Quantifying the Ancillary Benefits of Constructed Treatment Wetlands

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Why Build a Wetland?

- Unit processes that can be designed to provide specified water quality improvements
  - Exceptional nutrient removal
  - Resilient
- Long and well-studied performance history
- Low operational and maintenance costs
  - Relies on land area (solar energy) vs. power (electrical energy)
- **Ancillary benefits**
  - **Wildlife habitat**
  - **Recreation**

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Sweetwater Wetlands Park

Gainesville, FL

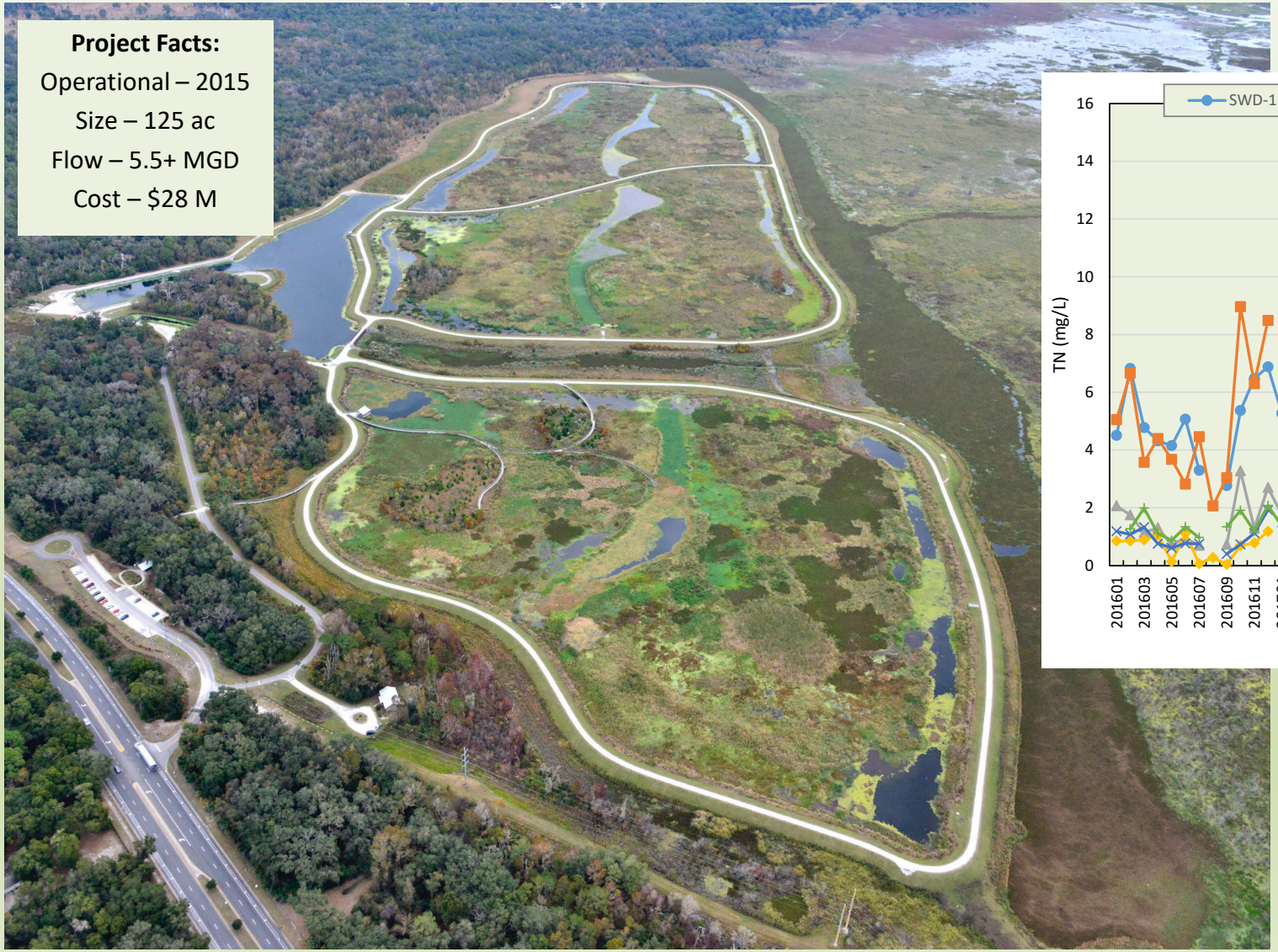
Project Facts:

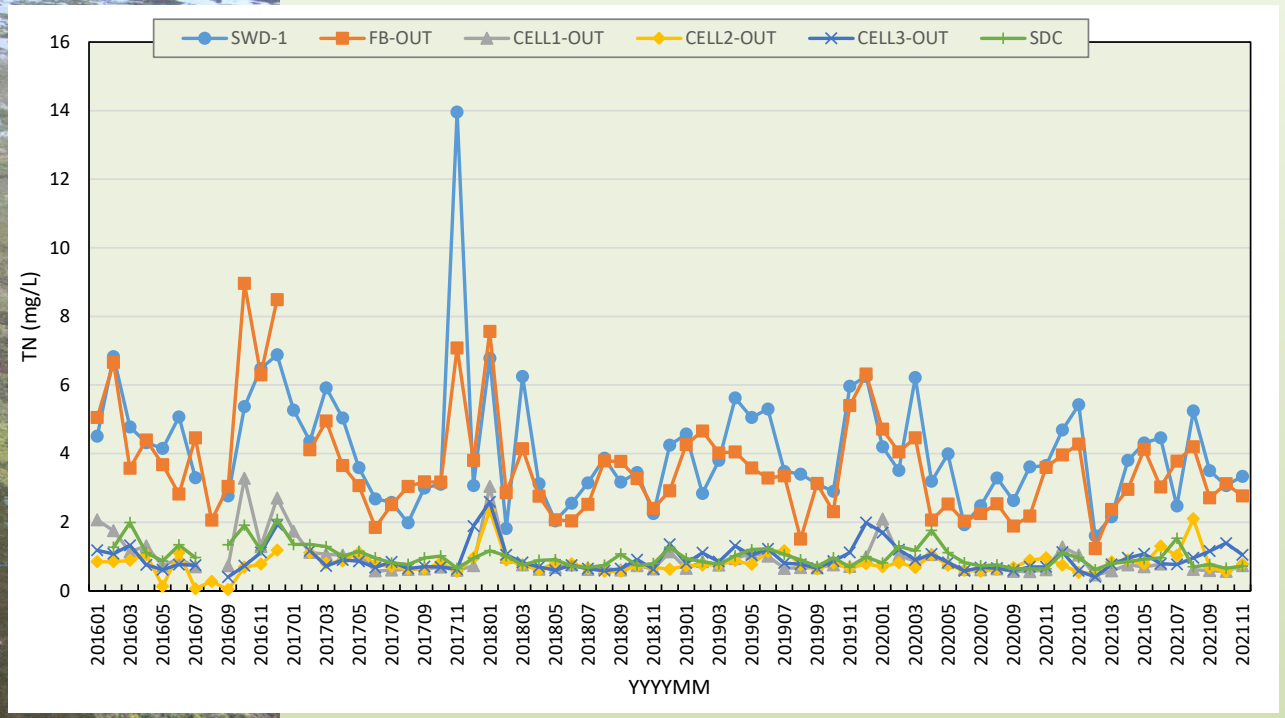
Operational – 2015

Size – 125 ac

Flow – 5.5+ MGD

Cost – $28 M





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How Do We Quantify Ancillary Benefits?

- Ancillary uses are any non-primary use (human use, wildlife use, stormwater storage, flood protection, etc.)
- Focus here is on human and wildlife use
- Ancillary uses can be a significant consideration during design
  - Human Use: boardwalks, overlooks, meeting space, etc.
  - Wildlife: topography, habitat types, plant species, etc.

