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# Landscape Design and Performance at the Sandra Stetson Aquatic Center

Final Project Report for Institute for Water and Environmental Resilience Seed Grant

Prepared by:

Dr. Jason M. Evans: Associate Professor of Environmental Science, Stetson University

David Sacks: Registered Landscape Architect

Dr. Jon Calabria: Associate Professor of Landscape Architecture, College of Environment and Design, University of Georgia

Carson Bockoven, GIS Research Assistant, Stetson University (Class of 2021, Environmental Science)

July 15, 2019

## Project Summary and Key Outcomes

The overall purpose of this seed grant project was to engage Stetson faculty, staff, and students in a sustainable landscape design and visioning process for the grounds of the newly constructed Sandra Stetson Aquatic Center (SSAC) facility on Lake Beresford. Part of the overall vision for the SSAC grounds is development of a native botanical garden that references and honors the native flora along Lake Beresford and the St. Johns River as originally described by famed 18th century botanist William Bartram. While grant support provided by the Volusia County ECHO Program has provided some resources for interpretive signage and public access at the SSAC grounds, there is currently no formalized landscape plan for guiding long-term development and management of the site as a botanical garden. A primary objective of this project was to begin a formalized design and planning process that, ideally, would serve as a catalyst for attracting broader public attention and associated resources necessary for moving the botanical gardens concept forward. The design process for this project was led by David Sacks, a Florida Registered Landscape Architect (FL RLA, License #LA0001392), in collaboration with Dr. Jason Evans (Associate Professor of Environmental Science at Stetson University) and Dr. Jon Calabria (Associate Professor of Landscape Architecture at University of Georgia). Other important contributors in this process included a number of Stetson faculty, staff, students, and alumni, as well as key governmental partners such as Volusia County, East Central Florida Regional Planning Council, and the Florida Department of Environmental Protection. The design process implemented within this project resulted in conceptual drawings for a rain garden, littoral plantings, and floating islands within the SSAC stormwater system, as well as some design guidance for a pollinator garden implemented by Dr. Kirsten Work's Conservation Biology students in Spring 2019. The implementation of this seed grant project proved to be a critical component of a successful grant application to the Florida Department of Environmental Protection and solicitation of additional donor gifts for implementation of key botanical garden elements.

## Background

The primary genesis of this project was a one-day Bartram Gardens design "charrette" held at the SSAC on October 27 and co-facilitated by Evans, Calabria, and Sacks. A charrette is an intensive stakeholder meeting that landscape architects often use as a mechanism for gathering a large amount of initial input at the onset of a planning and design process. The Bartram Gardens charrette gathered input from approximately thirty people, including Stetson students, faculty, staff, administrators, and alumni, as well as several member of the general public. A word frequency cloud of the participants' visions for the SSAC grounds is shown below as Figure 1.

Follow-up discussions with Stetson faculty, students, and staff indicated a high amount of interest in continuing the momentum from the charrette through the next stages of a design process. The seed grant program through the Institute for Water and Environmental Resilience, as made available through support from the Jessie Ball DuPont Fund, was identified as an ideal mechanism for developing and implementing the next phase of a "research by design" process (Lenzholer et al. 2013) that continued to engage faculty, students, staff, and other stakeholders.


**Figure 1**: Word frequency cloud of stakeholder input from the Bartram Gardens charrette at the Sandra Stetson Aquatic Center, October 27, 2018. Larger text size indicates more frequency of word usage in stakeholder comments. *Image credit: Allison Terry, Stetson Class of 2019, Environmental Studies*

## Project Implementation

The fundamental goals within the project proposal were threefold: 1) develop an inventory of existing site conditions within a geographic information system (GIS) database; 2) engage students, faculty, staff, and other stakeholders in an iterative design development process; and 3) develop conceptual plan drawings to attract additional resources for implementation of the botanical gardens and spur follow-up research projects.

### Site Inventory

Stetson student Carson Bockoven (Environmental Science, Class of 2021) was hired as the GIS research assistant for this project. Bockoven first obtained computer assisted drawing (CAD) files and renderings for the SSAC as developed by Dewberry, a major engineering firm. Under the supervision of Evans, Bockoven implemented a rigorous technical process of transforming and georectifying the CAD information into a GIS format (the full process is described in Appendix 1). Bockoven then used relevant portions of these newly created GIS files as the basis

for creating an overall site map for the SSAC facility (Figure 2), which was used as a template for development of signage that will be installed at SSAC through Volusia County ECHO Grant funding.

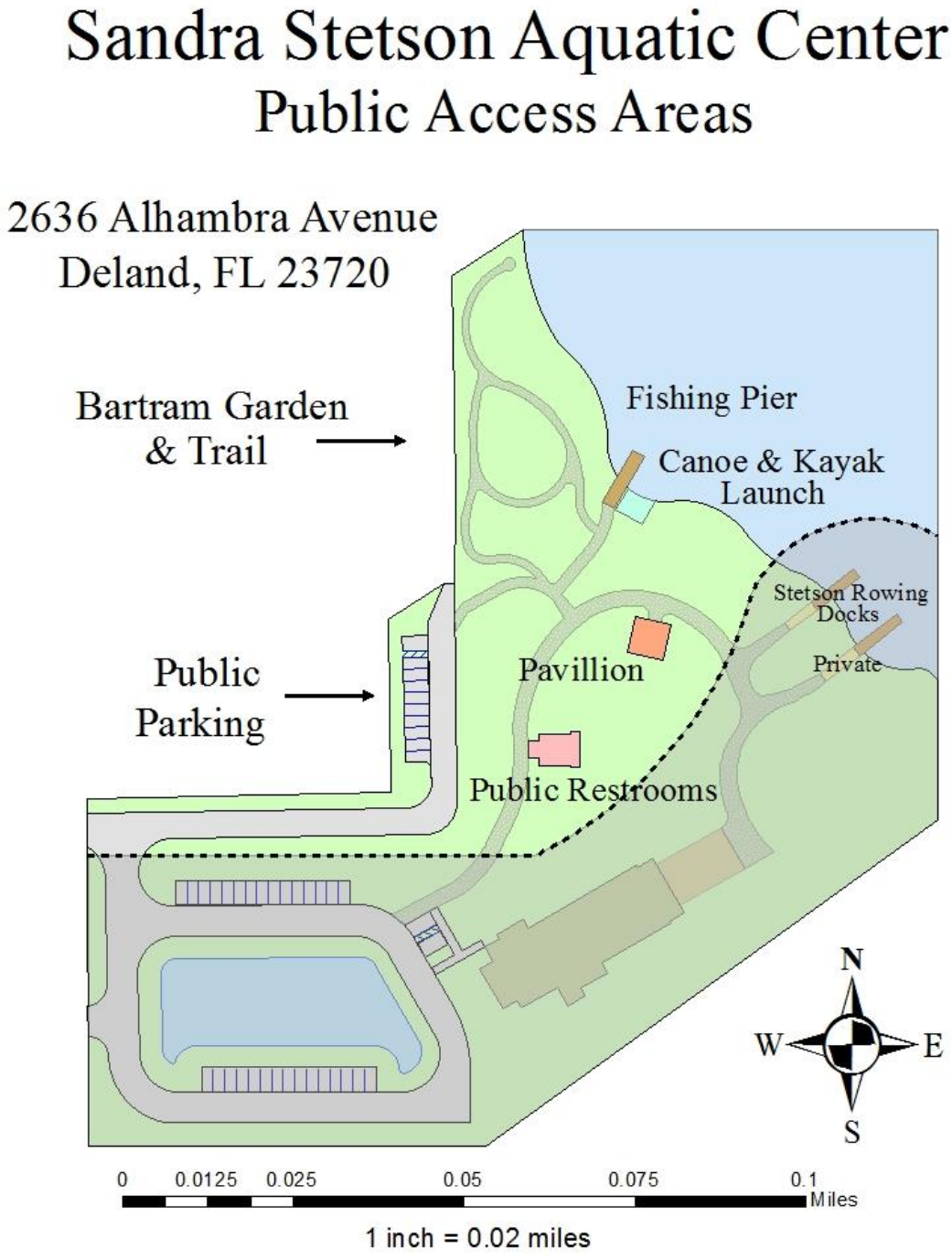



**Figure 2**: Sandra Stetson Aquatic Center public access area map. *Image credit: Carson Bockoven, Stetson Class of 2021, Environmental Science*

**Engagement Process**

Calabria and Sacks made two visits to the SSAC facility over the course of the project to engage with students, faculty, staff, and other stakeholders in an on-site design process.

