

Burhead sedge, *Cyperus blepharoleptos* (also called Cuban bulrush, *Oxycaryum*)



Duck potato, *Sagittaria lancifolia* (also called lanceleaf arrowhead)



Duck potato
Sagittaria lancifolia
Photo by Vic Ramey
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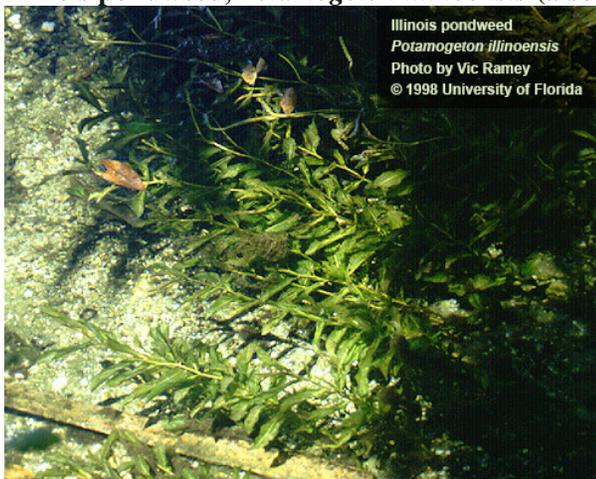


Bulltongue arrowhead
Sagittaria lancifolia
Photo by Vic Ramey
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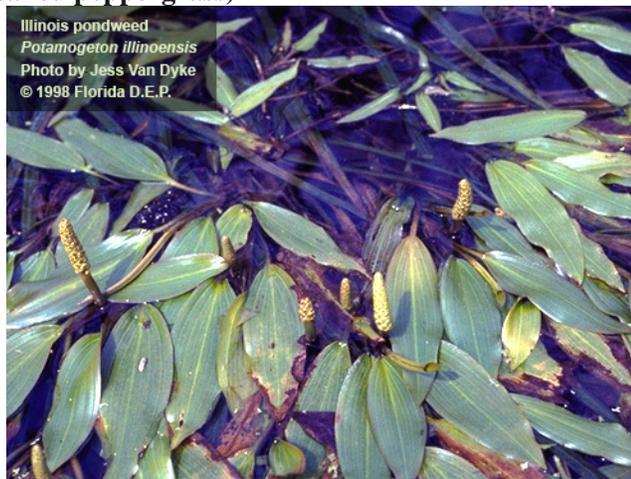


Duck potato
Sagittaria lancifolia
Photo by Ann Murray
© 2001 University of Florida

Illinois pondweed, *Potamogeton illinoensis* (also called peppergrass)



Illinois pondweed
Potamogeton illinoensis
Photo by Vic Ramey
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Illinois pondweed
Potamogeton illinoensis
Photo by Jess Van Dyke
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Illinois pondweed
Potamogeton illinoensis
Photo by Jess Van Dyke
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Mexican primrose, *Ludwigia octovalvis*



Peruvian primrose, *Ludwigia peruviana*





Lake Istokpoga Advisory Committee Meeting 4
Bert J. Harris Jr. Agricultural Center, Conference Room 3
4509 George Blvd; Sebring, Florida 33875
December 13, 2018



Summary

Overview

On Thursday, December 13, 2018 the Lake Istokpoga Advisory Committee convened in Sebring Florida. Project principal investigator Kai Lorenzen, research scientist Chelsey Crandall, and lead facilitator Joy Hazell designed and facilitated the meeting (Appendix A, Agenda).

Eight committee members, two alternate members, one guest, and three Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

- Develop trust and community between committee members
- Continue process of consensus building on species/habitats of concern and management actions to address concerns
- Develop a plan to engage the wider public in the Lake Istokpoga Habitat Management Plan

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

The UF team outlined the future meeting schedule to develop the habitat management plan for committee participants. Target months and activities for 2019 are as follows:

January – Habitats

February – Maintenance Control and Restoration

-Survey-

March – Maintenance Control and Restoration

April – Monitoring Protocols

May/June – Other Considerations

Review of Field Trip

On Wednesday, December 12th ten committee members attended a field trip on Lake Istokpoga via airboats provided by FWC. [The committee spent the first part of the meeting reviewing the field trip. They were initially asked to identify “Aha” moments from the trip. Their responses follow:](#)

- There is an extensive marsh on top of Bumblebee Island due to few people accessing the area, after concerns about the loss of marsh on the west wall it was good to see
- Bumblebee spot had more lily and submersed aquatic vegetation (SAV), not just spatterdock
 - Area looked alive, baits, birds and ducks

- Don't get to see this area unless one has an airboat
- Amount of SAV more than expected
- Different than what we hear on the internet – internet comments speaking to Northeast shoreline vs. interior
- Water a lot cleaner in their
- Public can't see that area
- Area with reestablished vegetation very interesting, reasons why plants are where they are
- Frustration over what's being done to fix areas that are great for fishing vs. for duck hunters
- Field trip (and process) taking a long time
- Groan zone
- Lots of opinions
- Sandy bottom = great spawning area vs. others thinking it should be full of marsh
- Different perspectives
- Large lake, not every area needs to be the same
- Lot of area to cover, too much chatter in each spot, should make stop then bring discussion into the meeting
- Falcon sighting cool
- Want to see east side where bulrushes were killed
- If it wasn't for duck hunters/bird hunters, fishing is as bad as I have ever seen it
- Catching fish in those areas, solid pads
- No floating vegetation to catch fish, unsure where fish are
- Disgusted to see the lake in shape it is
- We are fishing under dead, floating bulrush
- 22 acres – spot do it, could be bad and hurt fishing
- Primrose: harvest it, not 22 acres of pads

The committee then split into groups to answer the following questions about the field trip:

Table 1.

	What did you see/discuss that was useful?	What was missed that you want to see/discuss next trip?
Group 1	Seeing protected marsh, learning more about why it looks that way and wanting more of it Revegetation efforts Hearing various opinions, especially in regard to waterfowl	Bulrush and fishing areas Discussion of mitigation of ruined areas Better trip agenda (stick to times) or smaller sections/trip
Group 2	Marsh at the top of Bumblebee – bird life positive but ducks missing from habitat negative Fishing – nothing good, outside pads gone, SW Bulrush habitat (committee members have differing views on the impact of outside pads)	Look for changed habitat from negative to positive as well as from positive to negative, i.e. East Side
Group 3	Getting to hard to reach areas, remote view Commonality in desired plant habitats 1 st hand view of monocultures Desired plant species Eelgrass revegetation Multiple views for areas and possible management strategies	East side Fishing habitats in these areas Some bottom topo maybe?

Presentation on Aquatic Habitat Monitoring

Kevin Johnson and Craig Mallison from the Florida Wildlife Research Institute each delivered a PowerPoint presentation on different methods of monitoring lake habitats. A PDF of each presentation can be found at <https://lakeistokpoga.wordpress.com> under project documents. The presentations covered the methods and findings from Aerial CIR Photography, Point Intercept Mapping and Hydro-Acoustic Sensing.

Committee Members asked for additional data and resources related to the presentations:

1. What is the % of emergent vegetation in 2017-2018?
2. What are the contour and substrate changes from 2016-2017? (including changes related to Hurricane Irma)
3. Cost of this research is on average \$10,000 per lake but split into a cost/Km² with a 4 month turn around

Discussion of Public Meeting

After the presentations there was a discussion of what could be presented/discussed at the public meeting and in future committee meetings. Ideas are as follows:

- What is causing the decrease in vegetation: spraying, lake management, sewage from Avon Park, hurricane, water down Arbuckle Creek?
- Address how water quality, including dissolved oxygen and phosphorus, impact the lake

- Stress that this is all a work in progress
- Concerns about data not being current
- Was SAV gone before the hurricane?
- There are not as many fish, disagreement in creel survey results from 10/17 – 6/18
- Invite new creel survey guy to the public meeting

Activity to Identify Concerns about Bulrush and Floating Vegetation

Advisory committee members were split into small groups. Each group was given a plant species (guild) of concern and asked to respond to the questions in the table header.

Table 2.

	Bulrush	Floating Plants
What is the problem?	Blocks view of the lake (what is wrong with viewshed of Bulrush) Homeowners spraying it themselves Creates disagreement b/w homeowners and fishermen (matter of degree) Bulrush is thinning Pontoons are crashing through and breaking over bulrush	Are we over managing for lettuce and hyacinth? Fishing shows anglers always near floating vegetation Missing duckweed Pennywort being sprayed/disappearing More muck, negative impact to natives
What is the benefit?	Great fishing habitat – best cover in the lake Birds (Bitterns, etc) need to nest Cleans water Buffer b/w open water and shoreline	Better fishing and fish easier to locate Duck food and habitat Nursery/sanctuary
What change would you like to see?	Spot spray using best management practices and enforce the BMPs Mechanical removal over spraying Better awareness of disseminating information to the public about Bulrush benefits and not using illegal pesticides to eradicate More focused information exchange (maybe including the Florida Yards and Neighborhoods Handbook)	Balance Leave it – all in appropriate areas Some is better than none for fishing Would prefer pennywort over hyacinth Mechanical removal over spraying

Pulling it all Together and Next Steps

A parking lot was created to identify next steps and additional information desired by the committee. The following will be addressed in the next several months:

- Concern over FWC policy to continue spraying throughout the plan and that if it doesn't stop the lake will be done
- Fishermen don't agree with Friends of Istokpoga – don't want the same things
- Some suggestions for the next airboat tour
 - Video tape the trip
 - Make it a full day trip – 3 stops before lunch, 3 after, clear objectives and time at each
 - Start earlier
 - Should we have FWC specialists?
 - Early morning? Then head out with specialists?
 - Add the bird photo to the website and email to participants

Next Meeting and Future Considerations

- Next public meeting will be held in late January 10, 2019 at the Bert J. Harris Ag Center Auditorium
- Next Advisory Committee Meeting will be held the morning of January 10, 2019.

This then closed the meeting.

Appendix A: Agenda

Lake Istokpoga Advisory Committee Thursday, August 9, 2018

Meeting Objectives

11. Develop trust and community between committee members
12. Begin process of consensus building on species/habitats of concern and management actions to address concerns
13. Develop a plan to engage the wider public in the Lake Istokpoga Habitat Management Plan

Meeting Agenda

8:30 Welcome and Introductions

9:00 Recap of Field Trip

9:45 Presentations on Aquatic Habitat Monitoring

10:15 Break

10:30 Activity to Identify Discuss Plant Species

12:15 Pulling it all Together and Next Steps

12:30 Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Summary

Overview

On Thursday, January 10, 2019, the Lake Istokpoga Advisory Committee convened in Sebring Florida. Project principal investigator Kai Lorenzen, research scientist Chelsey Crandall, lake expert Mark Hoyer, and lead facilitator Joy Hazell designed and facilitated the meeting (Appendix A, Agenda).

The meeting objectives were to:

- Develop trust and community between committee members
- Continue process of building consensus on habitats of concern and management actions
- Continue to build shared understanding
- Talk about wider public engagement

Welcome, Introductions and Looking Back

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

The meeting then spent a few minutes discussing the plan's progress and the current approach and trajectory of the next few meetings. Below are the notes from that discussion:

How is the process going?

- Pretty slow
- Start with vision
- Use existing plans
- Put boundaries around and work in boundaries
- If public involvement be open to more than vision plan
- Keep mission as wide as possible, open
- Concern from public that their input isn't taken into account
- Different stakeholders may have different priorities
- Need to compare costs of spraying versus mechanical; money, pollution: provide info
- Like a toilet bowl that doesn't get cleaned but then keep adding tidy bowl
- Is the problem for SAV pollution versus spraying versus storm: can someone provide the best info
- More plants there are the more nutrients are taking up and helps with storm
- Non-native causes more problems (water hyacinth)
- Homework: 1) read LIMC plan, 2) read IPM plan, 3) is contractor doing what it said
- Get copies of biology and control of aquatic plants ABMP handbook (Getty, Haller, Petty)

Committee Member Presentations

Advisory Committee members were then each given the opportunity to share their own expertise/knowledge, information gathered, and/or experience with regard to the lake. Below are the notes recorded during the presentations and associated discussions:

- Bass fishing: better, worse, the same (survey question)
- European countries use cattails to clean sewers, hydrilla
- Research needs to be analyzed
- Has to be the right research
- Send a soil sample, ext.
- Need substrate, what we would sample? What for we agree on results
- Hydrilla is a chronic problem
- It's a desert-may not be able to grow hydrilla or eelgrass
- AHRES- eelgrass study is canary in coal mine
- Why won't hydrilla grow?
- Not just hydrilla...anything
- Can we manipulate for more lily than spatterdock?
- Peace pond: get details from Nolan
- Think problem was herb...all have impact
- Need SAV for good fishing
- Problem one of the best bass fishing lakes...one of worst today
- There is a difference between non-native and invasive
- Elodia: try in Lake Istokpoga
- Long term goal is to get back to 7-8 years ago: probably everyone is on the same page
- Sample bottom, figure out what was going on
- To get to long-term, need to fix right now
- Need a wind break to protect SAV
- Need to determine what is going on
- Last 4 seasons of big catch 40-90 in 4 years program
- Use bass tournament data for monitoring
- Lake I is different than Lake Placid
- Problem: SAV and marsh – even if there are fish they aren't being caught
- Crappie trawls: looks like good population of young of year
- Tournaments not necessarily one to one, prizing changes and numbers down all over lake (Trophy Catch)
- Ton of shiners in comm. fishing in Fall (electrofishing) this up a lot compared to previous
- Lots of large bluegill (electrofishing), threadfin shad
- Bass in spring
- Electrofishing largest fish/minute since program began, 2/3 threadfin shad

- Look at balance of predator/prey, trends over time
- Crappie, shad, shiner seems to be +
- Changes in SAV shifts predation
- All agree bass fishing is down, don't know why
- Is there similar info for other species (to Jim's presentation)?

Public Meeting Planning

The committee then opted to spend the remaining time planning for the public meeting that would follow that evening. An agenda for the public meeting was presented and discussed, then revised together. Below are the notes recorded during the discussion about the public meeting:

- Newspaper: DOT: Weekly updates
 - o Can FWC do it too
- Ship has sailed regarding managing habitat
- Drawdown only thing to save marshes
- Problems deeper than spraying now
- Have to have public on our side
- FWC say there is a problem, here is how fix it
- Holiday for spraying
- Soil/silt analysis: residue from spraying
- To get people on our side
- Go home, say "they are doing something"
- To get public trust, give them a bone
- Work with this group
- FWC: understand there is a problem
- Stop spraying for a time ("cease fire")
- History: when have we stopped spraying on other lakes
- People think lake being poisoned, not safe to eat fish, etc.
- Routinely check water coming out of lake for herbicides
- Intro: committee needs in depth info from you to help write this plan, get into details/why (build from last time)
- Notebooks for advisory committee members to get input too
- Stick with best management practices: should we agree on this now?

Next Steps and Meeting Closing

The meeting closed with a brief discussion of next steps and a plan to meet back in preparation for the public meeting that evening.

Appendix A: Agenda

Lake Istokpoga Advisory Committee Thursday, August 9, 2018

Meeting Objectives

- Develop trust and community between committee members
- Continue process of building consensus on habitats of concern and management actions
- Continue to build shared understanding
- Talk about wider public engagement

Meeting Agenda

8:30 Welcome and Introductions

Looking Back

Presentations

Habitat Mapping Activity

11:45 Public Meeting Discussion

12:15 Pulling it all Together and Next Steps

12:30 Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Lake Istokpoga Advisory Committee Meeting
Bert J. Harris Jr. Agricultural Center, Conference Room 3
4509 George Blvd; Sebring, Florida 33875
February 14, 2019



Summary

Overview

On Thursday, February 14, 2019, the Lake Istokpoga Advisory Committee convened in Sebring Florida. Project principal investigator Kai Lorenzen, and lead facilitator Joy Hazell designed and facilitated the meeting (Appendix A, Agenda).

The meeting objectives were to:

- Develop trust and community between committee members
- Identify research needs
- Move forward on plan
- Continue to build shared understanding

Welcome, Introductions and Looking Back

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

The meeting moved on to discussion of the two public meetings held in 2019. The first discussion covered the Habitat Management Plan public meeting. The group then moved onto the February 13th public meeting regarding the FWC aquatic plant management program, the spraying pause and the field trip.

January 10th Public Meeting on the HMP - Impressions

- Lots of hostility from users towards spraying and the HMP
- FWC did a good job not responding defensively
- As evening went on felt less animosity, people began to feel heard
- Lots of questions and unknowns
- Surprise at the number of new people
- Liked the representative from FWC
- Some discussion that audience was concerned we were trying to divide and conquer
- Lack of hard data
- Participants want other agencies present including DEP and Water Management
- Lots of levels of understanding or lack thereof

January 10th Public Meeting on the HMP – What did we learn?

- Mission to have HMP does not address issues raised at public meeting

- There is a problem with fish and wildlife on Lake Istokpoga, needs to be addressed by government agencies (functional versus natural)
- Majority of marsh, duck, fish people feel there is a problem
- Biologists are trained in biology, not human relations
- How can FWC learn to listen and communicate better
- Need a public information strategy, how do you push info?
- Who is in charge? I.E. Lake Boss/ single point of contact

February 13th Public Meeting on the Aquatic Plant Management Program – Impressions

- Lots of concerns – Okeechobee, Red Tide, Local Lakes, Human Health and Safety
- Objective – to hear public concerns and report to the commissioners
- Revolved around spraying
- Heard concerns that had been on social media/petitions
- Learned about the Citrus County program (mechanical removal)
- Format was okay
- Length of time for public comments were good, presentation broad, FWC was too defensive
- Passion at both ends but a disconnect
- Nobody at either side of the table learned anything
- Nobody talked about local conditions such as sewage, septic, hurricanes
- Has any info been released regarding eelgrass replanting
- FWC doesn't do a good enough job of letting people know the process, timeline or expected impact with projects
- FWC doesn't broadcast successes
- Need to know why some eelgrass plants are doing well while other plants aren't
- Maybe survivability issues – can look into soil samples (core samples) for those sites

Spraying Pause – Impressions

- Hope FWC would look at our HMP process and see if this approach works for other areas in the state
- No lakes have HMPS – trying to determine if we can HMPS on lakes
- Hard to describe habitat changes over time and link to successional changes between droughts and floods
- Look at historical data...maybe post-Irma
- Problems with lawn care/septics, need public education
- Pause gives us a break but may cause more issues when spraying starts again
- Plan on lake maintenance – access IPM work plan
- Disconnect on how long the spraying program has gone on

Field Trip, Istokpoga Park Pier – Impressions

- In 2014 there was a marsh past the pier, now most plants are gone, clumps of spadderdock and some cattails and bulrush
- Question as to why it was treated that much, for one target plant?
- Not much habitat for underwater fauna
- Want emergent marsh vegetated
- Speaks to the disconnect, some may see success because one plant was eliminated, others see nothing there
- Someone might see tussock potential, others might not
- How to manage a project?
- Formalize with a Lake Boss then document results at 3 months, 6 months, 2 years.
- There are trade offs to consider, access to habitat vs. removal of emergent marsh
- During shocking there were no fish in SD, maybe a method issue, may be that there is not a lot of fish there
- Seeing lots of bass bedding on north sides of the lake

Research Needs for HMP

The committee began to look forward to research needs for the development of the Habitat Management Plan. They discussed location of sediment sampling as well as information they might need from a public survey.

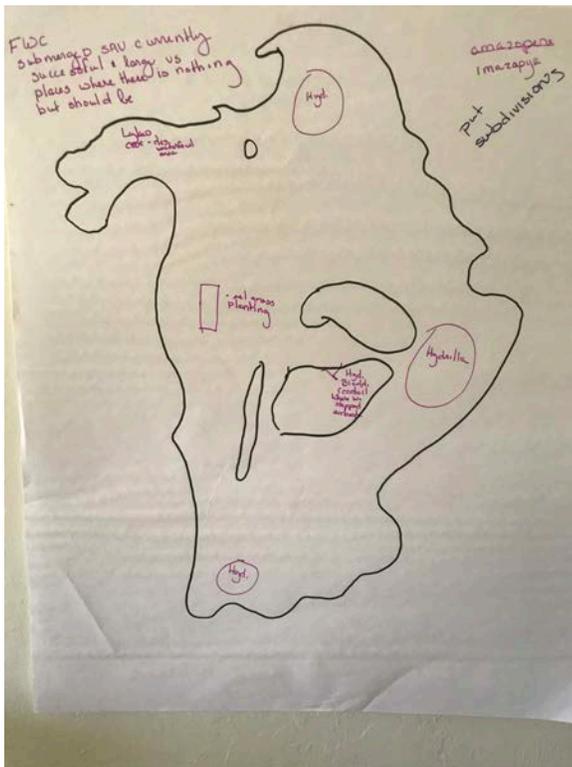


Figure 1. ID spots where sediment samples should be taken

Sediment Sampling – Ideas

- ID spots where samples should be taken (Figure 1.)
 - Focus on SAV, 3-4 suggestions to Eric Johnson
 - Southern part of lake where there was hydrilla and less flushing
 - Eelgrass study area, compare a successful and unsuccessful site
 - Areas where diquat has been used extensively
 - Sample both muck and sandy area
 - Spots back in the marsh (Lykes Cove)
 - Bumblebee where there is SAV
- Can we do more than Lake Istokpoga? Use a comparable lake where things (hydrilla) are growing
- Unsure if a foliage or root event is causing death of Hydrilla?
- What will be testing for? Ph? Chemicals?
- What happened to SAV?

Public Survey

- Would need to pre-notify on UF letterhead and follow up to encourage a good response rate
- Need to administer before Easter
 - Homeowners
 - Fishing license holders
 - Bass tournaments
 - Container of surveys at boat launches
 - Serial # of surveys?
- Lake management concept might be foreign to respondents
- Ask about openness to drawdown
- Ask about tolerance to prescribed fire
- Get at the necessity of management/view of “naturalness of the lake
- How do we evaluate desirability of a habitat – Based on animals or plant focused?
- How do we balance plant focus vs. a wider range of animals and insects/open water vs. other ways the lake could be perceived?

Notes and Next Steps

- Send map to committee and let them know we will be filling it in with desired habitats at next meeting
- What should the plan include – Desired Conditions, Tools to Get There, Monitoring to Assess Success, Communication Plan
- Weekly lake update in Newspaper
- What happened to SAV? – Why the extent of loss and time for recovery?
- Send an organizational chart of committee
- Determine if any spray chemicals are systemic?

- Get Geoff Lokuda's photopoint protocol.

Public Comment

- Trust is lost if spraying starts again
- Florida's reputation is at stake regarding fishing
- Plan should include a quick start, short term and 5 year timeframe.

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
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- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Lake Istokpoga Advisory Committee Meeting
Bert J. Harris Jr. Agricultural Center, Conference Room 3
4509 George Blvd; Sebring, Florida 33875
March 28, 2019



Summary

Overview

On Thursday, March 28, 2019, the Lake Istokpoga Advisory Committee convened in Sebring Florida. Project principal investigator Kai Lorenzen and research scientist Chelsey Crandall designed and facilitated the meeting (Appendix A, Agenda). Project team member Mark Hoyer was also present.

The meeting objectives were to:

- Continue process of building consensus on habitats of concern and management actions
- Obtain feedback on first draft of habitat management plan (objectives and actions)
- Discuss habitat types to be represented in the plan and habitat targets
- Talk about next steps

Welcome, Introductions and Looking Back

The meeting began with brief welcome and introductions.

Feedback on draft habitat management plan objectives and activities

The project team introduced a first draft of the habitat management plan objectives and actions for committee feedback (Appendix B). The draft was assembled by the project team based on committee discussions, public input, and relevant elements of the Orange Lake habitat management plan.

The draft objectives and actions were placed on flipcharts, and committee members were asked to individually rate each objective and associated activities by placing colored dots next to each item according to the following: 'looks good' (green) or 'needs work' (yellow). Also, one committee member used blue to identify text that was 'difficult to understand'. The committee then discussed those elements of the plan that were considered to 'need work'. Key points from these discussions are documented in Appendix B. As next steps, the project team will incorporate committee feedback into the next draft.

Public feedback on the updated draft will be sought at the upcoming public meeting. Feedback from FWC biologists and managers will then be sought and any areas in need of further deliberation identified. Such areas may include, for example, points where committee recommendations conflict with scientific information or existing legal requirements.



Committee discussion on the draft habitat management plan

Discussion on habitat table/targets

An example habitat table was created by the project team to facilitate discussion about the definition of habitat types and targets for the habitat management plan. The committee was asked: using this as a starting point, what habitats should be in here? What is missing? What should we take out?

Committee members identified the following specific habitats that should be considered for targets: Bulrush; SAV: hydrilla, natives; Spatterdock; Cattail; Marsh; Open water; Water hyacinth; Lettuce; Emergent grasses.

In addition, the need to include aspects of habitat quality as well as quantity was proposed (for example, bulrush thickness or spatterdock density), as well as whether habitat targets would need to be defined by lake region.

The committee also recognized that further types may need to be added for species conservation concerns, e.g. snail kite habitats?

In terms of habitat types that should be explicitly represented, committee members highlighted: Further types may be identified by committee members not present and/or the wider public.

Discussion on possible management actions to be implemented in the near future

Cole Harty communicated a request from Geoff Lokuta for the committee to provide feedback on a suite of management actions being considered by FWC for implementation following the end of the statewide spraying pause. These included (with committee member comments below each discussed):

- Stop managing invasive plants at ‘lowest feasible level’, instead maintain between limits
 - What we were doing right is what we should do
 - Some others want some hyacinth
 - Tradeoffs? Muck?
 - Experiments: do in some areas/not in others
- Implement control over a larger area, then stop control for a while
 - Looks more controlled
 - Looks out of control
 - Quadrants possible?
- Change timing of control measures
 - Spawning season?
- Change applicator behavior
- Eliminate ‘approaches that look bad’
- Implement new technologies for (monitoring of) applicators
- Remove some non-native species from treatment plan
- Conduct submersed treatments (better optics)
- Conduct a floating plant harvest project

Committee: can we target primrose with mechanical harvesting?

Committee: need for replication in treatment experimental design

Committee: bring into public meeting

Committee: note that there must be flexibility

Committee: pros/cons/outcomes

The committee considered all these options as potentially positive steps and suggested that the FWC should draw up more detailed plans for implementation of key options. The committee also noted that the upcoming public meeting would provide a good venue to obtain wider public input. If FWC receives input on proposals they are willing to implement and then makes decision consistent with public input, this would be a good opportunity to demonstrate responsiveness and build trust.

Next public meeting

The committee discussed the upcoming public meeting and agreed that the meeting should involve the following elements:

- Feedback on the draft habitat management objectives and actions (a revised version taking into account inputs from this committee meeting)
- Input on habitat targets (based on a revised version of the habitat identification and table, taking into account inputs from this committee meeting).

- Input on aquatic plant management actions and schedules (based on a set of options to be developed from the draft habitat management plan and the near-term options suggested by FWC (above)).

Other points brought up included the idea of putting something in the paper to show what the public meeting will talk about, as well as awareness that the public might want to talk about the spray pause (and the need to consider that in public meeting planning).

Other questions/points raised

Is the county spraying right now?

What about climate change impacts?

Muck/hyacinths: get info to the public (summary of Ch.2)

Hydrilla = more herbicides (people need to understand)

Evening meeting: should we meet in the evening to make sure the fishermen can make it?

Next meeting: should we come up with a vision for the lake?

Systematic evaluations after treatments?

- In Florida: what has/hasn't worked in different situations
- Mark: pointed to a current project
- Should share with the public that this is going on

Plant growth seasons: can we take this into account with spraying? Spray in the summer for example?

Next Steps and Meeting Closing

The meeting closed with a brief discussion of next steps.

Appendix A: Agenda

Lake Istokpoga Advisory Committee Thursday, March 28, 2019

Meeting Objectives

- Continue process of building consensus on habitats of concern and management actions
- Obtain feedback on first draft of habitat management plan (objectives and actions)
- Discuss habitat types to be represented in the plan and habitat targets
- Talk about next steps

Meeting Agenda

12:30 Welcome and Introductions

Feedback on draft management plan (objectives and actions)

Discussion on habitat types and targets

Discussion on upcoming public meeting

16:30 Pulling it all together and next steps

17:00 Adjourn

Appendix B: Draft habitat management plan objectives and activities with committee feedback

Habitat management plan objectives and activities had been drafted by the project team based on committee and public input and relevant elements of the Orange Lake habitat management plan. Committee members individually rated each objective and associated activities 'looks good' (green) or 'needs work' (yellow). Also, one committee member used blue to identify text that was 'difficult to understand'.

Objective: Balance multiple needs and perspectives in habitat management

Moderation in all actions and a willingness to understand that there is a need to balance multiple perspectives and uses for the lake

3 green, 2 yellow: need overall lake objectives first, willingness to understand: might be forced willingness, for example snail kites

Objective: Consider habitat diversity, connectivity and dynamics

Desire for a mix of habitat types and species

Many fish and wildlife populations rely on a mix of habitats to complete their lifecycle and thrive – need to consider this matrix when deciding on habitat management actions

All 5 green

Objective: Define focal habitats for maintenance, control and restoration

Define focal habitats in terms of structure, species composition and/or other metrics for the purpose of planning for maintenance, control and restoration (see "Table 1" for starting point).

Definitions can be based on scientific and/or stakeholder knowledge and should be clear enough to support monitoring and management (examples: Marsh, SAV, deep water crappie areas)

Where the same broad habitat type can occur in more or less desirable forms (e.g. pickerelweed is native but can become too dense), differentiation into sub-types may be necessary

Include all managed invasive species as focal habitats

3 green, 1 yellow, 1 blue: define invasive species (plants? animals?)

Objective: Set Habitat Targets (ranges) while accounting for wildlife and human use needs and the dynamic nature of aquatic habitats

Set target ranges for the extent of focal habitats and rules to trigger management actions when habitat extent is outside the target range

Target ranges could be further broken down into 'desired' and 'acceptable' ranges

Target ranges should be set while taking into account the natural fluctuations in lake habitat (check historical variation to set realistic ranges)

Include target ranges for all managed invasive species (even if targets are 'minimum feasible level')

All 5 green

Objective: Set targets by lake region if necessary

May not be necessary as e.g. increase in SAV and EV is desired all around the lake, not necessarily allocated to one area

4 yellow, one green: like it, impossible, needs more clarification, some interaction with other considerations

Objective: Consider medium/long-term consequences of habitat management actions

Consider likely habitat development after treatment of existing vegetation – e.g. will treatment to remove primrose willow lead to habitat full of bulrush and maiden cane, or spatterdock?

Reduce spatterdock in some areas to allow other vegetation to recover (but unclear if it will)

3 green 2 yellow: consider but don't know what will happen, research recommendation: look at history, unexpected outcomes, reviews

Objective: Use active re-vegetation when abundance of focal species/habitats falls drastically below target range
Re-vegetation, e.g. Kissimmee grass and spikerush and maiden cane plantings; eel grass cages
3 green, 2 yellow: clarification needed, why lost in first place?, sometimes can't (money won't be there)

Objective: Manage spoil islands

Long-term plan to remove spoil islands, but unclear whether this is a priority (filled habitat, noxious plants, erode)
Options: Truck out? Smooth out?; Tradeoff with drawdown; Disposal spot, marsh restoration tradeoff
4 yellow, one blue: discuss more, should this be a priority? tradeoffs

Access, Navigation and Aesthetics

Goal. Improve and maintain reasonable lake access, navigation and aesthetic quality in a way that balances the needs of diverse user groups.

Objective. Manage vegetation to provide access to/from boat ramps and creeks.

Dependability of control for access is key.

Consider regular use of mechanical harvesting for access maintenance

Definition of tussocks and tolerability, trends and control methods

Treat mobile floating tussocks in the immediate vicinity of access points using the most efficient method based on vegetation composition, which is generally mechanical harvesting and/or shredding for mud tussocks and herbicides for vegetative tussocks (adapted from Orange Lake plan).

All 5 green

Objective. Adopt a standard network of boat trails and manage the vegetation within those trails to enhance navigation.

Develop a network of access trails in coordination with fish camps, guides, and local tournament organizers. (E.g. cut trails through spatterdock; navigation corridor around lake?).