- Human Use
  - Relatively easy to quantify
  - Trail counters, wheel counters, honor boxes
  - Challenges include equipment malfunction/inaccuracies, undercounts, non-compliance
- Wildlife Use
  - Difficult and expensive to quantify
  - Extremely time intensive
  - Visual surveys

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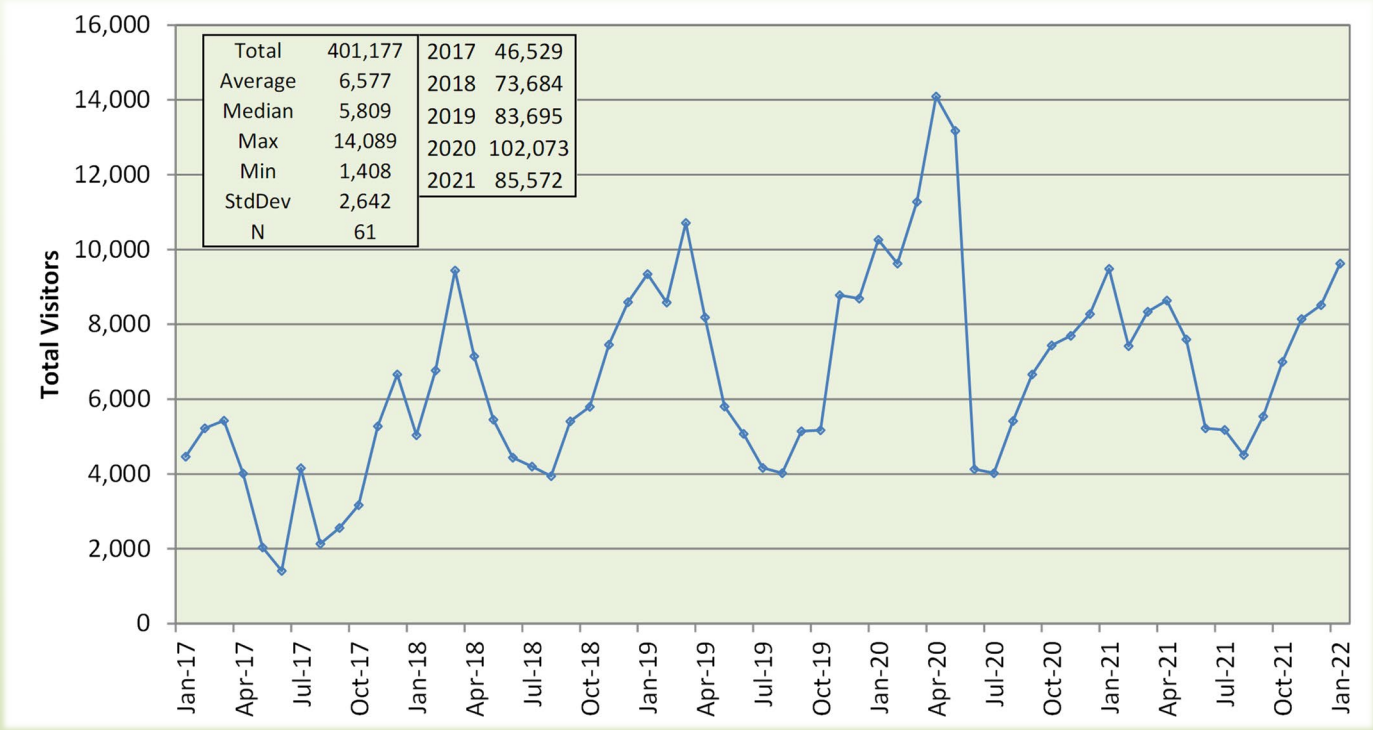