Site Visit 1

The first visit was April 1-2 and involved on-site collaboration with three Stetson classes (ENSS301, Geographic Information Systems and Science; ENSS325, Climate Adaptation and Planning; and BIOL444V, Conservation Biology) to develop design concepts for a pollinator garden, a rain garden, littoral plantings, and floating islands. Students from the Conservation Biology course, taught by Dr. Kirsten Work, had already developed design ideas and plant lists for the pollinator garden and littoral planting through a class project. Sacks provided feedback to the students' design ideas and provided some guidance about issues such aesthetic flow and trail access for the pollinator garden. Evans and Calabria worked more directly with the littoral planting group and provided direction into regulatory permit requirements that would necessarily drive some of the littoral planting designs. A Stetson alumnus and member of the IWER Advisory Council, Nancy Daves, also participated in the on-site student engagement activities on April 2. Soon after this experience, Daves made a gift pledge of $25,000 to help support IWER's design implementation of the SSAC botanical gardens, with particular focus on the student engagement aspect of this work.

The following are additional thematic notes from the April 1-2 engagement sessions.

*Boardwalk*

Only a portion of the public boardwalk area shown in the engineering original site drawings for the Aquatic Center was constructed. In the future, the extant dredge spit could be improved to serve as an overlook for longer views of Lake Beresford. This feature could also serve as spectator viewing or officiating during regattas, which may be funded externally by donors connected to the rowing program. This would require additional trail construction to connect the existing mulch trail to the proposed overlook.

*Interpretation*

Stakeholders identified many themes to consider for physical or virtual interpretation at the site. Thematic direct and indirect interpretation could be physically installed in key areas on the site that demonstrate particular themes. For example, geologic or biological timelines could be installed as sleek linear panels mounted along the boardwalk guardrails. Alternatively, virtual reality or augmented reality could illustrate other components of the site showing cultural time periods, particularly Bartram's observations. This would require additional funding sources.

*Student Driven Experiential Learning*

By coupling student envisioned landscape interventions with rigorous scientific inquiry, students and faculty could install long term design of experiments that many students could monitor and

evaluate. Data and results would likely be publishable if coupled with environmental data, such as a weather station with distributed sensors linked to a real-time website dashboard to allow users to see and explore data (see, e.g., https://stormcentral.waterlog.com/SiteDetails.php?a=112&site=3306&pa=khubbard; https://athensclarke.weatherstem.com/sanfordstadium).

Site Visit 2

The second visit of Sacks and Calabria was on May 30-31. These sessions were dedicated to technical development of rain garden and stormwater planting designs in collaboration with Evans, Bockoven, Katrine Locke (Volusia County), and Dr. Wendy Anderson (Stetson Environmental Science and Studies).

*Stormwater Pond*

Figure 3 illustrates how native floating wetlands and littoral shelf "eyebrows" can be integrated into the stormwater pond on site. Integration of experimental learning into landscape design offers students opportunities to monitor different interventions such as combinations of different plant species and changes to pollinator species, water quality, soil health and even aesthetic perceptions of site users. For example, the wetlands could be replicated three times and the littoral shelves replicated four times to accommodate experiments.

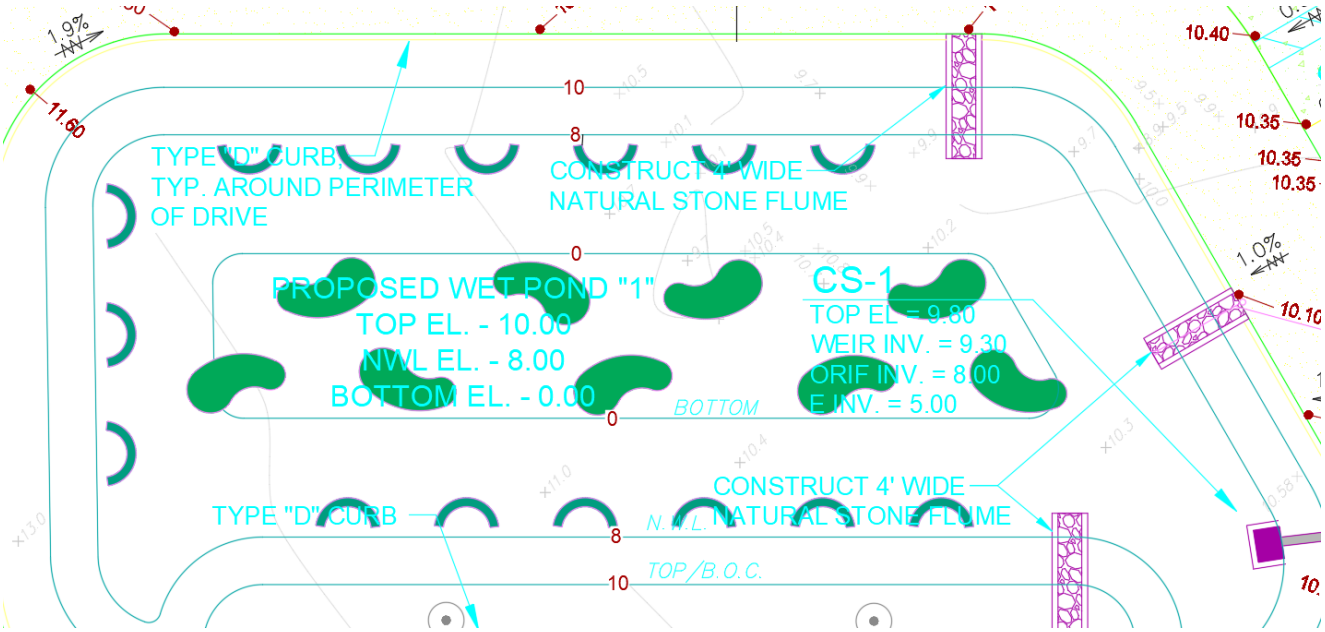



**Figure 3**: Stormwater experimental pond design with littoral plantings (green "eyebrows") and floating wetlands (green shapes in pond) with replication to promote experiential learning

*Rain Garden*

The term "rain garden" describes a planted stormwater collection area that contains s suite of attractive plants – usually native species – that can withstand both wet and dry conditions, while also providing enhanced water quality treatment and wildlife habitat support. The rain garden planning for this project also involved two additional design considerations: 1) placement of an emergency fire suppression water tank; and 2) incorporation of a trail for use by rowing teams during large regatta events.

Two design alternatives for the rain garden, as developed by David Sacks during site visit 2, are provided as Figures 4a and 4b. The first design (Option "A", Figure 4a) is a rain garden and trail concept based on a siting of the water tank in a position adjacent to the SSAC building. This siting of the water tank was developed by Stetson Facilities in consultation with architects and engineers involved in the full SSAC development. IWER faculty and the coach of the Stetson Rowing team, however, both raised concerns about the functionality of the site with the water tank in this location, and worked together with Sacks and Calabria to develop the second design plan (Option "B", Figure 4b), which relocates the water tank onto higher ground approximately 80 feet from the building. Figure 6 provides a ground-level rendering of the water tank options, including a vegetative screen for the Option B alternative. After some discussion with Stetson Facilities, the Option B design (Figure 4b) for the water tank, rain garden, and trail configuration was selected for final construction.


**Figure 4a**: Rain garden and rowing team trail concept design for Option "A" water tank site


**Figure 4b**: Rain garden and rowing team trail concept design for Option "B" water tank site


**Figure 5:** Ground-level renderings of water tank siting option for Sandra Stetson Aquatic Center

## Project Conclusion and Next Steps

This seed grant project successfully achieved the three objectives defined in the project proposal. This included development of a comprehensive GIS inventory (as led by a student researcher), high level engagement with students, faculty, staff, and other stakeholders in a site design process (as most directly achieved with the two site visit activities), and, importantly, attraction of external funding support for moving forward with the overall botanical gardens. As noted above, one source of funding that has already been secured is a $25,000 pledge from Stetson alumnus Nancy Daves for implementation of stormwater plantings and associated research. Ms. Daves has also pledged an additional $25,000 for student-led research into a solar photovoltaic array at the SSAC facility.

In addition, the design process and options developed for this project were leveraged as the basis for a successful water quality grant application to the Florida Department of Environmental Protection in partnership with Volusia County and the East Central Florida Regional Planning Council (**Appendix 2**). This grant, as funded through the United States Environmental Protection Agency's 319 grant program, will provide $60,000 of support for implementing the rain garden and stormwater plantings. The contracting process for this project is still ongoing as of the writing of this report, but it is anticipated that funds will be available to Stetson by September 2019 for project implementation purposes.

