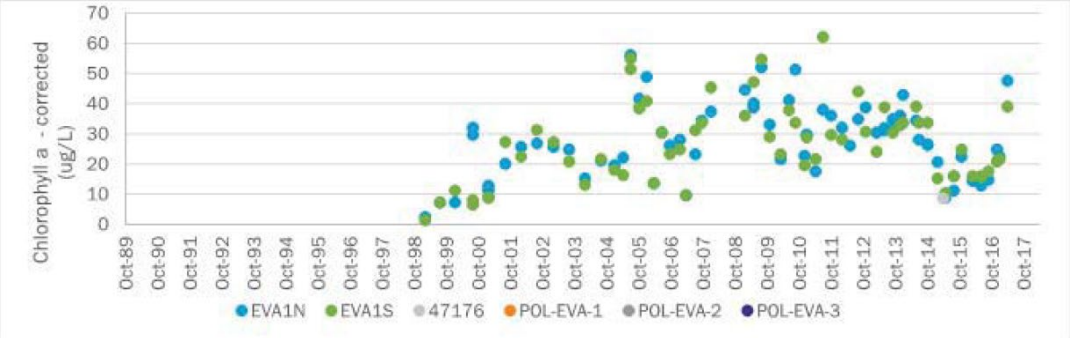
Stations used in the Total Phosphorus assessment:

21FLPOLKEVA1N, 21FLPOLKEVA1S, 21FLGW47176

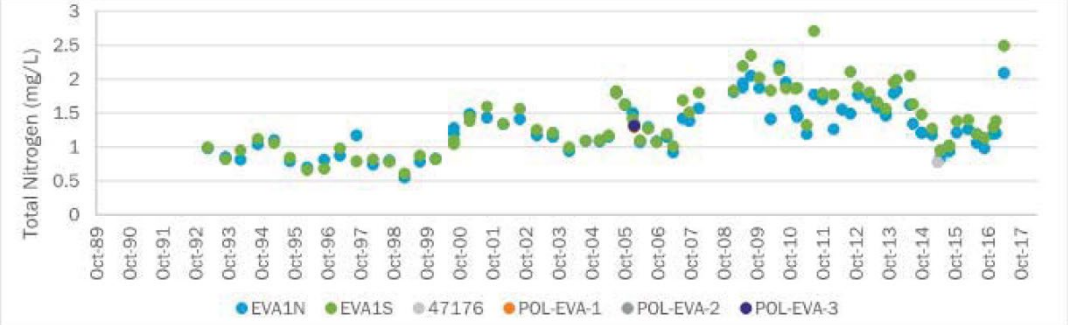
See table below for a baseline water quality data summary for the Group 3 Cycle 3 Verified Period.

| Nutrient AGM - Verified Period | | | |
|---|---|---|---|
| Year | CHLAC (µg/L) | TN (mg/L) | TP (mg/L) |
| 2008 | No Data | No Data | No Data |
| 2009 | 41 | 2.00 | 0.04 |
| 2010 | 30 | 1.83 | 0.03 |
| 2011 | 31 | 1.68 | 0.02 |
| 2012 | 33 | 1.67 | 0.03 |
| 2013 | 32 | 1.69 | 0.03 |
| 2014 | 34 | 1.62 | 0.02 |
| 2015 | 14 | 1.04 | 0.02 |
| 2016 | 17 | 1.18 | 0.02 |
| 2017 | 30 | 1.66 | 0.02 |
| 2018 | 20 | 1.37 | 0.02 |
| 2019 | 13 | 1.00 | 0.02 |

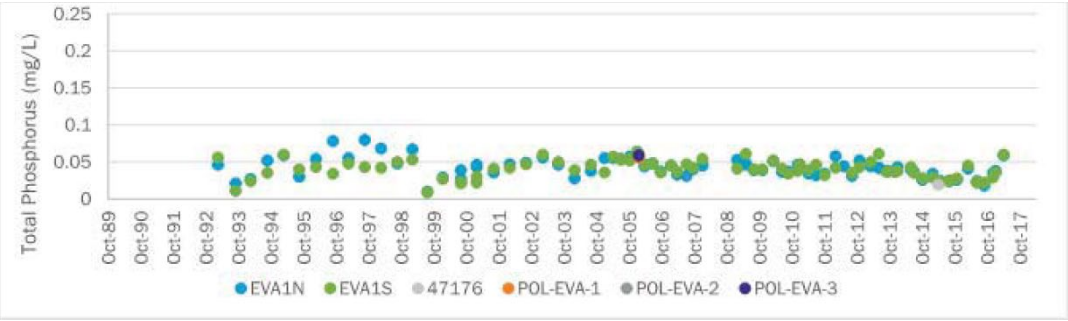
The below graph is a time series of chlorophyll-a in Lake Eva. Please note that the chlorophyll-a criterion is 20 µg/L and the 2 stations (POL-EVA-1 and POL-EVA-3) did not have any data during this timeframe.