Balance trail network with need to protect sensitive wildlife habitat. Trade-offs between boater access and protecting animals/plants from predators and nutrient inputs

Proactively treat SAV in the adopted network of trails before it limits access as a way to prevent it from limiting access in the future.

3 green, one yellow

Objective: Limit removal of EV (e.g. bulrushes) for access and aesthetics

Bulrush: limited removal, mechanical over spraying.

Better information exchange with homeowners

3 green, 2 yellow: think about homeowners

Objective. Collaborate with other agencies and partners to maintain and/or upgrade public access facilities.

Explore opportunities to cooperate with partners to enhance public access points including improved boat ramps, improved parking at Lake Istokpoga Park, improved and new docks for shoreline fishing and nature viewing.

All 5 green

Goal. Enhance fishing opportunities in focal areas through artificial structures

Objective. Provide structure for fish aggregation/target for fishing in some areas currently devoid of structure.

Consider placing marked fish attractors to provide structure in open water areas

3 green, 2 yellow: might be some push back, concerns about putting things that are artificial in the lake

Invasive Species

Goal. Manage invasive species to minimize their adverse impact while maintaining habitat objectives outlined in the Habitat Targets.

Objective. Define and rate invasive exotics and discussion of tolerability, trends and control methods

Need to consider invasiveness and impact vs. collateral damage from control methods

All 5 green

Objective. Review and better specify the ‘lowest feasible level’ goal for invasive species management – is it possible to set a higher threshold?

Is it possible to allow slightly higher levels if that reduces overall spraying and collateral damage?

Spray when it becomes a problem- DEFINE THRESHOLD

Spray nothing, then if hyacinths get out of control, then just spot spray that area

Are floating plants (hyacinth, water lettuce, pennyworth) over-managed? Leave more?

4 yellow, 1 green: discuss more

Management Operations

Goal. Manage focal habitats and invasive plants according to the Habitat Targets

Objective. Develop annual work plans to manage habitat types according to the Habitat Targets.

Conduct aerial or satellite mapping and GIS analysis of habitat composition every 3 years to assess compliance with the Habitat Targets.

Perform field assessments of changing conditions and produce an annual habitat status report that will communicate observed changes in habitat composition during interim mapping years.

When developing annual work plans, identify and develop projects to address habitat deficiencies based on results of aerial mapping/GIS analysis and observations from field assessments.

2 green, 2 yellow, one blue: overall objective for the lake needed (example: special fish management lake for bass), 3 years GPS too long: quicker change but takes a lot (feasible?), photography? Satellite? The technology might change, big picture versus species, big broad analysis versus fine scale, issue with 3 years

Objective. Expand the ‘toolbox’ of habitat management

Consider increased use of mechanical harvesting where feasible and not involving excessive cost (e.g. maintenance of access?)

Restore the use of prescribed burns as a viable tool for managing Marsh habitat to the extent feasible given weather and safety conditions, including smoke management, and as authorized by the Florida Forest Service.

4 green, one yellow: concerns about cost for county, research the cost

Goal. Minimize adverse impacts and perceptions of management actions

Objective. Establish and implement policies that minimize scope and scale of management related disturbance to fish and wildlife resources and the public.

Habitat maintenance and/or management actions that exceed a total of XXX acres (X% of total lake area) per year will not be conducted without stakeholder support.

Schedule management actions to minimize conflicts with wildlife critical life history events (e.g., nesting, spawning, molting) and public use opportunities (e.g., fishing, hunting) to the greatest extent feasible.

Develop a comprehensive list of critical timing considerations for fish and wildlife and stakeholder concerns. (E.g. Minimize noncritical management actions during the fish spawning season, during warmer months when dissolved oxygen levels are naturally low, 1-2 weeks before opening and during various waterfowl hunting seasons, etc.).

Avoid spraying under conditions where herbicide drift is likely high, i.e. high winds.

4 green, one yellow: BMP: yearly management goal, big projects versus maintenance management/ one go versus cumulative (for the %)

Objective: Increase transparency of habitat management activities

Post annual work plans to provide increased transparency about decision-making

Better spray schedule transparency; Post spray schedule at ramp

4 yellow, one green: we can do more, what are we doing now? Format, think about.

Objective: Reduce overall level of spraying activity

Don't spray every day; only do so much at a time; too many different sprayers at same location within a short time period; overlap of spraying needs to stop (need to assess which criteria have the highest priority (e.g. fewer days of spraying, smaller areas affected, etc.))

Some Ideas: 10-day hit and the no spraying for rest of month; only Tue-Thur; moving quadrants

2 green, 3 yellow: discuss more, think about perception, right track but still talk about it, best management practices?, Sometimes overlap of spraying is on purpose

Objective: Better co-ordinate between agencies

Better co-ordinate spraying and other habitat management activities between agencies to consolidate/reduce spraying activity where possible

FWC and county spraying – zoning; Need better/coordinated efforts by/with all groups that are spraying on the lake

All 5 green

Objective: Continually review herbicides used

Look at other chemicals/herbicides

All 5 green

Objective: Enhance oversight of applicators

Applicator Behavior; Better monitoring of spray crews, Onsite supervision of applicators; Not following BMPs;

Applicators need Go Pros, Video camera on all spray boats – especially AA

Need more training, Sprayers need better training (what to spray), Training of sprayers – still mistrust

All 5 green

Objective: Enhance outreach to homeowners

Land owners spray, and they spray beyond their yards, How do we regulate that?

Private owners and all entities, policing needs to follow vs. 'homeowners action are drop in the bucket'

4 green, one yellow: too open, acknowledge homeowners rights, statutory rights, what can't infringe upon

Communications

Goal. Promote the growth and development of a mutual understanding between FWC and stakeholders regarding habitat management at Lake Istokpoga.

Objective. Improve stakeholder engagement with FWC by maintaining and increasing opportunities to exchange information.

Maintain Istokpoga Habitat Management Committee to provide input to annual work plans. Review HMP activities and progress at regular meetings of the committee.

Conduct 1-2 public forums annually to provide opportunities to for communication about the condition of the lake, annual work plans, results of recent management actions, and pertinent information relative to habitat management.

Post information about lake condition annual work plans at boat ramps and other public places.

All 5 green

Objective. Improve communication between FWC and stakeholders by providing informative content on the FWC website.

Post annual work plans for the Aquatic Habitat Restoration/Enhancement Subsection and the Invasive Plant Management Section.

Provide a schedule of FWC management activities and opportunities for stakeholder involvement.

Provide maps that identify areas where habitat management has occurred and is proposed.

Develop a document library that consolidates pertinent current and historical information on Lake Istokpoga including management plans and evaluations, scientific studies, physical and biological conditions, habitat enhancement,

access/navigation maintenance, invasive plant management, surveys and monitoring, fish and wildlife rule changes, and fishing and hunting conditions.

4 green, one yellow

Experimental Management and Research

Objective: Improve the management information base by treating management actions as experiments

Experimentally test alternative spray schedules

3 yellow, one blue: think about repercussions, the scale of experimentation, premature, clarify, maybe experiment elsewhere, each system is unique

Objective: Determine what factors are negatively impacting desired habitats on the lake

What caused the decline in SAV? (water quality, hurricanes/stochastic weather events, apple snails, residual herbicides, etc.)

4 green, one yellow: try, but we may never know, historical audit of history of impacts, standardize data across the state

Anything else? – Points that are missing:

- Systematic review/analysis
- Coordination across FWC management programs
- Homeowner control/activities
- Pro-active information (before not after problem), Major efforts: explain objectives and explain after activity, were results met, follow-up on objectives
- Inspector-general team to audit the lake

Appendix C: Example habitat table used as a basis for committee discussion about habitat types and targets. Note that the target examples were put there just to demonstrate the kinds of targets the committee could come up with; though designed based on past committee discussions (what they want to see more or less of), they are not meant to be the actual targets-the committee still needs to discuss and come up with the targets they desire, with the help of public input at the next public meeting.

Class	*2005	2007	2009	2012	2015	2007-2015 range	Target examples
Open water	23,467	21,143	21,411	20,962	21,047	78-87%	
Freshwater marsh	1,014	1,546	952	1,016	947	4-6%	6%
Marsh with shrubs & brush	116	304	483	504	782	0-3%	
SAV	11	1,473	930	363	417	0-5%	30%
Spatterdock	659	727	904	708	822	2-3%	2%
Lotus	n/a	199	163	666	443	1-2%	3%
Water lily	n/a	13	17	188	152	0-1%	2%
Mixed pads	n/a	n/a	n/a	144	333	1%	2%
Bulrush or bulrush-pads	261	298	300	307	407	1-2%	3%
Cattail or cattail-pads	1045	857	990	1021	796	3-4%	4%
Pickerelweed + (combination of all below rows)	454	364	749	1064	748	1-4%	
Pickerelweed/arrowhead-pads	108	77	120	122	276	0-1%	
Cattail-pickerelweed/arrowhead	58	70	276	479	183	1-2%	
Pickerelweed/arrowhead-water primrose/knotweed	3	18	3	68	165	0-1%	
Pickerelweed/arrowhead	111	116	182	239	96	0-1%	
Pickerelweed/arrowhead-torpedograss	31	27	97	103	18	0%	
Pickerelweed/arrowhead-bulrush	54	24	36	41	10	0%	
Spikerush-pickerelweed/arrowhead	89	32	35	12	0	0%	
Spikerush	4	26	11	4	1	0%	
Other emergent plants	44	18	9	15	18	0%	
Maidencane/Egyptian paspalidium	36	24	27	19	16	0%	
Torpedograss	56	49	68	36	13	0%	
Water primrose/knotweed-pads	0	47	91	111	117	0%	
Water primrose/knotweed	80	131	107	85	46	0%	
Water primrose/knotweed-cupscale	22	110	107	34	8	0%	
Willow	0	32	56	90	20	0%	
Cypress							Maintain
Floating islands/tussocks							
Wet prairie							More

grey=committee mentioned but not in Craig's table, note that 2005 is greyed out because it was not the standardized sampling method used in the other years, grey text=synthesized in the above category, so all those are put into the pickerelweed+)

*pickerelweed: need to tease this one out still, we had discussions about its pros and cons and tradeoffs and about keeping it in its place but having no monocultures of it



Summary

Overview

On Thursday, April 18, 2019, the Lake Istokpoga Advisory Committee convened in Sebring, Florida. Research scientists Chelsey Crandall and Kai Lorenzen, and lead facilitator Joy Hazell attended, designed and facilitated the meeting (Appendix A, Agenda).

Committee members, one guest, and one Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

- Continue to build trust and community between committee members
- Continue process of consensus building on species/habitats of concern and management actions to address concerns
- Revisit draft of management plan objectives and goals
- Plan the public meeting that would follow that evening

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

Revisiting Draft of Habitat Management Plan Objectives and Goals

The flipcharts from the March 28th meeting containing the draft of the habitat management plan objectives and actions and the sticky dots from the committee activity were hung on the walls at the back of the room. A summary of the activity from the last meeting was presented to catch up those who had missed the March 28th meeting. Those who had not made the last meeting were asked, during the break, to read the objectives and place a red dot next to any that had only been rated as green ('looks good') at the last meeting, but which they felt needed some more work. (No red dots or additional comments were noted.)

Next, committee members were asked if they had anything they wanted to add or to discuss about the draft habitat management plan. Discussion and feedback included:

- Last objective = most important
 - o What happened to SAV and marshes?
 - o Is it going to be possible to determine what happened to SAV and marshes?
 - Physical and intellectual facilities and resources
 - o Resource allocation
 - Committee
 - o Do an audit of all factors – did herbicide cause or exacerbate

- Nosedive in fish populations occurred in 2014/15
- Declining catch in 2017-2019
- Last decent recruitment in 2007/2010
 - o 2011/2012 better crop of fish
- Less SAV = less particulate being filtered
- Vegetation cleans the lake- phosphorous, nitrogen – only trend is phosphorous and nitrogen
- Kim Odell paper on hyd. water quality
- Kissimmee: apple snail study
- Kissimmee: emergent lost (going on at a lot of lakes) along shores
 - o Interior littoral marshes reduced
- All else in habitat management plan assumes last point has been solved
- Not all objectives of equal importance, give attention to ordering, i.d. most important
- Ex: accessibility not a problem right now
 - o Plan for into future too
- Establish threshold: 20% hydrilla doesn't seem like too much to have
- Proposal: short page with current main priorities?
 - o Along with full longer-term plan
- Why SAV gone = hard question
- Water weird color right now, for example
- Things happening on lots of lakes, beyond Lake Istokpoga
- Message to agencies to investigate
- Look at lots of lakes
- Leverage here: prototype for test case/evaluation that will lead to results in other lakes
- Lake Harris example: fishing came back after 15 years, can't wait 15 years here
- Set our goals for what we want and let agency decide how we get there
 - o Try things, see what works
- Establish what we want lake to look like and turn over to FWC
 - o Only FWC? Other agencies? Coordination?
 - USFWS, ACOE
- Sue example: who to call when homeowners remove plants?
 - o Call IPM
 - o Riparian rights: 50% or 50'
 - o Better info needed on what can do
 - o Problem on Lake Istokpoga too
 - o System not set up to be responsive
- "Lake Management" companies
- Cole: get a summary from Geoff for website outlining what homeowner can/can't do and who is in charge
 - o What can do
 - o Who to contact

- What to do if you see rules being broken (ex: take pictures)

Parking Lot

Other points that came up during discussions included:

- Lake Istokpoga: Lake Persimmon comparison?
 - Answer: they are very different lakes
- Primrose: is it a big problem?
- Trust is important
- We need hydrilla back: will we get it back? Can we get it back?
- Have a practice webinar

Turion/Tuber Discussion

Results from the recent sediment sample looking for hydrilla tubers/turions were discussed briefly with the committee. Results and feedback included:

- No tubers/turions found in the sediment samples
- Herbicides don't kill tubers
- Light penetration issue?
- Walk-in-Water example (storms disturbed the soil)
- Mark will present details in May
- Can we stock hydrilla?
 - Answer: It's not legal
 - Can we make it legal?

Management Operations

Next, the committee discussed management operations. The discussion began by highlighting the roles of different sections in FWC with regards to plant management on the lake.

-Both below Habitat and Species Conservation (HSC)-

IPM (Invasive Plant Management)

- Treats invasive plants
 - Daily boats you see are out there for:
 - Lettuce
 - Hyacinth
 - Tussocks? Treat if invasive
 - Primrose
 - Cuban bulrush

AHRES (Aquatic Habitat Conservation and Restoration)

- Larger scale tussocks
- Plantings

- Access
- Some large scale projects

Also spraying:

County: currently spraying the canals

Private sprayers: homeowners hire

Next, the committee focused a discussion on the daily management operations surrounding water lettuce and water hyacinth:

- All county managing the operations would be better = more oversight (versus Applied Aquatics)
 - o Resident: would feel they would have better oversight (county)
- GPS on wands: piloting now (GPS on nozzles and boats)
 - o Would know if sprayed the same place, for example
 - o Detailed image of where, when spraying
 - o See what they are spraying when and where
 - o Build trust
- Analytical chemistry: detect chemicals in the water
 - o Lakewatch: analyze the water
 - o Would help answer the question: is it herbicides killing the lake? Full of poison (people's perception) or not?
- GPS pilot: not sure it will expand
 - o Costs, feasibility
 - o If successful, government should subsidize the cost
- Hyacinth, lettuce: treat individually rather than widespread, as necessary
- Daily nature of spraying: constantly picking at it
 - o Ecosystems: naturally large disturbances, patterns
 - o Cycles over many years, it's a process, with development, years of change
 - o Daily spraying doesn't reproduce hemi-marsh, just 1/2 dead
 - o Move to periodic treatments
 - 10 years?
 - Lettuce, hyacinth grow back to certain % then knock them back
- Lettuce, hyacinth: need to eliminate non-target kills
 - o Use different spray
 - o Watch out for drift
 - o Treat so doesn't overdominate littoral marsh, back in the marsh
 - o Zones: i.d. zones
- Image issue: leave like a fighter squadron
 - o Image impact, A.A. cowboys image not working professionally, appearance of horseplay
- Timing change
 - o Scab might heal a bit
 - o Spawning?
- Spot spraying

- Logistically hard
- When at low levels, can't do
- Let it grow more: still have to wand it, but more time in between
- Long-term, waiting
 - Mechanical instead of spraying
 - Feasible if spray less, remove mechanically when it develops in zines
 - IPM looking into mechanical
- Missing: someone with experience managing lettuce and hyacinth
- Timing
 - Mid-week
 - Thresholds
 - What target vs. when spray
 - Impact on bass spawn
 - Research says no (return to nest, etc.)
 - Perception issue
- Succession idea: knock back, create conditions for invader plants
 - Lots of money spent
 - Filled up with spatterdock
 - Kill everything: invaders come back first
 - Accept what we have or open conditions for something you don't want?

Public Meeting Discussion

The committee then discussed the plan for the public meeting that would follow that evening.

Next Meeting and Future Considerations

- Next meeting will be held June 13
 - Committee to decide if hold it outside at Jim's house or wait until Fall to do so
- Next meeting will continue to discuss the plan draft, as well as a vision for the lake
- In May, a webinar will be held to share and discuss results of the sediment tuber and tomato studies
 - A practice webinar will be set up to help work out logistics

This then closed the meeting.

Appendix A: Agenda

**Lake Istokpoga Advisory Committee
Thursday, March 14, 2019**

Meeting Objectives

14. Develop trust and community between committee members
15. Continue process of consensus building on species/habitats of concern and management actions to address concerns

Meeting Agenda

8:30 Welcome and Introductions

Revisit draft HMP goals and objectives

Discuss management operations

Plan public meeting

12:30 Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Summary

Overview

On Thursday, May 23, 2019, the Lake Istokpoga Advisory Committee met online via webinar to hear the results of recent research on the lake. Research scientists Mark Hoyer, Chelsey Crandall and Kai Lorenzen, and lead facilitator Joy Hazell attended, designed and facilitated the meeting. Research scientist Jason Ferrell (Director of the Center for Aquatic and Invasive Plants) was also present.

Six committee members attended the meeting. The meeting objective was to:

- Share the results of recent studies conducted on Lake Istokpoga

Presentation

The webinar consisted of a presentation by Mark Hoyer, with input from Jason Ferrell, summarizing the results of two studies done recently on the lake, and the plan for a third study that will be conducted in the near future. The entire presentation can be seen here: (put link)

Advisory Committee Discussion

Each committee member was asked to identify anything that surprised them in the presentation. Responses were recorded as such:

- nothing that surprised me, thought very encouraged that they are being done
- maybe possible analyze for diquat using solid state MMR
- surprised that there were no tubers found in any of the samples
- encouraged that it looked like biomass and overall size of tomato plants were even better than Lake Toho so the soil here can promote plants
- lack of tubers may be why no hydrilla
- re-establish natives and hydrilla, it should come back as it needs to and then we determine threshold levels and desired locations to get established with hydrilla and natives.
- Diquat: if takes a lot to test for it I would say put that somewhere better well served, can see the soil can grow tomato plants if works in Toho ought to work in Istok, just the lack of tubers.
- Depth that core sampler goes? Depth of tubers normally? A: most in top 5-6 inches, coring device went 10-12 inches
- surprised, encouraged, happy to hear lake can take natural course and come back hopefully
- not surprised to see, felt herbicide use was being properly conducted and wasn't responsible
- think other issues responsible for state of the lake, would like to see these results put into a larger context that included other things which may have caused loss of aquatic vegetation

- amounts of fertilizers and nutrients and sewage dumped in lake recently plus impressive results from Hurricane Irma, all those together help explain what has happened to the lake in the past few years

Next Meeting and Future Considerations

- Next meeting will be held June 13
 - Location and time to be sent out soon
- Will put this recording up on the website and email the link to you so you can share it
- Note: DEP report is up on the website too under Resources, will email that link as well
- Results will also be presented to the LIMC at the next meeting
- Results are not written up yet, but Mark can share the powerpoint slides if desired

This then closed the meeting.



Summary

Overview

On Thursday, June 13th, the Lake Istokpoga Advisory Committee convened in Sebring, Florida. Research scientists Mark Hoyer, Chelsey Crandall and Kai Lorenzen, and lead facilitator Joy Hazell attended, designed and facilitated the meeting (Appendix A, Agenda).

Committee members, three guests, and one Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

- Continue to build trust and community between committee members
- Begin to identify habitat targets for Lake Istokpoga
- Begin to identify management tools and processes to meet habitat targets

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

Identification of Habitat Targets for Lake Istokpoga

The first activity aimed to identify desired amounts of target habitats by completing the table below (percentages in the table come from historical ranges and ranges obtained from a previous public meeting):

Habitat Type	Historical Example Amount	Public Meeting Target Range	Advisory Committee Target Range
Open Water	86%		
Bulrush	1-2%	++	
Spadderdock	2-3%		
Mixed Emergent	1-2%	5% (Arrowheads)	
Lily	0.5%		
Cattail	3-4%	+	
Emergent Grass	.3%	10%	
Freshwater Marsh	4%	40%	
Submersed Aquatic Natives	5%	5%, +, 20-40%	30%
Hydrilla		10%, 20%, 10%, 20-40%	
Water Hyacinth		1-2%, 2%	
Water Lettuce		1-2%, 2%	

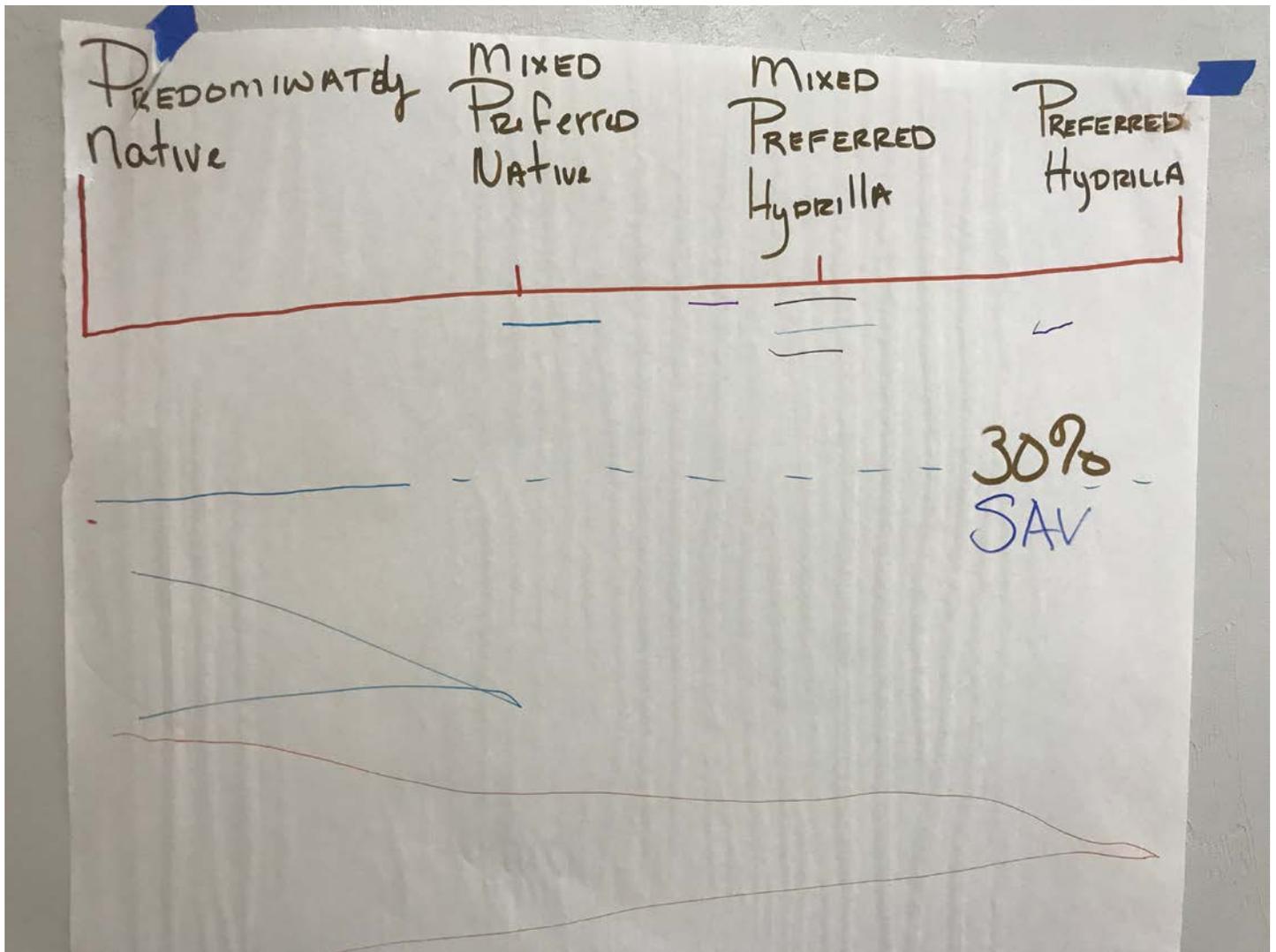
Discussion of Submersed Aquatic Vegetation

The committee initially agreed on a target of 30% (+ or -) for submersed aquatic vegetation (SAV). However, it soon became apparent that there were differing understanding of desired SAV with regards to hydrilla and native plants. A robust discussion followed that did not reach consensus at this meeting, but we hope will allow for consensus in the future. The discussion notes are transcribed below:

- If not hydrilla don't lose natives
- Hydrilla for ducks
- Common target in other plans
- 30% natives, keep hydrilla separate
- Why not hydrilla
- Distribution of SAV and hydrilla across the lake, vs. one spot is important
 - Pull in the maps drawn by the committee members
- Great, hope we get to the point where we must discuss 30% SAV and hydrilla vs. native because right now we aren't close.
- FWC open to 30% SAV, make up is important (natives, hydrilla, both)
- Tight eye on hydrilla is necessary, more monitoring to ensure it doesn't go beyond the target range
- Water quality is important to the county – need at least 30% for lake to be decent
- Highest % of natives possible
- FWC IPM include natives and hydrilla as submersed
- Orange lake: proactively plan (ahead of target or wait until it hits the number)
- Hydrilla almost gone before IRMA – other suspects?
 - Pollution, algae, water visibility, lack of light
 - Herbicide doesn't kill tubers
- Keep hydrilla and native % separate to maximize native vegetation
- Stakeholders will say 30% hydrilla
- In the public meeting most put natives and hydrilla together
- Fishers want both natives and hydrilla
- Eelgrass is not the only native – had lots of Illinois pondweed – stick with native submersed aquatic vegetation to describe (this was in response to facilitator Joy continually using eelgrass as a stand in for natives)

Continuum Activity

Recognizing that there was a wide area of disagreement between the desirability of all natives, mixed natives and hydrilla or predominately hydrilla for submersed aquatic vegetation in Lake Istokpoga the UF team asked participants to mark on a continuum where they stood on this question. The purpose of the activity was to get a better understanding of areas of overlap and areas of disagreement, it was not a voting or decision-making tool. The results are shown in the photo below.



Discussion of Submersed Aquatic Vegetation

- A lot of mix
- Spatial question
- Do we need to get more specific?
- Future: vet specifics through public meeting
- We recognize that it's 30%ish
- 20% hydrilla and 20% native: Bad thing?
- 20 – 40 or 50% range?
- Time of year? Concentration?
- Think of biologist perspective: define
- 95% of hours on the lake spent by fishermen – all fishermen happy with 30% hydrilla & 30% native submersed vegetation
- 20% (at least) of hydrilla mandatory for fishers

- 20-40% range
- Don't agree fishers want 20% hydrilla
 - Crappie, pan fishers, bass
 - Fishing in native habitat preferable
- Want life, hydrilla contains, fishers angry
- 20-40% mix okay

Management Operations (Spray Program and Best Management Practices)

Next, the committee discussed possible changes to management spraying operations and the tradeoffs of different changes.

<i>Potential Management Options for Discussion</i>		
Few Boats (2 – 4) on the Lake Daily – Lake wide	Many Boats on the Lake for a Contracted Period – Lake wide (for example, 1 week/month)	Zone Treatment – Boats concentrate in zones on a predictable schedule to meet target levels of water lettuce and hyacinth removal
-Perceived control -Get to know people spraying -Year one/two	-Disorganization (Perception) -Little more frequent -Year three + -People won't always experience boats on the lake -Too many boats at once may be misperceived -Pro - not constant presence -Con – risk allowing more buildup, may lead to more herbicide use, more much and shade out SAVE -Selectively treat areas -Many at one time may turn areas brown	-Perceived control -Get to know people spraying -Fishermen know where they are spraying

Additional Suggestions for Management Operations/Best Management Practices

- Applied aquatics banned from lake – county manages lake
- Target what supposed to be targeted – accountability, who is in charge of people spraying
- As many boats as necessary when it is necessary
- Accountability goes both ways
- Website tough for many, not updated, hard to navigate
- Training workshop to use website tool
- Hybrid of options
- Time of year – switch management operations strategies

- Educate/inform public about spraying
- If saw lots of boats selectively spraying wouldn't have such a problem
 - Trust
 - Crazy spraying
- Word "spray" is a bad word now
- Free airboat rides with sprayers
 - Regain trust
 - Meet on personal level
- Private contractors' issue
- However, they need to keep it from getting to big (areas)
- Burn as a tool

Parking Lot

The parking lot captures ideas that are important but may not fit into the present discussion. Below are ideas that came up during this meeting:

- Combination of herbicide (not from maintenance program), pollution and IRMA contributed to the loss of SAV
- Florida scientist and aquatic plant index methodology is a good resource (put on website)
- LIMC: ongoing committee for plan implementation
- Prioritize recommendations – research should be number 1
- Carly's eelgrass plantings died – observations
 - S. bumble is okay
 - N. end is okay
 - West wall had been struggling – snails in cages
- The plan is trying to achieve better fishing and bird populations
- What plants/combinations do we need to improve fishing
- Structure vs. species of plant

Next Meeting and Future Considerations

- Next meeting will be held July 11th
 - More face time is better (meet in person)
- Committee requested a word version of the chapter 4 draft to provide comments

This then closed the meeting.

Appendix A: Agenda

Lake Istokpoga Advisory Committee Thursday, June 13, 2019

Meeting Objectives

16. Develop trust and community between committee members
17. Continue process of consensus building on species/habitats of concern and management actions to address concerns

Meeting Agenda

1:00 Welcome and Introductions

Habitat Targets

Spray Program Options

Open Discussion

4:30 Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Summary

Overview

On Thursday, July 11, 2019, the Lake Istokpoga Advisory Committee met in Sebring, Florida. Research scientists Chelsey Crandall and Kai Lorenzen, and lead facilitator Joy Hazell attended, designed and facilitated the meeting.

The meeting objectives were to:

- Share the results of recent studies conducted on Lake Istokpoga

Welcome and Introductions

- The meeting began with activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda.

Activity

Participants were given large sticky notes and asked to answer the following: “Please describe the lake in terms of plants, fishing, birds, other wildlife”. Notes were then placed on the wall and discussed as a whole.

What do they have in common:

- Fishing not great, hope recovering
- Water quality: mucky, brown
- SAV: concerns about plant communities
- No one has changed
- Room for improvement on every one of categories

Points of disagreement:

- Large (fish)- where?
- Level of disappointment with where lake is at: very poor... not best, getting better
- Things not where should be: static or improving?
- Creel surveys through years: past number of boats versus now, when surveyed
 - o Seen less boats, wildlife
- Saw: windy point 3 trailers, Lake Placid: 50
- Large fish: tournament had fish
- Creel surveys: now success was down, different lake now than 2010, different type of fishing, take into account
- Tournament results: FWC does not have individual teams’ results
- Number of limits: closest metric

Sediments/tomato herbicide studies

A brief update on the sediment studies was presented, followed by a Q and A.