## Appendix 1

Sandra Stetson Aquatic Center GIS Work Log

Georeferenced PDF of Aquatic center plan to imported CAD points
Defined projection for SSAC Site Plan.dwg as FL East State Plan
Create file geodatabase called SSACcomponents
Created shapefiles for each type of tree, saved to SSACcomponents, example trees_palm (categories, Palm, Oak, Pine, Cedar, Cherry, Cypress, Gum, Laurel Oak, Live Oak, Magnolia, Maple, and Miscellaneous (MISC))
Created shapefile for shrubs, called shrubs_water_oak, all are classified as wateroak except 1, labeled specimen
Created shapefile for elevation points of the tree line, called elevpoints_treeline
Created shapefile for signs points, called signs (7 are mailboxes, 5 just sign)
Created shapefile for elevation points on toe of slope, called elevpoints_TOE
Created shapefile for elevation points on pavement, called elevpoints_pavement
Created shapefile of water main lines, called water_main
Created shapefile of light points, called lights
Created shapefile of bollards (short posts for traffic and stuff), called bollards
Created shapefile of existing waterlines, called existing_waterlines
Created shapefile of parking signs, called parking_signs
Created shapefile of electrical parts called electricity_components
Created shapefile of polyline of hedges, called hedge_line
Created shapefile of dirt outlines, called dirt_roads
Created shapefile of TOB lines, called TOB_lines
Created shapefile of fence lines, called fence_lines
Created a shapefile of trail lines, called trail_outlines
Created a shapefile of main road outlines, called road_outline
Created a shapefile of road centerlines, called road_centerlines
Created shapefile of grass road, called grass_road
Created a shapefile of neighboring lot boundaries, called lot_divisions
Created a shapefile of deed line, called deed_line
Created a shapefile of parking markings (both spot markings and prohibited parking spots), called parking_lines
Created a shapefile of the SSAC boundary, called SSAC_boundary
Created a shapefile of the SSAC boundary into the lake (?? This is what it looks like it is, could be something else?), called SSAC_water_boundary
Created a shapefile of the road curb around the retention pond, called road_curb
Created a shapefile of all storm water features, called strm_water_features
Created a shapefile of the earthen ramp, called earth_ramp_outline
Created a shapefile of the swales, called swale_lines
Created a shapefile of the canal water line, called canal_waterlines
Created a shapefile of the canal dock outline, called canal_dock
Created a shapefile of the proposed water storage tank, called PROPOSED_waterstorage
Created a shapefile of the restroom building outline, called bathroom_building
Created a shapefile of the pavilion outline, called pavilion_outline

Created a shapefile polygon of the earth ramp, called earth_ramp
Created a shapefile polygon of all the docks present on the map, called docks (!!! Having been out to SSAC a few times, this does not seem to be accurate, definitely needs double checking !!!)
Drew the outline of the SSAC building, creating a polygon feature class called SSAC_building
Created feature class called SSAC_exits, drew all 4 exits, meaning traced doors and what I called porches, then populated attribute field with door or porch, opening orientation (NW etc for doors) and material for porches (either concrete of gravel)
Created a feature class called metal_ramps, containing polygons of the 2 metal ramps on the map
Created a shapefile of sidewalk (outside main entrance) line features, called sidewalk_outline
Created a shapefile of overhead powerlines, called overhead_utilities
Created a shapefile of all contour / topography lines, called topography_lines
Created a shapefile with all sanitary sewer line features (both lateral and force mains), called sanitary_sewer_pipes
Created a shapefile of C-TREE-BRIER (layer attribute) features, called tree_circle_buffers
Created a shape file of C-BZNA (+C-BZNA-WTLND and C-BZNA-CANAL) line features, called natural_area_delineations
Created a shapefile of circular line feature, called duke_elec_pole
Created a shapefile of exits of the SSAC buildings (concrete pads and doors), called SSAC_exits
Created a shapefile of digitized gravel roads (both big parking lot road and road that loops around to other parking) called gravel_roads
Created a shapefile of digitized parking lots (attribute table has type as either grass or concrete and Handicap, Yes or No) called parking_lots
Created shapefile of digitized dumpster fence (line feature), called dumpster_fence
Created a shapefile of digitized dumpster pad, called dumpster_pad
Created a shapefile of digitized retention pond, 3 separate polygons in the feature class based on depth, 0 feet, 8 feet, and 10 feet, called retention_pond

**Appendix 2**

# DIVISION OF WATER RESTORATION ASSISTANCE NONPOINT SOURCE MANAGEMENT PROGRAM PROJECT INFORMATION PROPOSAL FOR GRANT FUNDING CONSIDERATION

***Complete all appropriate sections and sign/date (expand writing areas as needed).***
*Instructions are included in italics throughout the project information proposal.*

## OVERVIEW

**Project Information Proposals Accepted from the Following Entities:**
Governmental entities in Florida, including state agencies, local governments and special districts, public universities or colleges, state water management districts, and National Estuary Programs. See Subsection 287.012(14), Florida Statutes (F.S.), for the definition of a governmental entity.

**Examples of fundable projects or programs include, but are not limited to:**

- Demonstration and evaluation of best management practices (BMPs) https://floridadep.gov/dear/water-quality-restoration/documents/statewide-best-management-practice-bmp-efficiencies
- Nonpoint source pollution (NPS) reduction in priority watersheds *(i.e., areas with Water Quality Restoration Plan(s), treatment of impaired waters, etc.)*
- Ground water protection from nonpoint sources
- Public education programs on nonpoint source management *(319(h) Grant only)*
- Septic to sewer projects (laying the lateral from the residence/business to the main sewer line, connection to sewer line, grinding station [if on the resident's property], and abandonment of the septic if the remaining septic tank is a continued source of pollution) *(319(h) Grant only)*

**Proposal Evaluation Periods:**
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. If the project is not funded in the current evaluation cycle, it will be considered in the following cycle with no need to resubmit (unless there is a need to update the proposal). If the project is not funded by the end of the state fiscal year, the proposal will need to be resubmitted for evaluation.

**Proposal Guidance:**
Please provide information in the fields provided in Parts I through VI of the project information proposal in detail, and write n/a for response on field(s) that the proposed project is not addressing. More complete information will provide reviewers a better understanding of the proposed project.

All proposal requests must be **submitted electronically** to the Grant Coordinator in the Nonpoint Source Management Program. If you have any questions or need further information, please contact the Grant Coordinator or email SF_NPSM@floridadep.gov or visit our website: https://floridadep.gov/wra/319-tmdl-fund/.

**Definitions and Terms:**

- **Size of Land Area Being Treated** – The size of the contributing land area, in acres (usually a watershed or sub-basin) that drains to the project being constructed.
- **Size of Project Impact** – The size of the site in acres where the project is being constructed (usually the extent of the permitted plans).
- **Waterbody Identification (WBID) -** The term is used interchangeably with waterbody segment. For more information on WBIDs, please visit the DEP Basin 411 website: https://floridadep.gov/dear/watershed-assessment-section/content/basin-411-0.
- **Pollutant of Concern** – "Pollutant of concern" means the pollutant or pollutants that have been identified as causing the impairment of a waterbody.
- **Total Maximum Daily Load (TMDL)** – A scientific determination of the maximum amount of a given pollutant that a surface water can absorb and still meet the water quality standards that protect human health and aquatic life. Waterbodies that do not meet water quality standards are identified as "impaired" for the particular pollutants of concern—such as nutrients, bacteria, mercury, etc.—and TMDLs must be developed, adopted, and implemented for those pollutants to reduce concentrations and clean up the waterbody.
- **Verified Impaired Water** Subsection 62-303.200(7), Florida Administrative Code (F.A.C.) – "Impaired water" shall mean a waterbody or waterbody segment that does not meet its applicable water quality standards as set forth in Chapters 62-302 and 62-4, F.A.C., as determined by the methodology in Part IV of this chapter, due in whole or in part to discharges of pollutants from point or nonpoint sources. The process for verifying that a water is impaired is described in Rule 62-303.400, F.A.C.

## Additional 319(h) Grant Guidance

**Nonpoint Source Definition:** https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution

The term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act:

- The term "point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

EPA Guidelines for States and Tribes on the 319(h) Grant Program can be accessed at the following link: https://www.epa.gov/sites/production/files/2015-09/documents/319-guidelines-fy14.pdf.

**Funding Breakdown Required in the 319(h) Grant:**
The 319(h) grant stipulates that a minimum of 50% of the state's grant funds must go towards projects that implement adopted EPA Approved nine element Watershed Based Plans (WBPs). The remaining 50% or less of the funding is not limited to projects that implement the BMAPs.

