

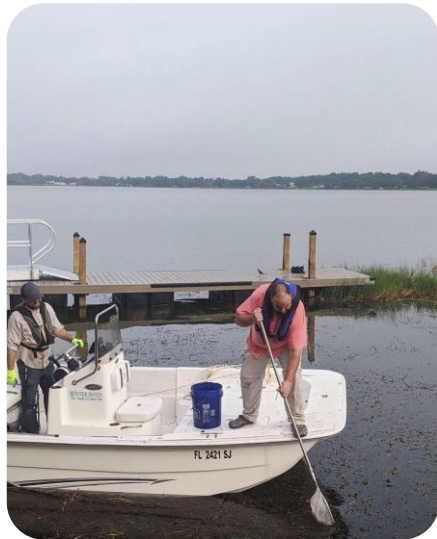
Making the Technical Accessible: Innovating Watershed Management

Devon Moore & Savannah Winstanley

Natural Resources Division

WINTER HAVEN
The Chain of Lakes City

What Do We Do?



City of Winter Haven Natural Resources

Mission:

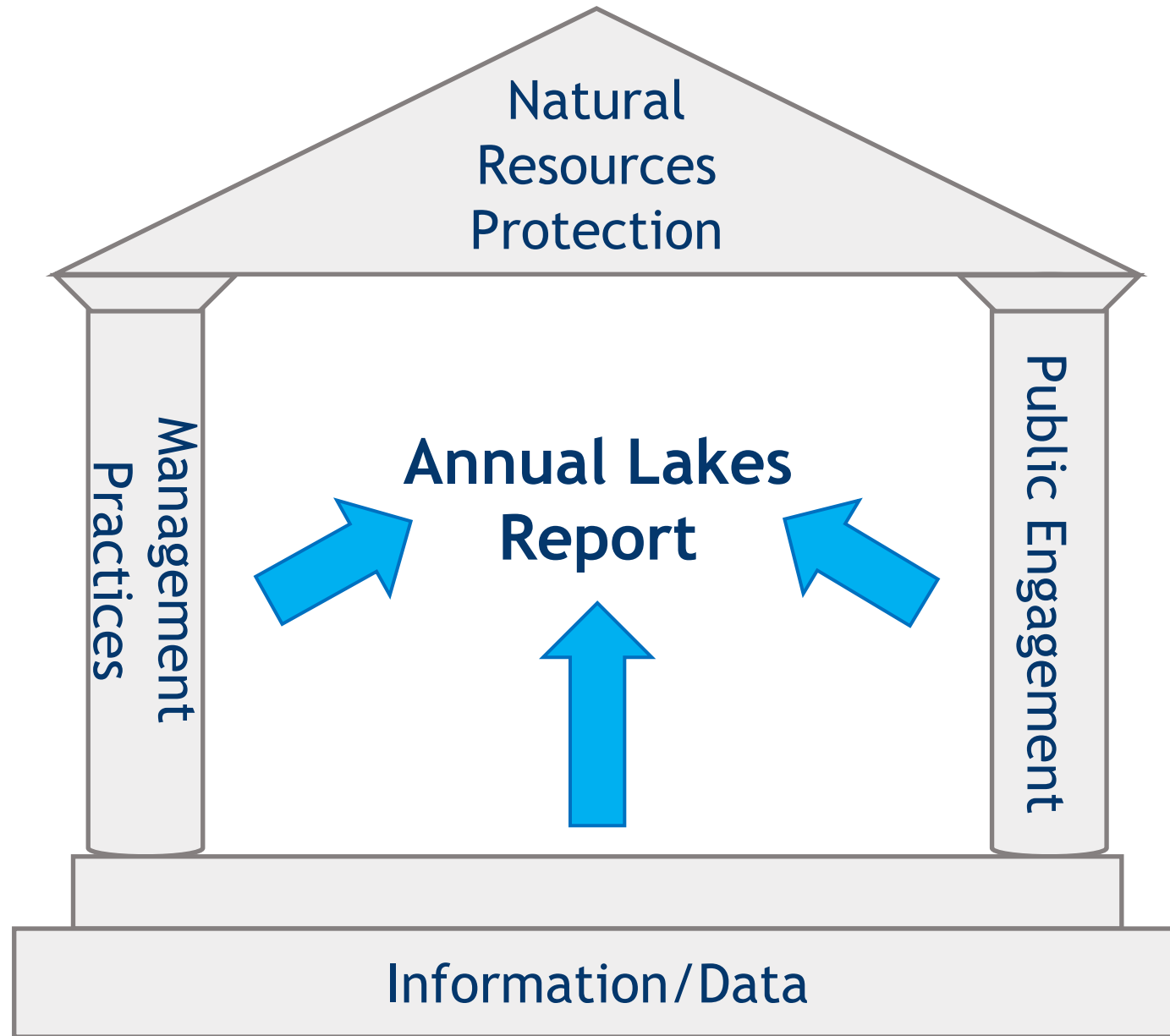
Maintain and improve local natural resources through management based on a sound understanding of social, economic, and ecological systems.