The below graph is a time series of total nitrogen in Lake Eva. Please note that the total nitrogen criterion is 1.05 mg/L.




The below graph is a time series of total phosphorus in Lake Eva. Please note that the total phosphorus criterion is 0.03 mg/L.



*Map*


21FLPOLKEVA1N
21FLTPA47176
Lake Eva - WBID 15101
21FLPOLKEVA1S
Lake_Eva_WBID_boundary
Lake_Eva_Stations
N
E
S

**Evidence of Watershed Approach**

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|---|---|
| *Area of Effort* | The Lake Eva watershed (WBID 15101) is located in the North central portion of Polk County, within the limits of Haines City, and has an area of roughly 150 square acres. The Lake Eva and Lake Henry wetland restoration project is located on the West side of the lake Eva, situated between Lakes Eva and Henry. The new wetland treatment area is designed to be 145 acres in size. |
| *Key Stakeholders Involved and Their Roles* | The key stakeholders that have been instrumental in developing and executing these restoration projects are listed below.<br>• Southwest Florida Water Management District<br>• Haines City<br>• Polk County<br>• Department of Environmental Protection |
| *Watershed Plan & Other Supporting Documentation* | The area includes the watershed drainage area from Lake Henry within WBID 1504A where extensive wetland restoration is taking place. WBID 1504A is not currently impaired for any parameters and nutrients (chlorophyll-a), nutrients (total nitrogen) and nutrients (total phosphorus) are in assessment category 2. WBID 15101 is impaired for nutrients (chlorophyll-a) and nutrients (total nitrogen) based on the AGMs. The objectives outlined by the Lake Eva and Lake Henry wetland restoration project will address these impairments.<br><br>The WBID drainage area corresponds to the key project as follows: Lake Eva and lake Henry wetland restoration project. |
| *Point Sources and Indirect Source Monitoring (Sites)* | There are no point sources contributing to Lake Eva. All land areas within the State of Florida surrounding WBID 15101 are regulated by a Municipal Separate Storm Sewer System (MS4) permit – NPDES MS4 Permit No. FLS000015, Permittee is Haines City.<br><br>The entire area is regulated by a Municipal Separate Storm Sewer System (MS4) permit #FLS000015. Stormwater outfall structures to Lake Eva are shown in Figures included later in this document.<br><br>Note: Generic Permits for stormwater discharge from large and small construction activities are considered temporary; therefore, are not included in this listing. |
| *Nonpoint Sources* | The land use breakdown for Lake Eva (WBID 15101) is as follows:<br><br>Urban and Built-Up – 4.98%<br>Agriculture – 0.01%<br>Rangeland – 0.00%<br>Upland Forest – 0.00%<br>Water – 87.93%<br>Wetlands – 7.07%<br>Barren Land – 0.00%<br>Transportation, Communication, and Utilities – 0.00%<br>Special Classifications – 0.00%<br><br>The anthropogenic land use component is approximately 4.99% |

| | |
|---|---|
| | **Wastewater Facilities in Area:**<br>There are no wastewater facilities within this WBID<br><br>**Solid Waste Facilities in area:**<br>There are no solid waste facilities within this WBID<br><br>The land use breakdown for the Lake Eva watershed (WBID 1500A) is as follows:<br><br>Urban and Built-Up – 50.39%<br>Agriculture – 26.85%<br>Rangeland – 0.00%<br>Upland Forest – 3.02%<br>Water – 1.59%<br>Wetlands – 14.25%<br>Barren Land – 1.18%<br>Transportation, Communication, and Utilities – 2.72%<br>Special Classifications – 0.00%<br><br>The anthropogenic land use component is approximately 81.14%<br><br>**Wastewater Facilities in Area:**<br>Paradise Island Campground WWTF – Permit #FLA013073<br><br>**Solid Waste Facilities in area:**<br>RJ Tires – Permit #106464<br>Southern Sod, INC. – Permit #102483<br>Orange Blossom Disposal Facility – Permit #95064<br>C.C. Calhoun, INC. RF #4 – Permit #95108 |
| *Water Quality Criteria* | Lake Eva is a clear lake with high alkalinity (lake assessment type 2). Based on the procedure for determining numeric nutrient criteria (NNC), outlined in Section 62-302.531, F.A.C., If there are sufficient data to calculate the annual geometric mean chlorophyll *a* and the mean does not exceed the chlorophyll *a* value for the lake type, then the TN and TP numeric interpretations for that calendar year shall be the annual geometric means of lake TN and TP samples, subject to the minimum and maximum limits. If there are insufficient data to calculate the annual geometric mean chlorophyll *a* for a given year or the annual geometric mean chlorophyll *a* exceeds the values for the lake type, then the applicable numeric interpretations for TN and TP shall be the minimum values.<br><br>The NNC for nutrients in Lake Eva are 20 µg/L, 0.03 mg/L, and 1.05 mg/L for chlorophyll-a, total phosphorus, and total nitrogen, respectively, which is anticipated to be achieved upon successful completion of all water quality restoration projects. |
| *Restoration Work* | The following priorities were identified for this project:<br><br>1. Meet Lake Eva Minimum Level and Low Guidance Level set by the SWFWMD<br>2. Improve water quality in Lake Eva |