Activities necessary to implement nine-element WBPs or acceptable alternative plans for watersheds containing one or more impaired waters are considered to be restoration activities under these EPA guidelines. As discussed in EPA's Handbook for Developing Watershed Plans to Restore and Protect our Waters (https://www.epa.gov/nps/handbook-developing-watershed-plans-restore-and-protect-our-waters), EPA expects WBPs to focus not only on the impaired segments within the watershed, but when possible, to identify currently unimpaired waters where protection and load reduction actions are necessary to ensure that high quality waters do not become impaired, and address conditions that may contribute to impairments downstream. In many cases, a mix of actions to restore waters and protect unimpaired waters may be necessary to comprehensively implement WBPs and successfully address NPS pollution.

Florida nine-element Watershed Based Plans (referred to as Water Quality Restoration Plan(s) in the project information proposal) approved for watershed funding by EPA include:

- Adopted Basin Management Action Plan(s) (BMAP)
- Adopted Reasonable Assurance Plan(s) (RAP)
- Additional Alternative Plans may be sent to EPA through the Florida Nonpoint Source Management Program, for approval upon Plan development

**Match Funding Eligibility Criteria**
Projects should include a minimum 40% nonfederal match (that is, Section 319 funding should generally not exceed 60 % of the total eligible project cost).

***Eligible Projects/Activities for Match Funding:***

- The same types of projects/activities that are eligible for grant funding are eligible to use for match funding.
- In addition, planning, engineering, and design activities are eligible to use for match funding.
- Certain in-kind services can count towards a match.

***Ineligible Projects/Activities for Match Funding:***

- The same projects/activities that are ineligible for grant funding are also ineligible for match funding, with the exception of planning, engineering, and design.
- Federal funding and other federal in-kind services cannot count as a match.

# PART I – GENERAL INFORMATION

**PROPOSAL FOR GRANT FUNDING CONSIDERATION** *(For this project, check all grants that you would like to be under consideration to receive funding. Reviewers will evaluate the project for the applicable funding sources in this project information proposal.)*

- ☑ Federal EPA 319(h)
- ☑ State Water Quality Restoration Grant

**PROJECT CATEGORY:** *Check all that apply*

- ☑ Stormwater
- ☐ Agricultural Best Management Practice(s) (BMP)
- ☐ Onsite Sewage Treatment and Disposal Systems (OSTDS)
- ☑ Water Quality Monitoring Only (*of installed nonpoint source BMP(s))*
- ☑ Education Only
- ☐ Other Water Quality *(describe)* _____
- ☐ Hydrologic Restoration

**PROJECT SUB-CATEGORY:** *Check all that apply*

- ☑ Urban Stormwater Runoff
- ☐ Erosion Control
- ☑ Low Impact Development/Green Infrastructure (LID)
- ☐ Coastal *(if the project is directly or indirectly impacting waters along the coastline, specify which):* _____
- ☐ Protection of Unimpaired Water(s)
- ☐ Protection of Groundwater
- ☑ Education – LID/Green Infrastructure
- ☑ Education – Nonpoint source pollution
- ☐ Education – OSTDS
- ☑ Education – Florida Friendly Landscaping (FFL)
- ☐ Education – Green Industries BMP (GI-BMP)
- ☑ Education – Waterfront Property Owners
- ☐ OSTDS Septic Tank Abandonment; *(also enter # of septic tanks eliminated):* _____
- ☐ OSTDS Connecting Property Owners to Sewer, not including main line installation; *(also enter # of septic tanks eliminated):* _____
- ☐ OSTDS Inspection and Education
- ☐ OSTDS Inventory/Update of DOH Database

**PROJECT FUNDINGSTATUS:** *Check all that apply*

- ☑ New project that was not previously funded with State or Federal funds through the Department.
- ☐ Part of or whole proposed project pending for federal or state funding through the Department.
  - ☐ *If any phase of proposed project is pending selection for State or Federal funds through the Department, provide project name and funding amount (grant and match, if applicable):* _____

☐ Phase of proposed project (or existing/ongoing project) previously funded through the Department.

☐ *If any phase of project previously funded with State or Federal funds through the Department, provide project name, funding amount (grant and match, if applicable), and DEP Agreement No.(s):*

_____

**ENTITY/SPONSOR NAME: Stetson University, Institute for Water and Environmental Resilience**

**CONTACT INFORMATION:**

NAME: JASON M. EVANS
Street Address: 421 N. Woodland Ave.
City, State, Zip: DeLand, FL 32723
Telephone: 386-822-7910
Email: jevans1@stetson.edu

**PROJECT NAME: Sandra Stetson Aquatic Center Green Infrastructure Demonstration and Performance Monitoring**

**PROJECT BACKGROUND:**

*Describe how the Entity/Sponsor has determined the need for this project. This may any decision-making process(s) and/or legislative mandate(s) and/or stormwater master plan(s) and/or operations and maintenance plan(s) that identifies this project a s a priority and/or describes how this project will benefit water quality in the project area.*

Stetson University is currently operationalizing its newly constructed Stetson Aquatic Center, located on a ten-acre site along Lake Beresford within the St. Johns River system, as a laboratory field station for the Institute for Water and Environmental Resilience. Engaging students, faculty, and the general public in research and outreach activities that benefit the ecological quality of springs, aquifers, and the St. Johns River is a primary mission for the Institute. The Center building, which is scheduled to open in March 2019, contains spaces for a wet laboratory, conference room, support offices, and a multi-use classroom. Volusia County has contributed $400,000 to the facility for public access, education, and centralized wastewater hook-up through the local ECHO Grant program.

The EPA 319 funds are being sought to enhance the Stetson Aquatic Center's newly constructed stormwater features with native littoral plantings, floating islands, and rain gardens for direct nutrient treatment of runoff from a medium-density residential watershed. The site has direct surface water connections to Lake Beresford (WBID #2893U), which is listed as Impaired for Nutrients (Chlorophyll-a, Total Phosphorus, and Total Nitrogen). There is a draft TMDL status for Lake Beresford for TP and TN. The site is also located within the Volusia Blue Spring BMAP area, which has a pending listing for nitrate.

Although the Stetson Aquatic Center is connected to a centralized wastewater system, all homes located up-gradient of the facility are served by on-site septic tank systems. Residential fertilizers

and drain field effluent are apparent sources of nutrients within the stormwater watershed that the project's green infrastructure interventions will be designed to treat. The site will also serve as a broader educational facility for demonstrating the benefits of green infrastructure to university students and the broader public.

**PROJECT LOCATION:** *If the project is covering a large area, please describe the extent of the project area, and include the centroid latitude/longitude. If known, additional latitudes/longitudes may also be included. If available, please attach GIS files for the project(s). We will need this information to calculate credits and reductions for projects that are funded and included in the Water Quality Restoration Plan(s).*

Geographic Location of Project (e.g. city, county, street address): 2636 Alhambra Rd., Deland, FL 32720

Size of Project Impact (area needed to build project): 0.5 acres
Size of Area Being Treated: 20 acres

Latitude (decimal degrees): 28°59'59.64"N
Longitude (decimal degrees): 81°21'22.82"W

**PROJECT FUNDING REQUEST AMOUNT:** $ 60,000, with $40,000 match
*(If request is for more than one Grant type, please breakout the plan (if known) for how the grant funds will be used for each Grant type request in the table below).*

**ORGANIZATION LOCAL FUNDS AND/OR MATCH COMMITMENT AMOUNT:** $
*(Match is not required for all Grants but may still be used to evaluate projects for consideration of grant funding. If the project information proposal request is planning for more than one funding source, please breakout the match amount applied towards each funding source in the table below. Note that Match is required for 319(h) grant requests.).*

| Project Proposal Funding Source Requested | Funding Requested Amount | Local and/or Match Commitment Amount | Local and/or Match Commitment Source |
|---|---|---|---|
| Federal 319(h) Grant | $60,000 | $40,000 | In-Kind Staff Time, Waived Indirect Cost, Volunteer Labor, Foundation Grant |
| State Water Quality Restoration Grant | $ | $ | |

**ADDITIONAL DETAIL OF LOCAL COMMITMENT TO THE PROPOSED PROJECT AND FUNDING PARTNERS:**
*(Provide information to demonstrate your organization's commitment to the project (e.g., required in the BMAP, RA Plan, or Alternative Restoration Plan; other secured funding sources, stormwater fees etc.), if there are any not described in the table above. Include a narrative description for each anticipated source of local funds and/or match committed to the project*

*information proposal request or entire project (e.g., St. Johns River Water Management District $X, Leon County $X, City of Tallahassee in-kind contribution equivalent to $X, etc.).*

Volusia County

- Does the proposal's organization have a dedicated stormwater fee?
  Yes ☐ No ☑

  If yes, state the monthly fee:

**TOTAL COST (Sum of Proposed Project Funding Request and Entity Local and/or Match Commitment Amounts): $**

Does the total cost shown above equal the total cost of the entire project?
*(i.e., project will be fully funded if project is selected for funding with the requested amount and local funds and/or match commitment provided):*
Yes ☑ No ☐