Vision:

To be the premier knowledge base for local natural resources, with an engaged public, supporting natural systems through a community ethic.

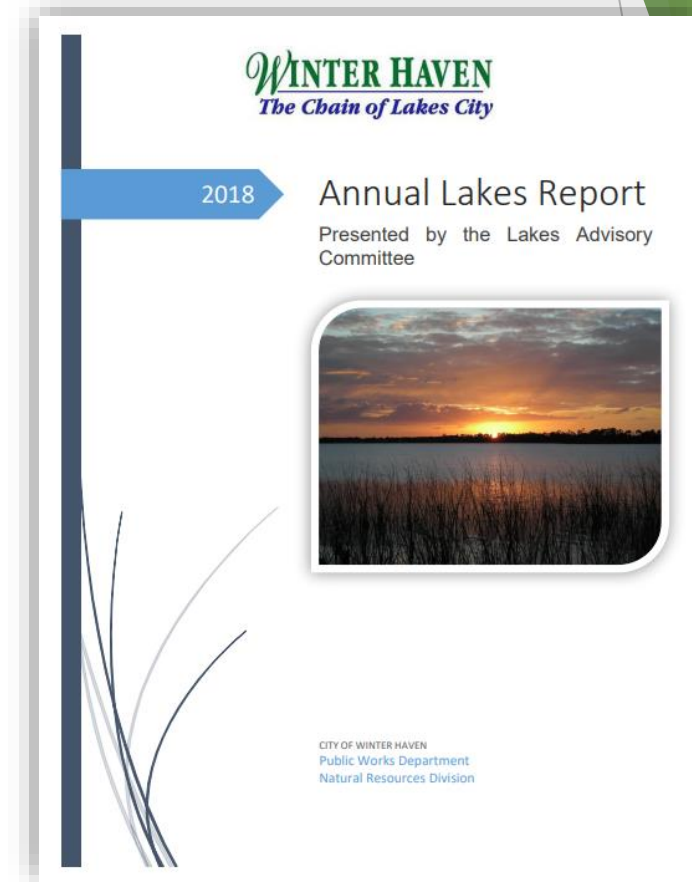
Purpose:

Balance the needs of diverse user groups to sustain natural resources the community can be proud of.



Objectives of our Annual Lakes Report

- ▶ Track lake health & management efforts
- ▶ Utilize data to drive decision-making
- ▶ Compile & disseminate information to the public & partner organizations
 - Technically sound
 - Generally accessible



Report Layout

How to Navigate this Document

Section	Description
1. Introduction	Purpose of the report Background info on the evaluation metrics Background info on the area lakes
2. Data Presentation & Analysis	Figures & Tables Current lake health data & trends Insights into lake health impacts
3. Management Strategies	Background on strategies the City is using to improve lake health Current management practices & successes Future strategic goals
4. Appendix	Additional & supplementary data References List of figures & tables
5. Water Quality Management Plans	Stats and info on individual lakes Primary challenges affecting water quality Unique strategic goals for each waterbody