- Herbicides: known to be used on lake
- Results of run-off from sewage/pesticides that go into Arbuckle Creek, cow pasture
 - o Chapter 2 : DEP analysis of water quality
- Are/is sewage used?
- Question about nutrients/ heavy metals going in to lake
- How stuff breaks down; what happens when they break down?
- Why certain herbicides were chosen
 - o 7-8 most common herbicides and got non-detects for any residual
- * Sonar
- Scientific approach: hypothesis, test, didn't support hypothesis
- Results deserve more communication and visibility
 - o Problem with trust in science
- Communication, if it worked would be great,
- Compare results from Istokpoga and Lake Tahoe
 - o Is it tubers in top
 - o Issues with natives...how to deal with
- Testing for residuals
- Hypothesis: residuals are preventing regrowth of SAV and vegetation, nothing can grow
- How does water level impact SAVs
- Drawdown can rejuvenate seed base

Survey Presentation

Results of the lake-wide survey were presented by Chelsey Crandall, followed by a discussion as summarized below:

- Would like to see results geographically, by neighborhoods, distance to lake, etc.

Main takeaway

- Mail respondents more satisfied, maybe because less involved than link (more involved)
- As many non duck hunters as duck hunters
- Where on scale they thought the lake was manmade---natural
- ? Did lake need to be managed
 - o Conflict between whether the lake need to be managed and what to do with invasives
- Points to a lack of communication
- Surprised about herbicide low opinion
 - o Surprised versus not surprised
- Tease out geographic responses to fire/drawdown
 - o Educational opportunity
- Surprised at number of negatives to prescribed burns
- BMPs: would have gotten yes but do they know bmps
- Would snowbirds have swayed the responses?

- Tease out duration on lake
- Concern that responses move away from best method
- How do you make a decision about the lake?
 - Based on preferences
 - Protection of ecosystem
 - How do you balance
- Most people don't know BMPs
- Zero in on habitats, targets
- How do you balance biology with human needs?

How can we use this/ what else do you want to know?

- Clear about means versus ends
- How do we understand use of divergent opinions
- Agreed: lake management is for wide spectrum of users
 - Matter of degree
 - Mapping exercise
 - Desires
 - How far are they willing to go for natural system
 - Prioritize areas...natural
- No hydrilla around spillway
 - Plants of any sort
- " in crappie areas
 - Deeper water
 - Hydrilla for spec, blue gill on lake
- " around ramps, homes
- Clear channel around lake
- Better communication and understanding between lake users and FWC

Management tools:

The committee then discussed different management tool options:

Drawdown:

- Short time pain for long-term benefit
- Can you burn during
- How do you manage access
- Benefits/obstacles
- Where do funds for dredging come from?
- Frequency?
- Corps receptive
- How to manage right now vs. long-term
 - Can we work management actions between busy season
 - What are economic impacts

- Try to do it in conjunction with spring/summer

Mechanical Harvesting

- Contracts out
- Potential for projects moving forward where feasible
- Would like to show progress of MH to public
 - Come out of Toho project

Communication discussion

The committee brainstormed and discussed ways to improve communication surrounding lake management:

- Agree: differ as to what that is and how
- When little/no trust can getting more info hurt us
- Gear toward getting trust back
- FWC: biologist in charge of PR scientist compared to politicians for communication example
- Get help from trained professionals
- Liaison
- Hard to communicate nowadays
- Wisconsin extension example: specialist who's job is to communicate, opportunity to develop here
- Meetings: facilitation
- Other examples of outreach: aquariums, ways to show things
- Extension: universities
- Open houses
- Worry: doing more damage than good
- Lake boss: focus questions, coordinate responses
- Lake PR person
- Part of problem right now: all FWC supposed to do this
- Center point of focus: not convinced will help
 - Communication has to go both ways
- Chapters: need tech editors

Parking Lot

- Every 2-3 months FWC/stakeholder lake trip
- New reservoir system
- How was the survey advertised?
- How was the response rate?
- Disconnect between trust of FWC in general and FWC activities: info gap
- Clubhouse: Highlands Park Estate
- No control over water level? Can work with water management
- Talk to farmers south of the lake
- X purposes of water levels

- Dredge canals, provide channels, may destroy some littoral zone but overall positive for lake

Next Meeting and Future Considerations

- Next meeting will be held August 8
 - Location and time to be sent out soon

This then closed the meeting.



Summary

Overview

On Thursday, August 8, 2019, the Lake Istokpoga Advisory Committee convened in Sebring, Florida. Research scientists Mark Hoyer, Chelsey Crandall, and Kai Lorenzen attended, designed, and facilitated the meeting.

The meeting objectives were to:

- Continue to build trust and community between committee members
- Discuss the results of the sediment research
- Continue defining habitat targets
- Discuss near and long-term goals of the habitat management plan

Welcome and Introductions

The meeting began with activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda.

Presentation

Mark Hoyer gave a brief presentation about the current results of the sediment research on Lake Istokpoga.

Discussion following:

- Tubers die off at low light during hurricane?
- Sediment depth? So thick it killed it? -It will grow a long way
- How close to the shoreline was the sampling done? (Map shown)
- Hydrilla gone before hurricane? Spraying?
- Any plants doing well on the lake? Eelgrass is coming back
- Can we plant hydrilla? No, Federally listed

The committee was then asked to brainstorm ways to communicate these results to the public. Discussion:

- FWC presentation
- Get extension involved
- Create a user friendly write up of the results (share with FOI, Lake Istokpoga Facebook page, newsletter, etc.)
- Fairs/displays
- Educational workshops
- Ingrid's news article
- Fish camps, bait shops
- Norm Lee

- Present at open meeting
 - o By UF or committee
- Boat shows
- Big tournaments, director/pre-tournament meetings
- Public information strategy
- John Benson will pass around
- Extension leaflet

Habitat targets

The advisory committee then participated in an activity designed to lead discussion about habitat targets. Flip chart sheets were placed around the room with draft targets and details based upon past committee meeting discussions. Below are notes from the discussion preceding the flip-chart activity:

- Vegetation: why do we want it/more? (*is it about the plant, or the fish/ducks it supports)
- What is the total percent that could possibly be marsh?
- Food and shelter for wildlife
- Marsh: homeowners
- Shape of marsh important too
- Boat channels
- Plan will be adaptable: important to remember
- Where do things belong?
- Spraying pickerelweed?
- Contour map of lake since hurricane?
- Look at the percentages in the Orange Lake plan for examples
- Depth numbers for lake contour map?

Members were asked to spend time at each, and to place green dots next to things they agreed with, and yellow dots next to items/numbers that needed more discussion. The group then reconvened to discuss each habitat target flip chart sheet. Below are images of each sheet, with dots and additional notes stemming from subsequent discussion.

SUBMERGED (SAV)

TARGET: 30% ($\pm 5\%$)

WIDER RANGE:

20-40

CONSIDER TIMING

Can too many natives? Impede navigation
20% trigger

25-50%

DETAILS: -TIME OF YEAR

●● BALANCE: HIGHEST % NATIVES
POSSIBLE WITH HAVING HYDRILLA
FOR FISHING

●● -NO MORE THAN 30% HYDRILLA
IF NATIVES EXCEED THAT WE LEAVE
THEM

● VET THROUGH PUBLIC MEETING/
FUTURE PROCESS IF IN COMBO
EXCEEDS 30%

● REPLANT NATIVES

- Final range: 25%-50%, with a trigger at 20%
- Consider timing

BULRUSH

TARGET: 3%

- more than 3%

- don't spray it don't let it get hit

- never heard anyone complain too much bulrush

- calculate how much we could have

DETAILS:

- NOT TOO THIN / SPARSE

- Band along outside edge of lake

- Calculate how much the lake COULD have and use that to further define target goal
- Don't spray it and don't let it get hit, would like to see more than 3%

PADS

TARGET: 4%

DETAILS:

- - REDUCE SPADDERDOCK ●
- MONOCULTURES IN FAVOR OF MIXED PADS
- - NO MORE THAN 50% OF PADS: SPADDERDOCK ●

- TRAILS IN IT - FLOWAYS
- WILL REQUIRE HERBICIDES

- PART OF MARSH

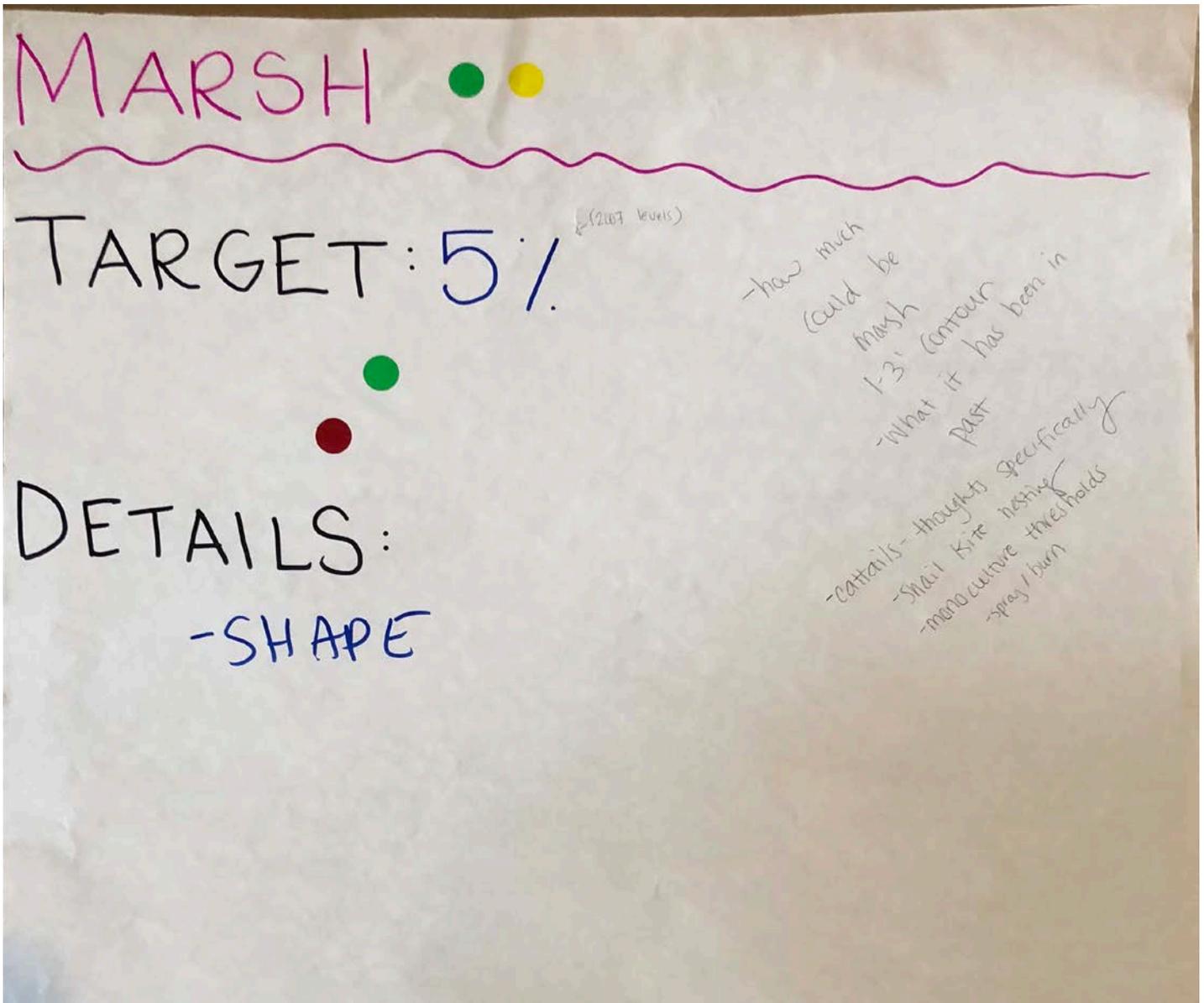
[- TIMING]

NOT AS MUCH SPATT IN POST
- POST DRAINDOWN
- COLONIZER - POST-TREATMENT

- LOTUS - ANNUAL
- FISHING FLAT PADS BEG
SPADDERDOCK
- TREE SPADDERDOCK - WHITE
FISHING

- DRAGNET IS MICROPLANKTON
- DO WE KILL MATTERS?
- SPRING - EXERCISE IN FERTILITY
- DID HAVE SWAY SPADDERDOCK
TUNING

- Incorporate this as part of the marsh habitat



- Calculate how much of the lake COULD be marsh and figure out target from there

Closing activity: near and long-term goals

Committee members were then asked to write on large sticky notes their “near” and “long” term goals for the lake and place them on the wall. Members then convened in front of each grouping and discussed.

Parking lot

- Plecos: invasive fish, are they a problem? Cole, Jeff Hill have more info
- Have they sprayed the lake? Yes, 75 acres
- Video to look up: boat with fork on front for plant removal
- Legislature should know about what is happening on the lake

- Management: 1: maintenance, 2: repair, and 3: improve
- Create a timeline for planning: e.g. when do we want the marsh back? And work backward from that.

Next Meeting and Future Considerations

- Next meeting will be held Sept 12
- To discuss: airboat field trip for future

This then closed the meeting.

University of Florida - IFAS



Lake Istokpoga Advisory Committee Meeting Sebring, Florida August 12, 2019

Summary

Overview

On Thursday, August 12, 2019, the Lake Istokpoga Advisory Committee convened in Sebring, Florida. Research scientists Chelsey Crandall and Kai Lorenzen attended, designed, and facilitated the meeting.

The meeting objectives were to:

- Continue to build trust and community between committee members
- Continue defining habitat targets

Welcome and Introductions

The meeting began with activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda.

Activity: Looking Back

The meeting began with an activity summarizing the different chapters of the habitat management plan and the progress the group has made so far in completing each.

History and Background Chapter: Mark has completed draft incorporating everyone's comments, as well as a short summary of the chapter (based on the committee's request).

Identification, development, prioritization of management issues, strategies, goals, objectives, and recommendations Chapter:

- Goals, objectives, and actions: have completed a draft summary of the ideas proposed and discussed by the committee, which has been reviewed by the committee and discussed at the public meeting. Remaining: flesh out some of the details, and prioritize what is important in the near term
- Habitat targets: in the last meeting, landed on a target of 25-50% SAV coverage, bulrush: 3% or more, with the goal to leave it alone and not have it impacted by spraying. Remaining: define marsh targets and discuss tolerance of invasive floating plants

Identification and Development of Monitoring Measurables and Strategies

- Kai has draft based on what has come up in the meetings, he will email to committee for feedback and bring in for discussion
- Define: what metrics will we use? Can we come up with indicator species (invertebrates)?

Actions for Other Agencies to Consider:

- Drafting based on discussions and input in the committee meetings. Focal actions to be further discussed:
 - o Consider alteration of lake water levels (WMD, ACOE)
 - o Consider reducing nutrient inputs (DEP, Farmers)

Focal Habitat Targets: Marsh

At the last meeting, the committee requested data on the maximum percentage of marsh habitat that the lake could hold to use as a starting point to determine desired target marsh habitat on the lake. Chelsey Crandall presented results from work conducted by Mark Hoyer, which gave 15% as an estimate of maximum marsh habitat coverage for the lake (presentation with details available on website). The committee then discussed their target for marsh coverage. Points raised:

- If maximum potential extent is 15%
- Remove marsh areas in front of homes
- What the lake should be
- Any reason not to have marsh?
- No marsh: airboat, like grass
- A lot of unincorporated properties
- What type of marsh? Discuss spatterdock
- How restore marsh? Hydrilla?
- Having a target range is important: development will build it up in future if we don't
 - o Spring Lake: development plans
- Where are we going? How do we get there
- 2012: where was marsh then? Fishing was good, recruitment not
- Not a % we need but a zone, need a strip around the whole lake
- Natural recruitment of eel grass
- 10-15% good target, quality is important
- Marsh: structure
 - o Continuous bands of vegetation, as contiguous as possible
 - o Clumps: anglers need edge, trails
 - o Homeowners
- North end: have clearing for access
- Discourage homeowners from clearing too much
- Angler edge: creating, homeowners
- Invasive plants-tradeoff
- AHRES: convert one type of marsh to another
 - o Broad: this doesn't help FWC to know what we need to do (need to be more specific)
- Obtain % and if frogs, birds come back be the judge of whether that was the right %
- Different animals need different things
- Tolerance for organics?
- Primrose? Example to discuss

- Tussocks and tussock precursors
- Pure researchers? Why aren't things growing now?
 - o Hire people for research
- Session on lake management
- Experimental scientific team
- FWC: Craig Mallison does this but is only one person
 - o Can bring questions to FWC researchers through this process
- Action items in plan: conduct research projects to---
 - o Research Questions you have: this is a chance to list them in the plan
- Persistent research
- Prototype
- Subtropical zone: unique here
- Homeowners: permit only if chemical or go beyond
- Synthesis: all agree want as much marsh as is possible on the lake, keeping the needs of homeowners in mind; need to flesh out what we want in that marsh

Next steps:

The committee agreed that the next activity should be to break into small groups and look at the draft of Chapter 2, and prioritize what they still need to discuss/flesh out in upcoming meetings and discuss what should be considered near-term priorities in the plan itself. Below is a transcription of each small group flipchart:

Group 1:

- Better program management with defined goals, follow-up, and reporting
 - o Define a program manager
 - o Outlined expectations and schedule for involvement (including feedback) "closed-loop"
 - o Restore SAV and emergent vegetation
 - How? Planting, volunteer work
 - o Better public info and progress reporting
 - o Specificity in actions
- Research (FWRI, near term hopeful)
 - o Develop a computer model of the lake and impacts of alterations or events (hurricane, sewage spill)
 - o Impact of hydrilla on habitat
 - o Muck accumulation rate (various plants/invasives and herbicide treatment strategies)

Group 2:

- Drawdown (Goal E-2-3)
 - o Spoil piles
- Revegetation (Goal I)
 - o How? Research, more planting, inside bulrush line
- GPS nozzle on spray gun (Goal F2)

- Marsh zone (Goal D)
 - o Tolerance threshold for invasives

Research activities

Based on what came out of the discussion on marsh habitat, the group spent the remainder of the meeting discussing research activities that should be included as goals of the plan. Below is a transcription of the flip chart notes that came out of that discussion:

- Lake model: impacts, outcomes
- Simple but powerful research: tomato example
 - o Below water vegetation not growing; something in the water?
 - o Plants that don't thrive now: look closely at
- Detailed experiments on in field spraying
 - o Nufar example
 - o Small scale quadrants
 - o Periphyton, collateral impacts?
 - o Vertebrates, invertebrates, baitfish, marsh biomass: get data on
- Document search: what is out there now
- Water used in irrigation
- Research: do during drawdown?
- Hydrilla: impact on native habitat, organics
- Herbicide treatment strategy that minimizes organics, maintenance management, muck
- Watershed study
 - o Impacts of whole watershed
 - o Nutrients, land use, BMAP
 - o Storm water treatment: SLID only doing right now
 - o Arbuckle Creek, dairy
- Synthesis: research includes:
 - o Model of impacts to lake
 - o Lab-type experiments to look at what is impacting plants (water?)
 - o In-situ experiments to look at potential impacts of spraying
 - o Literature review
 - o Watershed study (Nutrients)

Closing discussions

The meeting wrapped up with an update from the LIMC, as well as comments from the meeting guests (non-committee member attendees).

Parking lot

- Other states: Texas, people who build lakes-look at

- Other states: do they have the 50 foot rule?
- Marsh: what does this mean?
- Sediment study results: email summary
- Beacham: get summary of Okeechobee historical process
- Kevin J: get 2019 map on website

Next Meeting and Future Considerations

- Next meeting will be held October 10

This then closed the meeting.



Summary

Overview

On Thursday, October 10th, the Lake Istokpoga Advisory Committee convened in Sebring, Florida. Research scientists Mark Hoyer, Chelsey Crandall, and lead facilitator Joy Hazell attended, designed and facilitated the meeting (Appendix A, Agenda).

Committee members, two guests, and one Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

- Continue to build trust and community between committee members
- Move decision process along re:
 - a. Floating plant tolerance
 - b. Marsh composition
 - c. Management operations/spraying

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

Marsh Composition

The initial discussion centered on marsh composition. The committee agreed that the marsh should be at 15% based on historical levels and light data. They also agreed the marsh should range from the bulrush line to shoreline and be 80% vegetated with medium to dense (need to define these terms) emergent and floating leaf plants, with the rest in open areas. The detailed discussion is listed below:

- Emergent and floating
- the bulrush line to shoreline and be 80% vegetated with medium to dense (need to define these terms) emergent and floating leaf plants, with the rest in open areas.
- Structure and species (not monoculture/invasive)
- No hydrilla in this zone, not an SAV zone
- Okay with it growing there within the marsh
- Composition is determined by what can be where
- Shrub primrose marsh vs. annual perennial marsh – useful distinction
- Assumptions – water lettuce and hyacinth
- SAV grows in marsh, not outside of bulrush line historically
- Don't kill the marsh to transition to SAV

- Wet prairie edge w/bulrush – marsh varies
- Residential vs. nonresidential landowners; property not natural so is already disrupting
- Enforce riparian rules in lake
 - Especially if conflicts with HMP
 - Geoff Lokuta does enforcement
 - Want people to comply
 - Can hand people the HMP
 - Open houses, informational meetings
 - Hard to get people to pay attention to this, change attitudes
- Spraying – How FWC conducts its management
 - Maintenance
 - Projects
 - Improvements
- Lake manager – keep eye on it, out every day to take care of invasives before they become an issue
- Tighter management loop
- Keep areas clear
- Okeechobee example
- Too complicated for us to tell FWC how to get to our goals – best left to them, give them flexibility to use their knowledge
- FWC: Like recommendation but not to be limited
- Don't want to lock in without expectations but too many exc. Now, not plan
- Floating plants in marsh
- If marsh is healthy/full won't have floating plants in there
- Some areas are predictable, not others
- Need manager flexibility
- Pause – another Okeechobee?
- Not there, Geoff is out there
- Maintenance control but perception issue is a lot better now
- Okeechobee marsh is different than Istokpoga marsh
- Perception: tradeoffs, reduce # of times people see boats on the lake
- FWC: trying to be clearer, defined about action
- Trade-off: plants grow up more
- Drone hired by FWC to photo document
- Were still evicted/impacted in interim
- PPL issues on technique, scope and scale – encourage to put in plan
- Recommendation in report: this committee doesn't have background to say what is a problem – survey to ID what upsets people the most
- Our survey in there

- Sheer # of boats on lake, repeat treatments, # of trucks in parking lot, out every day, visual of ways tanks are cleaned (looks like blanket spraying) “spray everything, dead stuff
- Need liaison with Geoff
- Plan into future with adaptive management
- Geoff’s plan proposal before – what was the AC reaction, mixed
- Airboats – Facebook complaints about 6 weeks ago, was a law enforcement training exercise but people thought it was spraying

Management Operations/Spraying

The advisory committee discussed various alternative management options/spraying protocols for invasive species, particularly floating plants. The details of the discussion are listed below. The advisory committee agreed to present three options for management operations/spraying to the FWC working group for discussion and adaptation. The three options are:

1. Only spray Tuesday, Wednesday and Thursday
 - a. It was noted that weather may impact these days and flexibility is important.
2. Stop all spraying in December, January and February
 - a. It was noted that issues may arise that necessitate spraying during this time and FWC will inform the new iteration of the HMP oversight committee if this happens
3. Divide the lake into quarters and rotate through each quarter so stakeholders know where the spray boats will be.
 - a. Rotations would not be constrained to a specific time, but the time needed in each quarter would be communicated to the new iteration of the HMP oversight committee

Management Operations/Spraying Discussion Details

- Tuesday – Thursday, already don’t spray on Friday
- Acceptable by FWC
- What does this mean for employees, jobs?
- Restrict: no spraying in high use periods?
- Weather issues such as storms must be considered
- If it is needed to get rid of plants, then spray
- Tuesday and Wednesday with Thursday as a rain day
- No limitations on spraying
- Approval period for actions are long – can change?
- Doing approval period and procedure now because of stakeholder perception – we can change it in plan
- Geoff Lokuta has no problem with approval process
- Already not spraying on Fridays, change since the start of the HMP development process – should communicate the change to the public
- Target days to extent practicable

- Monday – Wednesday with Thursday as a rain day
- Rain and wind considerations mean limiting days may be tight
- Limiting days would mean more boats out at a time
- Logistics of where to put boats, when
- Perception
 - Person out there seeing boats
 - Fisher pulls into spot and all brown
- Quadrants: hard to stick to, can tell public which quadrant we will be in
 - No fixed time but stay in one quarter at a time
 - Need compromise
 - 1 week might not be enough time to treat areas
 - Quadrants may give invasives a chance to blow up
- No spraying during spawn
- Busy time with people: Jan – Feb, off lake? Also, slow growing seasons
- 6 waterfowl areas already established
- Kissimmee has a pause
- No treatment during January – Feb
- December – January would overlap with waterfowl
- Great, should be December – February
- Unless really need to
- Lots of boats right before to prep
- Public information policy before
- Need monitoring/data
 - Will look at # of acres treated
 - What happens to native plant community
 - Bring in FWRI
- Mechanical harvesting
 - Admission already failed if need/use
 - May – Istokpoga
 - Can't take stuff out of bulrush
 - Research pre-post use
 - Put in research part of HMP
- Trial – no spraying December – February with monitoring
- Pause must be preceded by maximum effort
- Also monitor satisfaction
- Would rather not stop but if it is tried and combined with public information flow and admission if it doesn't work
- It's an alternative strategy to address dissatisfaction – make clear and get out to public
- Maximum people here then

- Need a trigger developed by FWC if spraying must be restarted before the pause ends.
- Change in how FWC handles communication – professional communicators, IPM will work with FWC communication division

Tussocks

- Definition/tolerability
- Past problem for homeowners
- Orange lake: range in definition, legacy islands, defined, spray, shred, remove
- Istokpoga – smaller and usually primrose, would clog homes, structure if floated on Istokpoga
- Primrose tussock treatment here
- Spray primrose – tussock precursor
- Not maintenance of primrose – larger scale treatments
- Animals use the mats
- Can push into bulrush

Research Questions for HMP

- Correction for run-off into lake? Ag/Septic
- Spring lake – stormwater treatment a success, can they do it down Arbuckle
- Stormwater treatment in new developments
- Research how we got here in lake – incorporate questions into research section for future opportunities
- Nutrient issue – Mark's LW data indicated nutrients aren't the problem
- Anything else coming down creek?
- Phosphorous high re: historical data
- Change after storm

HMP Oversight and Monitoring

- Oversight committee – next version of the LIMC
- Commissioners would like this too
- Or have AC member on LIMC
- Fishing rep on LIMC?
- Other reps also fish
- LIMC very formal – formal process? Trade-offs
- What about starting from scratch – technical advisory committee
- LIMC – fatigue on committee
- Could mesh new committee to FWC timeline
- Involve highlands county?
- Need to be closely aligned
- Can it be a subcommittee
- Doesn't make sense to have 2 independent committees

- Timeline of meetings
- Public meetings to tell people what is going on etc.
- Feedback loop
- What we want to see/tackle, here is what we will do, what we did, what worked/would change
- Public, LIMC – how to mesh
- Sequencing, roles of each
- Timeline needed – how to mesh messages
- Pickerel weed can also form tussocks

Next Meeting and Future Considerations

- Next meeting will be held July 11th
 - More face time is better
- Committee requested a word version of the chapter 4 draft to provide comments

This then closed the meeting.

Appendix A: Agenda

Lake Istokpoga Advisory Committee Thursday, October 10, 2019

Meeting Objectives

- Continue to build trust and community between committee members
- Move decision process along re:
 - a. Floating plant tolerance
 - b. Marsh composition
 - c. Management operations/spraying

Meeting Agenda

1:00 Welcome and Introductions

Marsh Habitat

Spray Program Options

Open Discussion

4:30 Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Lake Istokpoga FWC Working Group Meeting
Bert J. Harris Jr. Agricultural Center Auditorium,
Conference Room 3
4509 George Blvd; Sebring, Florida 33875
July 14, 2018



Summary

Overview

On Thursday, July 14, 2018 the Florida Fish and Wildlife Conservation Commission Lake Istokpoga Working Group met in Sebring Florida. Project principal investigator Kai Lorenzen, research scientist Chelsey Crandall, and lead facilitator Joy Hazell designed and facilitated the meeting (Appendix A, Process Agenda).

Approximately 15 working group members attended the meeting, including FWC staff, FWC law enforcement, and county staff. The meeting objectives were to:

- Develop trust and community between working group members
- Develop shared understanding of working group history and evolution of the need for a lake habitat management plan
- Develop shared understanding external and internal stakeholder analysis
- Identify potential actions to improve potential for a successful Lake Istokpoga Habitat Management Plan

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda and objectives, and participant generated ground rules for the meeting (Appendix B). As an icebreaker, participants were asked to identify their favorite thing about working on Lake Istokpoga.

Timeline Activity

Participants were then asked to create a timeline of their Lake Istokpoga experience from their first time on the lake (personally or professionally) to present day. Timelines can help gather, share, organize, and analyze information as steps in seeking common ground; they are simple and can be very effective. Participants were asked to write out key moments including trips, work projects, natural events, interactions with stakeholders and team members, etc. They were then asked to place 4 colored dots on the timeline to identify:

- Red dot: First time on the lake
- Green dot: Most memorable conversation with a stakeholder
- Blue dot: Moment they felt frustrated
- Yellow dot: Moment they felt successful/optimistic



Figure 1. Workshop participants creating a shared timeline for Lake Istokpoga.

Presentation and Discussion of External Stakeholder Analysis

Joy Hazell presented a summary of the results of the stakeholder analysis. Meeting participants received the draft stakeholder analysis report and will receive a copy of the PowerPoint presentation. Following the presentation, participants were divided into 4 small groups and asked to discuss what the current stakeholder situation means for the HMP moving forward by answering a series of questions (Table 1).

Table 1. Reflections on the external stakeholder analysis.

What are the main sources of tension within the stakeholder community that may prevent the execution of a successful HMP?	What has FWC done to contribute to the tension?	What has FWC done to deescalate the tension? Has it been successful? Why or why not?	What could FWC do with external stakeholder groups moving forward to increase the likelihood of a successful HMP?
-trust, communication, education (and understanding of each others concerns)	-regardless of consequences we are not addressing stakeholder concerns	-meetings, outreach, develop key relationships has worked to a point	-continue/more communication; finding new way to more effectively interact/communicate with stakeholders
-Unflexible/lack of compromise -Lack of open and continued communication -Lack of trust-don't believe we will do what we say -Integration and implementation of their ideas into the plan	-"we're the experts" -concept of maintenance control -public meetings-check the box	-developing a plan!-UF plan -more meetings with stakeholders and site visits -successful (relatively)- can be better than large group meeting/no meeting at all	-continuation of informal stakeholder engagement -ensure input is incorporated in a way that they can see
-trust -communication (internal: not communicating the same message; some say we don't communicate enough; don't reach ALL stakeholders; only thinking we react to a few stakeholders) -stakeholder circumvent process -differing opinions	-bait and switch-political influences -not communicating the same message -listen but don't react/change -focus on small projects but not big picture -lack of skills to identify and deal with SH in different situations	-1 on 1 interactions -group boat tours -public meetings -fish camp meetings -internal meetings : yes/no depends on individual	-give the stakeholders a win -from surveys use information provided by SH and address each (ie transparency)
-lack of trust-both ways -perceived lack of coordination within FWC -unwavering viewpoints	-failed to effectively communicate plans -did not build relationships -past lack of coordination	-increased stakeholder engagement: yes and no	-be more present -lake tours -fish camps and tournaments

		-altered timing and actions in response to stakeholders	-meetings
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Presentation and Discussion of Internal Stakeholder Analysis

Chelsey Crandall then presented a summary of the results of the internal (working group) stakeholder analysis. Meeting participants will receive a copy of the PowerPoint presentation. Following the presentation, participants were again divided into 4 small groups and asked to answer a series of questions about what the current situation means for the HMP moving forward (Table 2).

Table 2: Reflections on the internal stakeholder analysis.