If no, what is the total cost of the proposed project *(e.g., funding request is for a phase of a larger project or there are other expected funding contributing partners)*: $

If no, what are the other funding sources for the total cost of this project? *List all expected funding sources and amount required to complete the project*: _____

**COST EFFECTIVENESS:**
*Describe how this project is cost effective for reducing pollutants contributing to water quality impairments and/or restoring water quality. For non-structural projects, describe how the cost effectiveness of the project will be measured, including the methods used (e.g., surveys, monitoring changes in behavior, etc.).*

**PROPOSED PROJECT READINESS TO PROCEED:**

**Design Status:** *(check applicable)*
- ☐ Design is not required for this project.
- ☐ Project is 100% designed
- ☐ Project is between 60% and 100% designed
- ☑ Project is partially designed but less than 60%
- ☐ Project is at the conceptual stage, design has not started

**Permit Status:** *(check applicable)*
- ☑ Permits are not required for this project
- ☐ Project is fully permitted (100%).
- ☐ Between 50% and 100% of the permits have been obtained
- ☐ Less than 50% of the permits have been obtained
- ☐ Permitting process has begun but no permits have been obtained

☐ Permitting process has not started

**Project Start Date:** *(check applicable)*

- ☑ Project construction/eligible grant and/or match activities can start immediately after of notice of funding award.
- ☐ Project construction/eligible grant and/or match activities can start within 6 months of notice of funding award.
- ☐ Project construction/eligible grant and/or match activities can start within 12 months of notice of funding award.
- ☐ Project construction/eligible grant and/or match activities cannot start until 12 months or more after notice of funding award.

**Length of Time Expected to Complete Proposed Project:**
*How long will the entire project take to complete, if requested amount covers all work for the entire project? If part of a larger project, how much time will be needed to complete all work for the funding requested and local funds and/or match commitment provided?*

*Include the estimated timeframe in number of months for each applicable task so that the reviewers will know how much time is needed, regardless of when the project evaluation process takes place. Note that tasks may take place concurrently (e.g., education may take place throughout the entire project period). If tasks are performed concurrently, do not add time to the overall project timeframe unless the task(s) need additional time to complete.*

*Add applicable tasks if they are not listed below. If a task does not apply for the proposal, mark the task N/A so that reviewers will know that this section was not overlooked.*

**Do not include the time for work that has already been completed (which is not eligible for grant funds).**

No. of Months for Design and Permitting: 3 months
No. of Months for Bidding/Subcontracting:
No. of Months for Construction: 6 months
No. of Months for Education: 15 months
No. of Months for Water Quality Monitoring: 15 months
No. of Months for Reporting: 3 months

Total No. of Months to Complete: 15 months

**ADDITIONAL PROPOSAL INFORMATION:** *Please complete as applicable.*

- Is the project expected to be located in or primarily benefit a financially disadvantaged community? (e.g., Rural Economic Development Initiative)? *Information on REDI can be found at the following website:* http://www.floridajobs.org/docs/default-source/community-planning-development-and-services/rural-community-programs/redi/raomap1.pdf?sfvrsn=2.
  Yes ☐ No ☑

If yes, name the community:

If yes, *also find the nearest Census Place Name on the linked spreadsheet, enter the Census Place number in the Afford 1 tab, and* check the appropriate calculated Index Number below: https://floridadep.gov/wra/srf/documents/using-census-places:

*Enter Census Place Name used for calculation*: _____

☐ Index Number between 00-70
☐ Index Number between 71-85
☐ Index Number between 86-100
☐ Index Number greater than 100

- **Are any of the grant or match activities in this project proposal required under a municipal separate storm sewer system (MS4) or stormwater NPDES permit?**
  *Projects implementing requirements of an MS4 permit are not eligible for 319(h) funds. However, elements that are above and beyond what is required in the permit may be eligible. More information on the Phase I and Phase II MS4 permits can be found at the following website:* https://floridadep.gov/water/stormwater/content/municipal-separate-storm-sewer-systems-ms4
  ☐ Yes ☑ No

  If yes, describe.

- **Does the Proposal Organization have an O&M plan and expected funding identified (including in-kind contributions) that will be needed to operate and maintain this proposed project (mainly for structural projects)?**
  *Projects implementing requirements of a Water Quality Restoration Plan are expected to be maintained for the life of the BMP to retain load allocation credits under the Plan(s). Please identify, if possible, how much time, cost and work will be required to maintain the system and the expected lifetime of the BMPs.*
  ☐ Yes ☑ No

  If yes, describe.

- **Does the Proposal Organization have a long-term master plan to address all stormwater construction and operations/maintenance needs for their community?**
  ☐ Yes ☑ No

  If yes, describe.

# PART II: PROJECT WATERSHED CHARACTERISTICS

**WATERBODY ADDRESSED:**

1. Provide the name of the waterbody(s) that this project addresses:
   Lake Beresford and Volusia Blue Spring

2. Provide the WBID number(s) for the waterbody segment(s) that this project addresses.
   *Waterbodies are typically divided into segments which are identified by Water Body Identification (WBID) numbers. Water quality impairments are associated with the WBIDs, not the entire waterbody. Here is a link where that information can be found:* https://floridadep.gov/dear/watershed-assessment-section/content/basin-411-0

   2893U – Lake Beresford

3. List the parameter(s) the waterbody is impaired for that this project addresses.
   Nitrate (NO3), Total Phosphorus, Total Nitrogen

4. Does the project treat water that discharges directly into an impaired WBID(s)?
   Yes ☑ No ☐

   During extreme rainfall conditions, the stormwater pond has overflow discharge features that will direct flow into Lake Beresford.

   If yes, identify the **WBID(s)** that the treated water directly discharges into.

   2893U

   If no, then describe how the project contributes to reductions of the parameters impairing the WBID(s). *(e.g. does the unimpaired receiving water body discharge into an impaired water body and if so, describe how)*

**Please note, if the project does not reduce non-agricultural nonpoint source pollutants in an impaired waterbody, it may not be eligible to receive funding under the State Water Quality Restoration Grant.*

**IMPLEMENTATION OF A WATER QUALITY RESTORATION PLAN(s):**
*If available, please attach GIS files for the project(s). We will need this information to calculate credits and reductions for projects that are funded and included in the Water Quality Restoration Plan(s).*

5. TMDL Report Name that project is addressing, if applicable:

   If addressing a TMDL, identify the pollution reductions and parameters specified in the TMDL:

6. Does this project fall within the geographical boundaries of any of the following: *(check all applicable)*

   ☑ Developing BMAP
   ☐ Adopted BMAP

   ☐ Developing RAP
   ☐ Adopted RAP

   ☐ Developing TMDL Alternative Plan/Alternative Restoration Plan
   ☐ Approved TMDL Alternative Plan/Alternative Restoration Plan

   ☑ Springshed Area
   ☑ Outstanding Florida Spring Springshed Area
   ☐ Priority Focus Area for an Outstanding Florida Spring

   If any of the above are checked, please complete the following:

   a. Enter name of Water Quality Restoration Plan(s): Volusia Blue Spring Basin Management Action Plan

   b. Identify if this project contributes to pollutant reductions specified in the Water Quality Restoration Plan(s).
      ☑ Yes ☐ No

      i. If yes, briefly describe the nonpoint source issues or pollutant reductions specified in the Water Quality Restoration Plan(s) that the project is addressing. Include plan page numbers where applicable.

      Page 21 of the BMAP report notes that the two largest sources of nitrate-nitrogen within the Volusia Blue Springshed are onsite sewage treatment and disposal systems (OSTDS; 54% of N load) and urban turfgrass fertilizers (UTF; 22% of N load). The contributing watershed for the stormwater detention pond is composed of residential low density and medium density land uses served by OSTDS and that contain large amounts of fertilized turf grass. The implemented BMPs are expected to provide enhanced denitrification within the stormwater system, thereby reducing nitrogen loading into both the groundwater system (thus contributing to pollutant load reductions within the Volusia Blue Springshed) and the surface water system during heavy rainfall events (thus contributing to pollutant load reductions within Lake Beresford).