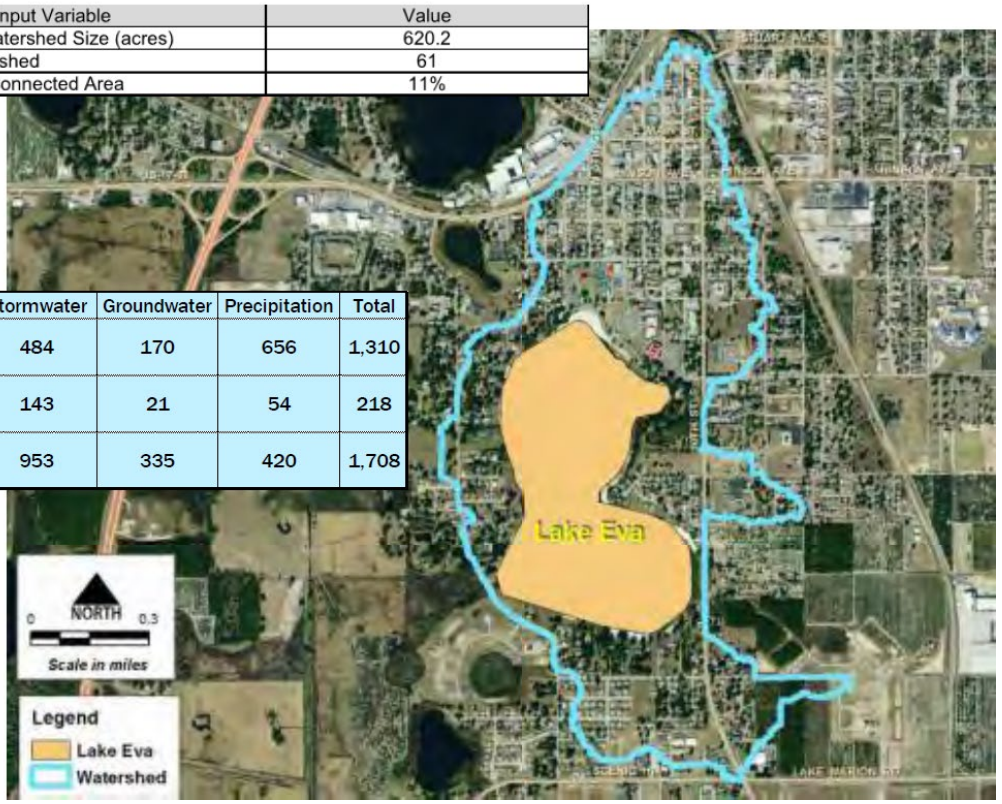
3. Natural Systems Enhancements/Improvement
4. Improve groundwater recharge and potentially obtain water supply credits from SWFWMD
5. Improve flood protection in the vicinity of Lake Henry, while protecting recreational opportunities

Additionally, Haines City identified the following primary project objectives:

1. Improve Lake Eva water quality to eliminate the need for a total maximum daily load (TMDL)
2. Connect Lake Henry and Lake Eva through natural systems
3. Increase the water supply to Lake Eva to meet SWFWMD guidance levels
4. Improve flood protection for the Lake Henry sub-watershed as needed while protecting water recreation opportunities
5. Enhance natural systems/wetland areas between the two lakes
6. Retain water in natural systems, increase groundwater recharge, and receive water supply credits

| Input Variable | Value |
|---|---|
| Overland Flow Watershed Size (acres) | 620.2 |
| SCS CN for watershed | 61 |
| Percent Directly Connected Area | 11% |

| | Stormwater | Groundwater | Precipitation | Total |
|---|---|---|---|---|
| Annual Volume (ac-ft) | 484 | 170 | 656 | 1,310 |
| Annual TP Load (kg/yr | 143 | 21 | 54 | 218 |
| Annual TN Load (kg/yr | 953 | 335 | 420 | 1,708 |