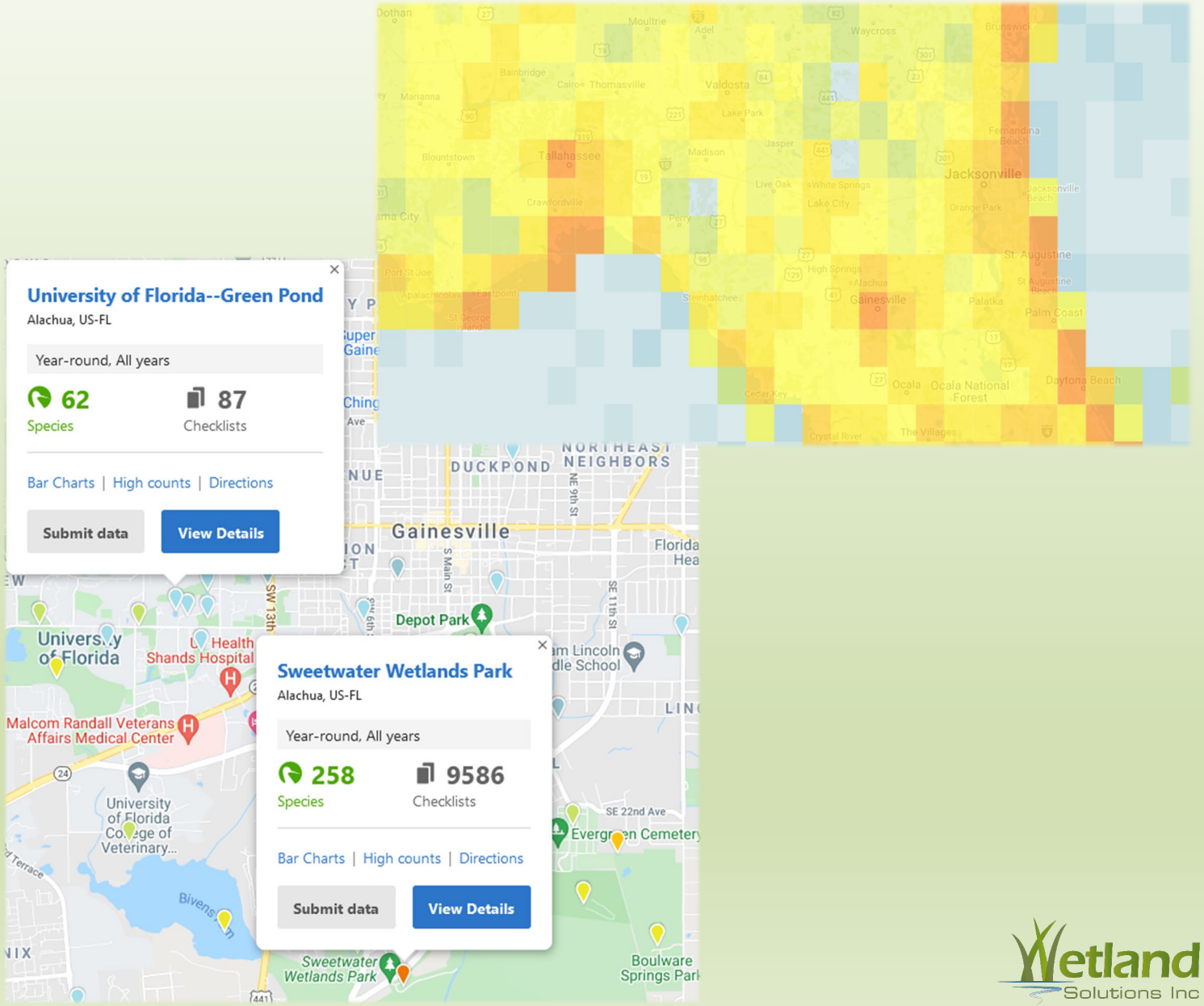
Human Use

- People enjoy nature and wildlife viewing
  - COVID pushed people outdoors
  - Many treatment wetlands offer large parks with access
- Birding is a popular and growing hobby
  - 45M birders as of 2016 (USFWS)
  - $39B in expenditures, $96B in total output, 782,000 jobs
- Sweetwater Wetland receives almost 100,000 visitors per year