What are the main sources of tension within the working group that may prevent the execution of a successful HMP?	What could the working group do internally moving forward to increase the likelihood of a successful HMP?
<ul style="list-style-type: none"> -IPM adherence to maintenance control -differing opinions about what issues are habitat “problems” -more participation/open conversation without fear of reprisal -new people and turnover result in lack of input/comfortable group interaction - lack of understanding across guilds 	<ul style="list-style-type: none"> -tough on the issue, not on the person -remain professional, disagreements aren’t personal or bad -actively participate
<ul style="list-style-type: none"> -different responsibilities -sideboards-flexibility of -consistent message 	<ul style="list-style-type: none"> -consistency in messaging to public -working group hierarchy? Equal distribution -positive messaging
<ul style="list-style-type: none"> -inability to adapt -lack of internal input -competing views/opinions -speaking with a unified voice 	<ul style="list-style-type: none"> -continued communication and discussion as we develop the HMP -brainstorm ways to communicate with a unified voice -brainstorm ways to communicate with external stakeholders -keep eachother informed so if meeting other can participate with SH
<ul style="list-style-type: none"> -assigned areas/focus different -position of leadership “who’s in charge” -consequence of decisions create more work -pressure to do actions and to be efficient -peer pressure -different stakeholder groups talk to different WG members 	<ul style="list-style-type: none"> -process is helpful -Facilitated discussions -being flexible on management strategies -improve internal communication -everybody speak up

Pulling it all Together and Next Steps

Joy Hazell then led a discussion to synthesize the meeting and to think about next steps for the working group. Below are points raised by working group members and recorded on the meeting flipchart:

- Norm pull up at site, say what you see
- Disrupt the hierarchy
- Stakeholder driven at sites
- Changing airboat captains
- Hear others' thoughts before telling them proposed actions at sites
 - Or say first what want to do at a site
- AHRES wants to hear projects
- Send where you want to go ahead of time (for site visits)
- Time limit for each site
- Whole group convos (keep boats together)
- Neutral facilitator for group
- Project ID for AHRES
- tension Q: look at, discuss, try to address

This then closed the meeting.



Figure 2: Timeline for Lake Istokpoga created by the working group.



Figure 3. Participants lined up in chronological order from when they first started on Lake Istokpoga.

Appendix A: Process Agenda

Time and Person Responsible	AGENDA TOPICS, OBJECTIVES & ACTIVITIES	Set up and materials
<p>10:00 a.m.</p> <p>Joy and Chelsey</p>	<p>1. Welcome and Introductions</p> <p><u>Objectives:</u></p> <ul style="list-style-type: none"> • Establish comfortable and constructive learning environment • Set the tone <p>Activities/Interactions: Welcome and Introduction Meeting Objectives Group Norms Agenda Review and Adaptations</p> <p style="text-align: center;">Total: 30 minutes</p>	<p>Agenda</p>
<p>10:30 a.m.</p> <p>Joy</p>	<p>2. Timeline Activity</p> <p><u>Objective:</u></p> <ul style="list-style-type: none"> • Create shared understanding of FWC History with Lake Istokpoga that reveals flash points and key moments <p>Activities/Interactions:</p> <ol style="list-style-type: none"> 1. Place long butcher paper piece on floor, wall or tables (or many flipchart pieces taped together). Draw line from one end to the other 2. I-----I -----I 3. Have team members “Create a timeline of their Lake Istokpoga experience to date” <ol style="list-style-type: none"> a. Everyone has to have a marker and write on it – KEY MOMENTS FROM THEIR OWN EXPERIENCE b. Start in (?) and end today: 4. Let prompts develop timeline and use prompts to help them think more creatively about key moments – trips, ah-hah-moments, meeting key people, confusion, etc. 5. Hand out dots: Place a dot on a key moment of learning for you, a key experience <ol style="list-style-type: none"> a. Moment you started working on Lake Istokpoga b. First time you went on the lake c. Moment when you felt frustrated d. Moment when you felt optimistic 6. Ask for examples of each 	

Time and Person Responsible	AGENDA TOPICS, OBJECTIVES & ACTIVITIES	Set up and materials
Continue	<p>10:30 Examine and discuss</p> <ul style="list-style-type: none"> • <i>Creating a shared history</i> reveals both flash points and key moments • Debrief by asking: <ul style="list-style-type: none"> ○ What have you learned about the issue, situation, problem, etc. from the timeline? ○ What have been the most significant events? Why? ○ How have events affected internal and external relationships among the parties? ○ What do you feel you did well/could have done differently? Why? <p style="text-align: center;">Total: 1 Hour</p>	
11:30	Lunch	
<p>12:30 p.m.</p> <p>Joy and Chelsey</p>	<p>3. Presentation and Discussion of External Stakeholder Analysis</p> <p><u>Objective:</u></p> <ul style="list-style-type: none"> • Create shared understand of external stakeholder analysis • Identify and discuss <p>Activities/Interactions:</p> <p>Presentation of Stakeholder Analysis – Joy Small group discussion – Chelsey Report out - Chelsey</p> <p style="text-align: center;">Total: 75 minutes</p>	
1:45	Break	
<p>2:00</p> <p>Joy and Chelsey</p>	<p>4. Presentation and Discussion of Lake Istokpoga Working Group Interview Analysis</p> <p><u>Objective:</u></p> <ul style="list-style-type: none"> • Create shared understand of internal stakeholder analysis • Identify and discuss <p>Activities/Interactions:</p> <p>Presentation of Analysis – Chelsey Small group discussion – Joy Report out - Joy</p> <p style="text-align: center;">Total: 75 minutes</p>	

Time and Person Responsible	AGENDA TOPICS, OBJECTIVES & ACTIVITIES	Set up and materials
<p>3:15 Joy and Chelsey</p>	<p>5. Pulling it all together and next steps <u>Objective:</u> Activities/Interactions: Group discussion of next steps</p> <ul style="list-style-type: none"> • What actions should the working group take? • What resources would the working group need? <p>Total: 45 minutes</p>	

Appendix B: Group Norms

- Be on time
- Do not talk over one and another
- Be tough on the issues, not on the people
- Attentive listening
- Limit electronic use
- Time for frequent bathroom breaks



Summary

Overview

On Monday, August 12th, the Lake Istokpoga Working Group and University of Florida Lake Istokpoga Project Team convened in Sebring, Florida. Principal Investigator Kai Lorenzen, research scientist Mark Hoyer, and lead facilitator Joy Hazell attended, designed and facilitated the meeting (Appendix A, Agenda).

Highlands County and Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

- Continue to build trust and community between working group
- Advance the thinking on how the survey and other stakeholder input (public meeting evaluations etc.) informs both the HMP and project planning
- Create a shared understanding of the HMP Recommendations

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B). Participants were sorted into groups to identify a series of expectations (+ or -) based on the final three months of development of the HMP. The expectations are listed below:

Hopes

- Advisory committee will advocate for the plan
- Working group members conducting work on the lake will have authority, document behind them
- Have a comprehensive plan that public can see/accept that has clear directives for staff
- Stakeholders educated through the process
- Things will settle down
- Document that clearly lays out action for staff
- Plan will be well publicized and lots of input to final (media)
- Plan has sufficient input by all stakeholders and is supported by the advisory committee

Concerns

- Get level of buy in and trust we are hoping for
- Who is going to make sure the plan is being implemented
- Go through the process and still have the same issues
- Plan that doesn't make sense or can't be implemented
- Plan is not amenable to snail kite nesting

- Concerns about re-education, new people
- Enough details in plan
- Plan is dynamic and flexible and continuing
- Staying plugged in and continuing

Lake Istokpoga Survey Summary Results Presentation and Discussion

Project research scientist Chelsey Crandall presented a summary of the survey results to the working group. After a period of questions and answers working group members gave their initial impressions.

Impressions

- Property appraisal records...one for property and one for dwelling to distinguish empty lots
- Interesting to hear snowbird ideas on non-native/invasive because the plants aren't growing while they are here
- What would happen if you broke it out by species?
- Better than expected based on public meetings
- Value in mail survey to a discreet group of people
- Communication gap – meeting participation vs. committee
- Change approach in public engagement
- Don't miss snowbirds
- Accurate way of sampling – empty home
- Scope and scale of methods of invasive plant removal – of AP actions

Working Group members then split into small groups to answer the following questions:

- a. What was most surprising about survey results?
- b. What was encouraging about survey results?
- c. What wasn't encouraging about survey results?
- d. How might the working group change their way of doing business based on the survey results?

	Surprising	Encouraging	Discouraging	Change
Group 1	<p>Value natural habitat</p> <p>Not as harsh as expected</p> <p>Lack of knowledge on how lake functions</p> <p>Recognize our need to manage the lake</p>	<p>Value natural habitat</p> <p># of non-cons users respond</p> <p>Recognize lake does need management</p> <p>Respondents not all squeaky wheel types</p> <p>More support for herbicides and mgmt. of invasives than anticipated</p> <p>Support for drawdowns and prescribed burning</p>	<p>Lack of trust</p> <p>Distrust in use of herbicide</p> <p>Lack of lake natural functions</p> <p>Didn't capture winter residents</p>	<p>Messaging, how we talk managing exotics: "we're conserving native habitat, not treating exotics"</p> <p>How we communicate with stakeholders and better target our audience</p> <p>Timing of surveys to account for snowbirds</p>
Group 2	<p>Degree of natural lake response</p> <p>High response for mail and low for link</p>	<p>Need for management is understood/acknowledged</p> <p>High response and amount of new people reached</p> <p>Support for burns, drawdowns, harvesting</p>	<p>Lack of trust in our management or listening</p> <p>Lack of understanding regarding "natural lake"</p> <p>Negativity towards herbicide use</p>	<p>Better/purposeful engagement with public</p>
Group 3	<p>How many did not go to a house</p> <p>How many people felt it was a natural lake</p> <p>How low for "trust in mgmt.</p>	<p>That people said plants need to be controlled</p> <p>Number of people recognizing need for mgmt.</p> <p>Overall view of lake was 3.2, everybody gets a little but not everything/shred resource</p>	<p>Fact that people keep saying we are not communicating enough – FWC listens to concerns; responds to concerns</p> <p>People participating the most are least satisfied</p> <p>People saying we are doing exactly what we have been doing; not changed</p>	<p>Not necessarily change how we manage but more how we communicate our management</p> <p>How we tell our story; easily digestible to public</p> <p>How do you get satisfied people engaged in the process</p>
Group 4	<p>Support for exotic control</p>	<p>Support for exotic control</p> <p>Agreement that lake does require some management</p>	<p>Think it's mostly natural lake – don't understand the system</p> <p>Public didn't have high impressions of FWC communication</p>	<p>Change messaging</p> <p>Pros and cons of different techniques</p> <p>Less defensive</p>

Additional info desired from survey questions

- Scope and scale
- Methodologies
- Natural lake dynamics

Habitat Management Plan Recommendations

Project Principle Investigator Kai Lorenzen gave a brief presentation on the habitat management plan (HMP) recommendations.

Working group members then split into small groups to discuss how to operationalize the plan. Discussion points were recorded and are listed below by group

Group 1

- Annual compilation report – combine divisions
- 2x year newsletter
 - What we did
 - Lake condition (HAB, fish, gators, birds etc)
 - What we want to do
- 2x year public meeting
 - Same info as newsletter
- Coordinate timing of data collection and reporting
- Include volunteers with evals
- Time lapse photo station evals

Group 2

1. HMP with targets is approved
2. Assess the lake, compare and contrast
3. Stakeholder meeting 3x year
 - a. Collect input and discuss management options
 - b. Develop management plan based on input, publicize
 - c. Carry out and implement plan over next 4 months – repeat
4. Long term project/plans
5. Short term project/plans
6. Managing expectations is critical to convey to stakeholders in the process

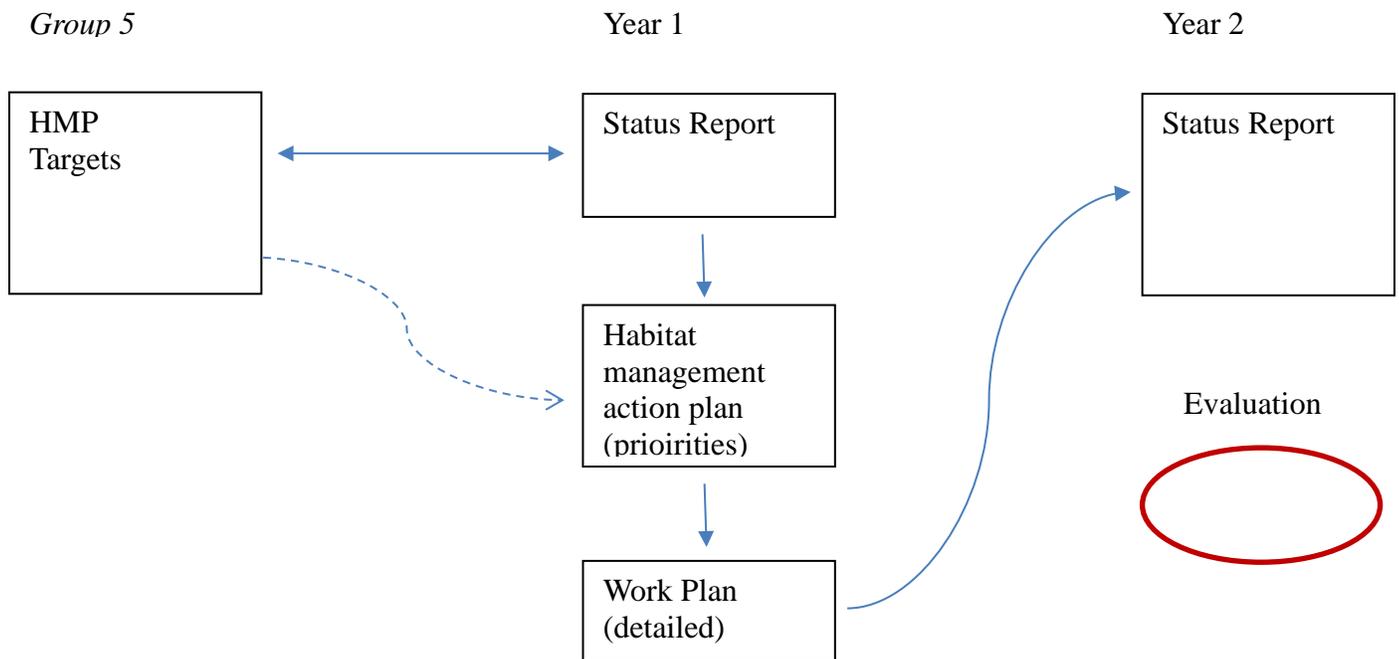
Group 3

- Define target habitats and ranges
- Define species, composition and distribution spatially
- Stakeholders define the above with FWC guidance
- Is annual monitoring doable?

Group 4

- Opportunity for FWC to review plan – preparation before meeting

- Distribute plan to review prior to the meeting – outline
- Iterative process between FWC and stakeholder committee
- Stakeholder committee provides options on how to operationalize
- Struggle with defining targets with stakeholders – quantitative/temporal scale, no shared language
- Monthly field trips



Whole Group Discussion on HMP

- Challenges with how public/FWC and within FWC understandings
- How do we get all past research validated
- Concerns about false promises
- Maybe have a shorter plan – Kissimmee as an example
- What do you mean by evaluation? – Habitats, critters
- Whole lake vs. specific areas
- Interaction between activities of SME complicates evaluation
- Always engage on big projects, never on IPM

Appendix A: Agenda

Lake Istokpoga Working Group Meeting Thursday, August 12, 2019

Meeting Objectives

- Continue to build trust and community between working group
- Advance the thinking on how the survey and other stakeholder input (public meeting evaluations etc.) informs both the HMP and project planning
- Create a shared understanding of the HMP Recommendations

Meeting Agenda

9:00 am	Welcome and Introductions
10:00	Lake Istokpoga Survey Summary Results Presentation and Discussion
Noon	Lunch
1:00 pm	Presentation and Discussion of HMP Recommendations
3:00 pm	Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available



Lake Istokpoga Advisory Committee Meeting
Sebring, Florida
November 7th and 8th, 2019



Summary

Overview

On Thursday, November 7th and Friday, November 8th, the Lake Istokpoga Working Group and University of Florida Lake Istokpoga Project Team convened in Sebring, Florida. Principal Investigator Kai Lorenzen, research scientists Chelsey Crandall, Mark Hoyer, and lead facilitator Joy Hazell attended, designed and facilitated the meeting (Appendix A, Agenda).

Highlands County and Florida Fish and Wildlife Conservation Commission (FWC) staff attended the meeting. The meeting objectives were to:

1. Discuss and decide on maintenance spraying management operations
2. Discuss and decide on operationalization of the plan including:
 - a. LIMC vs. newly established TAC
 - b. Melding annual or semiannual work plans, committee engagement and public process
 - c. Communication plan
3. Address further questions that remain, this discussion will be determined by working group priorities.

Day 1

Welcome and Introductions

The meeting began with 30 minutes of activities designed to set a positive, collaborative tone for the rest of the day. Activities included introductions, an explanation and clarification of the meeting agenda, objectives, and participant generated ground rules for the meeting (Appendix B).

Maintenance Operations

Geoff Lokuta provided the whole group with a definition of maintenance operations: our Florida Administrative Code Chapter 68F-54, a (15) “Maintenance program” means a method for the management of aquatic plants in which techniques are used in a coordinated manner as determined by the Commission. Put another way, a maintenance program or maintenance control strategy is the coordinated and continuous management of noxious plants in order to maintain the population at low levels, as influenced by funding, available technology, crew availability, and current conditions. There is no explicit definition of what that level is, as it varies waterbody by waterbody and even based on the time of year on a given waterbody. And the participants identified some points that needed clarity within the definition. These points included; there is no definition of lowest feasible levels and how lowest feasible levels can change from year to year and that the term has been changed to maintenance control; there are agreed upon invasive plants that fall under maintenance control including water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), burhead sedge (*Cyperus blepharoleptos*), and primrose (*Ludwigia* sp.).

Maintenance Operations Changes

Participants were asked to list changes to maintenance operations since the beginning of the plan development. These changes were not a direct result of plan development but were either in progress or came about as a result of the statewide pause in maintenance operations in January 2019. The changes are listed below:

- More vetting of treatments
- Applied aquatics does not work on Lake Istokpoga
- Committee sees FWC listens to them
- No longer maintenance control
- Spraying much less often
- All activities go to division director for approval and vetting after going through the working group and Lake Istokpoga Habitat Advisory Committee (LIHAC)
- Photos and gps points are recorded
- “what’s happening on your lake” website
- Spraying less often
- Level of vetting – slow process
- No boats on Fridays
- Half the boats overall
- Out less often
- In clearly defined areas
- Vetting increases time frame from conception to beginning work to 15-37 days
- PDFs of proposed treatment site take time
- Go to zones, not blocks
- Positive comments
- More emphasis on harvesting/mechanical methods
- Maintenance or harvesting project – how to justify work to stakeholders
- Overcomplicated because worried about stakeholder response

Impacts

The working group was then asked to list the positive and/or negative impacts of the above changes based on social, economic or environmental perspectives. The impacts are listed below:

Positive

- Strong documentation to defend management actions
- Transparency
- Show responsiveness to stakeholders
- New information to drive future research
- Improvements to schedule of operations
- Plants aren’t as bad as we thought they might be
- Saving money (less contractors)
- Some trust coming back
- Stakeholder reaction is positive – don’t know if they would agree, must get the message out

- Less brown plants
- Public perception unless boats are out there – when out presume they are out every day
- Less money spent right now
- Shows may be potential to look at other methods
- Time will tell if stakeholders have a sense we are listening to them
- Able to educate a few people
- County gets fewer calls
- Creel – fewer people upset

Negative

- Invasives increasing and displacing native habitats
- Larger areas of brown after spraying
- Impression that this is sustainable
- Create conflicts
- Had lake as best it has been at the start of the pause but keep getting behind, need to be flexible
- Perception – others didn't think lake looked great
- Harvesting will take up money saved
- Set up for big backlash if need large treatments
- Kites: not responsive, can't get done in time – responsiveness suffering
- Time, efficiency, herbicide use more when do go in – spend more
- More tussock development from letting sit longer – lead to habitat impacts
- Less efficacy on large scale projects
- Island space limited resources – disposal could be an issue if we increase harvesting
- Time constraints and needs for IPM Regional Biologist – map, process, resources he is not on now
- Canal calls – positive, can see impact, FWC only treats private canals if they can infest the lake
- Infrequent treatment accumulates more plant biomass
- Proactive – now reactive
- Leaf litter, muck accumulation, more brown
- Treat more plants.

Maintenance Operation Options

Working group members were presented with three options brainstormed by the LIHAC and asked to split into small groups to list the pros, cons and triggers for change for each option. They were also invited to identify and describe a 4th option if they wished. The options were:

- a. Spray only Monday – Wednesday with Thursday as a rain day
- b. Split the lake into quadrants and rotate through the quadrants with a clear communication plan
- c. Stop maintenance spraying from Dec – February or January - February

Group 1

Spray only Monday – Wednesday with Thursday as a rain day

- + Fewer days/boats seen
- + People can choose to go when they are not spraying
- - May need more boats on spray days
- - May not have enough staff on spray days
- - Potentially boats are still spraying every week
- - Reduces operational flexibility

Split lake into quadrants . . .

- + Everyone knows the crew is in a defined area
- - Hard to be flexible with weather
- + Stakeholders can go where no spraying is occurring
- - Must have a clear and agreeable communication plan

Stop maintenance spraying January and December

- + They don't see boats when most users are on the lake
- - May be lots of brown when treatment resumes or before
- + Could be adopted in specific areas

Trigger

- Certain quantities of bad vegetation accumulate within an area
- Negative and obvious degradation of native habitat
- February pause could be an option

Group 2

Spray only Monday – Wednesday with Thursday as a rain day

- + One day less spraying
- - Weather (rain/wind), use more boats/day
- Triggers – weather, endangered species, waterfowl areas, way behind (veg hits a certain %), budget concerns,

Split lake into quadrants . . .

- + Public knows where boats are
- - Public not happy with it
- Triggers – see above

Stop maintenance spraying January and December

- + Happy stakeholders who are concerned about spawning season treatment
- - HVA treatments – winter best season
- - Time to catch up on non-floating plants
- - Lots of boats to clean up prior – lots of work/brown

- Trigger – behind and costs

4th option

- 6 (8?) zones, choose zones, threshold by plant species (% acres, large vs. small area)

Group 3

Spray only Monday – Wednesday with Thursday as a rain day

- + Avoid peak times/less visible
- - More boats Mon-Wed
- - May cause treatments to occur at less environmentally ideal times (higher winds)
- - Susceptible to weather delays
- Trigger – weather conditions

Split lake into quadrants . . .

- + People will know when and where boats will be
- + Requires less planning time for regional biologist
- + Maintain flexibility when and where to work if regional biologist can direct how to move through zones
- + Similar to current operations but increased communication
- + or – Depends on how this is set up
- - Decreased on the fly adaptation

Stop maintenance spraying January and December

- + Avoids peak times
- + Opportunity to learn can we do things differently – how plants will respond
- - Increased user conflicts (preferential to bass fishermen)
- - Eliminates catch up time
- - Increased likelihood of large scale control

4th option

- Research these options so that we have data to support mgmt. strategy
- Negative and obvious degradation of native habitat
- February pause could be an option

Group 4

4th option - Pilot

- Split lake into 6 zones
- Clear notice of what two zones are being treated
- 3 days of spraying during December – February (Thursday for weather make up)
- Triggers
 - Endangered species
 - Access, navigation and flooding
 - Harvesting (days/areas)

- Early detection rapid response (EDRR)
- Aerial treatments – must be vetted
- Acreage to add zones
- Other duties by the county

Maintenance Operation Summary Discussion

The working group debriefed the above activity with a summary discussion where the following points were made:

- There are positive and negatives to each idea
- Operational differences
- Our mindset: get task accomplished, public: get off the lake, bias: how to get the job done
- Don't know if there are any right options – have to try something
- Each tried to pick better parts and combine – there is a willingness to consider changes
- Become more workable with caveats
- Zones: could prioritize zones by season then stay out
- Consistent problem areas: sedge, primrose
- Pause – rotate zones annually
- Is committee going to see this as cherry picking?
- This is compromise, us trying to find a way to work with this
- Can we ask for more tolerance of brown?
- Let them know some options will mean more brown etc.
- Until have target ranges for species doesn't need worry about sedge/primrose treatment, hard to have conversation without target
- Make sure when HMP is presented to public it represents public opinion
- Do we have to set targets? No one has good idea what the right amt is
- Varies by area
- Split invasive species out
- We're "overspraying", they aren't differentiating
- How do they define overspraying – different from a habitat question
- If we had hydrilla no one would mind brown
- We could give you # to take back
- How we operate
- Public meeting – show maps
- Need something quantitative to talk about

Operationalizing the Habitat Management Plan

The working group members were next asked to discuss on decide on how to operationalize the habitat management plan through the consideration of a three key questions:

1. Should the working group work with the existing Lake Istokpoga Management Committee (LIMC) or a new technical advisory committee?

2. How can the working group meld annual/semi-annual workplans, committee engagement and public processes?
3. What should the communication plan for operationalization look like?

The working group was split into small groups to discuss the three questions. The summary of each group's discussion is listed below:

Group 1

- LIMC vs. new committee – operating in the sunshine issues
- LIMC must continue to exist and function
- Could LIMC appoint a sub-group of LIMC members to attend Istokpoga WG meetings to gather info and report back to LIMC? What is the implication of this idea to sunshine laws?
- How do we (FWC) operate/manage habitat on Istokpoga differently?

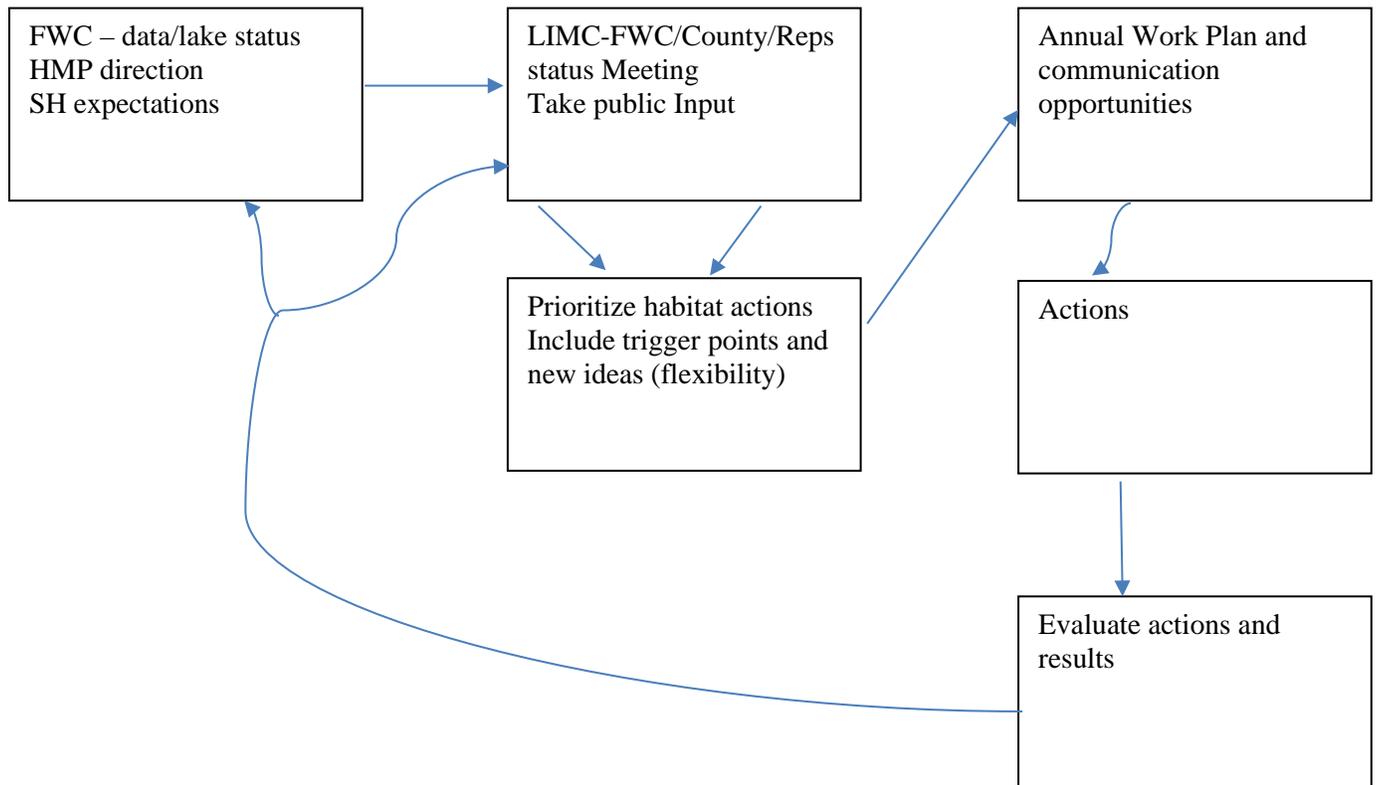
Group 2

- Maintenance operations separate from habitat operations
- Guidelines for where and when maintenance operations
- Define goals/ranges and types of habitat
- Define communicating: ops, habitat goals, current conditions
 - Include more detail in what's happening on my lake
 - Educational workshops for stakeholders
 - ? outreach opportunities

Group 3

- Working group visits lake, identify potential problems or issues
- Develop projects
- Meet with TAC group to determine metrics of success/research needs
- Present to public: public meeting, LIMC, FOI, Gov. Delivery news release
- Vet new plan through working group via email
- Implement project
- Meet with TAC group – successes/failures/lessons for future
- Present to public
- Repeat 2x year
- Revise LIMC resolution
- Incentivize participation
- Expand participation
 - DEP
 - USACE
 - Water District
 - Working group members
 - UF

Group 4



Day 2

Welcome and Setting the Stage

Day 2 began with an exercise aimed at reminding working group members why they opted to develop a stakeholder driven habitat management plan. They also discussed sources of conflict (see figure 1 and 2) and differences between the Orange Lake and Lake Istokpoga planning process. The results of the discussion are below:

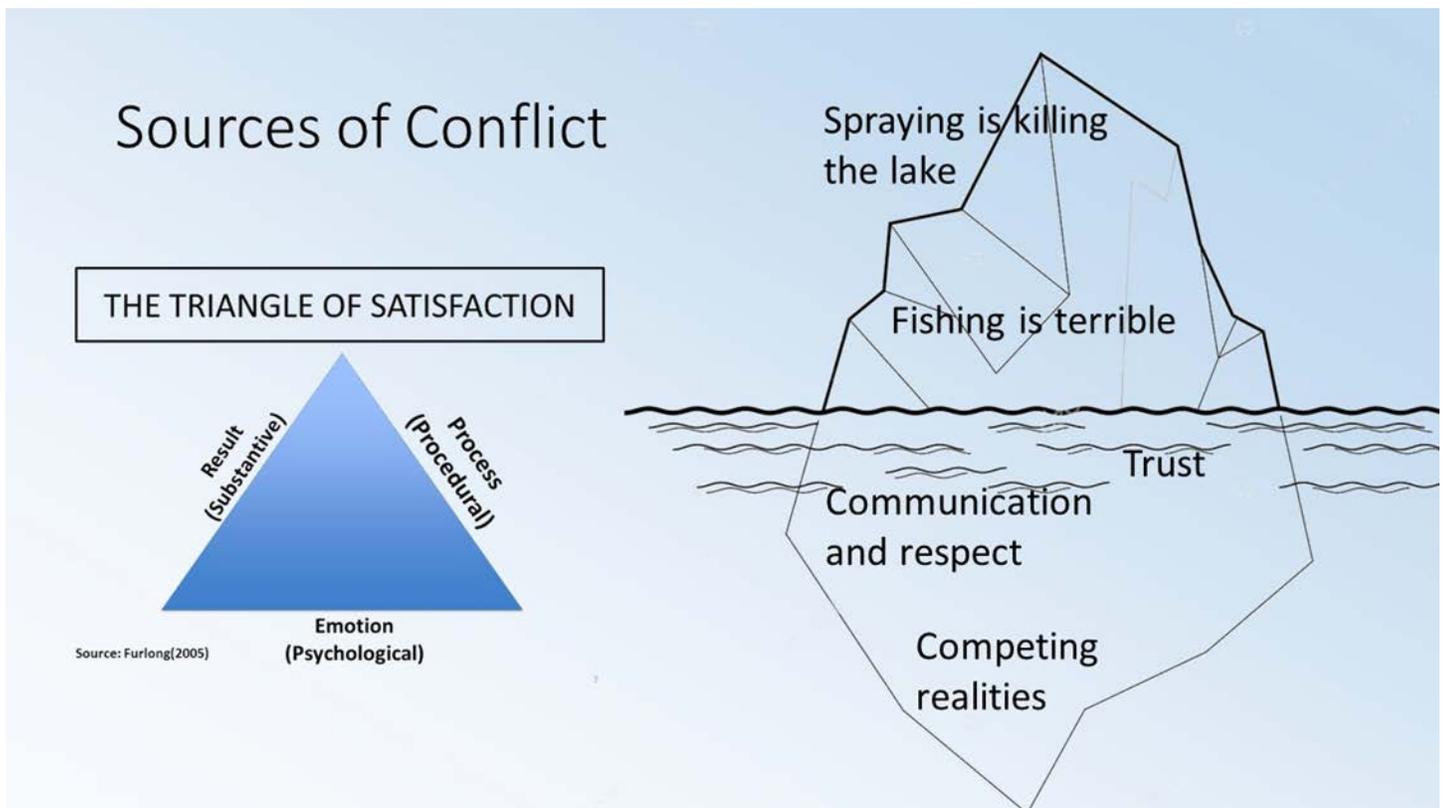
Why develop a stakeholder driven management plan?