Reducing watershed nutrient loads is proposed to improve surface water quality. For this project, nutrient load reductions will be provided by the restored wetland and the stormwater BMP retrofits. For the stormwater BMP retrofits, subsurface storage in pipes and the surrounding sandy soils are expected to provide a total of about 8 ac-ft of storage

in six BMPs. Some of these are existing BMPs and others are located under existing green space. Approximately 0.25-inch runoff retention will be provided when considering storage volume combined with infiltration occurring during storm events due to the extensive surface area and sandy soils. During final design, the stormwater BMP retrofits will be refined. For some existing BMPs, it may be possible to increase the BMP depth to increase the additional storage volume provided and reduce the required BMP retrofit surface area. Pollutant removal efficiency for infiltration BMPs is a function of the runoff volume retained and the total average annual runoff volume. Based on retaining a 0.25-inch runoff for this specific contributing watershed area, 70 percent pollutant/nutrient removal efficiency is predicted (Evaluation of Current Stormwater Design Criteria Within the State of Florida Final Report, FDEP, June 2007). This is based on the contributing watershed characteristics: 11 percent directly connected impervious area (DCIA), a non-DCIA curve number of 61, and located in Zone 2. The existing and resulting proposed condition Lake Eva stormwater pollutant loads and estimated average annual load reductions are listed in the below table.

Estimated Average Annual Stormwater BMP Retrofit Mass Pollutant Load Reduction for Lake Eva.

| | Total Nitrogen (kg/yr) | Total Phosphorus (kg/yr) | Total Suspended Solids (kg/yr) |
|---|---|---|---|
| Existing Condition | 953 | 143 | 49,200 |
| Proposed Condition | 286 | 43 | 14,700 |
| Load Reduction | 667 | 100 | 34,500 |

These load reductions do not consider treatment and additional load reduction achieved by the proposed gross pollutant removal structures on three of the primary stormwater outfalls to Lake Eva. Although the FDEP report predicts 70 percent removal efficiency, because of the location of some of the BMPs in close proximity to Lake Eva, actual load reductions may be somewhat less. Regardless, retention of the first 0.25-inch runoff from the urban watershed, in conjunction with the gross pollutant removal structures, is expected to produce measurable load reductions and water quality improvement.

Lake Eva Restoration Project Objectives


In addition to modeling simulations, the current physical, chemical, and biological conditions in Lake Eva and Lake Henry were evaluated to provide a baseline for comparison to potential future condition scenarios during the alternatives evaluation phase. Lake levels, rainfall, stage/volume, water quality, and lake bottom sediment and vegetation were assessed during the process to develop the baseline condition.

The results of the existing condition modeling and lake and watershed assessment were positive in terms of understanding the lakes and study area, and identifying possible opportunities to meet the project objectives. Model results indicate that there is sufficient water on an annual average basis reaching the Morrison Ranch property, which is located between Lake Eva and Lake Henry, that can be tapped to improve the hydrology of the study area and improve water quality in Lake Eva. Based on stakeholder input and supported by results of modeled storm events, the peak stages around Lake Henry do not indicate major flooding issues or concerns.

Initially, five alternatives were developed in accordance with the project scope of work. For all five alternatives, project elements included constructing a diversion weir on the Haines City Canal, diverting excess surface runoff to Lake Eva, wetland restoration, aquifer recharge, stormwater Best Management Practice (BMP) retrofits for urban areas discharging to Lake Eva, and revegetation of Lake Eva. The alternatives varied primarily based on the location of the diversion and the location and size of wetland restoration.

The wetland restoration area proposed for all alternatives used only existing historical freshwater marshes/wetlands with 100 percent hydric soils (Hontoon and Samsula muck). All five alternatives include stormwater BMP retrofits for the major outfalls on the northern, eastern, and southern sides discharging into Lake Eva.

On March 7, 2019, the project team including staff from the City of Haines City (City), SWFWMD, BC, and Applied Sciences met to review, discuss, and select two alternatives for more in-depth analysis. Primary differences between the two wetland restoration options include the location of the diversion on the Haines City Canal and the proposed wetland restoration area. With Option 1, only excess surface discharge from the north and northwest will be retained in the restored wetland and available for aquifer recharge on land and in Lake Eva. Approximately 64 acres of existing wetland area will be restored. Option 2 also captures excess surface water from Lake Henry and therefore increase the potential for wetland rehydration and aquifer recharge. More than twice the wetland acreage, 145 acres, will be restored.

To evaluate both options, the existing conditions ICPRv4 model was updated to incorporate the proposed improvements. Both options increase the average annual volume of water discharging from Lake Henry to the Morrison Ranch property by more than 500 acre-feet (ac-ft) and from the Morrison Ranch property to Lake Eva by more than 600 ac-ft. This should provide the water necessary to maintain the restored wetland, improve the water level in Lake Eva, and increase recharge to the aquifer. The existing and proposed water surface elevations in Lake Henry, Lake Eva, and the proposed restored wetland are similar during periods of average to above-average rainfall. During below-average rainfall periods, the proposed improvements help to maintain more consistent water surface elevations with less total drawdown.