▶ Introduction

▶ Data Presentation and Analysis

▶ Management Strategies

▶ Water Quality Management Plans

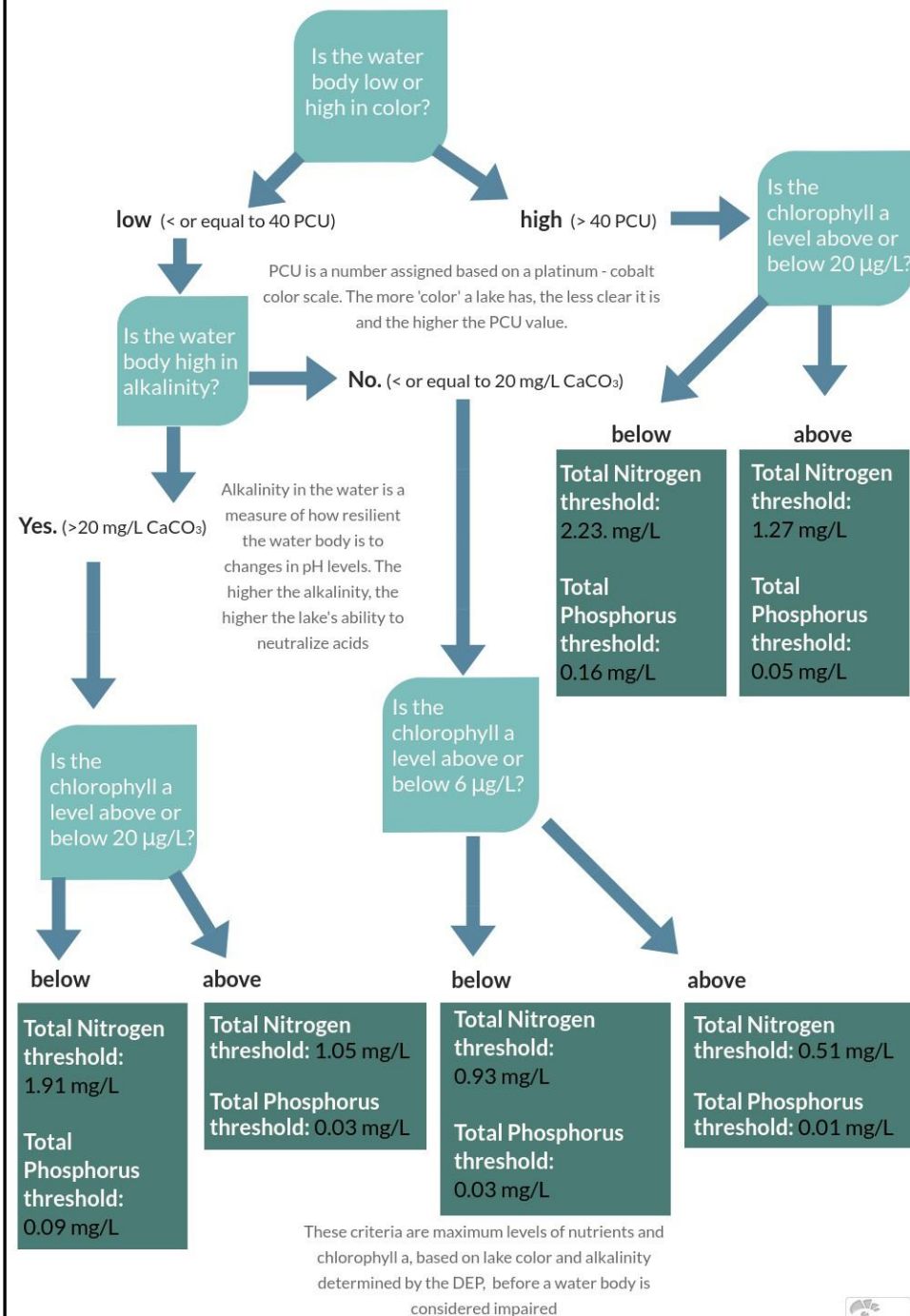
Introduction

► Purpose

► Watershed/Waterbody Info

► Metrics