- Orange Lake plan showed it was possible
- Give public role in management
- Not functioning: internal debates, public not happy
- Public not happy with what they are seeing/not knowing
- Something in writing to public
- Public want to see we have a plan, continuity
- Social acceptance and buy-in
- Accountability, transparency
- All we heard: “you are doing it wrong”
- What you want the lake to look like – specifics
- Defined measurables – group and public think we hear each other but we may not – clear up
- Get work in writing

- Appease stakeholders,
- Spell out, get all on same page

Sources of Conflict

- Communication
- Stakeholder expectations
- Trust
- Disconnect between long term goals and short-term needs, expectations
- Operations
- Decision making processes



Orange Lake Planning Process Differences

- A preestablished technical document
- Different issues, stakeholders, wider variety of interests
- Views less entrenched
- No snowbirds
- Process – no committee, just 4-5 public meetings
- Technical side (% etc.) by FWC
- Operational plan based on technical document

Maintenance Operations Cont.

The working group continued the operations discussion by listing their individual preferred option to see if the group was nearing agreement. The results are below and agreement was not reached.

- Aggressive, no pause, lowest feasible levels – status quo before pause
- Maintain what is defined in statute, stay consistent – define same, may change approach
- More comprehensive approach, i.d. areas can harvest (e.g. Henderson)
- Try changes as pilot
- Quadrants – keep eye on, if gets to certain % etc.
- Manage as close to zero as we can instead of lowest feasible level
- 3 days a week in quadrants, some areas let go
- Lake acreage range – put # to max
- We should try
- Public expectation of some alteration, all feasible, try and learn from it
- We can think it looks awful but does the public think it looks awful
- The public like seeing maps
- Set ranges, hard to hit one number, ranges more feasible
- Trigger value
- Keep distinction – manage maintenance priority species like they are habitat
- Target max – if zone exceeds, indicate need to treat
- Communication – ranges, triggers, can't wait until then, start the discussion before
- Keep in mind critical times
- %s need flexibility (concentrated vs. spread)

Habitat Management Plan Comments and Concerns

For a final activity the working group went through Chapter 4 to identify areas of disagreement and potential changes that could be incorporated. Based on these comments and the subsequent LIHAC meeting the UF team will amend the draft HMP and send it to FWC on November 22nd.

Appendix A: Agenda

Lake Istokpoga Working Group Meeting Sebring, Florida November 7th and 8th, 2019

Objectives

4. Discuss and decide on maintenance spraying management operations
5. Discuss and decide on operationalization of the plan including:
 - a. LIMC vs. newly established TAC
 - b. Melding annual or semiannual work plans, committee engagement and public process
 - c. Communication plan
6. Address further questions that remain, this discussion will be determined by working group priorities.

Agenda – Thursday, November 7th

- 1:00 pm** Welcome and Introductions
- 1:30** Maintenance Spray Discussion: Pros, Cons and Triggers for Three + Options
- Spray only Monday – Wednesday with Thursday as a rain day
 - Split the lake into quadrants and rotate through the quadrants with a clear communication plan
 - Stop maintenance spraying from Dec – February or January – February
- 3:00** **BREAK**
- 3:15** Operationalizing the Habitat Management Plan
- LIMC or Newly Established Technical Advisory Committee
 - Creation of Procedures/Process/Flow Chart
 - Engaging Wider Public
- 4:45** Wrap Up
- 5:00 pm** **Adjourn – Dinner and Social**

Agenda – Thursday, November 7th

- 8:30 am** Welcome and Review Previous Day's Work
- 9:00** Operationalizing the Habitat Management Plan
- Engaging Wider Public
 - Transparency
- 10:00** **Break**
- 10:15** Habitat Management Plan Remaining Questions

11:45

Wrap Up and Adjourn

Appendix B: Group Norms

- Be on time
- Good A.C.
- No one person dominates
- Be an active/good listener
- Tough on issues, not on people/individuals
- Don't tell someone else what their motives are
- Limit use of electronics
- Recognize different types of knowledge
- Use data when available

Appendix VII: Public Meeting Reports



Lake Istokpoga Public Meeting
Bert J. Harris Jr. Agricultural Center Auditorium
4509 George Blvd; Sebring, Florida 33875
January 10, 2019



Summary

Overview

On Thursday, January 10, 2019, the University of Florida convened a Lake Istokpoga Public Meeting in Sebring, FL. Project principal investigator Kai Lorenzen, research scientist Chelsey Crandall, lead facilitator Joy Hazell, and the members of the Lake Istokpoga Advisory Committee designed and facilitated the meeting. The public was invited through a press release, direct contact, and distribution of a meeting flyer. Agenda can be found in Appendix I.

Approximately 115 people attended the meeting including members of the public, Florida Fish and Wildlife Conservation commission staff, and county staff. The meeting was facilitated by Joy Hazell. The meeting objectives were to:

- Inform Lake Istokpoga supporters on the progress of the management plan and the stakeholder engagement plan process
- Build community and trust
- Gather input for the habitat management plan

Before entering, meeting attendees were asked to indicate on a map of Lake Istokpoga the place that is most important to them and what they do there (Appendix II).

The meeting began with activities designed to set a positive collaborative tone for the rest of the meeting. Activities included introductions, an explanation and clarification of the meeting agenda and objectives, and ground rules for the meeting. Participants were asked to identify their category as stakeholder through a show of hands as an icebreaker.

Dr. Kai Lorenzen then presented an update on the progress of the Lake Istokpoga Habitat Management Plan. A copy of this presentation, along with other project documents, can be found at the website: lakeistokpoga.wordpress.com.

The presentation was followed by a brief question and answer period.

Participants were then divided into 6 small groups. Each small group discussed different management options (Modify Spraying, No Spraying, Current Operations, Mechanical Removal, Other) and was asked to discuss what each would look like to them and what the positive and negative outcomes of each might be. All responses, in addition to other input and questions, were recorded on flip charts. In addition, roving team members recorded participant input and questions in notebooks. Below is a synthesis of what was discussed; a transcription of what was recorded on the flipcharts for each group and in the notebooks can be found in at the end of this report.



Stop Spraying: What does that look like?

Until plants recover/hydrilla gets bad/we see what happens

- Want a moratorium on spraying until recovered
- If hydrilla gets real bad they can start spraying
- Excessive hydrilla then spray
- Let the plants breathe then come back
- Give the lake a chance to recover
- Give it 5 years and see if anything grows

Until UF plan in place

- Moratorium-stop spraying until plan is in place
- UF should recommend FWC to stop now and observe and document until UF gets the plan in place
- Nothing bad will happen in 10 months
- Have committee evaluate the lake before spraying is done (vote on it)
- What about a “stop spray” (temporary) option of some type either during the management plan process or from now on

Do other studies during timeout

- Time out and during that time do other studies

Stop spraying

- We are all on board to stop spraying
- Stop spraying for 6 months
- 10 year moratorium on spraying
- No spraying for 2 years – unanimous
- No spraying-completely stop weeds come back
- The whole lake, immediately
- How can they have a plan if the lake keeps getting worse – needs immediate action and stop spraying. Give lake a chance to come back

Stop Spraying: Positive outcomes of stopping spraying

- Hydrilla kept the lake clean
- The good years they killed lettuce but not everything offshore
- Good for a while
- Lake will revive
- Pepper grass, eel grass, hydrilla will come back
- Fish habitat will come back
- Better filtration by plants on lake
- Community will be happy
- Less red tide
- More birds on the lake
- Bait fish/fry will have somewhere to hide
- Weeds come back
- Beds – fish start laying
- Kids won't look funny!
- Environment changes to normalcy
- Lower concentration of chemical
- Give fish shade

Stop Spraying: Negative outcomes of stopping spraying

- Negative – No
- Negative – weeds taking over
- Negative – navigation issues
- H2O hyacinths out of control
- Lake overrun with weeds
- Less boating
- If you let build up it (non-natives) will take over
- If we stopped spraying there would be an increase in invasive plants
- Nothing bad would happen

Stop Spraying: Concerns about spraying

- Spraying destroyed the ecosystem of this lake.
- Decline in last 6 years is tremendous and that's when heavy spraying started
- Seems very money driven
- Spraying makes lake constantly changing
- Lack of bluegill and bass from spraying
- It started with lettuce/hyacinth and now it is primrose
- Spraying everything on the lake everyday
- No filter on the lake with spraying

- Report isn't going to be done until December spraying will continue
- "FL reputation is done". Spraying all these places
- What's the cost of human life? Poisons and cancers
- Spraying is an experiment

Modify Spraying: What does that look like?

Timing

- Based on time you spray
- Don't spray in spawning areas during the spawning season
- Don't spray every day
- Shouldn't be everyday – maybe one day
- Have to spray but only do so much at a time
- No spraying during spawn
- Post spray schedule at ramp
- Let it build up and then spray

What gets sprayed

- Stop spraying birds' nests
- Leave at least 20% hydrilla (40%)
- Spot spray for hyacinth
- Mix of plants
- Controlled spraying (targeting plants)
- Spray nothing, then if hyacinths get out of control, then just spot spray that area (two stars by it)

How to spray

- Controlled spray, they spray everything they see no reason to spray around island, spray when it becomes a problem
- Make sure to retain access
- Look at other chemicals/herbicides

Modify Spraying: Positive outcomes of modifying spraying

- Bass population would come back
- Birds would come
- increase in birds since 2014 data set if spraying influence abundance of birds went up
- chance for native plants to come back
- you have to spray or non-natives take over
- More habitat, less dead on bottom
- Positive – more growing
- Positive – less invasive to spawning fish

Modify Spraying: Negative outcomes of modifying spraying

- There has to be some spraying because of water hyacinths
- Invasive plants will take over if there is no spraying
- Negative – still putting chemicals in the lake
- Negative – overlapping spray patterns
- Not going to cut it

Current Operations: What does that look like?

Applicator Behavior

- Better monitoring of spray crews, Onsite supervision of applicators
- Not following BMPs
- Applicator needs more supervision
- Applicators need Go Pros, Video camera on all spray boats – especially AA
- Need more training, Sprayers need better training (what to spray), Training of sprayers – still mistrust
- Contractor control concerns (check, check)
- They see us fishing and they go spray there
- Spraying when its blowing like crazy! Spraying at wind speed concern, Sprayers spray in the wind.
- Homeowners go into their homes. Indiscriminate spraying
- Sprayers will tell you if I go back with chemical I'll lose my job
- Not regulated, spraying everywhere

Coordination/Overlap

- Too many different sprayers at same location within a short time period
- Overlap of spraying needs to stop
- Someone needs to coordinate
- Need better/coordinated efforts by/with all groups that are spraying on the lake
- FWC and county spraying – zoning
- Coordination between agencies

Private Spraying

- Private owners and all entities, policing needs to follow
- My issue is private land owners spray. And they spray beyond their yards, How do we regulate that?
- Homeowners action are drop in the bucket

Current Operations: Negative outcomes/concerns of current spraying

- All the spraying may result in no plants coming back
- Spot treatment kills everything
- 5 boats 5 days a week, all the time, with big tanks

- Stop spraying for 2 months for the ducks
- Applied Aquatics 2-5 airboats everyday
- Nothing good about current
- Good for wave runners and jet skis (negative)
- Taxpayer money going to waste
- Less habitat
- Eliminating all non-native species (negative)

Mechanical Harvesting: What does that look like?

- Allow for plants to grow use mechanical harvest to harvest when they get out of control
- Stop spraying use harvester to control lettuce and hyacinths
- Removal for canal access
- What about mechanical harvesting-spraying is effecting water quality
- Instead of spraying, do mechanical removal without chemicals
- 33% of the lake need to be in grass then use mechanical harvesters
- Explore harvesting
- Mechanical harvest instead
- Might be going somewhere to not spray and mechanically harvest
- Mechanical is the best way to control for tussocks
- Instead of spraying put that money into mechanical harvesting

Mechanical Harvesting: Positive outcomes

- Positive: no spraying!
- Water quality
- Doesn't poison the water
- Can be controlled
- Anytime you can do mechanical you are better off
- No negatives to mechanical will suck budgets
- No changes if they are selective and don't go plowing through islands
- No chemicals (positive)
- Better control of area (+)
- Removed instead of left to decay (+)

Mechanical Harvesting: Negative outcomes

- Negative: cost more!
- We aren't going to pay for it
- Extra sediment and silt, What to do with silt during mechanical harvest

- Disposal
- Unintended consequences
- Labor intensive
- Cost comparison
- in emergent vegetation you have to spray because mechanical harvestors can't get hyacinth out of bulrush
- Removing beds and fish (negative)
- Cost (neg)
- Not permanent fix (-)
- Sound (-)
- Mechanical: get rid of what? And don't want it in lake

Other Concerns:

Sediment testing

- Possible sediment testing but expensive
- Go into areas where cattail and bulrush looks good. Now it looks bad. By Big Island they are dead. Take soil sample there. Where habitat is declining
- Take soil samples, Sediment testing, Take sediment samples, Take sediment samples scientifically
- Sediment sample to be sure there is no residual chemical
- Test for residual herbicides in lake

Water quality

- Water quality – adopt projects nationwide and are volunteer based. Is this an opportunity of volunteer to collect. Specifically for water quality.
- Water quality concerns
- Water quality is down, fewer pickerel is evidence

Drawdowns/dryouts

- Multifaceted solution, concerned that the problem has developed over the last 50 years. No periodic draw downs/ dry outs
- Had there been dry outs perhaps there would be less muck on the bottom and superior habitat for submersed vegetation
- Fishing picked up after drawdown/scrape
- Draw down lake again

Help from Texas

- Help from Texas Parks and Wildlife
- Look at Texas and how they do things

Planting

- More follow up on planting activities
- Replant pickerel weed, peppergrass, eelgrass, hydrilla, water lily

Fish Stocking

- Restocking use spray money = better off
- Spraying money to restock instead

Other

- Catch and release bass for 3 years
- Don't waste money on removing spoil islands
- Better advertising on lake management activities

Additional Statements

- Need to get grass to come back
- History of hydrilla on Lake Walk-in-Water hurricane took out hydrilla-no more fishing
- No ducks and only saw a snail kite only catch
- Flat line. No eel grass, no submersed
- "This is a disgrace"
- "Bird life gone"
- "Wildlife gone"
- "Lake is poisoned"
- "End the old process to start the new process"
- Silt and water and lack of weeds is affecting bass fishing
- Do not have a natural flow anymore
- Passionate, frustrated, pissed off too
- Why are we here? We are begging to stop
- We get fines and regulations. Someone needs to be fined.
- UF needs to realize we have been complaining for years and I don't think they can fix it
- Irma – effective bait fish and small fish
- Destroyed the whole side and a lot of food
- More development. And how many home owners are spraying and planting native vegetation
- FL native plant society has the native plants that need to be passed out (new book)
- Series of events that occurred, sediment and herbicide gets loss, over spraying, fecal matter, increase in homes
- Has an effect but not like the spraying that is happening now
- Lake is dead
- Muck is out of control
- Biologists don't know how to manage lakes
- No seeing of new plants growing on lake

- Tournament anglers are not catching bass
- FL should be the example for FW lakes
- Will fishing survive another year?
- Property values dropping
- No new baby fish, all are old
- Bird population is down
- Shiners aren't as big
- Fishing is terrible
- Lake is muddy and lower
- People from out of country in trouble on lake
- Water quality is terrible
- Guides are going to other lakes
- Tournaments not coming because of condition of lake
- Do I sell now?
- If they continue the way they are going, the lake will die and cause a trickle down effect to the local economy as the lake is a draw to the economy, forcing fishermen to go out of county
- Fishing problems are not specific to Lake Istokpoga, (Bentley?) and other lakes have the same problems with catching bass
- There is the atmosphere that no one is providing good management overnight. It's business as usual. Need to light a fire and start taking some actions
- Other lakes are having the same problems, so its not unique to Istokpoga (problem = loss of SAV)
- Was catching good numbers of bass until about 3 months ago, then the fishing went downhill
- The fish are still in the lake, but have moved, and I can't find them
- Tournament results are one proof that bass fishing is bad
- I've been fishing on Lake Istokpoga for 40 years and this is the worst I've seen. Something needs to change. (Note: specifically did NOT blame fishing problems on herbicide spraying)
- Water clarity/visibility/turbidity
- Don't see coots or ducks

Questions

- If no plan and spray continues, what's going to happen to fish and wildlife?
- What would be the long term impact- how long will it take for plants to come back?
- Shallow lake how long will it take for plants to come back?
- What was the main objective of spraying?
- Hydrilla-wasn't eradicated . It was ?
- Can you re-plant hydrilla?
- Want map of vegetation to see the changes – on website, 2015 is the latest
- Could this become a regulatory law? Private sprayers need to be permitted

- Is the eel grass planting going to continue?
- 3 spray companies: want to report in regards to spraying too far up
- Is there a guideline for sprayers to go by?
- Who regulates spraying by land owners?
- What are the names of the herbicides used?
- Any runoff has to answer for run-off of spraying so why doesn't this happen on the lake?
- Do you see coordinate of the creel surveys and the spraying?
- What to know creel surveys if they are correlating with spraying or with loss of hydrilla
- Access to the surveys- how do we get them? (creel, sediment, water quality)
- How many pounds of chemical that's been put on this lake?
- Inform the public on ecological surveys
- workshop on spraying needed, aquatic plant management and process
- Are fish healthy/safe to eat (chemical concerns)
- If you drop stuff to the bottom, who is responsible to get it out...those who spray it?
- Budget – where is it for Lake Istokpoga
- Sediment classified as hazardous waste hard to remove and where
- Is the fish safe to eat ???
- Draw down – is it planned?
- Why can't we have a schedule for spraying, how many gallons they spray?
- What chemical will they be spraying?
- Why can't we find out who is responsible for spraying and when
- Need to get information out on results of electrofishing and trawls to let people know the fish are there
- Responsibility: who is responsible for the lake
- Maps of spraying (private?)
- Who determines where private sprayers are spraying?

After small groups, participants were brought back together and given the opportunity to ask further questions and give additional input. Next steps were discussed, including a future public meeting toward the end of Spring. Evaluations were distributed. This then closed the meeting.

Agenda

Lake Istokpoga Public Meeting Thursday, January 10, 2019

Meeting Objectives

- Inform Lake Istokpoga supporters on the progress of the management plan and the stakeholder engagement plan process
- Build community and trust

- Gather input for the habitat management plan

Meeting Agenda

5:30 Registration and Reception

6:00 Welcome and Introductions

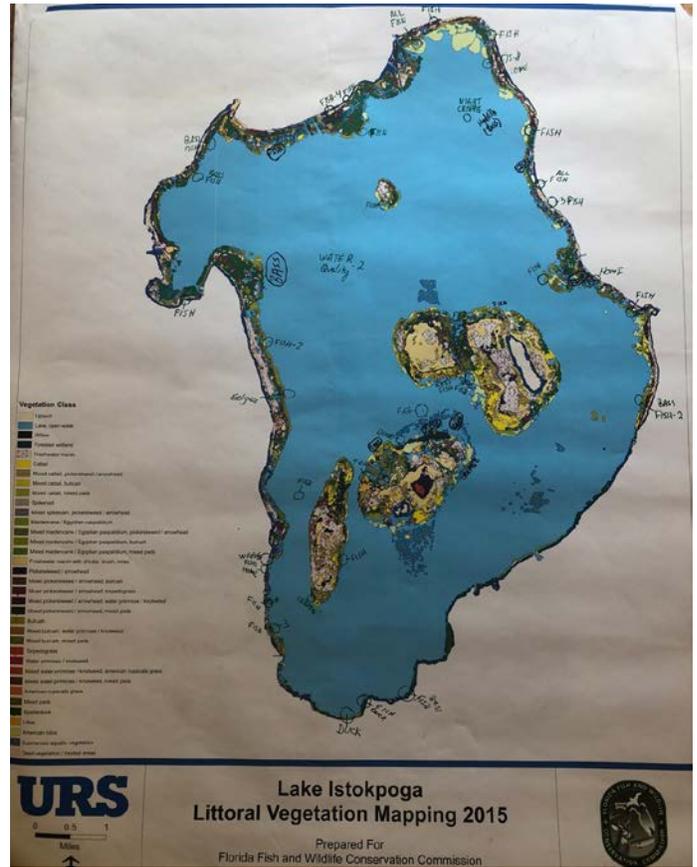
Presentation on Management Plan Progress

Activities to Gather Input: Small Group Breakout

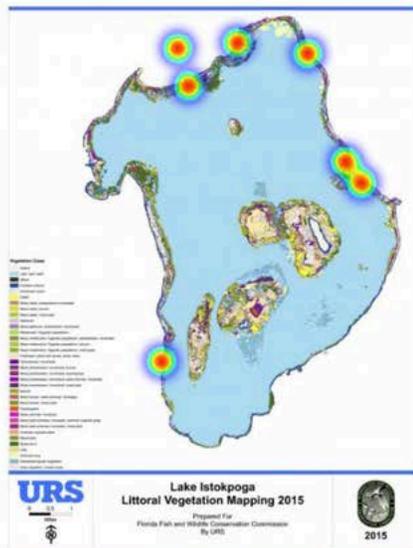
Wrap Up

8:30 Adjourn

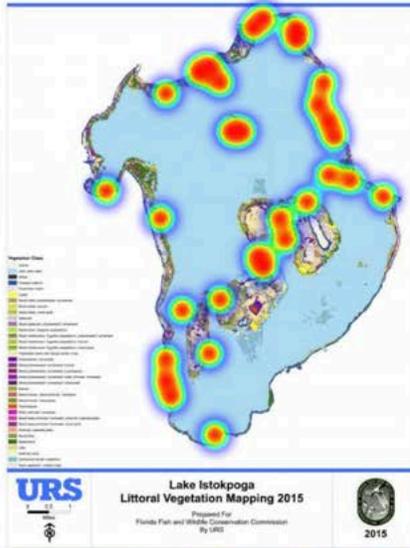
Maps at start of meeting, where attendees were asked to mark the place on the lake that is important to them and what they do there.



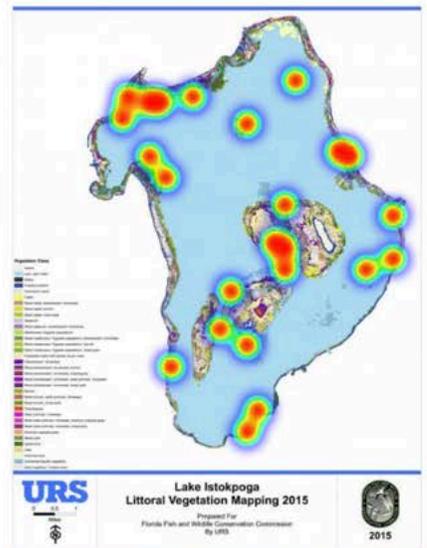
Summary maps depicting places where public meeting attendees said the lake is important to them for each of 5 common responses.



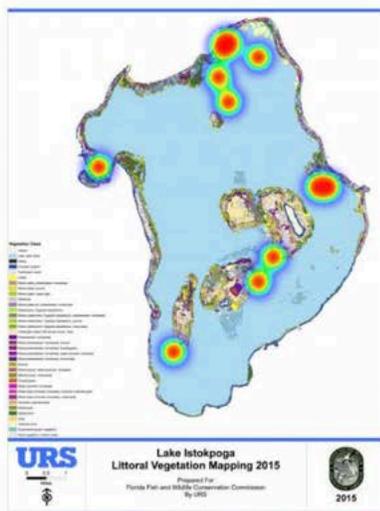
Home



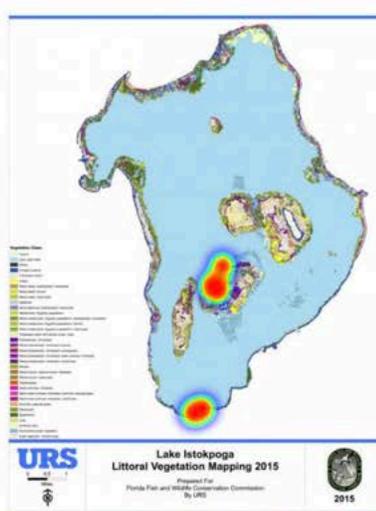
Fishing



Bass Fishing



Crappie Fishing



Duck Hunting

Flip Chart and Notebook Transcription

Group 1:

Modify spraying:

- Keep access – as part of the modification plan
- Allow for plants to grow use mechanical harvest to harvest when they get out of control

Mechanical:

- Stop spraying use harvester to control lettuce and hyacinths
- Negative: cost more!
- Positive: no spraying!

Current operation

- Better monitoring of spray crews

- If no plan and spray continues, what's going to happen to fish and wildlife
- Look at Texas and how they manage their resources
- What would be the long term impact- how long will it take for plants to come back

Modify spraying:

- Stop spraying for 6 months
- Northern seasonal people may want spraying to continue
- Look at other chemical/herbicides because using the cheapest chemical
- Spraying everything on the lake everyday
- No filter on the lake with spraying
- What does modify spraying mean?
 - o Modify: based on time, no modify spray unless plan is in place
 - o Modify use

No spraying

- Group said most want a moratorium on spraying until recovered
 - o Shallow lake how long will it take for plants to come back
- All the spraying may result in no plants coming back
- Need to get grass to come back
- Moratorium-stop spraying until plan is in place

Modify spraying

- Don't spray in spawning areas during the spawning season

Mechanical

- Removal for canal access

Modify spraying

- History of hydrilla on Lake Walk-in-Water hurricane took out hydrilla-no more fishing
- We are all on board to stop spraying
- Report isn't going to be done until December spraying will continue
- What about mechanical harvesting-spraying is effecting water quality

No ducks and only saw a snail kite only catch

Group 2:

1. No spraying-completely stop weeds come back

2. What was the main objective of spraying?

- Goals to keep invasives at lowest levels

We reduce habitat that's not inhabitable

- Invasive program is maintenance program

Spraying when its blowing like crazy!

- We want to give you a resource

3. Hydrilla-wasn't eradicated . It was ?

- No I seen it, you want to eradicate all plants (Ag citizen)

4. Can you re-plant hydrilla?

- Not good old hydrilla (not healthy looking)

5. Flat line. No eel grass, no submersed

Want map of vegetation to see the changes – on website, 2015 is the latest

6. Private owners and all entities, policing needs to follow

7. Could this become a regulatory law?

- private sprayers need to be permitted

8. Is the eel grass planting going to continue?

- west wall planting in progress

9. 3 spray companies: want to report in regards to spraying too far up

- FWC or FDACS (herbicide)

- Is there a guideline for sprayers to go by?

- Yes, addressing it so the information goes out

“This is a disgrace” “Bird life gone” “Wildlife gone” “Lake is poisoned”

“End the old process to start the new process”

Spraying at wind speed concern

-Who regulates spraying by land owners?

-What are the names of the herbicides used?

-On website

-Goes on for different aquatic plants

-Diquat treats water lettuce

-Water lettuce in bulrush, FWC used product for lettuce but not bulrush

11. My issue is private land owners spray. And they spray beyond their yards, How do we regulate that?

12. Will you eat the fish I caught there?

-Yes

13. Describe what “no spraying” means?

- The whole lake, immediately

- If hydrilla gets real bad they can start spraying

- They don't think hydrilla will ever be a problem

- Lettuce and hyacinth is a problem but not really

- Spot treatment kills everything

- UF should recommend FWC to stop now and observe and document until UF gets the plan in place

- Instead of spraying, do mechanical removal without chemicals

- spraying destroyed the ecosystem of this lake.

- Hydrilla kept the lake clean

- Decline in last 6 years is tremendous and that's when heavy spraying started

- Silt and water and lack of weeds is affecting bass fishing

14. What is the concentration of chemicals in the water now?

- possible sediment testing but expensive

15. So key areas to focus on are?

- Go into areas where cattail and bulrush looks good. Now it looks bad. By Big Island they are dead. Take soil sample there. Where habitat is declining

16. Any one person to stop the spraying?

- Not regulated, spraying everywhere
- Sprayers will tell you if I go back with chemical I'll lose my job
- Not following BMPs
- They see us fishing and they go spray there
- "FL reputation is done". Spraying all these places

17. Water quality – adopt projects nationwide and are volunteer based. Is this an opportunity of volunteer to collect. Specifically for water quality.

- Do not have a natural flow anymore

Any runoff has to answer for run-off of spraying so why doesn't this happen on the lake?

- UF can show something to the people that something is actually going to get one but missing fishing season with the Northerns, and they are big input

- Do you see coordinate of the creel surveys and the spraying

What to know creel surveys if they are correlating with spraying or with loss of hydrilla

Access to the surveys- how do we get them?

- Sediment
- Creels
- Water quality

Locals get to go along with FWC on the surveys

Mechanical removal:

- Extra sediment and silt
- WQ
- Distribution of habitat and fish
- Disposal
- Unintended consequences
- Doesn't poison the water
- Can be controlled
- Anytime you can do mechanical you are better off
- Labor intensive
- Cost comparison

- What's the cost of human life? Poisons and cancers

- Passionate, frustrated, pissed off too

- How many pounds of chemical that's been put on this lake?

- Homeowners action are drop in the bucket

- More than what needs to be done. Our doing?

- Why are we here? We are begging to stop

- We get fines and regulations. Someone needs to be fined.

- 5 boats 5 days a week, all the time, with big tanks

- FWC and county spraying – zoning

- UF needs to realize we have been complaining for years and I don't think they can fix it

- Stop spraying for 2 months for the ducks

So what type of zoning are you wanting?

Negative consequences for not spraying:

- Shouldn't be one extreme or the other
- Control and regulated
- The good years they killed lettuce but not everything offshore
- Use common sense
- Excessive hydrilla then spray
- Seems very money driven
- It seems too late
- Let the plants breathe and come back
- Time out and during that time do other studies

Impacts of the lake:

Irma – effective bait fish and small fish

Destroyed the whole side and a lot of food

More development. And how many home owners are spraying and planting native vegetation

FL native plant society has the native plants that need to be passed out (new book)

Series of events that occurred, sediment and herbicide gets loss, over spraying, fecal matter, increase in homes

Inform the public on ecological surveys

Has an effect but not like the spraying that is happening now

Group 3:

Modify spraying

Stop spraying until the place

(+) bass population would come back

Birds would come

(-) increase in birds since 2014 data set if spraying influence abundance of birds went up

(-) If we stopped spraying there would be an increase in invasive plants

Controlled spray, they spray everything they see no reason to spray around island, spray when it becomes a problem

Applied Aquatics 2-5 airboats everyday

have to spray but only do so much at a time

I started with lettuce/hyacinth and now it is primrose

(+) chance for native plants to come back

(-) you have to spray or non-natives take over – use to spray

Let it build up and then spray

Don't spray every day

No spraying

Nothing bad would happen

Good for a while

Give the lake a chance to recover

(-) If you let build up it (non-natives) will take over

33% of the lake need to be in grass then use mechanical harvestors

Take soil samples

Nothing bad will happen in 10 months

Mechanical harvesting

(+) no negatives to mechanical will suck budgets

No changes if they are selective and don't go plowing through islands

(-) in emergent vegetation you have to spray because mechanical harvestors can't get hyacinth out of bulrush

Anything else

Applicator needs more supervision

Applicators need Go Pros

Need more training

Onsite supervision of applicators

Sediment testing

Multifaceted solution, concerned that the problem has developed over the last 50 years. No periodic draw downs/ dry outs

Had there been dry outs perhaps there would be less muck on the bottom and superior habitat for submersed vegetation

Group 4:

Modify spraying

- 10 year moratorium on spraying

- Lake is dead

- Lake will revive

- Pepper grass, eel grass, hydrilla will come back

- Fish habitat will come back

- Better filtration by plants on lake

- Community will be happy

- Less red tide

- More birds on the lake

- Bait fish/fry will have somewhere to hide

Negative concerns

- H2O hyacinths out of control

- Lake overrun with weeds

- Less boating

Note: workshop on spraying needed, aquatic plant management and process

Modify spraying

Controlled spraying (targeting plants)

Not going to cut it

Sprayers need better training (what to spray)

Contractor control concerns (check, check)

Mix of plants

Other concerns

Muck is out of control

Explore harvesting

Biologists don't know how to manage lakes

Test for residual herbicides in lake

Help from Texas Parks and Wildlife

Take sediment samples

Water quality concerns

No seeing of new plants growing on lake

More follow up on planting activities

Better advertising on lake management activities

Are fish healthy/safe to eat (chemical concerns)

Tournament anglers are not catching bass

Modify spraying

Have committee evaluate the lake before spraying is done (vote on it)

Post spray schedule at ramp

FL should be the example for FW lakes

Will fishing survive another year?