The potential increase in recharge to the surficial and Floridan aquifers related to augmentation was estimated using the SWFWMD's Lake Eva Water Budget Model. The estimated surficial and Floridan aquifer augmentation in Lake Eva is 615 ac-ft with Option 1 and 628 ac-ft. with Option 2. Additional recharge from the surficial aquifer to the Floridan aquifer may occur throughout the watershed.

The proposed wetland restoration plan will convert existing pasture, ditches, and degraded wetlands to freshwater marshes, wetland swamp forest, and sloughs. It will also enhance the conditions of existing freshwater marshes and wetland swamp forest. To determine the difference between pre- and post-restoration wetland functional conditions at this site, BC performed an analysis using the Uniform Mitigation Assessment Method (UMAM) (FAC 2016). Option 1 is expected to generate a gain of approximately 13 wetland functional units while Option 2 creates 34 units. As a result of the wetland restoration project, several protected species may benefit, especially the federally threatened wood stork and state threatened Florida sandhill crane.

Pollutant removal efficiency for the proposed stormwater BMP infiltration retrofits for the primary outfalls discharging into Lake Eva is a function of the total average annual runoff volume and the runoff volume retained. Based on retaining a 0.25-inch runoff for this specific contributing watershed area, 70 percent pollutant removal efficiency is predicted. The reduced total phosphorus (TP) and total nitrogen (TN) loads, combined with sustaining a higher water surface elevation and water volume in Lake Eva, are expected to improve Lake Eva water quality. Planting additional desirable vegetation in Lake Eva is

also proposed, which will increase in-lake nutrient uptake and the potential for surface water quality improvement.

Based on the ICPRv4 continuous simulation, substantial water will pass through the restored wetland area in an average rainfall year. Estimated nutrient load reductions of the restored wetland are greater for Option 2 because of the substantially larger surface area compared to Option 1. This will provide water quality benefits not only to Lake Eva but also downstream lakes including Little Lake Hamilton and Lake Hamilton.

Lake Eva Restoration Project Alternatives Scoring

Evaluation Criteria and Option Scoring 5-15-19

| Selection Criteria | Priority* | Description | Weighting | Option 1 Score | Option 2 Score | Option 1 Points | Option 2 Points |
|---|---|---|---|---|---|---|---|
| Improve Lake Eva Water Quality | 1 | Achieve Lake Water Quality Improvement for Key Parameters including Total Phosphorus and Chlorophyll-a | 15 | 6 | 9 | 90 | 135 |
| Address Lake Eva Low Water Level Concerns | 2 | Address Regulatory Requirements for Maintaining Minimum Level and Flow (MFL) in Lake Eva | 12 | 6 | 9 | 72 | 108 |
| Meet Regional Integrated Water Resources Needs | 3 | Follow Central Florida Water Initiative (CFWI) guidelines, use regional approach to solving multi-jurisdictional "One Water" needs | 10 | 7 | 9 | 70 | 90 |
| Provide Groundwater Recharge and Water Supply Credits | 3 | Infiltrate "Excess" Water into project area groundwater system with the goal of generating water supply credits | 10 | 6 | 6 | 60 | 60 |
| Minimize Need for Land Acquisition and Easements | 4 | Maximize the use of existing public lands and easements for project improvements and minimize the need to acquire additional private land or easements | 9 | 8 | 7 | 72 | 63 |
| Utilize Existing Infrastructure and Natural Conveyances | 4 | Maximize natural conveyance and maintain existing drainage system infrastructure is such a way that it's compatible with maximizing natural conveyance. | 9 | 8 | 8 | 72 | 72 |
| Public / Stakeholder Acceptance | 5 | Consensus of acceptance by Stakeholders, Residences, and Businesses | 7 | 7 | 8 | 49 | 56 |
| Life-Cycle Cost | 6 | Lowest combined Capital and O&M Costs for 20-year life per unit of benefit | 6 | 5 | 8 | 30 | 48 |
| Provide Natural Systems Enhancement | 7 | Improve ecosystem form and function within the project area | 5 | 5 | 9 | 25 | 45 |
| Recreational Benefits | 7 | Maintain or improve Lake Recreational Benefits (Swimming, boating, fishing, etc.) | 5 | 7 | 9 | 35 | 45 |
| Social Benefits | 7 | Provide public benefits such as increased property value, economic development, educational opportunities, aesthetics, etc. | 5 | 7 | 9 | 35 | 45 |
| Reduce Lake Henry Flooding During Wet Weather Periods | 8 | Reduce extent/depth of flooding for residents adjacent to Lake Henry for the 100-year, 24-hour event based on existing flood maps | 4 | 7 | 7 | 28 | 28 |
| Minimize Impacts (temporary/permanent) to residences and businesses | 9 | Construction and Operation of Proposed Improvements has minimal impact on residences and businesses | 3 | 7 | 7 | 21 | 21 |
| Likelihood or Ease of Permitting | 10 | Regulatory Acceptability and Less Time/Lower Cost for Project Permitting | 2 | 7 | 5 | 14 | 10 |
| Proven Treatment/Recharge Approach | 11 | Use project elements which are effective and meet regulatory requirements | 1 | 8 | 8 | 8 | 8 |
| | | | | | | | |
| | | * = Rank from 1 to 15, "1" is most preferred | | TOTALS | | 681 | 834 |