- Water Quality
- Hydrology
- Biology



Data Presentation & Analysis

► Water Quality

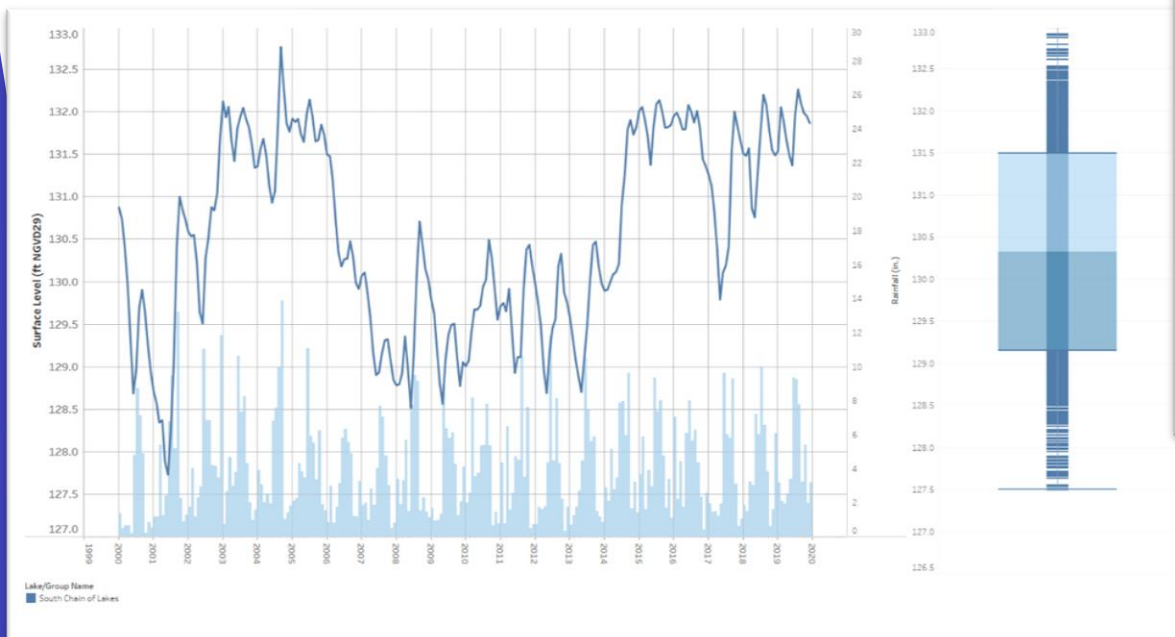
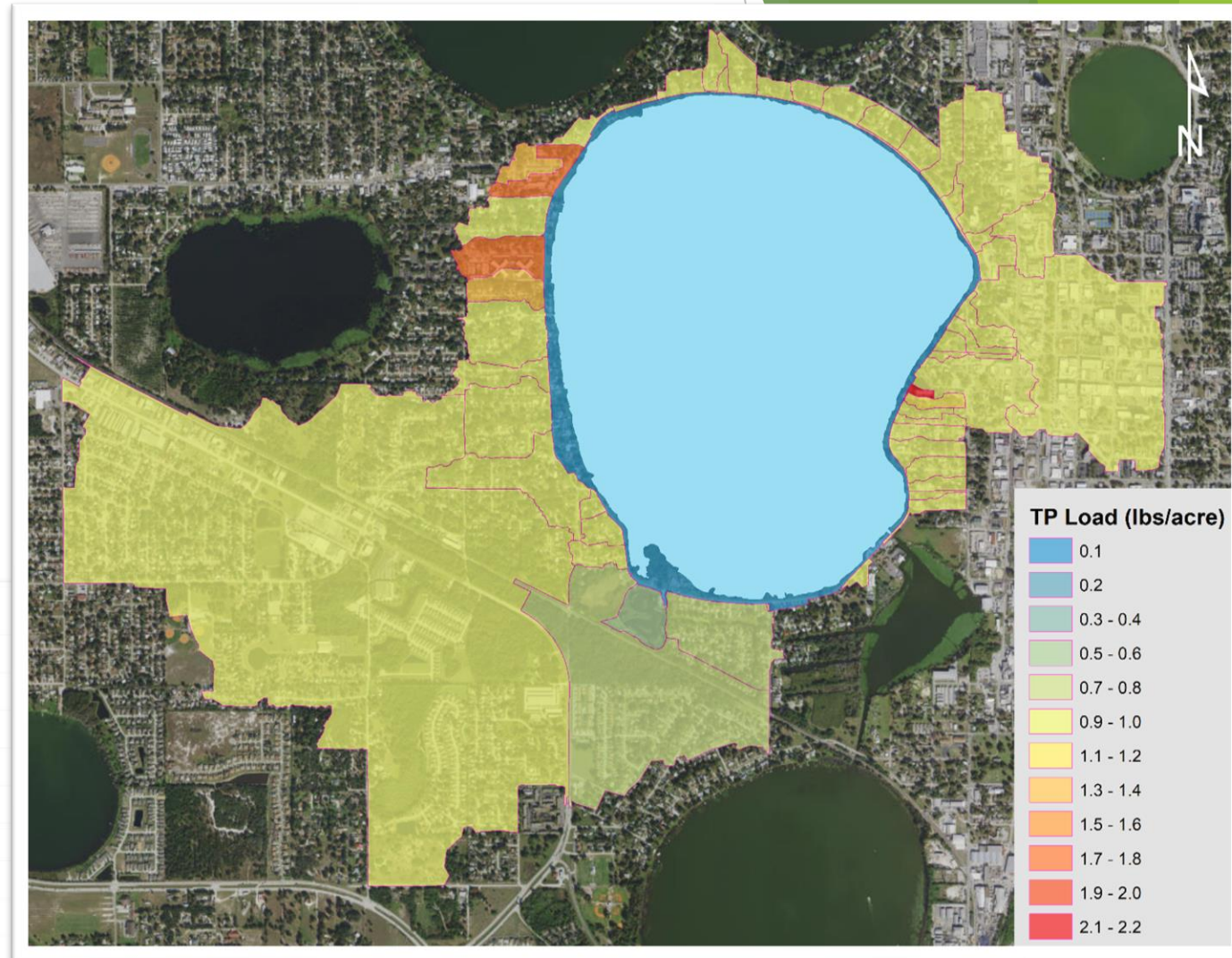
- Impairment (NNC)
- Long-term trends