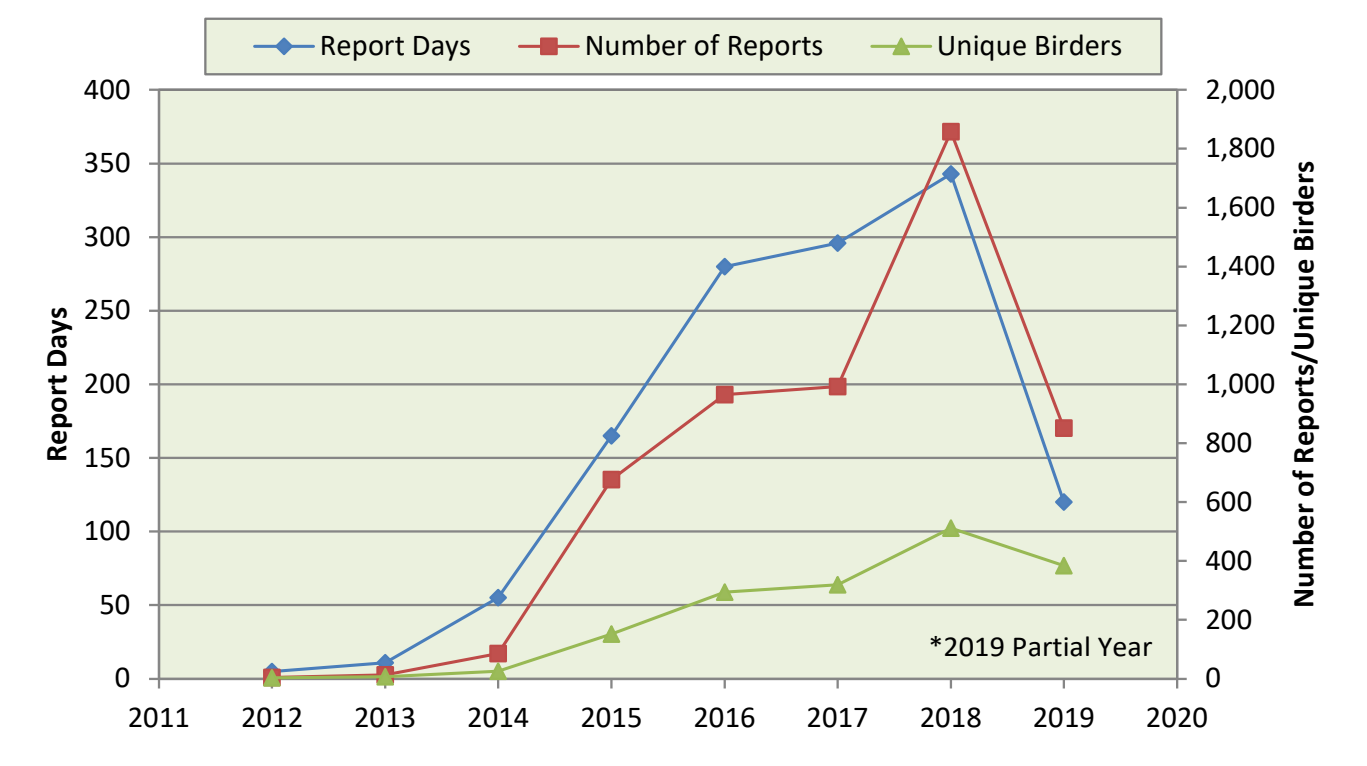
Citizen Science and Bird Data

- Cornell Lab of Ornithology eBird Database
  - One of largest citizen science databases
  - Expert reviewers
  - Data available for research
  - User growth rate of ~20% per year
  - Site-specific data and birding hotspots