Page 27 of the BMAP report lists a summary of potential credits to meet the TMDL. Stakeholder stormwater projects and DEP-approved credits for public education are listed as potential activities under the UTF nitrogen source, which is expected to meet a basin-wide load reduction of 7,210 lb/N/yr by year 15 of the BMAP implementation and full achievement of the TMDL. Public education at the site to promote reduced fertilizer usage, enhanced management of OSTDS, and conversion from OSTDS to centralized wastewater is expected to provide further load reduction benefits throughout the wider BMAP and TMDL area.

c. In addition to being located within a Plan area, is this project also listed in the Florida Statewide Annual Report on TMDLs, BMAPs, MFLs, and Recovery or Prevention Strategies (https://floridadep.gov/star)?
   ☐ Yes ☑ No

   i. If yes, provide the BMAP Project Number: _____
   ii. and/or, provide the RAP Project Number: _____
   iii. and/or, provide the TMDL Alternative/Alternative Restoration Plan Project Number: _____
   iv. and/or, provide the Recovery or Prevention Strategy/Project Name: _____

d. If the project is located within a Springshed Area, Outstanding Florida Spring Springshed Area, or Priority Focus Area for an Outstanding Florida Spring, does the project address: *(check all applicable, and note that these activities may not be eligible to receive funding under the 319(h) or State Water Quality Restoration Grants)*
   ☑ Water Quality *(describe): _____Pollutant load reduction for nitrate nitrogen* _____
   ☐ Water Quantity *(describe how the project will benefit the spring, including quantity of water made available in MGD):* _____
   ☐ Land Acquisition *(describe acres to be acquired):* _____
   ☐ Is the Project Listed in a Recovery/Prevention Strategy or Identified in a Regional Water Supply Plan as Benefitting an MFL?
      - If so, name the Strategy and Project Title:

**LAND USE and STATUS:**

**Land Uses of the Area Being Treated:**
*Enter the land use acreage in the table for the area expected to be treated, not just the area that the proposed project may occupy. The area being treated is the area that is contributing runoff to the treatment system. Please use the information based on the Florida Department of Transportation (FDOT) Florida Land Use Cover and Forms Classification System (FLUCCS) codes (or equivalent) for the most recent available year. Repeat for separate drainage areas if your proposal includes more than one separate and distinct drainage area.*

| Land Use<br>(Do not alter – All must be filled out; do not add categories; use a 0 for no acres) | Acres | % |
|---|---|---|
| Residential Low Density (1100) | 12.9 | 60.6 |
| Residential Medium Density (1200) | 8.4 | 39.4 |
| Residential High Density (1300) | - | - |
| Commercial and Services (1400) | - | - |
| Industrial (1500) | - | - |
| Extractive (1600) | - | - |
| Institutional (1700) | - | - |
| Recreational (1800) | - | - |
| Open Land (1900) | - | - |
| Agriculture (2000) | - | - |
| Upland Non-Forested (3000) | - | - |
| Upland Forests (4000) | - | - |
| Water (5000) | - | - |
| Wetlands (6000) | - | - |
| Barren Land (7000) | - | - |
| Transportation, Communication, and Utilities (8000) | - | - |
| Land Use Totals (Acreage and %) | 21.3 | 100 |

**NONPOINT SOURCE CONTRIBUTION AREA:**

7. Describe the source of the pollutants that are being treated by this proposed project (e.g. urban storm water, septic systems, agricultural runoff, etc.) and indicate in which of the above listed areas the sources are located. *Also describe how the runoff is getting to the proposed project site for treatment, whether the runoff is expected to come primarily from sheet flow or an agricultural canal, or if it will be directed through a major conveyance system (e.g., MS4 ditch or pipe), to help define the source for 319(h) projects.*

The treated pollutant sources will include urban stormwater conveyed from parking areas and the Stetson Aquatic Center building through curb and pipe systems, as well as nutrient-enriched shallow groundwater and sheetflow from up-gradient homes that utilize septic systems. An overview map is provided below as Figure 1.

**Land Ownership Status:** *(check one)*

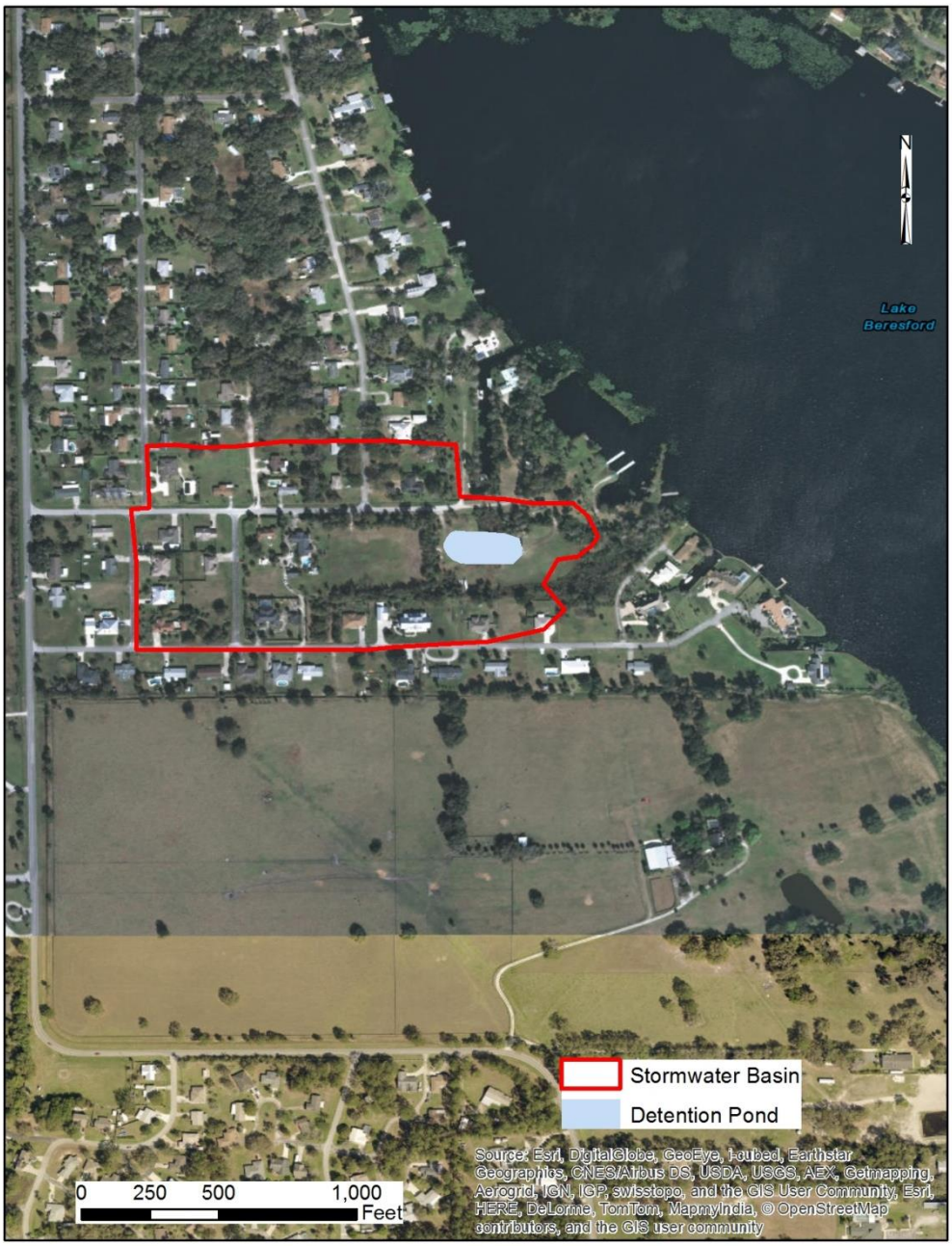
☑ Land necessary for the construction of treatment infrastructure has been acquired. Title is held by: Stetson University

☐ Land necessary for the construction of treatment infrastructure is under a legal option to buy (please provide documentation of the option-to-buy and funding to execute the purchase).

☐ Land necessary for the construction of treatment infrastructure is under an easement that allows for construction and access.

**Figure 1**

Site Map of Stetson Aquatic Center Stormwater Pond Basin



## PART III: DETAILED PROJECT DESCRIPTION

Include a full description of the proposed project. Project elements that are described on other submitted attachments but are not described in PART III, PART IV and/or PART V may not be considered as part of the project when evaluating the proposal for funding consideration.

*For education-only projects, you may skip Part III and Part IV and complete the information in Part V instead.*

8. **Description of only the proposed grant funded and (where applicable) local funds and/or match commitment activities**: *Provide sufficient detail so that the project evaluators will know exactly what is being constructed/implemented and how it will function. For treatment trains, include how the BMPs are connected and function as a train.*

   a. Provide a detailed description of all project activities and best management practices (BMPs) the grant and match funding is expected to be used for, including but not limited to, description of each activity and BMP, type of BMP(s), approximate size of each BMP, number/type of structures in each BMP, pond residence time, etc.

BMP #1: Approximately 600 square feet of native rain garden and pollinator species plantings within the overflow discharge zone for the pond, at an estimated cost of $15,000 ($25/square ft). Federal funds are requested for this BMP installation.