Data Presentation & Analysis

► Hydrology

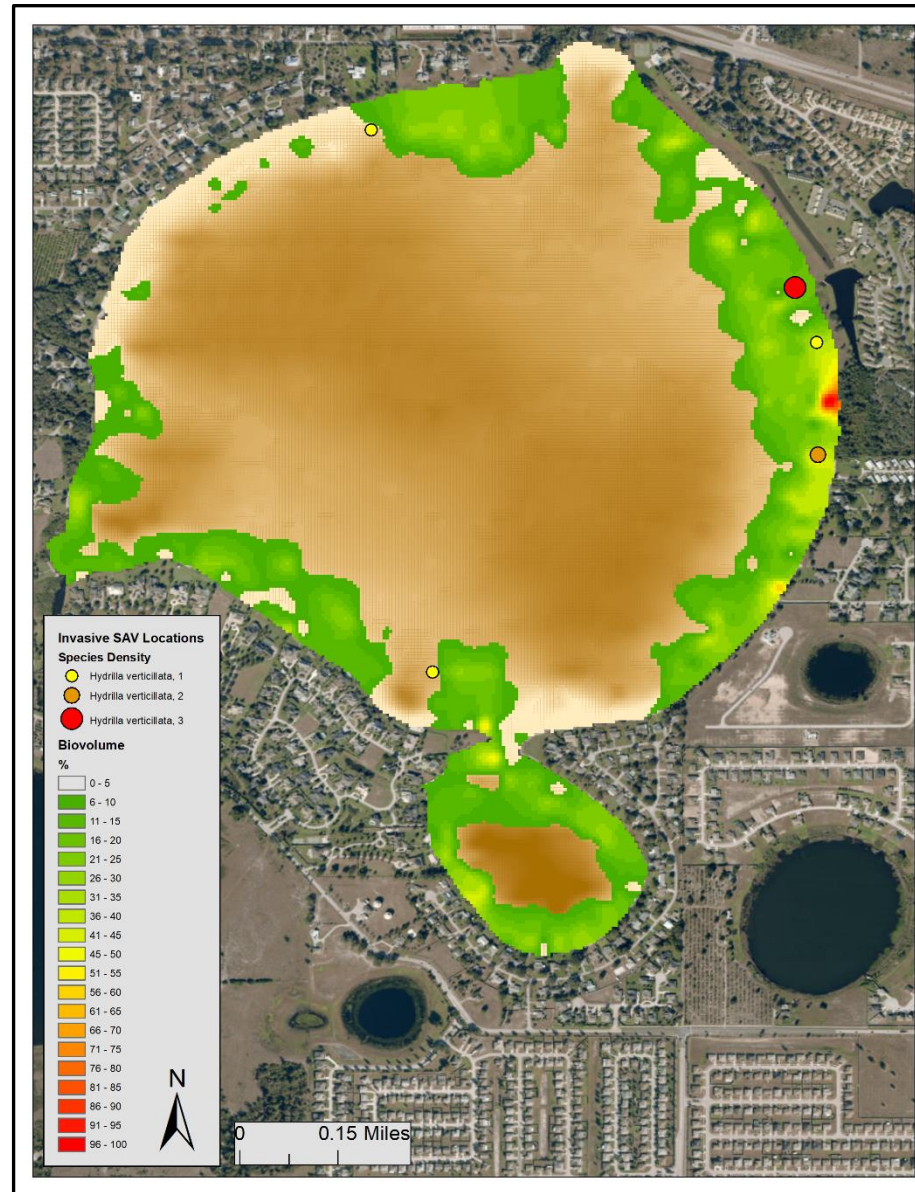
- Surface Levels
- Morphology
- Stormwater Loading