Group 5:

Modify spraying

More habitat, less dead on bottom
No spraying during spawn
Lack of bluegill and bass from spraying
Bassmaster top 100 all have hydrilla
Mechanical harvest instead
Stop spraying birds nests
Spraying is an experiment
Leave at least 20% hydrilla
- 40%
Shouldn't be everyday – maybe one day
Negative – still putting chemicals in the lake
Negative – overlapping spray patterns
Positive – more growing
Positive – less invasive to spawning fish

No spraying

Weeds come back
Beds – fish start laying
Kids won't look funny!
Spraying money to restock instead
Environment changes to normalcy
Lower concentration of chemical
Negative – No
Negative – weeds taking over
Negative – navigation issues
Give it 5 years and see if anything grows

Current operations

Nothing good about current
Good for wave runners and jet skis (negative)
Taxpayer money going to waste
Property values dropping
Less habitat
No new baby fish, all are old
Bird population is down
Eliminating all non-native species (negative)

Mechanical

No chemicals (positive)
Removing beds and fish (negative)
Better control of area (+)
Cost (neg)
Not permanent fix (-)
Removed instead of left to decay (+)
Sound (-)

Other

Restocking use spray money = better off

Catch and release bass for 3 years

Sediment sample to be sure there is no residual chemical

Fishing picked up after drawdown/scrape

- Look at the data

Don't waste money on removing spoil islands

If you drop stuff to the bottom, who is responsible to get it out...those who spray it?

Replant pickerel weed, peppergrass, eelgrass, hydrilla, water lily

Water quality is down, fewer pickerel is evidence

- Fewer/no fish breaking surface. Fly fishing is terrible, used to be great

Shiners aren't as big

Video camera on all spray boats – especially AA

Group 6:

What's modifying?

No spraying for 2 years – unanimous

How can they have a plan if the lake keeps getting worse – needs immediate action and stop spraying. Give lake a chance to come back

Fishing is terrible

Lake is muddy and lower

People from out of country in trouble on lake

Water quality is terrible

Give fish shade

Spraying makes lake constantly changing

Guides are going to other lakes

Mechanical: get rid of what? And don't want it in lake

Might be going somewhere to not spray and mechanically harvest

We aren't going to pay for it

What to do with silt during mechanical harvest

Budget – where is it for Lake Istokpoga

2013 they did mechanical removal

Why can't they afford now when they did then

There has to be some spraying because of water hyacinths

Take sediment samples scientifically

Coordination between agencies

Sediment classified as hazardous waste hard to remove and where

Tournaments not coming because of condition of lake

Training of sprayers – still mistrust

Spot spray for hyacinth

Mechanical is the best way to spray for tussocks

Is the fish safe to eat ???

Draw down lake again

Draw down – is it planned?

Do I sell now?

Why can't we have a schedule for spraying, how many gallons they spray?

What chemical will they be spraying?

Invasive plants will take over if there is no spraying

Too many different sprayers at same location within a short time period

Sprayers spray in the wind. Homeowners go into their homes. Indiscriminate spraying

Why can't we find out who is responsible for spraying and when

Overlap of spraying needs to stop

Someone needs to coordinate

Spray nothing, then if hyacinths get out of control, then just spot spray that area (two stars by it)

Instead of spraying put that money into mechanical harvesting

If they continue the way they are going, the lake will die and cause a trickle down effect to the local economy as the lake is a draw to the economy, forcing fishermen to go out of county

Notebook 1:

Fishing problems are not specific to Lake Istokpoga, (Bentley?) and other lakes have the same problems with catching bass

There is the atmosphere that no one is providing good management overnight. It's business as usual. Need to light a fire and start taking some actions

Need to get information out on results of electrofishing and trawls to let people know the fish are there

Other lakes are having the same problems, so its not unique to Istokpoga (problem = loss of SAV)

Was catching good numbers of bass until about 3 months ago, then the fishing went downhill

The fish are still in the lake, but have moved, and I can't find them

Tournament results are one proof that bass fishing is bad

I've been fishing on Lake Istokpoga for 40 years and this is the worst I've seen. Something needs to change. (Note: specifically did NOT blame fishing problems on herbicide spraying)

Notebook 2:

Water clarity/visibility/turbidity

Don't see coots or ducks

Need better/coordinated efforts by/with all groups that are spraying on the lake

What about a "stop spray" (temporary) option of some type either during the management plan process or from now on

Responsibility: who is responsible for the lake

Other notes recorded during plenary discussions were:

Maps of spraying (private?)

Who determines where private sprayers are spraying?



Lake Istokpoga Public Meeting
Bert J. Harris Jr. Agricultural Center Auditorium
4509 George Blvd; Sebring, Florida 33875
April 18, 2019



Summary

Overview

On Thursday, April 18th 2019, the University of Florida convened a Lake Istokpoga Public Meeting in Sebring, FL. Project principal investigator Kai Lorenzen, research scientist Chelsey Crandall, lead facilitator Joy Hazell, and the 11 members of the Lake Istokpoga Advisory Committee designed and facilitated the meeting. The public was invited through a press release, direct contact, and distribution of a meeting flyer. Agenda can be found in Appendix I.

Approximately 90 people attended the meeting including members of the public, Florida Fish and Wildlife Conservation commission staff, and county staff. The meeting was facilitated by Joy Hazell. The meeting objectives were to:

- Inform Lake Istokpoga supporters on the progress of the management plan and the stakeholder engagement plan process
- Build community and trust
- Gather feedback on the Lake Istokpoga advisory committee's Habitat Management Plan draft goals and objectives

Participants were provided a printed copy of the Habitat Management Plan (HMP) draft goals and objectives as reference (Appendix II). They were also introduced to the new interactive website for Florida lakes from FWC which can be found here: myfwc.com/Lakes. FWC informed participants that this site is a work in progress.

The meeting began with activities designed to set a positive collaborative tone for the rest of the meeting. Activities included introductions, an explanation and clarification of the meeting agenda and objectives, and ground rules for the meeting. Participants were asked to identify their category as stakeholder through a show of hands as an icebreaker.

Lake Istokpoga Advisory Committee members Dr. Paul Gray and Jim Reed then presented an update on the progress of the Lake Istokpoga Habitat Management Plan. A copy of this presentation, along with other project documents, can be found at the website: <https://lakeistokpoga.wordpress.com/>.

The presentation was followed by a brief question and answer period.

Feedback Activity

After the presentation participants were asked to provide feedback on the HMP draft goals and objectives. Five stations were set up around the room and participants had 60 minutes to rove from station to station. Each station represented a section of the habitat management plan. The draft goals and objectives were posted for each theme at their respective stations. The themes were:

1. Invasive Plant Species
2. Access and Navigation
3. Management Operations
4. Focal Habitats

5. Communication

Responses from participants were recorded on flip charts at each station. The theme and responses are listed below.

Invasive Plant Species

- Want hydrilla back
- Southern end of the lake
- Look at other systems
- In marshes
- Replant grasses
- Go back to the way it was until 2006
- Expensive, time consuming, now have to fish elsewhere
- Mechanical removal of hyacinth and lettuce
- Concerned about color of water
- Hydrilla will clear the lake
- Spoil islands – move to back of big island
- Spoils: not hurting anything
- Hyacinth: multiplies more than anything
- Keep low if mechanical harvest
- Water hyacinth thinner
- No grass shrimps
- Harvest the weeds
- Bring some hydrilla back
- Hydrilla spread quicker than eel grass
- Fish under hyacinth
- Made habitat
- Dredge – sell soil
- Find out what can do with it
- Ichetuknee – manually cleared out
- Community clean up
- Invasives are habitat
- Balance habitat needs

Access and Navigation

- County sprays canal if there is a blockage
- Mechanical harvesting but carefully not to disturb the good vegetation
- Spraying – work plan (County)
- Lake Blvd. boat ramp canals not able to access lake, needs to be dug out (dead vegetation, clogged canals)

- Likes marsh view
- Airboat paths over marsh disturbs birds
- Signage to keep airboats out of marsh
- Keep windy point ramp clear
- Homeowner has private ramp, does not want it sprayed – removes it himself
- Coordinate county sprayers with state

Management Operations

- Increase transparency – know what they are looking for and where
- Nice spraying wasn't every day
- Work with public – respond to public input
- Don't waste taxpayers' money
- Key is a transparent annual work plan
- Management at FWC must buy in and coordinate better
- Increased confidence in the committee, what happens when it is disbanded
- Useless if what is going on is happening without communication
- Try different management – harvesting and dredging
- Can't spray on a daily basis
- Seeing a change of what we see on the lake post pause including fry and we are catching fish
- Want management (100%) not spraying
- Inform committee on where/when spraying occurs to increase trust
- Frustrated by what they see
- FWC used to be our friend
- Concern about private contractor
- Spray specific areas in canal
- Need independent watchdog committee
- Private contractors not seeming to follow best management practices (BMPs)
- Question about health of the fish we eat
- People want to understand impacts of herbicide spraying
- All different organizations (including contractors) on the lake should have a central site the public can go to and know what is happening
- Need to communicate contractor activities
- Draw down and scrape around shoreline to take it down to hard sand
- Mechanical removal of low numbers of hyacinth – bulrush doesn't look healthy
- Want hyacinth managed at some point
- Muck is a concern

- Concerned about nutrients coming into the lake – citrus fertilizer as an example, if this is controlled mother nature can handle the rest
- Stop tournaments and go back to 3 fish limit
- Put GoPros on spray boats to monitor their actions
- Should only target hyacinth and lettuce, no secondary damage
- No need to deal with spoil islands, not doing anything and will cost a fortune, use that money to get back on lake
- Want vegetation around perimeter of the lake
- Need to get Army Corps of Engineers (etc.) to buy in and agree to draw down
- Like increased transparency
- Politics of water quality
- GoPros/GPS tracker on spray boats
- Who manages the managers?
- Appoint one overseeing manager

Focal Habitats

Focal Habitats included a table of habitat type/plant species (Table 1) and participants were asked what their target range for each was, they then provided feedback.

(Table 1. Habitat type/target range)

Habitat Type	Target Range
Open Water	
Bulrush	++
Hydrilla	10%, 20%, 10%, 20-40%
Native Submersed Plants	5%, +, 20-40%
Spadderdock	
Cattail	+
Water Hyacinth	1-2%, 2%
Water Lettuce	1-2%, 2%
Emergent Grasses	10%
Freshwater Marsh	40%
Arrowheads	5%
Lotus	+

- More weeds
- Eelgrass higher all-around lake!
- Not a pleasure boating lake
- Just want a healthy balance
- Edges

Communication

- Posting – let us know what stats have been done: Creel survey – aka via emails
- Post to fish camps and all boat ramps
- On website let everyone know where you can find the posting
- Let us know when and where they are spraying
- Use the newspaper
- Post to bait shops/marinas
- Get advanced notice for spraying
- We want advanced notice on when spraying is done (2 weeks to 1 month)
- All agencies need to communicate with each other
- Facebook posting
- Boat ramps (all of them)
- Mail/email to homeowners
- A specific organization to communicate to everyone
- Heard about this notice by Friends of Istokpoga and UF emailed everyone
- Working on canals – can we notify homeowners adjacent to canals
- This needs to be directed to ONE site
- Areas outside would like to know this info, also HOAs
- Survey box at all boat ramps – boat complaints included tags/rules and regulations/clogging boat ramps/so we can all give more input – included pen
- Enforce airboats
- Internet/website/email like the website noted earlier

Lake Istokpoga Public Meeting
Thursday, April 19, 2019

Meeting Objectives

- Inform Lake Istokpoga supporters on the progress of the management plan and the stakeholder engagement plan process
- Build community and trust
- Gather input for the habitat management plan

Meeting Agenda

5:30 Registration and Reception

6:00 Welcome and Introductions

Presentation on Management Plan Progress

Feedback Activity: Roving Stations

Wrap Up

8:30 Adjourn

Lake Istokpoga Public Meeting #3

April 17, 2019

Meeting Objectives

- **Gather feedback on the Lake Istokpoga advisory committee's Habitat Management Plan draft goals and objectives**

To provide additional comments post-meeting electronically please email Chelsey Crandall at kicksea@ufl.edu

Focal Habitat

Goal: Maintain focal habitats within ranges that support wildlife and human uses

Objective: Balance multiple needs and perspectives in habitat management

Moderation in all actions and a willingness to understand that there is a need to balance multiple perspectives and uses for the lake

Objective: Consider habitat diversity, connectivity and dynamics

Desire for a mix of habitat types and species

Many fish and wildlife populations rely on a mix of habitats to complete their lifecycle and thrive – need to consider this matrix when deciding on habitat management actions

Objective: Define focal habitats for maintenance, control and restoration

Define focal habitats in terms of structure, species composition and/or other metrics for the purpose of planning for maintenance, control and restoration (see “Table 1” for starting point).

Definitions can be based on scientific and/or stakeholder knowledge and should be clear enough to support monitoring and management (examples: Marsh, submersed aquatic vegetation (SAV), deep water crappie areas)

Where the same broad habitat type can occur in more or less desirable forms (e.g. pickerelweed is native but can become too dense), differentiation into sub-types may be necessary

Include all managed invasive species as focal habitats

Objective: Set Habitat Targets (ranges) while accounting for wildlife and human use needs and the dynamic nature of aquatic habitats

Set target ranges for the extent of focal habitats and rules to trigger management actions when habitat extent is outside the target range

Target ranges could be further broken done into ‘desired’ and ‘acceptable’ ranges

Target ranges should be set while taking into account the natural fluctuations in lake habitat (check historical variation to set realistic ranges)

Include target ranges for all managed invasive species (even if targets are ‘minimum feasible level’)

Objective: Set targets by lake region if necessary

May not be necessary as e.g. increase in SAV and emergent vegetation (EV) is desired all around the lake, not necessarily allocated to one area

Objective: Consider medium/long-term consequences of habitat management actions

Consider likely habitat development after treatment of existing vegetation – e.g. will treatment to remove primrose willow lead to habitat full of bulrush and maiden cane, or spatterdock?

Reduce spatterdock in some areas to allow other vegetation to recover (but unclear if it will)

Objective: Use active re-vegetation when abundance of focal species/habitats falls drastically below target range

Re-vegetation, e.g. Kissimmee grass and spikerush and maiden cane plantings; eel grass cages

Objective: Manage spoil islands

Long-term plan to remove spoil islands, but unclear whether this is a priority (filled habitat, noxious plants, erode)

Options: Truck out? Smooth out?; Tradeoff with drawdown; Disposal spot, marsh restoration tradeoff

Access, Navigation and Aesthetics

Goal. Improve and maintain reasonable lake access, navigation and aesthetic quality in a way that balances the needs of diverse user groups.

Objective. Manage vegetation to provide access to/from boat ramps and creeks.

Dependability of control for access is key.

Consider regular use of mechanical harvesting for access maintenance

Definition of tussocks and tolerability, trends and control methods

Treat mobile floating tussocks in the immediate vicinity of access points using the most efficient method based on vegetation composition, which is generally mechanical harvesting and/or shredding for mud tussocks and herbicides for vegetative tussocks (adapted from Orange Lake plan).

Objective. Adopt a standard network of boat trails and manage the vegetation within those trails to enhance navigation.

Develop a network of access trails in coordination with fish camps, guides, and local tournament organizers. (E.g. cut trails through spatterdock; navigation corridor around lake?).

Balance trail network with need to protect sensitive wildlife habitat. Trade-offs between boater access and protecting animals/plants from predators and nutrient inputs

Proactively treat SAV in the adopted network of trails before it limits access as a way to prevent it from limiting access in the future.

Objective: Limit removal of EV (e.g. bulrushes) for access and aesthetics

Bulrush: limited removal, mechanical over spraying.

Better information exchange with homeowners

Objective. Collaborate with other agencies and partners to maintain and/or upgrade public access facilities.

Explore opportunities to cooperate with partners to enhance public access points including improved boat ramps, improved parking at Lake Istokpoga Park, improved and new docks for shoreline fishing and nature viewing.

Goal. Enhance fishing opportunities in focal areas through artificial structures

Objective. Provide structure for fish aggregation/target for fishing in some areas currently devoid of structure.

Consider placing marked fish attractors to provide structure in open water areas

Invasive Species

Goal. Manage invasive species to minimize their adverse impact while maintaining habitat objectives outlined in the Habitat Targets.

Objective. Define and rate invasive exotics and discussion of tolerability, trends and control methods

Need to consider invasiveness and impact vs. collateral damage from control methods

Objective. Review and better specify the ‘lowest feasible level’ goal for invasive species management – is it possible to set a higher threshold?

Is it possible to allow slightly higher levels if that reduces overall spraying and collateral damage?

Spray when it becomes a problem- DEFINE THRESHOLD

Spray nothing, then if hyacinths get out of control, then just spot spray that area

Are floating plants (hyacinth, water lettuce, pennyworth) over-managed? Leave more?

Management Operations

Goal. Manage focal habitats and invasive plants according to the Habitat Targets

Objective. Develop annual work plans to manage habitat types according to the Habitat Targets.

Conduct aerial or satellite mapping and GIS analysis of habitat composition every 3 years to assess compliance with the Habitat Targets.

Perform field assessments of changing conditions and produce an annual habitat status report that will communicate observed changes in habitat composition during interim mapping years.

When developing annual work plans, identify and develop projects to address habitat deficiencies based on results of aerial mapping/GIS analysis and observations from field assessments.

Objective. Expand the ‘toolbox’ of habitat management

Consider increased use of mechanical harvesting where feasible and not involving excessive cost (e.g. maintenance of access?)

Restore the use of prescribed burns as a viable tool for managing Marsh habitat to the extent feasible given weather and safety conditions, including smoke management, and as authorized by the Florida Forest Service.

Goal. Minimize adverse impacts and perceptions of management actions

Objective. Establish and implement policies that minimize scope and scale of management related disturbance to fish and wildlife resources and the public.

Habitat maintenance and/or management actions that exceed a total of XXX acres (X% of total lake area) per year will not be conducted without stakeholder support.

Schedule management actions to minimize conflicts with wildlife critical life history events (e.g., nesting, spawning, molting) and public use opportunities (e.g., fishing, hunting) to the greatest extent feasible.

Develop a comprehensive list of critical timing considerations for fish and wildlife and stakeholder concerns. (E.g. Minimize noncritical management actions during the fish spawning season, during warmer months when dissolved oxygen levels are naturally low, 1-2 weeks before opening and during various waterfowl hunting seasons, etc.).

Avoid spraying under conditions where herbicide drift is likely high, i.e. high winds.

Objective: Increase transparency of habitat management activities

Post annual work plans to provide increased transparency about decision-making

Better spray schedule transparency; Post spray schedule at ramp

Objective: Reduce overall level of spraying activity

Don't spray every day; only do so much at a time; too many different sprayers at same location within a short time period; overlap of spraying needs to stop (need to assess which criteria have the highest priority (e.g. fewer days of spraying, smaller areas affected, etc.))

Some Ideas: 10-day hit and the no spraying for rest of month; only Tue-Thur; moving quadrants

Objective: Better co-ordinate between agencies

Better co-ordinate spraying and other habitat management activities between agencies to consolidate/reduce spraying activity where possible

FWC and county spraying – zoning; Need better/coordinated efforts by/with all groups that are spraying on the lake

Objective: Continually review herbicides used

Look at other chemicals/herbicides

Objective: Enhance oversight of applicators

Applicator Behavior; Better monitoring of spray crews, Onsite supervision of applicators; Not following BMPs; Applicators need Go Pros, Video camera on all spray boats – especially AA

Need more training, Sprayers need better training (what to spray), Training of sprayers – still mistrust

Objective: Enhance outreach to homeowners

Land owners spray, and they spray beyond their yards, How do we regulate that?

Private owners and all entities, policing needs to follow vs. ‘homeowners action are drop in the bucket’

Communications

Goal. Promote the growth and development of a mutual understanding between FWC and stakeholders regarding habitat management at Lake Istokpoga.

Objective. Improve stakeholder engagement with FWC by maintaining and increasing opportunities to exchange information.

Maintain Istokpoga Habitat Management Committee to provide input to annual work plans. Review HMP activities and progress at regular meetings of the committee.

Conduct 1-2 public forums annually to provide opportunities to for communication about the condition of the lake, annual work plans, results of recent management actions, and pertinent information relative to habitat management.

Post information about lake condition annual work plans at boat ramps and other public places.

Objective. Improve communication between FWC and stakeholders by providing informative content on the FWC website.

Post annual work plans for the Aquatic Habitat Restoration/Enhancement Subsection and the Invasive Plant Management Section.

Provide a schedule of FWC management activities and opportunities for stakeholder involvement.

Provide maps that identify areas where habitat management has occurred and is proposed.

Develop a document library that consolidates pertinent current and historical information on Lake Istokpoga including management plans and evaluations, scientific studies, physical and biological conditions, habitat enhancement, access/navigation maintenance, invasive plant management, surveys and monitoring, fish and wildlife rule changes, and fishing and hunting conditions.

Experimental Management and Research

Objective: Improve the management information base by treating management actions as experiments

Experimentally test alternative spray schedules

Objective: Determine what factors are negatively impacting desired habitats on the lake

What caused the decline in SAV? (water quality, hurricanes/stochastic weather events, apple snails, residual herbicides, etc.)

Appendix VIII: Results of Stakeholder Mail Survey

Lake Istokpoga Mail Stakeholder Survey Summary Report

Chelsey Crandall, Joy Hazell, Mark Hoyer, and Kai Lorenzen

Fisheries and Aquatic Science Program
School of Forest Resources and Conservation
University of Florida

Nia Morales

Center for Conservation Social Science Research
Fish and Wildlife Research Institute



The Lake Istokpoga Habitat Advisory Committee, in collaboration with UF project team members and FWC scientists, created a survey to better understand the attitudes and perspectives of the Lake Istokpoga community. The objective of the survey was to get input and feedback from a wide range of lake stakeholders, which would help inform the committee as they moved forward with creation of the Lake Istokpoga Habitat Management Plan.

The survey was designed to be printed and sent in the mail. A first draft was pilot tested with Lake Istokpoga community members and people who have fished other lakes in Florida. This led to some editing and the removal of questions that were deemed either confusing or unnecessary. The final version of the survey included 22 questions in total.

The goal of the survey was to reach a wide range of Istokpoga stakeholders, therefore it was first sent to a random sample people around the lake. To start, 3,500 names were randomly selected from a database of people who owned homes within a 5 mile radius of the lake, and 1,500 were randomly selected from a database of people who had a freshwater fishing license and resided within a 20 mile radius of the lake. Unfortunately, the random sample contained a high proportion of non-deliverable addresses (i.e., empty lots), resulting in a final sample of 2279 addresses in total.

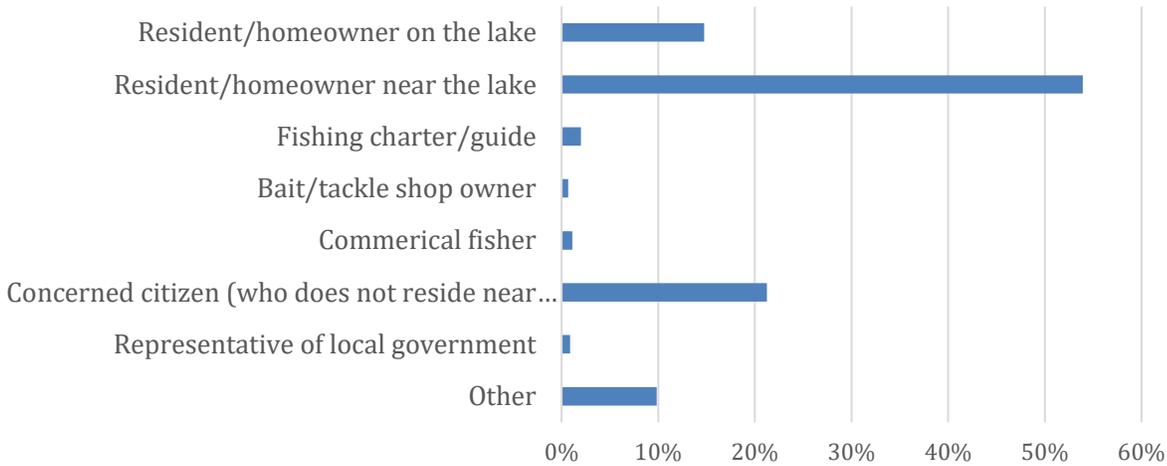
Those individuals who had been randomly selected to participate were mailed a survey, along with a cover letter explaining the project. If they did not fill out the survey, they were then sent a reminder postcard two weeks after the initial mailing. Those we still hadn't heard from after a month were sent a second complete mailing with cover letter and survey. All mailed respondents were given the option to respond online and were asked to input the unique identifying code that was found on the front of their paper survey.

After the mail survey distribution was completed, an online version of the survey with a general link was opened to allow those who had not been part of the random mail sample the opportunity to participate in the survey. The survey link was posted on social media and sent to individuals who reached out as well as to those who had participated in the project in the past, and people were asked to distribute it widely to anyone who might be interested in participating.

Results

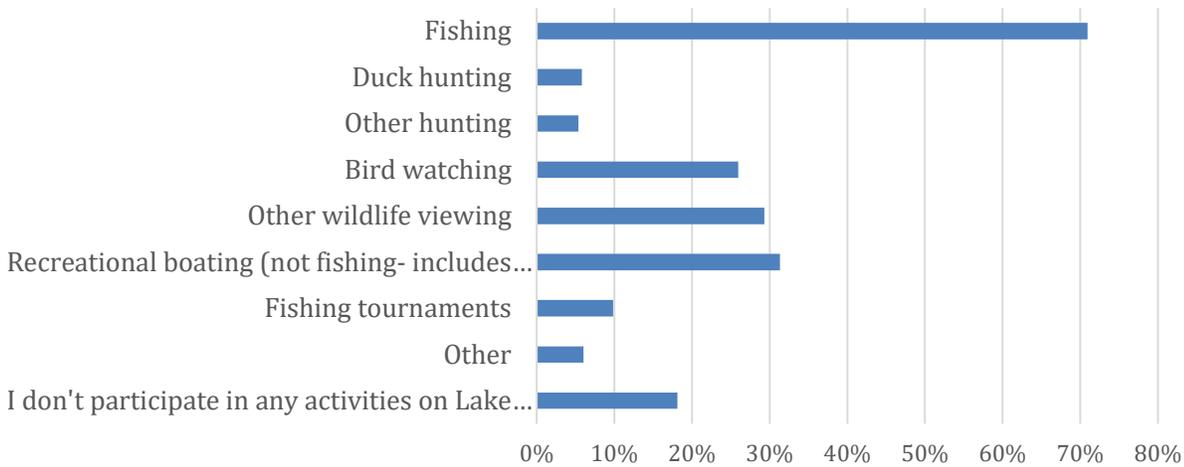
In total, 462 individuals completed the random mail survey, for a response rate of 21%. In addition, 50 people filled out the survey using the online general link. Because the sampling methods were different (a random mail survey versus a general online link), the results have been analyzed separately. This report summarizes the results from the random mail survey. The majority (65%) of respondents were male. Nearly all (94%) respondents were full-time residents in the area and had lived there for an average of 24 years (with a range of 6 months to lifetime).

How are they connected with the lake?



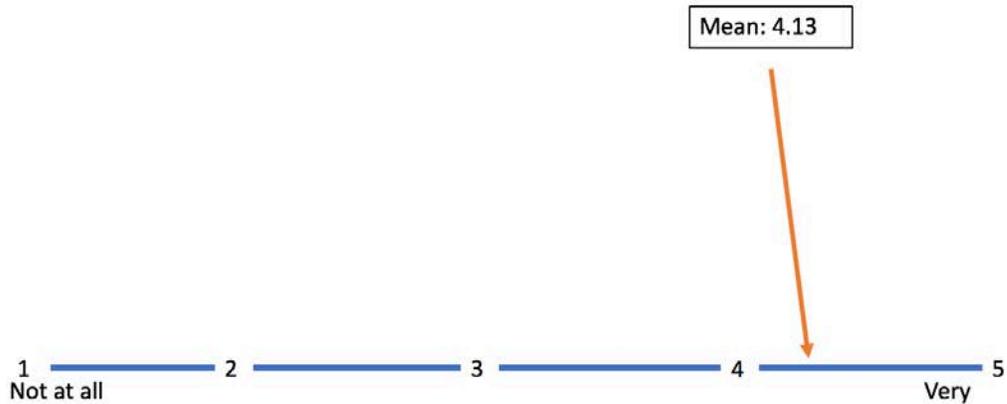
In the mail survey, 15% of respondents self-identified as residents or homeowners on the lake, with 54% self-identifying as residents or homeowners near the lake, and 21% identifying as concerned citizens who do not live near the lake. Respondents included representatives from the charter, bait and tackle shop, and commercial fishing sectors as well as representatives of local government.

What activities do they do on the lake?



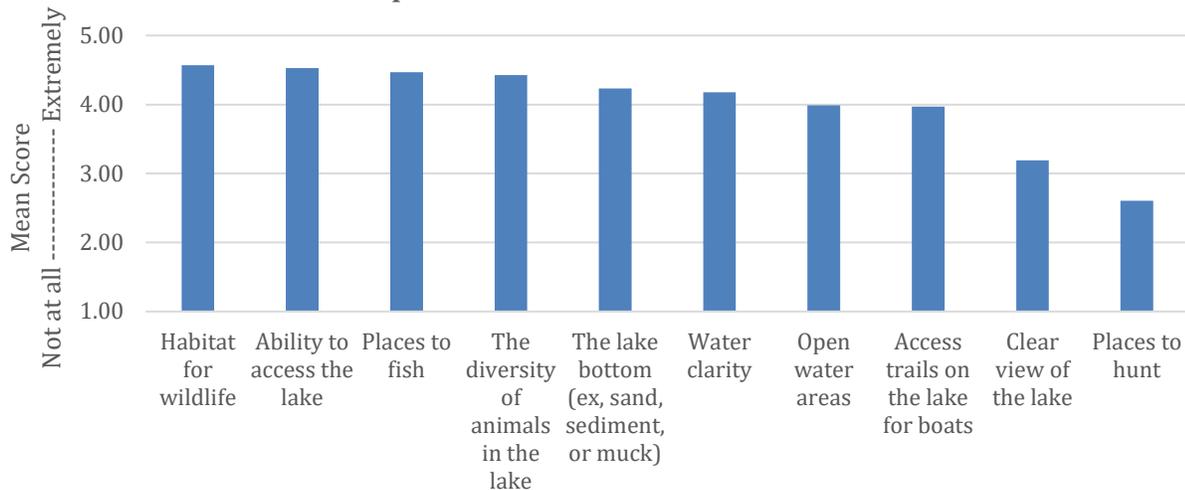
Most (71%) respondents said they fish on Lake Istokpoga, though a variety of other lake uses was represented. Notably, 18% indicated that they don't actively participate in any activities on the lake.