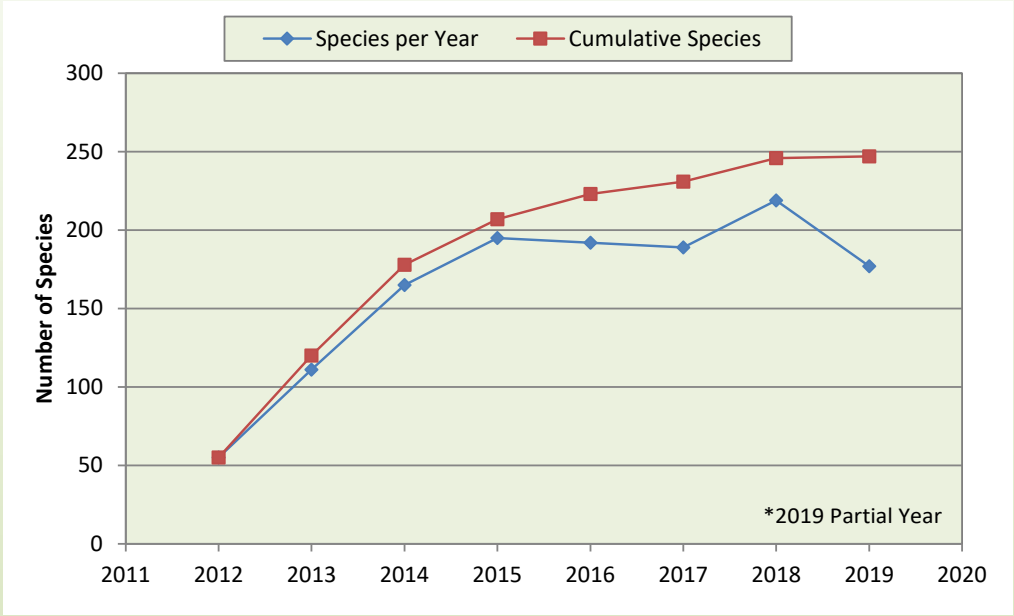
Birding Effort

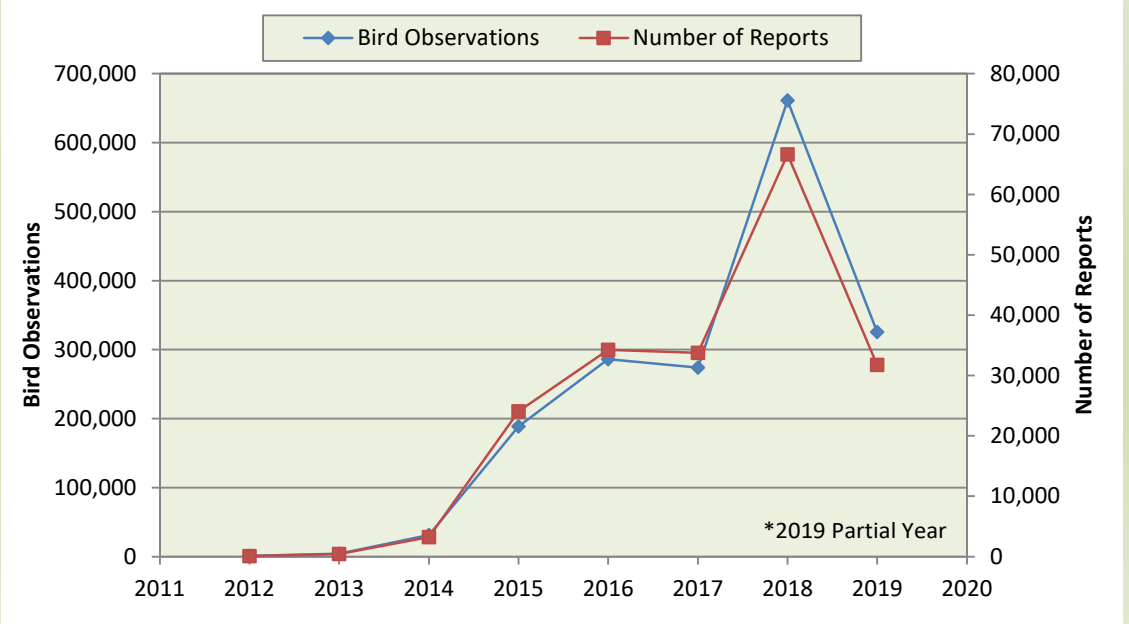
- Current effort evaluates 2012-2019* (partial year)
- Increase in birding intensity
  - Birding reports near daily in 2018
- Approximately 1-3% of visitors were apparent eBirders between 2017 and 2019