Data Presentation & Analysis

► Biology (Aquatic Vegetation)

- Abundance
 - PAC
 - Biovolume
- Diversity
 - Richness
 - Evenness
- Invasives



Data Presentation & Analysis

▶ Lake Health Index

- Identify common issues
- Track changes over time
- Prioritize management efforts

2019	Waterbody	NNC Impairment	WQ Trend				PAC	% Inv	Diversity	Lake Health Score
			Chla	TN	TP	Secchi				
North Chain of Lakes	Lake Conine	0	3	2	3	3	3	1	1	2.0
	Lake Fannie	3	2	2	2	3	2	1	2	2.1
	Lake Haines	1	2	3	2	3	2	0	3	2.0
	Lake Hamilton	0	0	0	3	0	1	2	2	1.0
	Lake Rochelle	0	3	3	3	3	3	0	1	2.0
	Lake Smart	0	2	2	3	2	3	1	2	1.9
	Little Lake Hamilton	0	1	1	2	1	2	3	1	1.4
	Middle Lake Hamilton	0	1	2	3	2	2	1	2	1.6
South Chain of Lakes	Lake Cannon	1	2	3	2	3	3	2	0	2.0
	Lake Eloise	0	2	2	2	3	2	1	2	1.8
	Lake Hartridge	1	0	0	1	0	3	1	2	1.0
	Lake Howard	1	3	3	2	3	2	3	3	2.5
	Lake Idylwild	1	2	1	2	3	3	1	2	1.9
	Lake Jessie	0	1	1	2	2	3	1	3	1.6
	Lake Lulu	0	3	2	3	3	3	2	2	2.3
	Lake May	0	3	3	3	3	3	1	3	2.4
	Lake Mirror	3	3	3	3	3	3	1	2	2.6
	Lake Roy	3	3	3	3	3	2	2	1	2.5
	Lake Shipp	0	3	3	3	3	3	1	1	2.1
	Spring Lake	3	3	3	3	3	3	1	3	2.8
	Lake Summit	3	3	3	2	3	3	2	2	2.6
Lake Winterset	3	3	3	3	3	3	0	3	2.6	
North Central Lakes	Lake Buckeye	3	3	3	3	3	3	0	2	2.5
	Lake Idyl	0	1	1	1	2	1	1	1	1.0
	Lake Martha	3	0	0	0	0	1	2	3	1.1
	Lake Maude	3	3	3	2	3	3	0	0	2.1
	Lake Silver	3	2	2	2	1	1	3	2	2.0
South Central Lakes	Lake Elbert	3	0	0	1	1	3	0	2	1.3
	Lake Link	3	2	3	2	2	NA	NA	NA	2.4
	Lake Mariam	3	1	2	2	2	2	0	2	1.8
	Lake Otis	2	2	2	2	2	2	0	3	1.9
Outlying Lakes	Lake Blue	0	2	2	3	2	1	3	2	1.9
	Lake Daisy	3	3	2	2	2	1	3	1	2.1
	Lake Deer	0	2	2	2	2	3	0	1	1.5
	Lake Mariana	0	1	1	2	0	2	3	2	1.4
	Lake Ned	3	0	2	0	0	1	1	3	1.3
	Lake Pansv	3	0	1	1	1	3	1	3	1.6

Management Strategies

Public Benefit:

Low impact development and green infrastructure projects provide multiple benefits including stormwater pollutant load reduction, groundwater recharge, reduced ponding in roadways, and aesthetic improvements. These social, economic, and environmental benefits make LID implementation an efficient and effective management strategy for the City.