How important is Lake Istokpoga to you or your family?



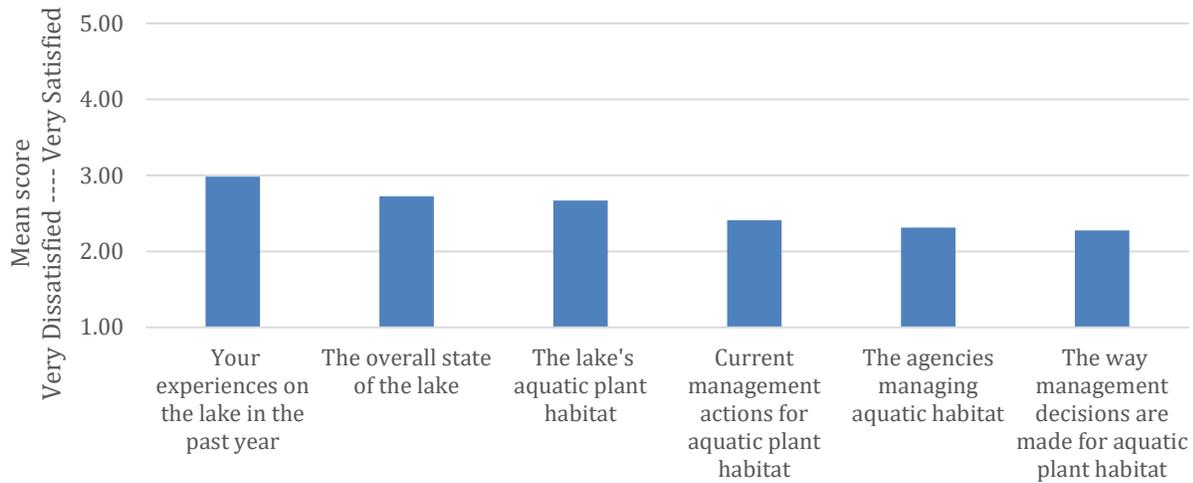
Most respondents indicated that Lake Istokpoga is relatively important to them and/or their families, with a mean score of 4.13 out of 5.0 across all respondents. Only 5% of respondents indicated that the lake was not at all important to them.

How important is each to their ideal lake?

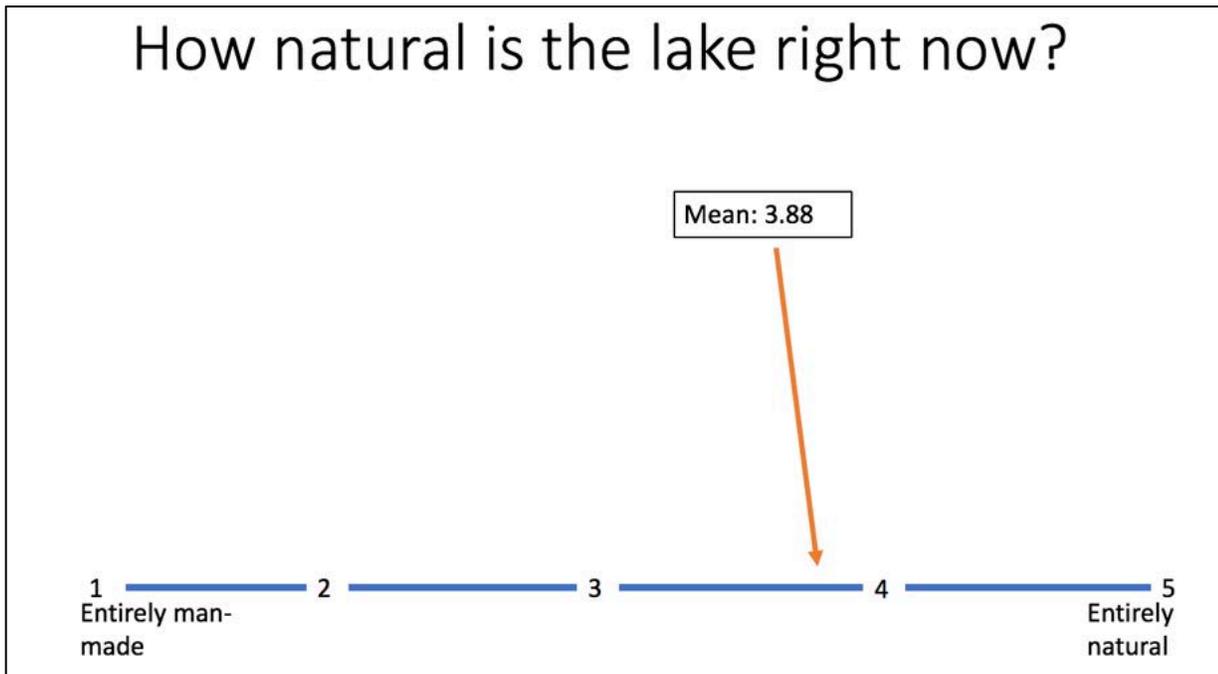


Respondents were asked to rate on a scale of 1-5 how important each of a variety of factors was to their ideal Lake Istokpoga. On average, habitat for wildlife was rated as most important (4.57 out of 5.0), followed by ability to access the lake (4.53), places to fish (4.47), and the diversity of animals in the lake (4.43). Clear view of the lake (3.19) and places to hunt (2.61) were less important on average across all respondents.

How satisfied are they with the following:

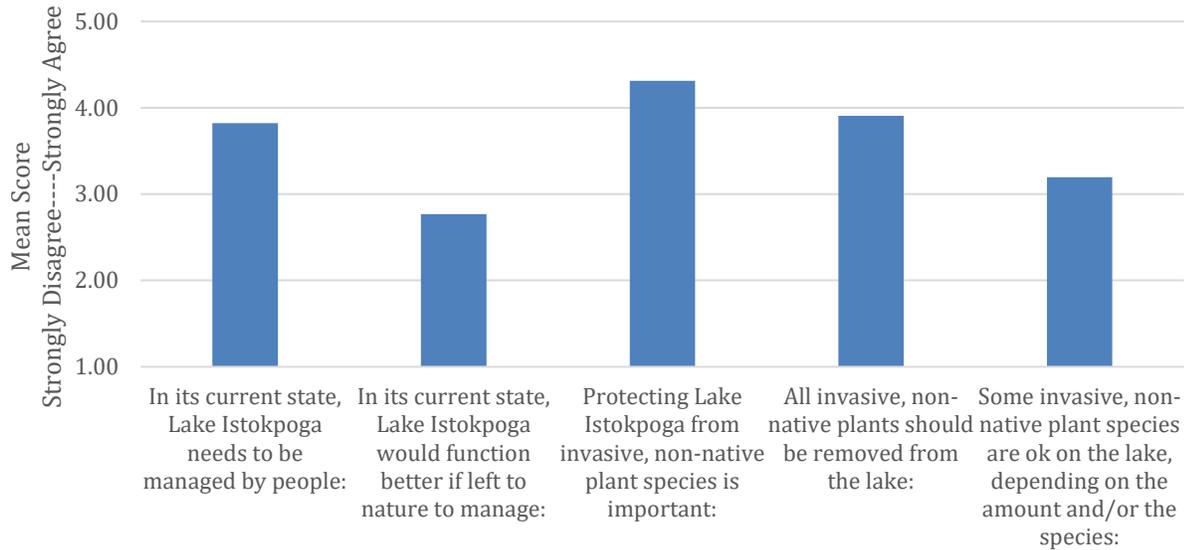


Respondents were asked to indicate their level of satisfaction, on a scale of 1-5, with each of a list of factors relating to the state of the lake and its management. On average, they were most satisfied with their recent experiences on the lake, though this was still scored a 2.98 out of 5.0 (relatively low), and least satisfied with the way management decisions are made for aquatic plant management (2.28).



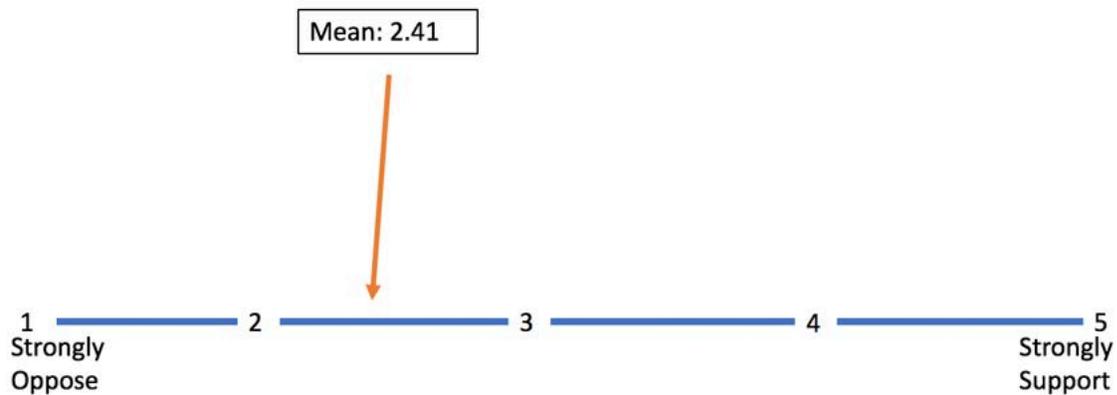
Respondents were asked how they would describe Lake Istokpoga currently, on a scale of entirely man-made to entirely natural. More than half of respondents scored it as relatively natural (27% said 5: entirely natural, 31% rated it a 4 out of 5). Only 2% of respondents described the lake as entirely man-made (score of 1.0 out of 5.0).

Level of agreement:



Respondents were also asked a series of questions about their attitudes toward management of non-native, invasive plant species on the lake. Only 12% of respondents disagreed that the lake needs to be managed by people, and only 27% agreed the lake would function better if left to mother nature to manage. Most (77%) agreed that protecting the lake from invasive, non-native plants is important, and 63% agreed that all invasive, non-native plants should be removed from the lake. Almost half (44%) agreed that some invasive, non-native plant species are ok on the lake, depending on the amount and/or species.

What is your opinion of using herbicides to manage plants on Lake Istokpoga:

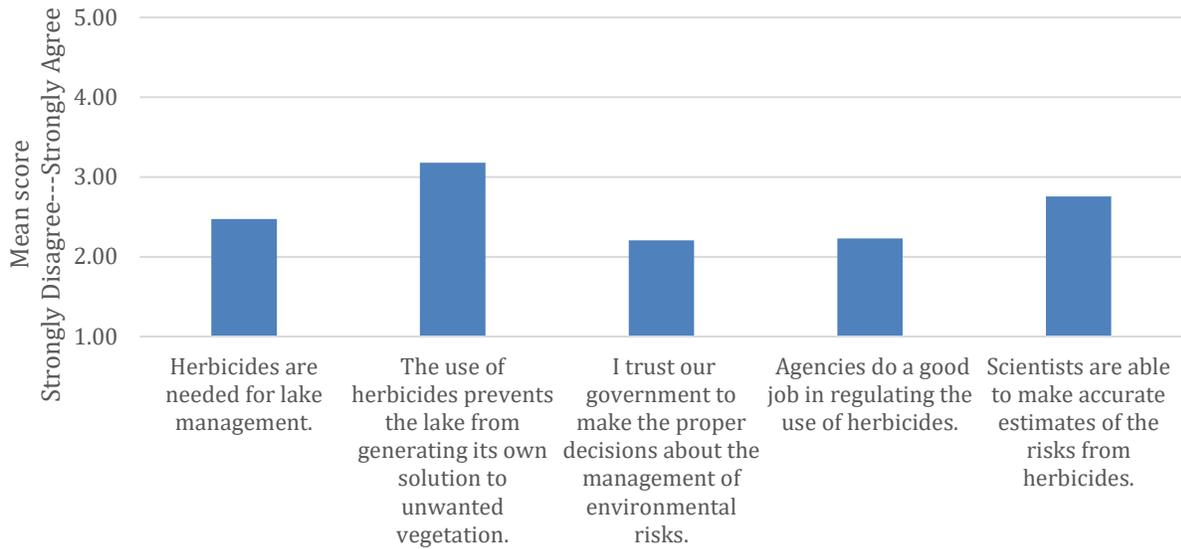


Only 6% of respondents strongly supported using herbicides on the lake, with 10% responding with a 4 out of 5 (indicating some level of support). Roughly a third (35%) selected 3 out of 5, indicating they have no strong opinions either way. A third (32%) of respondents strongly opposed the use of herbicides on the lake.

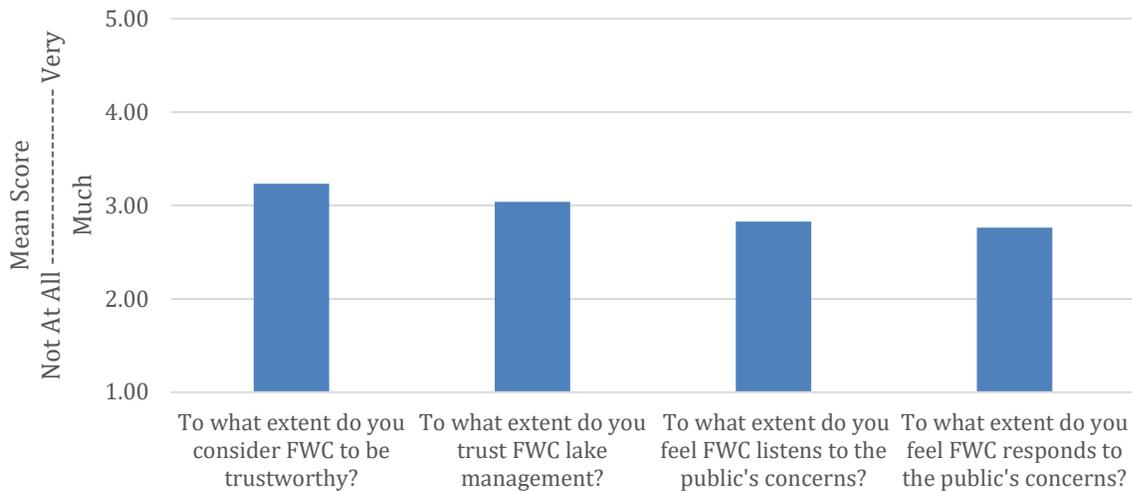
	Yes	Maybe	No	I don't know
Drawdown	40%	30%	14%	15%
Mechanical Harvesting	64%	21%	5%	8%
Prescribed Fire	51%	23%	14%	9%

There was moderate support for other methods of aquatic plant management. Most either supported or might support the use of mechanical harvesting, prescribed fire, or drawdown, with relatively few opposed to any of these measures.

Level of agreement:

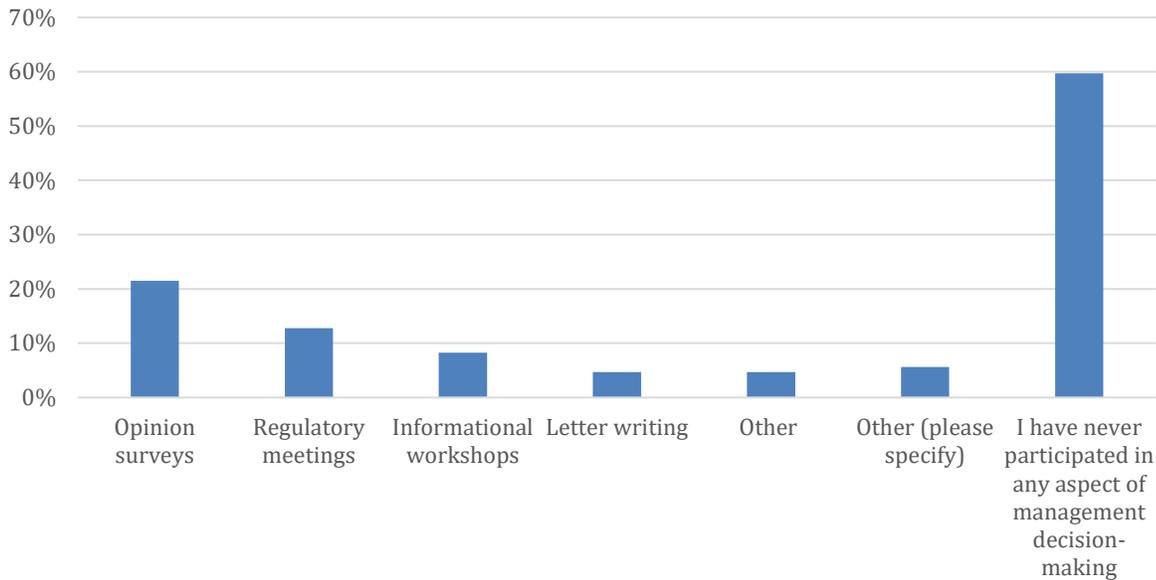


Respondents were also asked a series of questions regarding their attitudes toward herbicides and the use of herbicides for lake management. On average, respondents disagreed that herbicides are needed for lake management (with only 19% of respondents agreeing with this statement). A third (38%) agreed that the use of herbicides prevents the lake from generating its own solutions, and only 16% agreed that they trust the government to make proper decisions about risk. In addition, only 14% agreed that agencies do a good job in regulating herbicide use, and only 30% agreed that scientists are able to make accurate estimates of risk.



Respondents found FWC to be relatively trustworthy (mean score of 3.23 out of 5.0) and had a moderate level of trust for FWC lake management (mean of 3.04). Scores were slightly lower with regard to perceptions of how well FWC listens (2.83) and responds (2.76) to public concerns.

How have you participated in the past?



Most respondents (60%) had never participated in management decision-making for the lake before. In addition, most (74%) were unaware of the ongoing habitat management plan process, and only 9% had participated in the habitat management process.

Discussion/Conclusions

The survey heard from a variety of lake stakeholders, many of whom had never given input to management before and most of whom had not yet contributed opinions to the habitat management plan process. The majority of respondents were full-time residents who live on or near the lake. The main lake activity of respondents was fishing, though we also heard from non-fishing stakeholders, and the lake was relatively important to all, including those who don't actively recreate on the lake.

Respondents in the survey prioritized managing the lake for habitat for wildlife and places to fish, while maintaining access to the lake. The quality of lake bottom and water clarity were also relatively important to them.

Respondents had varied perspectives on the current status of the lake. Most felt that the lake is almost or entirely a natural system, but agreed that the lake in its current state needs to be managed by people. As seen in other stakeholder engagement activities, there was overall opposition to the use of herbicides for lake management, and support for alternative management methods.

Results showed a lack of trust in science and management, and suggest that FWC needs to work on building trust.

Future Research/Analysis

The results presented in this document represent a descriptive summary of the data. Researchers on this project are currently conducting inferential and spatial analyses of these data to gain better insights into the connections between responses and characteristics of the respondents. There are plans to develop a manuscript for publishing in a peer reviewed journal and for presentations of these results at professional conferences.

Appendix IX: Public Input on the Final Draft

Following the final public meeting at which the full draft of the habitat management plan was presented, stakeholders were given three weeks to send comments on the plan to the project team. Comments could be contributed via email, telephone, or mail. The draft of plan was available on the project website. The opportunity to comment was advertised in the public meeting, using the project email list, on the project website, and in a local newspaper article. Below are the comments received verbatim.

COMMENT 1:

Thank you for all that you and your team have done. I have but one final request as a person with three dogs in this fight. I am a conservationist and member of Highlands County Audubon, Society so the wildlife is very important to me. I am an angler who fishes for bass, and crappie and I am a home owner. I keep hearing that mechanical removal is too expensive. I say, "So What".

COMMENT 2:

Thank you for giving the public a chance to comment on the Lake Istokpoga Habitat Management Plan. I attended one of the public meetings and it quickly became clear that the report would be by fisherman and respect the interests of the fisherman only. The report and more importantly the summary did not disappoint.

My comments are in the attached word file. The science in the Management Plan is excellent and should stand on its own. The non-scientific comments from the committee that reflect their individual wants and biases should be removed from the science and data of the report and placed in a committee opinion portion of the report. The committee is biased towards fishing and their opinions should not stop the science and data from standing by itself.

The summary of the report is a political document and disregards the science and data provided by UF and reflects only a fishing perspective. I am a University of Florida Graduate and dismayed that UF would want its name on the summary when science and data was disregarded.

I spent a great deal of time traveling around the perimeter of the lake. The amount of trash, fishing debris, development and agriculture pressure on the lake is sad. I have attached a few pictures from my travels around the lake. It is sad that the committee chose to point fingers at only the lakefront homeowners as the reason the habitat around the lake is declining.

(ATTACHED WORD FILE)

Good Day Dr. Crandall:

I have read both the Habitat Management Plan and the Habitat Management Plan Summary. First and foremost I would like thank you and your team for a thorough scientific review of the current state of the lake. The findings are well organized, comprehensive, and provide excellent references for further study of the issues.

My concerns about the Habitat Management Plan and more notably the Habitat Management Plan Summary (*the only part most people will ever bother to read*) are that the **opinions** of the fisherman and boaters as presented are more important than the science and it is these opinions that are presented as the recommendations of the Lake Istokpoga Habitat Management Committee (LIHMC). Opinions of the boaters and fisherman should be left out of the study. Science and the current state of the lake should be front and center in both the Habitat Management Plan and the Habitat Management Plan Summary. Instead the special interests of the people that use the lake for fishing and boating were presented as paramount and the rights of the homeowner and the need to educate and possibly limit the rights of the homeowner is the listed as one of the actions in the Habitat Management Plan Summary (page 19). There is no mention of the need to educate boaters, no mention of the impacts of the businesses that surround the lake, no mention of

the impacts of the high density fish camps on the shore of the lake and most notably the summary is silent on how the surrounding agriculture community impacts Lake Istokpoga. The science in the report is clear – a substantial portion of the nutrients in the lake and the resulting aquatic plants can be traced to the agriculture community - but the summary and the recommendations are silent on trying to take actions or educating the agriculture community on the vital importance of reducing the deposit of these nutrients and herbicides into the lake. The report and summary are both silent on the affects the fishing pressure and their associated noise levels have on both fish counts and the lake habitat.

My recommendations for the report and the summary:

1. Let the science generate the actions to be taken – not the special interests of any one stakeholder group.
2. Educate all stakeholders on how to protect the lake and respect the rights and interests of all stakeholders.
3. Clearly show how the actions of all stakeholders impact the lake.
 - a. The report is clear – the surrounding agriculture community (Sugar, cattle, caladiums, etc.) is having a negative impact on the lake – but this is not even mentioned in the summary.
 - b. The report is clear that the impacts by the residents that live on Lake Istokpoga are “a drop in the bucket”. However, the summary presents a major recommendation to limit lawn fertilizers and educate these lakeside homeowners. This recommendation when presented by itself will not solve the problems of the lake but only serve to protect the interests of those that use the lake for fishing and alienate a group of stakeholders that love the lake as much or more than the boaters. This recommendation should be presented in a larger group of recommendations that show the impacts of ALL stakeholders and recommended actions for each stakeholder.
 - c. Outline the impacts the people that boat and fish have on the lake and habitat. The report is silent on these impacts. The amount of beer cans, fishing line, lures, cigarette packages and garbage that are found on the shoreline adjacent to the lake is immense. Much of this came from boaters or people fishing from shore. I guess everyone that goes out on a boat or fishing on the shore puts all their urine and feces in a 5-gallon and returns it a designated restroom? While these impacts are “a drop in the bucket”, this waste does end up in the lake. No mention of the noise pollution caused by the boaters. I guess a 90-100dba airboat or a 200hp bass boat and their associated noise gets a free pass on their impacts to the fish, habitat and environment. I guess the oil sheens I see on the lake get another free pass?
 - d. Modify the report and summary to outline the impacts that decisions by the federal, state and local governments have had on the lake and seek solutions:
 - i. Army Corp of Engineers – given a mandate by congress to limit flooding in Florida and provide adequate water resources for the agriculture community. The Army Corp of Engineers work was too good. Flooding was controlled and the agriculture community has water even in the driest of times – but the environment was sacrificed. Lake Istokpoga has become a retention area in the dry season – concentrating

nutrients and pollutants not just from this lake but most of Highlands County and portions of Polk County. Lake Istokpoga has also become a detention area in the wet season – holding and moving large volumes of water, nutrients and pollutants from surrounding areas through the lake. The Army Corp together with the Water Management Agencies interconnected or permitted the interconnection of all of the lakes west of US 27 and the lakes north of US 98 and into Polk County to discharge through Lake Istokpoga. Historic wide and slow moving sheets of water that flowed south and east of the lake were modified to arrow straight canals and ditches to insure rapid discharge of runoff from heavy rains. These canals and ditches are kept free of aquatic plants that could filter out some of these contaminants.

- ii. South Florida Water Management and Southwest Florida Water Management – issue permits to connect developments and roads to drainage systems and lakes. In the early years of development minimal thought was given to the direct discharge of runoff (rainwater) into the creeks, canals and lakes. The costs to correct many of these early decisions are high and would require the acquisition of lands surrounding the lake or lands near the source of the pollution.
- iii. Department of Transportation – Created roads (US 27, US 98 and 621) around the perimeter of the lake that changed the historical water flows, allowed for agricultural expansion and development of the area.
- iv. Local Government (Highlands County, Lorida, etc.) – Permitted development in and around the lake with little regard to protecting the lake and lake shores. Poor zoning or the lack of zoning allowed for very high density (fish camps, mobile home parks, campgrounds, etc.) along the lake. In addition canal networks were built adjacent to the lake to allow for additional direct access to the lake and further expanding the number of direct impacts to the lake. Drainage swales and culverts for developments and agriculture were allowed to flow into Lake Istokpoga and all surrounding lakes with minimal environmental protection.
- v. Back pumping of agricultural waste continues to this date.

4. Present solutions to the current problems:

- a. Reduce the amount of nutrients and pollutants entering and exiting the lake:
 - i. Educate all stakeholders about their impacts on the lake (nutrients, pollutants, trash, etc.) and provide adequate enforcement to ensure all stakeholders meet their obligations.
 - ii. Highlands County has an abundance of undeveloped land along Arbuckle Creek, along Josephine Creek east of US 27, and south and east of the lake. Some of this land is used for agriculture and some of it is not.
 1. Acquire and modify the lands north (along Arbuckle Creek) of Lake Istokpoga, immediately south and west of the lake to create pretreatment

areas. These areas could be used to manage large influxes of runoff into Lake Istokpoga and the associated pollutants and nutrients.

2. Modify the areas east and south of the lake, adjacent to the control structures and drainage discharge canals to provide dry detention/retention and pretreatment areas that will allow for the capture and treatment of runoff from large rain events, treat runoff from the surrounding agriculture lands and reduce impacts on Lake Okeechobee.
- b. Eliminate non-native invasive plants in Lake Istokpoga. The continued growth of invasive plants in the lake is expensive, requires the use of large amounts of herbicides, competes with native vegetation and is inconsistent with state and federal laws. The planting of native species can take place prior to removal of exotic vegetation as needed to insure fish have adequate habitat. A continued and intentional presence of invasive hydrilla, water hyacinth, and or water lettuce should not be condoned because it is desired by one of the stakeholders but has a negative impact on the lake as a whole.
 - c. Modify County Road 621 to allow for more even water flows:
 - i. 621 is currently treated as a dike that funnels everything through South Florida Water Management Water Control Structure S- 68 or via a canal beneath 621 to Water Control Structure G-85.
 - ii. Raising the road in certain areas creating additional control structures on the south lake shore together with the construction of detention/pretreatment areas south and east of the lake would reduce fluctuations in water levels and help improve the water quality in the lake, mimic historic water flows, improve the overall habitat of the lake, and reduce impacts on Lake Okeechobee.
 - d. Create mechanisms to provide funds for the above improvements:
 - i. Lobby federal, state and local officials for additional funds to improve the quality of the runoff before it enters Lake Istokpoga, the water in the lake and the habitat around Lake Istokpoga. The fishing and boating community has lobbied hard for more public access to Lake Istokpoga (and continues to in the summary), more and improved boat ramps, restrooms and other facilities. Lake Istokpoga could benefit greatly if some of this lobbying was used to make changes that actually improve the quality of the water and habitat in Lake Istokpoga.
 - ii. Residents - Create a lake improvement district for the property owners that are directly on the lake. Funds could be used to hire professionals to manage the invasive weeds along the shorelines adjacent to the property owners and eliminate the varying methods used by these property owners now.
 - iii. Fisherman – Add a Lake Istokpoga Habitat dock stamp or other fee to the general fishing license to help pay for the improvements

- iv. Other Lakes that feed into Lake Istokpoga – use a combination of items ii. and iii. to offset their impacts to Lake Istokpoga.
- v. Businesses – add fees or taxes to the businesses and fishing camps that depend on the lake.
- vi. Agriculture – pass laws, regulations, taxes and fees on the agriculture community that truly reflects the negative impacts they have on the lake.

There is no free lunch. The current license fees are not enough to offset the impacts of the fishing and boating community. The higher taxes lakefront owners pay do not go to the lake – they go to local governments who offer few lake services to these homeowners for their additional taxes. None of these mechanisms will be easy or politically correct. One or more of these mechanisms will be unacceptable to each stakeholder. Unless all stakeholders have a strong reason to get involved in the process, the lake will continue as it is and special interests and their political supporters will make the decisions for all.

Conclusion:

The report as presented and more importantly the summary of the report points fingers at certain stakeholders and reiterates the opinions of the fishing community that Lake Istokpoga is in decline because the fish numbers are down in the lake. The summary does not utilize or respect the science in the report that clearly indicates the quality of both the water and the habitat are consistent with other lakes in the State of Florida. Blaming one or more of the stakeholders for all of the problems of Lake Istokpoga will do nothing to improve the quality of the water or improve the habitat of Lake Istokpoga. Only by working together will the health of the lake habitat improve. Solutions to the problems of the lake should not be determined by the wishes of one group of stakeholders. The overall health of the lake should be paramount and all solutions should be in accordance with state and federal laws and guidelines.

COMMENT 3:

This plan reflects a lot of good effort and hard work. Most of my big picture issues have been expressed in the meetings and many of them are in the document. For these comments, I have included specific (and informally written) comments on parts of the document.

An overall issue: As I read it, in some places it feels like it is two documents in one and gets hard to follow. Kind of like we mixed the methods and results sections together. The "first" document is the

"management plan," how should we manage the lake, what are the habitat targets, how do we document it. The "second" document is "how was the management plan made?" It describes the process used to get to the management plan. To the extent the methods can be put in appendices and the basic plan separated from them, it could make the management plan shorter and easier to understand for lay people and those new to reading the plan.

Specific comments on sections:

Page 7 and 15. I don't think that Lake Istokpoga fluctuated 7.5 feet each year, or even between droughts and floods. The earliest measurements we have were taken AFTER the Indian Prairie Canal was dug (Hanna and Hanna 1948 page 171 say it was between 1917 and 1925) and the Kissimmee had been at least partly channelized. Lake Okeechobee was permanently lower in the 1910s by about 5 feet creating more head for the Indian Prairie Canal to function. The organic soils on the south end

(caladium fields) could never have formed if they dried very often. Chapter 5 of McVoy et al (2011) has a good write up of the conditions needed to form the organic rim around Lake O, which is very similar to the one on Lake Istokpoga. An additional line of evidence that levels were probably fairly stable is the lake sits on the seepage slope from the Lake Wales Ridge, as does Arbuckle Creek, meaning both had steady inflows of some level virtually all the time. Had we encountered this Lake 1000 years later it likely would have been a solid sawgrass marsh.

The naturally relatively-stable water levels are an important point in managing organics in this lake. They formed naturally and historically. Yes, eutrophication has accelerated that process but it is natural and should caution managers about a categorical dislike for organics in the marsh or the need to always try to get rid of them, the Everglades is an organic-based marsh.

Page 7. Water lettuce is a native plant. It is detected in pre-Columbian cores from Lakes Annie and Tulane and was encountered by the first soldiers to see Okeechobee in the 1830s. Indeed, all the first accounts of Lake O include references to water lettuce, indicating it long has been a prominent part of

¹ Hannah, A. J. and K. A. Hannah. 1948. Lake Okeechobee: wellspring of the Everglades. The Bobbs-Merrill Co., New York, NY.