Score 1 to 10:
maximum score is 1030

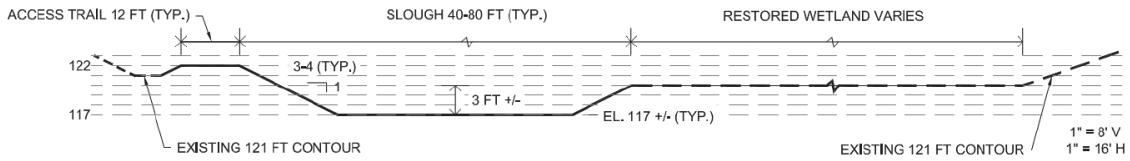
The selected wetland restoration alternative Conceptual Design, as shown below, will divert excess surface discharge from the north, northwest, and Lake Henry through the restored wetland to Lake Eva. This will be accomplished with a very wide earthen weir downstream of the intersection of the Haines City Canal and the outfall channel from Lake Henry. Most of the approximately 145 acres of wetland restoration are located on the Morrison Ranch property, with a smaller portion on the east side located on Sunset Chase Homeowners Association property. The boundary of wetland restoration will be at the existing 121 ft NAVD88 elevation contour and within the historical marsh/wetland and zone of muck soils. The top elevation of the earthen diversion weir will be at approximately 120.5 ft NAVD88 and will be finalized during final design using the ICPRv4 model. Limited grading in the existing wetland is proposed since the existing grade is at approximately 120 ft NAVD88. Some grading of the existing channels to create a slough is proposed along with excavation of some deeper pools (depth approximately 5 ft) for

sediment accumulation and wildlife habitat. Filling is only anticipated to construct the diversion weir, the wooded hummock rise on the northern side of the restored wetland, and portions of an access trail around the restored wetland. The trail could also be used for recreation. Two plugs are shown for very small channels on the southern side of the Lake Henry outfall channel to reduce the potential for water to bypass the diversion. An operable control structure is proposed as part of the diversion feature to provide more flexibility in controlling upstream water levels and water release. A box culvert will connect to the operable control structure and extend through the weir to convey flow downstream in the Haines City Canal. The earthen weir is very wide so substantial flow can be conveyed downstream with minimal water depth over the weir. Cleaning and some regrading of the existing channel is needed from Peninsula Drive to Lake Eva to allow proper flow into and out of Lake Eva.

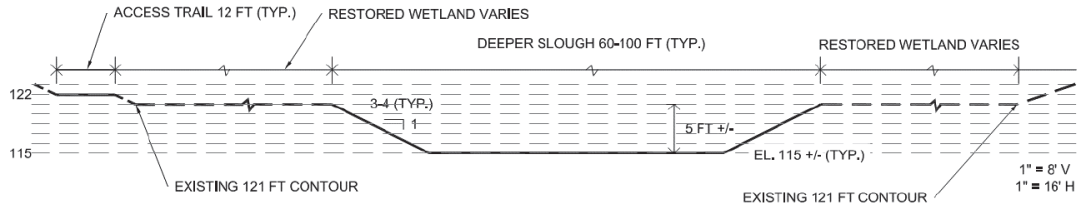
On the Conceptual Design plan, the access trail is shown extending from both US 27 and Peninsula Drive around much of the restored wetland perimeter. Access is needed for routine maintenance and also for recreation and education. Coordination with the property owner is needed to finalize the locations. There is a portion of the wetland perimeter with no trail on the western side of the wetland, so existing forested wetlands will not be disturbed. Approximately 900 LF of optional boardwalk is shown on the Conceptual Design crossing the wetland about midway in the north-south direction to connect the eastern and western sides of the perimeter access trail. This would improve the recreational and educational opportunities at the site. An optional observation deck is also shown at the eastern end of the boardwalk. This would allow visitors to observe the full breadth of the restoration project and adjacent lakes. Educational signage is also depicted on the Conceptual design plan

Conceptual Design typical sections for the proposed wetland restoration element are shown below. The main channel and slough top width will vary from about 40 ft to 100 ft, with water depth from the surface elevation of the restored wetland to the bottom of the channel/slough ranging from 3 ft to 5 ft. Proposed side slopes for the channel/slough and edge of the restored wetland are relatively mild and range from 3 to 4 horizontal to 1 vertical. The top elevation of the access trail may vary from 121 to 122 ft NAVD88.