BMP #2: Approximately 300 square feet of floating wetlands within the wet detention pond, at an estimated cost of $9,000 ($30/square ft). Federal funds are requested for this BMP installation.

BMP #3: Approximately 2000 square feet of littoral shelf plantings along the pond perimeter, at an estimated cost of $20,000 ($10/square ft). Federal funds are requested for this BMP installation.

Volunteer and in-kind labor will be provided for BMP construction. Match funds of $8,000 will be provided the direct construction and planting activities.

Two educational signs (one at the pond site and one at the rain garden site) that provide background into the Volusia Blue Spring and Lake Beresford ecosystems, the issue of UTF and OSTDS nutrient loading into listed waters, description of the BMP interventions, and notation of contributing funding sources, at an estimated cost of $8,000. Federal funds are requested for these outreach and education tools.

Performance monitoring of the BMPs. Water quality metrics will include pre and post-BMP measures of dissolved Nitrate-N, Total Nitrogen, Total Phosphorus, and Chlorophyll-a in the stormwater pond. Biological & ecological metrics will include survival rates and growth

rates for plant species in all BMPs. Estimated cost of performance monitoring is $20,000 over the course of the project. Federal funds are requested for $8,000 of performance monitoring. The remaining $12,000 will be provided through in-kind match.

Design of the BMPs. The design of the BMP installations will be implemented in a participatory process developed in cooperation with landscape architects already partnering with Stetson University through internal private foundation funding. This participatory design process will be funded through $10,000 of in-kind match.

Education programming in the form of two public workshops and classroom activities through Stetson University coursework will be provided at the Stetson Aquatic Center over the course of the project. This education programming will be funded through $6,000 of in-kind match effort.

Final report writing will be provided as an in-kind service, with in-kind faculty effort of $4,000.

b. Describe how the project is expected to treat nonpoint source pollution or improve water quality.

Floating islands are expected to provide 15-25% reduction of nitrate-nitrogen and TN within the stormwater pond, primarily through denitrification and uptake, resulting in reduced N loading into the groundwater system with the Volusia Blue Spring basin. Littoral shelf plantings are expected to provide additional denitrification and N-uptake. The rain garden is expected to result in volumetric runoff reduction, uptake and adsorption of P, and denitrification and N uptake, thus resulting is nutrient load reductions of both P and N into Lake Beresford and decreased N load into the groundwater system.

*c.* If the project proposal includes green infrastructure/low impact development features, highlight the expected BMPs or practices and what benefits will be added by including these features. *If known, describe if there are multiple uses and benefits provided by the LID such as expected value added to community use, if there is support by the community for LID implementation, added safety, nutrient reductions, long-term cost savings, etc.*

Littoral shelf, rain garden, and floating island systems will result in nutrient load reductions, as described above in section III.b., and community amenities that demonstrate the beauty of these systems for implementation in other areas.

d. Describe educational activities that are part of the project **in Part V of this project information proposal**, if applicable.

9. **Objective:** Explain how the activities and BMPs in the grant and local funds and/or match funded project proposal will reduce nonpoint source pollution. Include how they will benefit

the associated impaired water and, if applicable, implement the Water Quality Restoration Plan(s) or how they will protect unimpaired waters.

Expected direct load reductions from the BMPs are described above in section III.c. Additionally, the educational components are expected to result in decreased load of N & P from UTF through behavioral change in the Blue Spring and Lake Beresford watershed. Education and outreach programs are also expected to result in increased adoption of advanced OSTDS with nitrogen reducing technologies and conversion of homes from OSTDS to centralized wastewater in both the Blue Spring and Lake Beresford basins.

*10.* **Project Effectiveness Evaluation:** Describe how the success of the project will be evaluated, such as water quality monitoring, surveys, etc. Provide sufficient detail to indicate which activities and BMPs will be monitored and how.
***Note:*** *Effectiveness evaluation is required for all 319(h) projects.*

Monthly grab samples for nitrate, TN, TP, and Chlorophyll-a will be taken from the stormwater pond, including a pre-implementation and post-implementation period. The pre and post measures of water quality will be utilized as a primary basis for determining nutrient reduction. Plant survival and growth rate surveys will be implemented into Stetson University courses and utilized as the basis for senior research studies by undergraduate researchers.

11. **Project Funding and Timeline:** *for ONLY the Grant and Committed Local Funds and/or Match Funded Portions of the project proposal request*.

*In the table below, provide the estimated funding amounts and timeline for each grant and committed match funded step in the proposed project. Examples of typical descriptions have been provided but can be edited as needed.*

*Note that for the State Water Quality Restoration Grant project proposals, grant funds are expected to be used for construction of capital projects and match is not currently required to receive funding.*

*Note that for 319(h) project proposals, grant funds may be used towards construction, education, monitoring, and reporting. All tasks identified below may be considered to apply towards match for the 319(h) grant.*

| Description | Grant Funding | Match Funding | Estimated Timeframe to Complete Task |
|---|---|---|---|
| Design, Permitting | $ | $10,000 | 03/15/2019 to 06/15/2019 |
| BMP Construction | $44,000 | $8,000 | 08/01/2019 to 02/01/2020 |
| Education *(319 only)* | $8,000 | $6,000 | 07/01/2019 to 09/30/2020 |
| Monitoring *(319 only)* | $8,000 | $12,000 | 07/01/2019 to 09/30/2020 |
| Final Report | $ | $4,000 | 07/01/2020 to 09/30/2020 |

12. **Additional Information (optional):** Include other relevant information about the project that has not been addressed in the previous questions (e.g., the presence of protected species at the site).

13. **Does the project use innovative technologies/BMPs?**
*For example, stormwater projects that include an extensive treatment train such as a combination of retention ponds, exfiltration trenches, and swales; or enhancements such as denitrification walls, alum and other polymer treatments, electrostatic panels, and parameter specific filters, etc., will be considered more innovative than projects that install a single conventional BMP.*

☑ Yes ☐ No

If yes, please explain how the BMPs are innovative.

The BMP interventions are innovative in the sense that they are enhancing a newly constructed and conventional detention pond system with a treatment train of littoral plantings, floating islands, and rain gardens. The BMPs are also innovative in the sense that a participatory design process that includes landscape architects and numerous stakeholders will include aesthetic beauty and educational functionality as fundamental design criteria, thereby increasing the likelihood of broader acceptance and implementation of similar techniques throughout the watershed.

14. **For Agricultural BMP Project Proposals:** *Check all that apply and attach supporting documentation, if applicable*

☐ Project is supported by both state and local grower associations.
☐ Project complements an existing BMP project or U.S. Department of Agriculture (USDA) program.

# PART IV – PROPOSED PROJECT ESTIMATED POLLUTANT LOAD REDUCTIONS

15. This proposal is for a **structural BMP** project.
☑ Yes ☐ No (If no, go to next question).

a. If the answer is yes, then enter the estimated load reductions and event mean concentrations (EMCs) in the Pollutant Load Reduction table for each BMP. *To check recommended BMP efficiencies, refer to the following link:* https://floridadep.gov/dear/water-quality-restoration/documents/statewide-best-management-practice-bmp-efficiencies

Baseline EMC values are estimated as 1.645 mg/l of N and 0.27 mg/l of P. Annual mass load estimations from the stormwater pond watershed are 108 lb N/yr and 18 lb P/yr. Estimated direct reduction of N are 26 lb N/yr and estimated direction reduction of P is 5 lb P/yr.

b. Describe how the estimated reduction(s) were determined, including the name of the model used: *For consistency, the Department recommends using the University of Central Florida BMPTrains Model.* http://stars.library.ucf.edu/bmptrains/

The BMPTrain model was used to develop annual average loadings for both N and P. Estimated reductions are estimated based upon a 15% uptake and denitrification for N and 15% adsorption and uptake of P in floating island, 5% N & P reduction in littoral shelf plantings, and 5% N and P load reduction in the rain garden. These values were derived from the UCF Stormwater Management Academy's 2015 publication for Florida Department of Transportation entitled Best Maintenance Practices for Stormwater Runoff, Designer and Review Manual (https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/maintenance/maintenance/rdw/bestmaintpracticesswrunoff.pdf)

c. If EMCs are not the primary parameter of the model, describe the source and type of the model information.

d. What are the estimated residence times of any ponds, swales, etc. Add rows as needed.

| Associated Task Number | Type of Structure (pond, swale, etc.) | Estimated Residence Time (in days) |
|---|---|---|
| - | - | - |
| - | - | - |
| - | - | - |

16. This proposal is for a **nonstructural BMP** project, such as demonstrations, or effectiveness evaluations.
☑ Yes ☐ No

a. If the answer is yes and you are unable to fill out the Pollutant Load Reduction table, please describe below how the project will reduce pollutant loads.