Support of Mission, Purpose, and Vision:

LID implementation directly supports the Mission by using “a sound understanding of social, economic, and ecological systems.” To “Maintain and Improve local natural resources”. Improving hydrology and water quality help to “balance the needs” identified in the Purpose. LID construction is a realization of the Vision, in that the City has received outside support because other agencies recognized the City is the “premier knowledge base for local natural resources”.

Strategic Goals:

- Pursue funding to design and construct additional LIDs
- Prioritize the maintenance/repair of existing LIDs in the downtown area in 2020
- Develop SOP to ensure existing and newly built LIDs are maintained into perpetuity
- Utilize modelling software to estimate existing pollutant load reduction for each BMP

Completed Objectives:

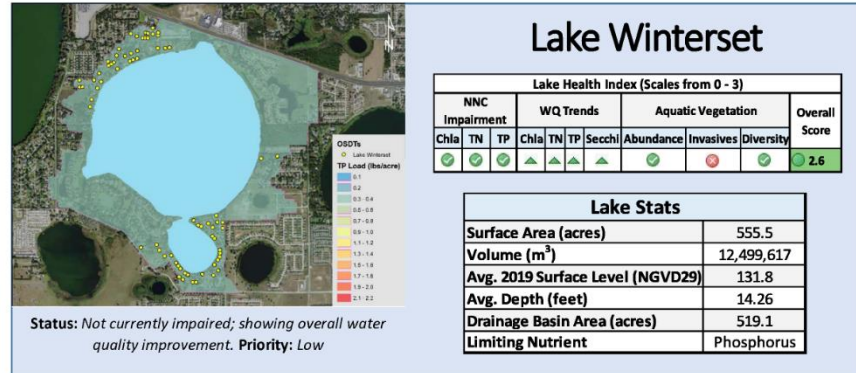
- ✓ Renegotiated contracts with funding partners to more realistically meet defined benefits
- ✓ Incorporated all LIDs and green infrastructure into the City's asset management inventory

▶ Description & Benefits

▶ Support of MVP

▶ Strategic Goals

Water Quality Management Plans



▶ Lake Health Index, Stats, & Priority Level

▶ Current WQ Impacts/Challenges

▶ List of Existing & Planned BMPs

Water Quality Impacts/Challenges	Best Management Practices
<p>Stormwater Pollutant Loading:</p> <p>Due to a lack of stormwater infrastructure, Lake Winterset receives runoff from a relatively small drainage basin. The majority of this area consists of residential developments which have implemented required stormwater mitigation best management practices (BMPs). Since phosphorus is the limiting nutrient in this waterbody, the above map depicts the annual Total Phosphorus (TP) load in lbs/acre. Lake Winterset's TP loading rate is comparatively low considering the entirety of the study area. The majority of this basin falls outside Winter Haven boundaries which limits the City's ability to implement stormwater mitigation BMPs.</p> <p>Onsite Sewage Treatment & Disposal (OSTD):</p> <p>The 71 septic systems (depicted as yellow points) are moderately dense in Lake Winterset's drainage basin. These systems can potentially contribute excess nutrient loads via groundwater leaching.</p> <p>Invasive Species Management:</p> <p>The Florida Fish and Wildlife Commission (FWC) has documented invasive species treatment in Lake Winterset since the late 1990s. Large-scale treatment of invasives using herbicide can cycle nutrient back into the water column. Throughout this time period, the overall treatment intensity has been low (<20% of the total lake area per year). However, Winterset did receive a whole-lake hydrilla treatment in 2016. This seems to have been only moderately effective as hydrilla made up roughly 10% of the plant community in 2019.</p>	<p>Existing Best Management Practices</p> <ul style="list-style-type: none"> Aquatic Vegetation Management: The City has been monitoring vegetation communities in Lake Winterset since 2017. The goal is to detect the spread of invasives early to reduce the amount of treatment needed at one time. <p>Future Management Strategies</p> <ul style="list-style-type: none"> Explore source analysis of septic systems in the drainage basin to determine if human waste is a major contributor to excess nutrients The City will continue to work with the FWC to manage for invasive species; utilizing alternative treatment methods where appropriate

Interactive Online Format: Nuts & Bolts

- ▶ Water quality, trend analysis, surface levels, regulatory status, and other lake information stored in relational databases
- ▶ Scripts auto-clean & update datasets
- ▶ Makes analysis quick & easy (using Tableau for visualization)
- ▶ Merging Desktop & online GIS datasets