Below is a conceptual designed wetland restoration typical sections for Lake Eva




TYPICAL SECTION 1




TYPICAL SECTION 2


Lake Eva
Main Channel
TOB EL. 121 +/-
BOT EL. 117 +/-
Water Collection
Area by Culvert
2 - 60" RCP (Exist)
Access
Trail
Wooded
Hummock Rise
EL. 121
~EL. 129
Street
FL-27
2 - 54" RCP (Exist)
EL. 120 +/-
Pool
5FT-Depth
Tenold
Property
Minor Slough
Grading (typ.)
End of
Access
Trail
TOB ~EL. 120
EL. 120
145 acres
Improve
Channel
End of
Access
Trail
Optional
Boardwalk
Optional
Observation
Deck
See typical
sections next page
Access
Trail
Plug
EL. 120
Pool
5FT-Depth
Access
Trail
Sunset
Chase
Pool
5FT-Depth
EL. 120
Minor Slough
Grading (typ.)
Educational
Signage (typ.)
Earthen Weir (500 LF
~EL. 120.5) and Operable
Control Structure and Box
Culvert
~EL. 121
EL. 120
~EL. 121
FL-544
2-86"x60" Box
Culverts (Exist)
Legend
Access Trail
Wooded Hummock Rise
Tenold Property
Sunset Chase
Homeowners Assoc.

The selected alternative includes six stormwater BMP retrofits for major outfalls discharging into the northern, eastern, and western sides of Lake Eva as shown on the Conceptual Designs on Figures 6-3 and 6-4. This is to reduce the nutrient load to Lake Eva from stormwater runoff and improve surface water quality. The total contributing drainage area is approximately 540 acres. These areas generally contain Candler sands, are 0 percent hydric, with low fines content, excessively drained, with rapid permeability. At the request of the City, only underground practices were considered so that the appearance of the area will not substantially change. Infiltration BMP retrofits are planned to take advantage of the sandy soils in the area. Stormwater runoff flowing in existing storm pipes would be diverted using underground structures and storm pipes into the proposed/modified BMPs. Runoff in excess of the capacity of the BMPs will continue in the existing storm pipes and discharge to Lake Eva. Underground gross pollutant removal structures are proposed for the two largest outfalls located at the northern end of Lake Eva. Located upstream of the proposed underground retention, these will capture trash, organic debris (e.g., grass, leaves), and larger sediment. For the stormwater BMP retrofits, subsurface storage in pipes and the surrounding sandy soils are expected to provide a total of about 8 ac-ft of storage in six BMPs labeled as A1 through A6. All BMP retrofits, with the exception of A1, are proposed within the footprint of existing stormwater BMPs. One of the BMPs, A5, is currently owned by FDOT. All other areas and BMPs are owned by the City of Haines City. Approximately 0.25 inches of runoff retention will be provided when considering storage volume combined with infiltration due to the extensive surface area and sandy soils. During final design, the stormwater BMP retrofits will be refined. For some existing BMPs, it may be possible to lower the BMP bottom elevation to increase the above ground storage volume provided and reduce the underground storage volume.


Proposed stormwater BMP retrofits account for about two-thirds of the estimated construction cost, and wetland restoration makes up the remaining one-third. On a life-cycle cost basis, proposed stormwater BMP retrofits account for almost 60 percent of the cost with the remaining 40 percent for wetland restoration. While it may be possible to phase project construction, both the proposed wetland restoration and stormwater BMP retrofit elements are needed to achieve the project objectives.

**Critical Milestones/Monitoring**

| | |
|---|---|
| *Anticipated Critical Milestone(s) and Completion Dates:* | • Conduct Feasibility Study to assess existing conditions and restoration alternatives, and complete conceptual design for the selected alternative. Includes stakeholder meetings and input. (Complete)<br>• Complete 30 Percent Design Package including survey, geotech, design, regulatory coordination, benefits, and cost estimates (Complete)<br>• 3rd Party Review (2020)<br>• Complete Design and Submit Permit Applications (2021)<br>• Complete Final Construction Bid Documents and Permits Issued (2021)<br>• Complete Project Bidding (2021)<br>• Complete Construction (2022) |
| *Monitoring Component* | The Polk County Water Atlas contains water quality data broken down into the following:<br><br>1. The overall trophic state index<br>2. Nutrient chemistry<br>3. Water clarity<br>4. Bacteria<br>5. Dissolved oxygen<br><br>Per the Polk County Water Atlas website (http://www.polk.wateratlas.usf.edu/), Lake Eva has been monitored at seven locations, with a total of 5,224 collected data points from February 4, 1986, through present. Monitoring information can be obtained from the following data sources: Florida Department of Environmental Protection (FDEP), LAKEWATCH Volunteer Water Quality Monitoring, Polk County Parks & Natural Resources Division, and the District. Storage and Retrieval (STORET) and Water Quality Exchange were reviewed, but only contained data for Lake Eva from the Polk County Natural Resource Division. |