**POLLUTANT LOAD REDUCTIONS:** *Enter in the table below the load reductions of the impaired parameters that the above described project is estimated to achieve in the affected waterbody. Expand table as needed for load reduction per BMP implemented. Enter amounts in pounds/year (lbs./yr.).*

17. If the grant and match commitment work is part of a larger project:
    a. Are the reductions for the larger project: ☐ Yes ☑ No
       *Note that if the reductions are for the larger project, you will also need to break out the reductions for just the grant and match committed portion.*
    b. Are the reductions for the grant and match committed portion only: ☑ Yes ☐ No

**If the model used more than one EMC per parameter, then enter them in the Additional EMCs table along with the corresponding land use.*

**BMP #1 Name: Littoral Shelf Plantings**

| BMPs Installed | TSS lbs./yr. | TP lbs./yr. | TN lbs./yr. | Sediment lbs./yr. | BOD lbs./yr. | Other lbs./yr. | Other lbs./yr. |
|---|---|---|---|---|---|---|---|
| EMC* | - | 0.27 | 1.645 | - | - | - | - |
| Pre-Project | - | 18 | 108 | - | - | - | - |
| Post-Project | - | 17 | 103 | - | - | - | - |
| Load Reduction | - | 1 | 5 | - | - | - | - |
| % Reduction | - | 5% | 5% | - | - | - | - |

**BMP #2 Name: Floating Islands**

| BMPs Installed | TSS lbs./yr. | TP lbs./yr. | TN lbs./yr. | Sediment lbs./yr. | BOD lbs./yr. | Other lbs./yr. | Other lbs./yr. |
|---|---|---|---|---|---|---|---|
| EMC* | - | 0.27 | 1.645 | - | - | - | - |
| Pre-Project | - | 18 | 108 | - | - | - | - |
| Post-Project | - | 15 | 92 | - | - | - | - |
| Load Reduction | - | 3 | 16 | - | - | - | - |
| % Reduction | - | 15% | 15% | - | - | - | - |

**BMP #3 Name: Rain Garden**

| BMPs Installed | TSS lbs./yr. | TP lbs./yr. | TN lbs./yr. | Sediment lbs./yr. | BOD lbs./yr. | Other lbs./yr. | Other lbs./yr. |
|---|---|---|---|---|---|---|---|
| EMC* | - | 0.27 | 1.645 | - | - | - | - |
| Pre-Project | - | 18 | 108 | - | - | - | - |
| Post-Project | - | 17 | 103 | - | - | - | - |
| Load Reduction | - | 1 | 5 | - | - | - | - |
| % Reduction | - | 5% | 5% | - | - | - | - |

**TOTALS**

| BMPs Installed | TSS lbs./yr. | TP lbs./yr. | TN lbs./yr. | Sediment lbs./yr. | BOD lbs./yr. | Other lbs./yr. | Other lbs./yr. |
|---|---|---|---|---|---|---|---|
| Pre-Project | - | 18 | 108 | - | - | - | - |
| Post-Project | - | 13 | 82 | - | - | - | - |
| Load Reduction | - | 5 | 26 | - | - | - | - |
| % Reduction | - | 25% | 25% | - | - | - | - |

**Additional EMCs**

Use this table if there is more than one EMC used per parameter. Add rows as needed.

**BMP #1 – Additional EMCs**

| Land Use | TSS | TP | TN | Sediment | BOD | Other | Other |
|---|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |

**BMP #2 – Additional EMCs**

| Land Use | TSS | TP | TN | Sediment | BOD | Other | Other |
|---|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |

## PART V: ADDITIONAL QUESTIONS FOR PROPOSALS WITH EDUCATION COMPONENT(s)

Include a full description of the proposed project, if not described in PART III. Proposed project elements that are described on other submitted attachments but are not described in PART III, PART IV (if applicable), and/or PART V may not be considered as part of the project when evaluating the proposal for funding consideration.

**PROJECT INFORMATION:** *Please provide responses to the questions below. The questions in the section pertain to only the grant funded and local funded and/or match funded activities unless otherwise specified.*

18. Will the proposal entity be partnering with any other organization? Describe below and identify who will lead efforts for various project aspects.

    *Stetson University will partner with Volusia County, East Central Florida Regional Planning Council, and the West Volusia Audubon Society on educational components. Research collaborators at the University of Georgia's College of Environment and Design are providing design and performance monitoring support, as well as regional outreach and educational opportunities for graduate student.*

    *Volusia County is currently implementing a $240,000 USEPA 319 grant that is focused on green infrastructure and LID education within the Blue Spring Springshed. One of the primary comments received in workshops implemented to date is that Volusia County lacks readily accessible demonstration sites that can educate elected officials, developers, and the general public about green infrastructure and other stormwater BMPs. This project will help fill this missing educational and outreach link within the local community.*

19. What is the subject matter of the education outreach?
    *Septic maintenance education, reducing nonpoint source pollution from stormwater, reducing nonpoint source pollution through behavior change, LID/Green Infrastructure.*

20. What are the methods and frequency of outreach?
    *Two major workshops through the project duration, four volunteer planting events, and two expert lectures at the Aquatic Center will be implemented for public outreach. Passive outreach through signage will also be a component of the project. Stetson University students will be utilizing the site for coursework and senior research projects.*

21. What is the size and type(s) of the target audience for each method of outreach?

*Workshops of 50 people, volunteer planting events (including university students) to include up to 50 people, permanent signage, expert lectures – 100 people.*

22. Does any of the outreach described above include education on low impact development (LID)? *If yes, describe what types of LID will be the subject matter.*

    Workshops will demonstrate rain gardens and stormwater treatment trains as a scalable LID intervention that can be implemented in urban and other residential settings.

23. Describe any materials, not already listed, that will be developed or published under this project and the associated outreach method they will be used in.
    *Presentations, fact sheets, and flyers for workshops will be developed over the course of the project*.

24. Please describe how the proposed project is expected to reduce pollutant loads and/or protect unimpaired waters.
    *Plantings are expected to facilitate direct denitrification. Education programming into low-intensity landscaping and other green infrastructure practices are expected to contribute to behavioral changes that reduce nutrient loading from fertilizers and septic tanks throughout the watershed.*

**PROJECT OVERVIEW:** *Provide a more detailed narrative description of the project education components, keeping in mind the following items to address in the description (limit to 2 pages).*

- Include more details on the subject matter for each type of outreach listed above (if not described in detail in previous responses).

The Stetson Aquatic Center is opening in February 2019 through an innovative partnership between a private university (Stetson University) and Volusia County. A fundamental purpose of the site, as described in agreements with the primary donor for funding development of the site, Sandra Stetson, and the Volusia County ECHO grant program is public education about the area's water resources and demonstration of innovative water resource conservation and restoration techniques. Stetson University faculty and students will be utilizing the facility as a primary teaching and demonstration site, and the two public workshops and two expert lectures about green infrastructure and LID (as described above) will be held on-site at the Stetson Aquatic Center facility.

- How will you encourage public participation?

Partners from Volusia County, East Central Florida Regional Council, and the West Volusia Audubon Society will contribute email lists of participants in previous LID and green infrastructure workshops throughout Volusia County and the broader central Florida region. Stetson's Institute for Water and Environmental Resilience also maintains a large email list and Facebook page, where all events will be advertised. Direct outreach to neighbors to the facility will also be conducted, and signage will be posted on the Stetson University campus and through the Volusia County Department of Environmental Management.

*25.* **Project Effectiveness:** Measuring project effectiveness is a requirement under the 319(h) grant. Describe how the effectiveness of the education components of the proposed project will be measured. *Provide a detailed description of the method(s) used. Include estimated number of participants in the effectiveness measurement (limit to 2 pages). Examples of methods: surveys, monitoring changes in behavior.*

Educational program effectiveness will be measured through direct surveys of participants in the workshops and other outreach events. Participant surveys will be used to gauge both knowledge and attitudes about green infrastructure and LID. A more general public survey of knowledge and attitudes about green infrastructure and LID will also be implemented as a comparison to those who have taken part in the workshops. The survey effectiveness monitoring component will be implemented as a senior project at Stetson University under the direction of faculty affiliated with the Institute for Water and Environmental Resilience.

26. **Project Funding and Timeline:** *for ONLY the Grant and Committed Local and/or Match Funded Portions of the project request*.

*In the table below, provide the estimated funding amounts and timeline for each grant and committed match funded step in the project.*

| Description | Grant Funding | Match Funding | Estimated Timeframe to Complete Task |
|---|---|---|---|
| Education *(319 only)* | $8,000 | $6,000 | 07/01/2019 to 09/30/2020 |



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