Sweetwater Birds by the Numbers

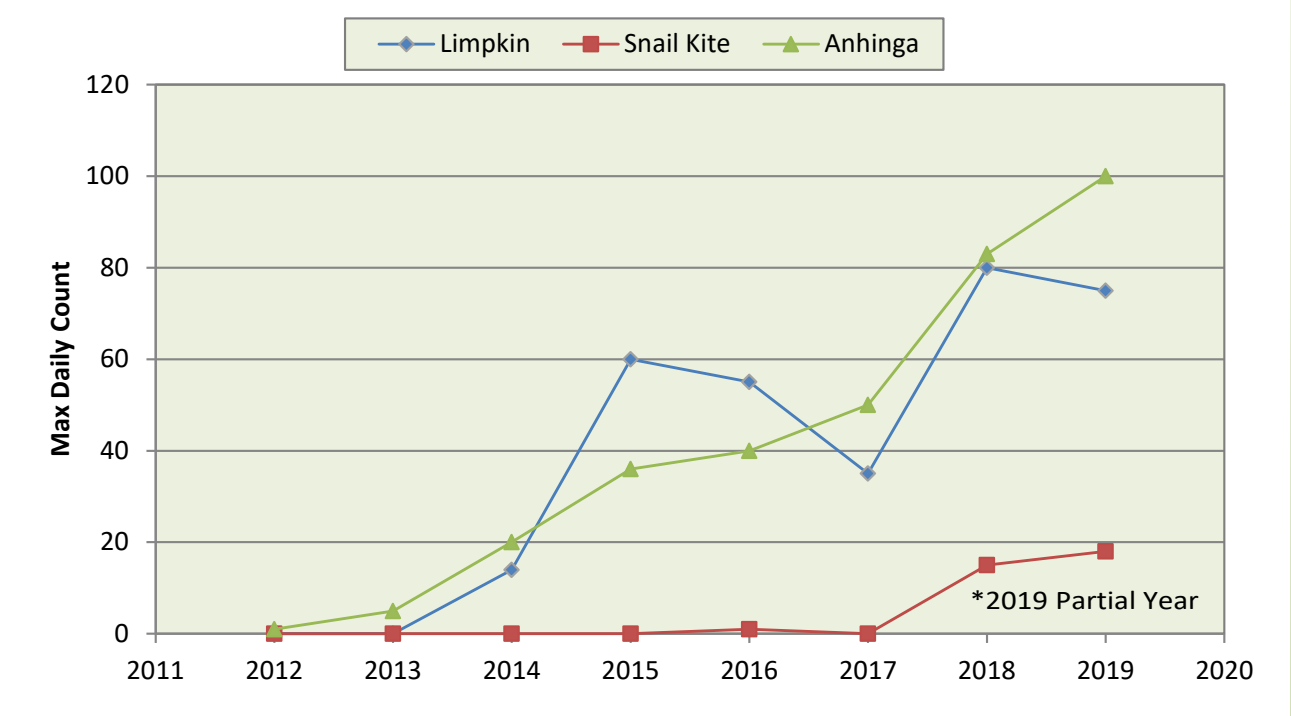
- 257 observed species during study period
  - 189-219 annual species since operations began in 2015
  - Species accumulation slows dramatically
- >500,000 reported bird observations in 2018





Future Work

- Update data set through 2021
- Compare Sweetwater to other systems
- Species specific analysis
- Develop additional tools and metrics



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Questions