Interactive Online Format: The Benefits

- ▶ Summarize & condense technical report into ‘story-telling’ format
- ▶ Usable on desktops & mobile devices
- ▶ Incorporate more visual elements
- ▶ Make data interactive & downloadable—tailorable to the user’s interests



Interactive Online Format: Walkthrough

Winter Haven Lakes Report

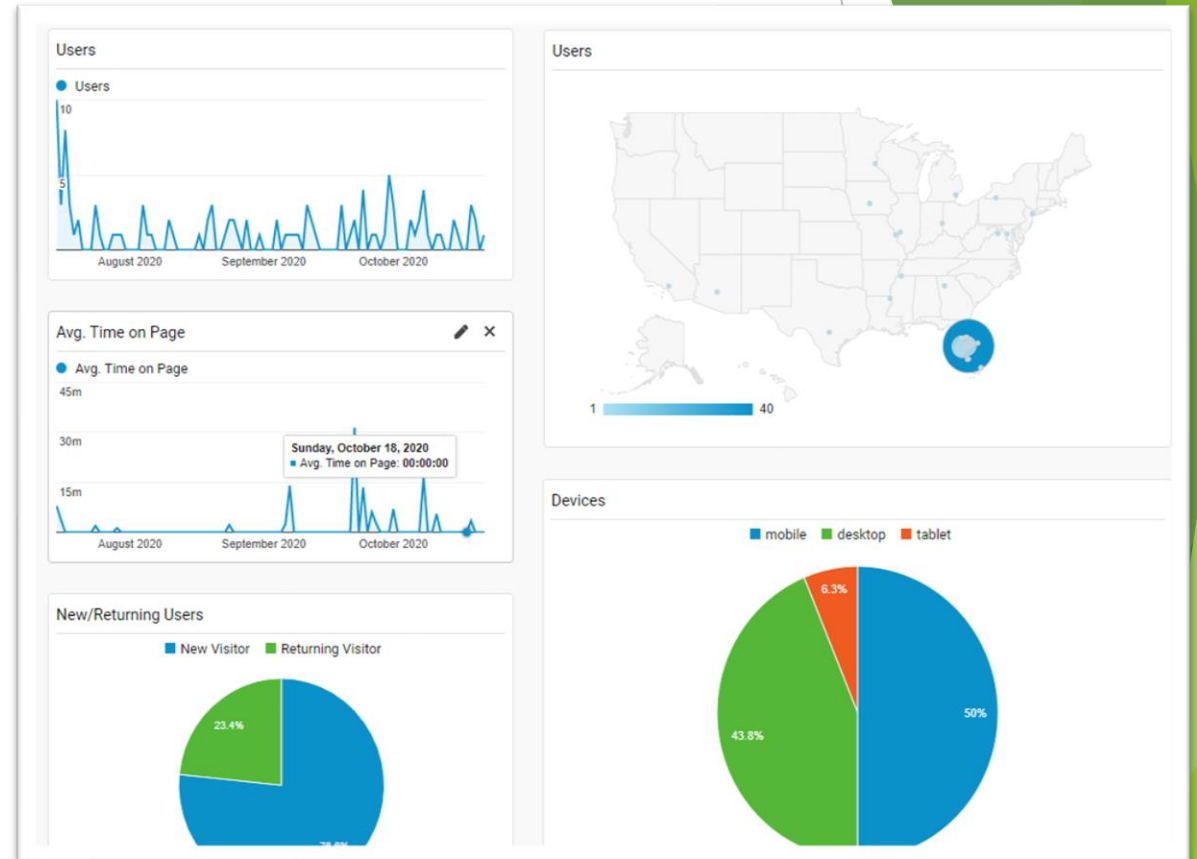
Annual report on the status of our local lakes and management strategies

City of Winter Haven, Natural Resources Division | October 8, 2020



Interactive Online Format: Engagement

- ▶ 96 unique users/746 views**
 - Avg. 5 views/day
- ▶ Users access via mobile & desktop evenly



Takeaways

- ▶ What message are you trying to send?
 - Determine how your data will be used
 - Understand your audience(s)
- ▶ What resources are at your disposal?
 - Try out different tools/software
 - Take advantage of free online training
- ▶ How can you make it better?
 - Never stop improving: methods, format, etc...



Thank You!

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