**Other Key Dates**

| | |
|---|---|
| *Estimated Date for Delisting from Verified List or Removal from Study List* | WBID 15101 is in the state's Group 3 Basin in the DEP Southwest District. The current review and assessment cycle (statewide biennial assessment) is scheduled for completion in 2022. This waterbody is currently impaired for nutrients (chlorophyll-a) and nutrients (total nitrogen), the earliest opportunity for delisting would happen during the next statewide biennial assessment. However, if this WBID doesn't meet delisting requirements at that time, it will remain in assessment category 4e, which will postpone TMDL development. |

**Financial Commitments**

Estimated Implementation Cost

Lake Eva CFI Cost-Benefit Analysis

| Category | Units | Project Value | Rating | Comments | |
|---|---|---|---|---|---|
| Water Quality | | | | | |
| Nitrogen reduction | $/lb | $114 | High | Estimated TN load reduction | 3,159 lb/yr |
| Phosphorus reduction | $/lb | $1,025 | High | Estimated TN load reduction | 351 lb/yr |
| Suspended solids reduction | $/lb | $3.65 | High | Estimated TSS load reduction | 98,480 lb/yr |
| Wetland Restoration | $/ac restored | $13,308 | High | 145 acres restored | $1,929,714 |
| Additional GW recharge | Million Gal /year | 155 MG | NA | GW recharge | |
| Meet Lake Eva MFL | MFL | 628 ac ft/yr | NA | Additional flow to Lake Eva | |

Note: "High" Rating is best possible CFI rating.

Number of days Lake Eva is at or above the MFL Minimum Lake Level (P50, 117.18' NAVD88) over the 14 year continuous simulation period increases from 151 days to 348 days. Average number of days above P90 elevation increases from 260 to 359 days.

Construction and Life Cycle Cost Summary. Option 2, highlighted in red was selected as the best path to restoration.

| Option | Construction Cost ($)[1] | Average Annual O&M Cost ($)[1] | 20 Year Life Cycle Cost ($)[1] |
|---|---|---|---|
| 1 | 4,749,000 ($3.3 to 6.2 M) | 78,000 | 6,307,000 ($4.4 to 8.2 M) |
| 2 | 5,198,000 ($3.6 to 6.7 M) | 100,000 | 7,195,000 ($5.0 to 9.4 M) |
| BMP retrofits only | 3,269,000 ($2.3 to 4.2 M) | 43,000 | 4,124,000 ($2.9 to 5.4 M) |
| Wetland Restoration only (Option 1) | 1,480,140 ($1.0 to 1.9 M) | 35,000 | 3,071,000 ($2.1 to 4.0 M) |
| Wetland Restoration only (Option 2) | 1,930,000 ($1.4 to 2.5 M) | 57,000 | 3,071,000 ($2.1 to 4.0 M) |

1. includes 20% contingency (Range is +/- 30%)

| | |
|---|---|
| | In addition to the District cooperative funding, it may also be possible to obtain an FDEP 319 Grant for project implementation. The current solicitation period runs through April 30, 2020. Project proposals may be submitted anytime throughout the year. Department review and evaluation periods are expected to occur in September/October and March/April of each year, or as needed.<br><br>Polk Regional Water Cooperative (PRWC) is another potential project funding vehicle. The District approved a resolution dedicating $25 million over five years to fund PRWC alternative water supply projects. The PRWC funding agreement with the District requires completion of a feasibility analysis by March 31, 2021. The Peace Creek Integrated Water Supply Project was identified as one of three priority projects to receive funding support. The Lake Eva and Lake Henry Restoration project provides additional water supply and natural resources benefits within Peach Creek Watershed and should be considered for PRWC funding.<br><br>The total project cost, including land acquisition $TBD<br><br>The cost includes a 319(h) Clean Water Act Section grant of $TBD<br><br>The estimated 20-year operation and maintenance cost is $10,266,000. |
| Land Acquisition (if applicable) | **Funding Source:**<br><br>Total……...NA |
| Design and Construction (if applicable) | **Funding Source:**<br><br>Total……...$7,128,000 |

**References:**

"Lake Eva and Lake Henry Restoration Feasibility Study" by Brown and Caldwell – Prepared for Haines City, Florida August 29, 2019.