² McVoy, C. W., W. P. Said, J. Obeysekara, J. A. VanArman, and T. W. Dreschel. 2011. Landscapes and hydrology of the pre-drainage Everglades. Univ. Press of Florida, Gainesville.

Florida lakes. In my opinion, the phobia managers have about is misguided and unfounded. Sure, manage it when it is a navigation nuisance but otherwise it is a productive habitat feature.

P 12. Most of this geologic and social history is interesting but I don't think it needs to be part of this document. It makes it longer and in some ways, less accessible to readers interested in Lake I.

P 14 ... is an important source of water supply for agricultural lands and the Brighton Indian Reservation located southeast...[the Indians have a water compact with legal rights]

P 14 I prefer to call "organic accumulation" in the littoral zone simply that, rather than "muck" which is a soil type (Hontoon and Brighton muck soils) that underlies the south end of the lake

P 16 An alternative interpretation of clean shorelines in 1958 was unprecedented low levels due to drainage and drought. Essentially we were seeing the bottom that formerly was too deep for macrophytes. The lake still would rise to the 40+ foot range during wet events but unchecked drainage would quickly lower it. In other words, it was fluctuating so widely vascular plant communities would have trouble keeping up. The littoral zone formerly was outside the present Lake's boundary at 39.5 feet.

P 21 I worry folks will misinterpret the 90 percentile P levels less than 252 ppm as thinking such values would be OK in Istokpoga. Millison (19783) and the 2003 SWIM plan⁴ found much lower numbers, which I would use as benchmarks for what we should expect.

P 26-27 your explanation of hydrilla and water clarity match the observations of O'Dell et al (19955).

Page 34, Table 2.3 I am not sure what this table is supposed to be about. It has distinctions without saying what they mean. In other words, what is the purpose of the categories? Some categories are single species, some are mixes, some are habitat types (freshwater marsh and it leaves me wondering what the basis or meaning of the categories is intended to be. Without more context I'd leave this out, or if left in, explain what trends or messages to see or look for

P 44 "Aquatic birds and wildlife" biodiversity of most vertebrates is correlated with habitat structure, the more variety of habitat (niches) the more kinds of things can live there. The reason I think vertebrate species lists are important is to ensure the management plan systematically accounts for all

³ Millison, J. F. 1978. Limnological investigations of seven lakes in the Istokpoga drainage basin. Tech. Pub. 78-1. SFWMD, West Palm Beach.

⁴ SFWMD. 2003. Lake Okeechobee Surface Water Improvement and Management (SWIM) Plan (final). Planning Document. South Florida Water Management District (SFWMD), West Palm Beach, FL.

⁵ O'Dell, K. M., J. Vanarman, B. H. Welch, and S. D. Hill. 1995. Changes in water chemistry in a macrophyte-dominated lake before and after herbicide treatment. *Lake and Reserv. Manage.* 11:311-316.

the things that "should" be in Istokpoga. Weller (1995⁶) provides a good framework to use organisms to assess ecosystem "health." This is especially important to me because FWC uses "focal taxa" which are taxonomic groups like wading birds or waterfowl and gives the entire group ONE score. Because all the members of these taxa are different (according to classical ecology, closely related organisms living around each other must be in different niches to avoid competing for limited resources), giving one score will be close for a few of them and wrong for most of them. This is a poor and I think technically-unsound basis for scoring habitat value. This plan should identify what species should be here and use that as a framework to check whether the marshes are being managed for them, and not managed for somebody's preference for "open habitat," or other silly metrics FWC staff often tout. For example, Hilary and I got no Coots on the Christmas Bird Count in the Lake, that "indicates" SAV are absent.

As for nutrients and biodiversity, nutrient-enriched systems often are less biodiverse than nutrient poor, presumably because some "bully" organisms (e.g., cattail) can capitalize on abundant nutrients enough to become dominant. Conversely, nutrient poor systems can limit the ability to dominate. Looking at biodiversity metrics can help FWC evaluate when systems have become too monocultural, due to nutrients (and stabilized water) and justify management actions.

P 46 It would be useful to have a table of listed species on the lake, they have special management considerations

P 48 I would argue FWC has been mapping the marsh but has yet to link that to biological responses from fish and wildlife. I think this plan, and all plans, should emphasize fish and wildlife response over merely mapping plants

P 49 summary repeats ideas that are questionable to me. Organic accumulation is normal for this lake and even though it probably has accelerated with eutrophication, the "reason" FWC bulldozed the lake might have more to do with personal preferences than ecological needs

Page 53 section 3.2 this section should include specific reference to Chapter 68F-20 and 64F-54 (at least as appendices) and cite pertinent statutory direction including the definitions of "beneficial native plants" "noxious aquatic plant" "maintenance program" and so on. It is important to frame what FWC is supposed to do in statute and rule, and not do. And it would be useful to include a summary of the alligator program on the lake including how and when surveys occur, what they count, how they decide on nest harvest and records of nest and alligator harvest over the years

P 58 Section 3.7 gives me heartburn. FWC is a resource management agency and their job is to manage Florida for what it is, not what they or anyone simply prefers. They do not have legal authority to decide they don't like habitats under their management and get rid of what is there to replace it with something else. "Undesired" without technical justification is not a valid management criterion. I realize FWC wanted you to look at stakeholder interests and consider them, but there is a limit to what FWC legally can do. If people wanted snook, they could not pour salt in the lake and if people don't like native plants, they cannot just go kill them.

⁶Weller, M. W. 1995. Use of two waterbird guilds as evaluation tools for the Kissimmee River Restoration. *Restoration Ecol.* 3:211-224.

P 59 I would change the first sentence in 3.8 to say, "Habitat in Lake Istokpoga should be managed to support the full diversity of wildlife species along with human uses."

P 60 Focal habitats: I would use the word "qualitative" not quantitative. The biologists look at the lake and give it a "score" based on their perception of habitat quality, "professional judgement" at best, and as mentioned previously, one score for diverse groups of taxa is a poor process.

P 61 Table 3.3 probably too late to change this but percents are not ecologically meaningful. Structure is what this table should describe and it should apply equally to the whole shoreline, recognizing that the south end has different soils and conditions than the north end.

P 63 Objective A-3 my target would be "a contiguous (or nearly so) band of bulrush along the outer edge of the marsh on the west, north and east sides. (the south end likely won't support this for soil reasons)

Objective A-3-1 needs to specify the littoral zone should have medium to dense vegetation. FWC's management goals often allow up to 75% removal of emergent vegetation in the marsh which technically could be called "marsh habitat" but not functionally for biodiversity conservation

P 68 Section 4.3 thanks for articulating these ideas, FWC needs to ponder them in a formalized way. Much like they ended up doing for hydrilla. Could add to the "decline in fishing quality ... a decline in birds such as Ring-necked Ducks and American Coots.

P 71 E-3-2 please add a reference to including homeowners in plant management considerations, particularly FWC's responsibility to manage the riparian permits.

P 72 document library is a good idea, where could it be housed?

P 75 please mention the wildlife monitoring should be paired with vegetation metrics to develop relationships

P 75 Wading bird indicators are a good idea but selecting these 4 because they are the most abundant is the wrong approach. It is the species that should be there but aren't, who are good indicators. As mentioned for the Christmas Bird Count on the south end of Istokpoga, we drove 20 miles by boat and did not see one Coot. That "indicates" something is not right for them and it is lack of SAV, their primary food. Please refer to Weller 1995 for how to use taxa as monitors of appropriate ecological conditions.

P 79 FDEP, FDACS, SFWMD, and Highlands County.

Page 467 timeline Indian Prairie Canal dug by 1925

P 99 and 104. I prefer the phosphorus maps in Fernald and Purdum (1998; page 150) to the 90% maps, which I think are misleading to a casual viewer. These values are not the normal values to expect. The P standard for the Everglades is <10 ppb but this map puts it 9 times higher! I just don't think 90% maps are a good way to represent average conditions, especially to lay audiences.

⁷Fernald, E. A., and E. D. Purdum. 1998. Water resources atlas of Florida. Institute of Science and Public Affairs, Florida State Univ., Tallahassee.

Appendix X: Relevant Florida Statutes

Florida Statutes

369.20 Florida Aquatic Weed Control Act.--

369.20 Florida Aquatic Weed Control Act.

369.22 Aquatic plant management.

369.20 Florida Aquatic Weed Control Act.--

- (1) This act shall be known as the "Florida Aquatic Weed Control Act."
- (2) The Fish and Wildlife Conservation Commission shall direct the control, eradication, and regulation of noxious aquatic weeds and direct the research and planning related to these activities, as provided in this section, so as to protect human health, safety, and recreation and, to the greatest degree practicable, prevent injury to plant and animal life and property.
- (3) It shall be the duty of the commission to guide and coordinate the activities of all public bodies, authorities, agencies, and special districts charged with the control or eradication of aquatic weeds and plants. It may delegate all or part of such functions to any appropriate state agency, special district, unit of local or county government, commission, authority, or other public body.
- (4) The commission shall also promote, develop, and support research activities directed toward the more effective and efficient control of aquatic plants. In the furtherance of this purpose, the commission is authorized to:
 - (a) Accept donations and grants of funds and services from both public and private sources;
 - (b) Contract or enter into agreements with public or private agencies or corporations for research and development of aquatic plant control methods or for the performance of aquatic plant control activities;
 - (c) Construct, acquire, operate, and maintain facilities and equipment; and

(d) Enter upon, or authorize the entry upon, private property for purposes of making surveys and examinations and to engage in aquatic plant control activities; and such entry shall not be deemed a trespass.

(5) The commission may disburse funds to any special district or other local authority charged with the responsibility of controlling or eradicating aquatic plants, upon:

(a) Approval by the commission of the control techniques to be used by the district or authority; and

(b) Review and approval of the program of the district or authority by the commission.

(6) The commission shall adopt rules pursuant to ss. 120.536(1) and 120.54 to implement provisions of this section conferring powers or duties upon it and perform any other acts necessary for the proper administration, enforcement, or interpretation of this section, including creating general permits and exemptions and adopting rules and forms governing reports.

(7) No person or public agency shall control, eradicate, remove, or otherwise alter any aquatic weeds or plants in waters of the state unless a permit for such activity has been issued by the commission unless the activity or waters are expressly exempted by commission rule. The commission shall develop standards by rule which shall address, at a minimum, chemical, biological, and mechanical control activities; an evaluation of the benefits of such activities to the public; specific criteria recognizing the differences between natural and artificially created waters; and the different amount and quality of littoral vegetation on various waters. Applications for a permit to engage in aquatic plant control activities, including applications to engage in control activities on sovereign submerged lands, shall be made to the commission. In reviewing such applications, the commission shall consider the criteria set forth in subsection (2) and, in accordance with applicable rules, take final agency action on permit applications for the use of aquatic plant control activities on sovereign submerged lands.

(8) As an exemption to all permitting requirements in this section and ss. 369.22 and 369.25, in all freshwater bodies, except aquatic preserves designated under chapter 258 and Outstanding Florida Waters designated under chapter 403, a riparian owner may physically or mechanically remove herbaceous aquatic plants and semiwoody

herbaceous plants, such as shrub species and willow, within an area delimited by up to 50 percent of the property owner's frontage or 50 feet, whichever is less, and by a sufficient length waterward from, and perpendicular to, the riparian owner's shoreline to create a corridor to allow access for a boat or swimmer to reach open water. All unvegetated areas shall be cumulatively considered when determining the width of the exempt corridor. Physical or mechanical removal does not include the use of any chemicals or any activity that requires a permit pursuant to part IV of chapter 373.

(9) A permit issued pursuant to this section for the application of herbicides to waters in the state for the control of aquatic plants, algae, or invasive exotic plants is exempt from the requirement to obtain a water pollution operation permit pursuant to s. 403.088.

(10) Notwithstanding s. 369.25, the commission may collect aquatic plants to be used for habitat enhancement, research, education, and for other purposes as necessary to implement the provisions of this section.

(11) The commission may quarantine or confiscate noxious aquatic plant material incidentally adhering to a boat or boat trailer.

(12) The commission may conduct a public information program, including, but not limited to, erection of road signs, in order to inform the public and interested parties of this section and its associated rules and of the dangers of noxious aquatic plant introductions.

369.22 Aquatic plant management.--

(1) This section shall be known as the "Florida Aquatic Plant Management Act."

(2) For the purpose of this section, the following words and phrases shall have the following meanings:

(a) "Commission" means the Fish and Wildlife Conservation Commission.

(b) "Aquatic plant" is any plant growing in, or closely associated with, the aquatic environment and includes "floating," "emersed," "submersed," and "ditch bank" species.

(c) A "maintenance program" is a method for the management of aquatic plants in which control techniques are utilized in a coordinated manner as determined by the commission.

(d) An "eradication program" is a method for the management of aquatic plants in which control techniques are utilized in a coordinated manner in an attempt to kill all the aquatic plants on a permanent basis in a given geographical area.

(e) A "complaint spray program" is a method for the management of aquatic plants in which weeds are allowed to grow unhindered to a given level of undesirability, at which point eradication techniques are applied in an effort to restore the area in question to a relatively low level of infestation.

(f) "Waters" means rivers, streams, lakes, navigable waters and associated tributaries, canals, meandered lakes, enclosed water systems, and any other bodies of water.

(g) "Districts" means the six water management districts created by law and named, respectively, the Northwest Florida Water Management District, the Suwannee River Water Management District, the St. Johns River Water Management District, the Southwest Florida Water Management District, the Central and Southern Florida Flood Control District, and the Ridge and Lower Gulf Coast Water Management District; and on July 1, 1975, shall mean the five water management districts created by chapter 73-190, Laws of Florida, and named, respectively, the Northwest Florida Water Management District, the Suwannee River Water Management District, the St. Johns River Water Management District, the Southwest Florida Water Management District, and the South Florida Water Management District.

(3) The Legislature recognizes that the uncontrolled growth of aquatic plants in the waters of Florida poses a variety of environmental, health, safety, and economic problems. The Legislature acknowledges the responsibility of the state to cope with the uncontrolled and seemingly never-ending growth of aquatic plants in the waters throughout Florida. It is, therefore, the intent of the Legislature that the state policy for the management of aquatic plants in waters of state responsibility be carried out under the general supervision and control of the commission. It is the intent of the Legislature that the management of aquatic plants be carried out primarily by means of maintenance programs, rather than eradication or complaint spray programs, for the purpose of achieving more effective management at a lower long-range cost. It is also the intent of the Legislature that the commission guide, review, approve, and

coordinate all aquatic plant management programs within each of the water management districts as defined in paragraph (2)(g). It is the intent of the Legislature to account for the costs of aquatic plant management programs by watershed for comparison purposes.

(4) The commission shall supervise and direct all management programs for aquatic plants, as provided in this section, so as to protect human health, safety, and recreation and, to the greatest degree practicable, prevent injury to plant, fish, and animal life and to property.

(5) When state funds are involved, or when waters of state responsibility are involved, it is the duty of the commission to guide, review, approve, and coordinate the activities of all public bodies, authorities, state agencies, units of local or county government, commissions, districts, and special districts engaged in operations to manage or eradicate aquatic plants. The commission may delegate all or part of such functions to any appropriate state agency, special district, unit of local or county government, commission, authority, or other public body. However, special attention shall be given to the keeping of accounting and cost data in order to prepare the annual fiscal report required in subsection (7).

(6) The commission may disburse funds to any district, special district, or other local authority for the purpose of operating a program for managing aquatic plants in the waters of state responsibility upon:

(a) Approval by the commission of the management techniques to be used by the district or authority; and

(b) Review and approval of the program of the district or authority by the commission.

(7) The commission shall prepare an annual report on the status of the aquatic plant management program which shall be posted on the commission's Internet website.

(8) The commission shall have the authority to cooperate with the United States and to enter into such cooperative agreements or commitments as the commission may determine necessary to carry out the control or eradication of water hyacinths, alligator weed, and other noxious aquatic plant growths from the waters of the state and to enter into contracts with the United States obligating the state to indemnify and save

harmless the United States from any and all claims and liability arising out of the initiation and prosecution of any project undertaken under this section. However, any claim or claims required to be paid under this section shall be paid from money appropriated to the aquatic plant management program.

(9) The commission may delegate various aquatic plant management functions to any appropriate state agency, special district, unit of local or county government, commission, authority, or other public body. The recipient of such delegation shall, in accepting commitments to engage in aquatic plant management activities, be subject to the rules of the commission. In addition, the recipient shall render technical and other assistance to the commission in order to carry out most effectively the purposes of s. 369.20.

(10) The commission is directed to use biological agents for the management of aquatic plants when determined to be appropriate by the commission.

(11) The commission shall adopt rules pursuant to ss. 120.536(1) and 120.54 to implement the provisions of this section conferring powers or duties upon it and perform any other acts necessary for the proper administration, enforcement, or interpretation of this section, including adopting rules and forms governing reports.

(12) No person or public agency shall control, eradicate, remove, or otherwise alter any aquatic plants in waters of the state unless a permit for such activity has been issued by the commission, or unless the activity or waters are expressly exempted by commission rule. The commission shall develop standards by rule which shall address, at a minimum, chemical, biological, and mechanical control activities; an evaluation of the benefits of such activities to the public; specific criteria recognizing the differences between natural and artificially created waters; and the different amount and quality of littoral vegetation on various waters. Applications for a permit to engage in aquatic plant management activities, including applications to engage in management activities on sovereign submerged lands, shall be made to the commission. In reviewing such applications, the commission shall consider the criteria set forth in subsection (4) and, in accordance with applicable rules, shall take final agency action on permit applications for the use of aquatic plant activities on sovereign submerged lands.

68F-54.001	Program Criteria and Standards
68F-54.003	Definitions
68F-54.0035	Waters Eligible and Eligibility Criteria for Aquatic Plant Management Funds
68F-54.005	Approval, Allocation, and Disbursement Procedures for Aquatic Plant Management Funds

68F-54.001 Program Criteria and Standards.

(1) The Florida Legislature provides funds to the Commission annually through the Invasive Plant Control Trust Fund for the management of aquatic plants.

(2) Funds are allocated by the Commission to government agency and private sector contractors, after evaluation of workplans and associated budgets for eligible waters, in accordance with eligibility standards and priorities established in this chapter. The Commission then monitors and assists contractors to ensure the appropriate management of aquatic plants and funds.

(3) The Aquatic Plant Management Funding Program and the Corps Cooperative Agreement DACW 17-85-H-0020 (effective date as amended 26 September 1988, which is hereby incorporated by reference and is available from the section) shall be implemented by this chapter.

(4) Applying the maintenance program management policy to noxious aquatic plants shall include the following actions:

(a) Identifying the noxious aquatic plant species present, and their impact on plant and animal life and property.

(b) Determining in which eligible water bodies these plants are most disruptive to maintenance program objectives.

(c) Determining which plants are the most feasible to manage under given conditions and available methodologies.

(d) Establishing management priorities for eligible waterbodies, and selecting management methods to be used including mechanical, biological, or herbicide techniques, which may often be used in combination.

(e) Coordinating with and seeking comments from stakeholders including other agencies and local governments.

(f) The Commission is authorized to contract with government agencies and private sector organizations for the management of aquatic plants in waters of the state.

(g) The Commission is authorized to reimburse any government agency or private sector company with which it has entered into a contractual agreement to manage aquatic plants, subject to the eligibility requirements of this chapter.

(h) The Commission is responsible for determining that funds are spent in accordance with annual workplans, task assignments and contracts.

(i) The Commission shall reimburse contractors based on the available funds, program eligibility, program priorities, and the method of reimbursement as defined in this chapter. To compensate for limitations in the planning cycle prior to the end of the fiscal year, the Commission is authorized to review allocations to contractors to determine if additional funds are needed or if excess funds are available for reallocation to management programs in need of additional funds.

(5) Herbicide Management Standards:

(a) Herbicide management activities shall be in conformity with label restrictions of the product to be used.

(b) Herbicides with label restrictions for potable water use which do not indicate a potable water intake setback distance must not be used to manage floating plants within 0.5 miles of a functioning potable water intake permitted by the Department of Environmental Protection in a lake or within 2.0 miles upstream or 0.5 miles downstream of a functioning potable water intake permitted by the Department of Environmental Protection in a river system. There are no setback requirements when using herbicides that do not have restrictions on the label for potable water use.

(c) When used to manage aquatic vegetation other than floating plants, herbicides with label restrictions for potable water use which do not indicate a potable water setback distance must not be used within 2.0 miles of a functioning potable water intake permitted by the Department of Environmental Protection in a lake or within 2.0 miles upstream or 0.5 miles downstream of a functioning potable water intake permitted by the Department of Environmental Protection in a river system. There are no setback requirements when using herbicides that do not have restrictions on the label for potable water use.

(d) When management activities, using a herbicide with label restrictions for potable water use which does not have a potable water setback distance, are to take place within 2.0 miles of a functioning potable water intake permitted by the Department of Environmental Protection in a lake, or within 2.0 miles upstream or 0.5 miles downstream of a functioning potable water intake permitted by the Department of Environmental Protection in a river system, written notice by certified mail must be given to the operator of the water treatment plant and to the section at least one week prior to the treatment activity, unless an alternative notification system has been previously approved by the Commission. There are no requirements to notify water treatment plant operators or the section when using herbicides that do not have restrictions on the label for potable water use.

(e) When more than one herbicide is registered for use in an aquatic site, the Commission shall require the use of the herbicide which it determines has the least adverse effect upon human health, safety, recreational uses, non-target plants, fish, and wildlife. In determining which herbicide shall be used, the following criteria shall be considered:

1. Which herbicide will provide the greatest protection to human health, safety, and recreational uses.
2. Which herbicide will provide the greatest protection to non-target plant and animal life.
3. Which herbicide will be most effective at controlling the targeted species.

(f) No herbicide shall be permitted for use in violation of label requirements as registered by the Department of Agriculture and Consumer Services or the United States Environmental Protection Agency.

(g) Application of herbicides shall be conducted at all times in a manner to cause the least possible adverse effect on human health, safety, recreational uses, non-target plants, fish, or wildlife.

(h) Management activities using herbicides shall not be permitted in manatee aggregation sites when manatees are present except when automatic herbicide spreaders operating on timing devices have been authorized in the workplan.

(i) When manatees are sighted in a control area, all herbicide control operations must cease immediately, (except when automatic herbicide spreaders operating on timing devices have been authorized in the workplan), and shall not be resumed until all manatees have left the control area of their own volition. No manatee may be herded or harassed into leaving the control area.

(j) Proposed herbicide treatments that may cause the rapid decay of aquatic vegetation and possible oxygen depletion, shall be required to be staggered or conducted in stages to allow time for recovery and stabilization of oxygen levels between treatments.

(6) Mechanical and Physical Management Standards:

(a) Mechanical aquatic plant management operations shall be conducted in a manner which will not cause further significant spread of noxious aquatic plant species. All cut or harvested aquatic vegetation shall be deposited as prescribed in the workplan. No substrate is authorized to be recontoured or removed under an aquatic plant management workplan.

(b) When manatees are sighted within 50 feet of mechanical operations, all operations must cease immediately and shall not be resumed until all manatees have left the mechanical operations area of their own volition. No manatee may be herded or harassed into leaving the control area.

(7) Biological Management Standards:

(a) The use of fish as biological management for aquatic plants requires authorization from the Commission which has statutory authority for the regulation of the use of fish.

(b) All other biological management agents shall be used only if approved for general release by the U.S. Department of Agriculture and the Florida Department of Agriculture and Consumer Services.

Rulemaking Authority 369.20, 369.22 FS. Law Implemented 403.088, 369.20, 369.22 FS. History—New 1-7-87, Amended 5-30-93, Formerly 16C-54.001, 62C-54.001, Amended 10-9-12.

68F-54.003 Definitions.

(1) “Aquatic plant” means any plant, including a floating, emersed, submersed or ditchbank species, growing in or closely associated with an aquatic environment, and includes any part or seed of such plant.

(2) “Budget” means the detailed anticipated expenditures including anticipated federal, state or local funds which are within the categories designated eligible by this chapter for the fiscal year for which funding is being allocated.

(3) “Commission” means the Florida Fish and Wildlife Conservation Commission.

(4) “Connection” means any depression, ditch, canal, culvert, pipe, or any other natural or man-made conveyance, whether permanent or intermittent, which joins the surface water of one waterbody to the surface water of another waterbody in such a manner as to allow the interchange of water between the waterbodies. Waterbodies with conveyances which are subject to man-made controls, including but not limited to dams, weirs, water control gates, and valves, which are preventing the interchange of water between waterbodies at the time of the use of a herbicide for aquatic plant management activities and throughout any water use restriction periods required by the herbicide product label, shall not be considered to be connected.

(5) “Contract” means a written agreement which outlines the obligations of the Commission and the contractor and constitutes an aquatic plant control permit under subsection 68F-20.002(8), F.A.C.

(6) “Contractor” means any government agency or private sector company with which the Commission has entered into a contractual agreement to reimburse eligible costs associated with managing aquatic plants.

(7) “Control area” means an area of water containing the aquatic plant management site within which opportunity exists for the

mixture of water temporarily degraded by management activities with receiving or adjacent waters, and the area of water in which the use of a herbicide or mechanical aquatic plant management activity is undertaken.

(8) "Corps" means the United States Army Corps of Engineers, an administrative subdivision of the United States Government.

(9) "Ditchbank species" means those plants usually growing not directly in water but near water's edge at normal water level.

(10) "Eligible costs" means costs identified by the contract as being reimbursable.

(11) "Federal funds" means those aquatic plant management funds provided by the Corps.

(12) "Fiscal year" means the state fiscal year, July 1 through June 30.

(13) "Herbicide" means any chemical product used to chemically control or regulate aquatic plant growth.

(14) "Local government" means a county or municipal government.

(15) "Maintenance program" means a method for the management of aquatic plants in which techniques are used in a coordinated manner as determined by the Commission.

(16) "Manatee aggregation site" means a specific area within a waterbody or canal system where manatees periodically congregate, as identified by the section in consultation with the U.S. Fish and Wildlife Service and the Commission's Imperiled Species Management Section.

(17) "Noxious aquatic plant" means any part, including but not limited to seeds or reproductive parts, of an aquatic plant which has the potential to hinder the growth of beneficial plants, to interfere with irrigation or navigation, or to adversely affect the public welfare or the natural resources of this state.

(18) "Section" means the Invasive Plant Management Section, an administrative subdivision of the Florida Fish and Wildlife Conservation Commission.

(19) "Sovereignty lands" means, pursuant to Article X, Section 11, Constitution of the State of Florida, the title to lands under navigable waters, within the boundaries of the state, which have not been alienated, including beaches below mean high water lines, is held by the state, by virtue of its sovereignty, in trust for all the people.

(20) "State funds" means those aquatic plant management funds provided by Legislative appropriation.

(21) "Task assignment" means an executed agreement between the Commission and the contractor that authorizes all of the workplans and an approved budget for the contractor's area of operations for a given fiscal year.

(22) "Waters" or "Waters of the state" means rivers, streams, lakes, navigable waters and associated tributaries, canals, meandered lakes, enclosed water systems, and all other bodies of water.

(23) "Workplan" means an outline of the anticipated aquatic plant management operations to be conducted on a given waterbody for a given fiscal year.

Rulemaking Authority 369.20, 369.22 FS. Law Implemented 369.20, 369.22 FS. History—New 1-7-87, Amended 5-30-93, Formerly 16C-54.003, 62C-54.003, Amended 10-9-12.

68F-54.0035 Waters Eligible and Eligibility Criteria for Aquatic Plant Management Funds.

(1) The Commission is authorized to enter into contracts for the purpose of managing noxious aquatic plants in sovereignty lands, or those sites which might adversely impact sovereignty lands. Approval of control techniques and program approval are contained in the individual workplans for each waterbody which are compiled into a task assignment.

(2) In order for state and federal aquatic plant management funds to be considered, waters for which these funds are requested must meet the following eligibility criteria:

(a) The waterbody must be sovereignty lands, or Commission managed lands such as a Fish Management Area or Wildlife Management Area, or a site which might adversely impact sovereignty lands or Commission managed lands, or a state-owned spring or spring run.

(b) For sovereignty lands, the waterbody must have access to the boating public by way of an established, improved boat ramp or a direct navigable connection to an eligible waterbody.

1. There must be a sign at the boat ramp stating that it is a public boat ramp or use area.

2. A ramp fee may be charged provided that the fee is not unreasonable (in keeping with ramp fees charged in the area).

3. There must be at least one directional sign on the nearest paved roadway indicating the way to the public boat ramp.

4. The boat ramp must have sufficient space to safely turn a vehicle and trailer around and ample parking space within one quarter mile distance from the boat ramp.

(c) Commission approval shall be the execution of the task assignment between the contractor and the Commission.

Rulemaking Authority 369.20, 369.22 FS. Law Implemented 369.20, 369.22 FS. History--New 5-30-93, Formerly 16C-54.0035, 62C-54.0035, Amended 10-9-12.

68F-54.005 Approval, Allocation, and Disbursement Procedures for Aquatic Plant Management Funds.

(1) Workplan requests shall be reviewed and approved by the section staff to determine compliance with this chapter.

(2) Although a waterbody may meet eligibility criteria, funding and workforce availability may be insufficient to manage noxious plants for a period of time. The section shall allocate funds according to the following priorities, with 1 being the highest priority, and the additional considerations listed in subsection 68F-54.005(3), F.A.C.:

Priority 1: To manage waterhyacinth and waterlettuce, including those plants in waters which could infest connected eligible lakes and rivers.

Priority 2: To manage new hydrilla infestations, particularly those at boat ramps or in waters connected to eligible waters which contain little or no hydrilla.

Priority 3: To manage any noxious aquatic plant restricting access at public boat ramps, or to establish trails which connect boat ramps to major use areas.

Priority 4: To provide open areas in dense stands of hydrilla for navigation and recreational use.

Priority 5: To provide for large scale hydrilla management operations.

Priority 6: To provide open areas in dense stands of other noxious plants for navigation and recreational use.

Priority 7: To manage noxious plants in residential or dead end canals and which are connected to eligible waters, unless they contain waterhyacinth or waterlettuce, or hydrilla when there is a navigable connection to an eligible water and the eligible water contains little or no hydrilla.

(3) The section shall allocate funds for an individual waterbody using the criteria established in subsection 68F-54.005(2), F.A.C., with consideration being given to the following factors:

(a) Availability of state and federal funds.

(b) Availability of local funds or in-kind services.

(c) Major uses of the waterbody.

(d) Feasibility of achieving control of noxious aquatic plants in the waterbody.

(e) Anticipated environmental and biological community impacts including the current and anticipated water quality conditions.

(f) Specific comments provided by substantially affected persons.

(g) Current and anticipated level of aquatic plants in the waterbody.

(h) Relative benefit to the public.

(4) A task assignment shall be executed by the Commission with the contractor prior to any aquatic plant management activities being eligible for reimbursement.

(5) Reimbursement shall be based on accounting for actual costs and shall be the means for identifying and distributing allowable costs in the program. All invoices for a given month shall be provided to the Commission for determination of reimbursement no later than the 20th day of the following month. The Commission shall have thirty (30) days in which to review, inspect, and accept the contractor's work effort and associated reimbursement documentation. Incomplete or incorrect invoices submitted shall be returned by the Commission for correction to the contractor within thirty (30) days of receipt. The corrected invoice shall be returned to the Commission no later than the 20th day following the day of receipt by the contractor. The Commission shall reimburse the contractor monthly upon receipt of a properly certified invoice. The following certification statement shall appear on the invoice, "I certify that the above bill is correct and just and that payment thereof has not been received; I further certify that the contractor and all sub-contractors employed on the work have complied with the labor standards provision of the contract." The contractor shall keep separate cost accounting records for this program from which the invoice shall be prepared.

Rulemaking Authority 369.20, 369.22 FS. Law Implemented 369.20, 369.22, 120.60 FS. History--New 1-7-87, Amended 5-30-93, Formerly 16C-54.005, 62C-54.005, Amended 10-9-12.

Appendix XI: Presentations On Lake Mapping

Given By Craig Mallison and Kevin Johnson (FWC) to the LIHAC

Lake mapping with high-resolution aerial photography



**Craig Mallison
Fish & Wildlife Research Institute**

Lake Istokpoga

2009

Aerial CIR

Photography

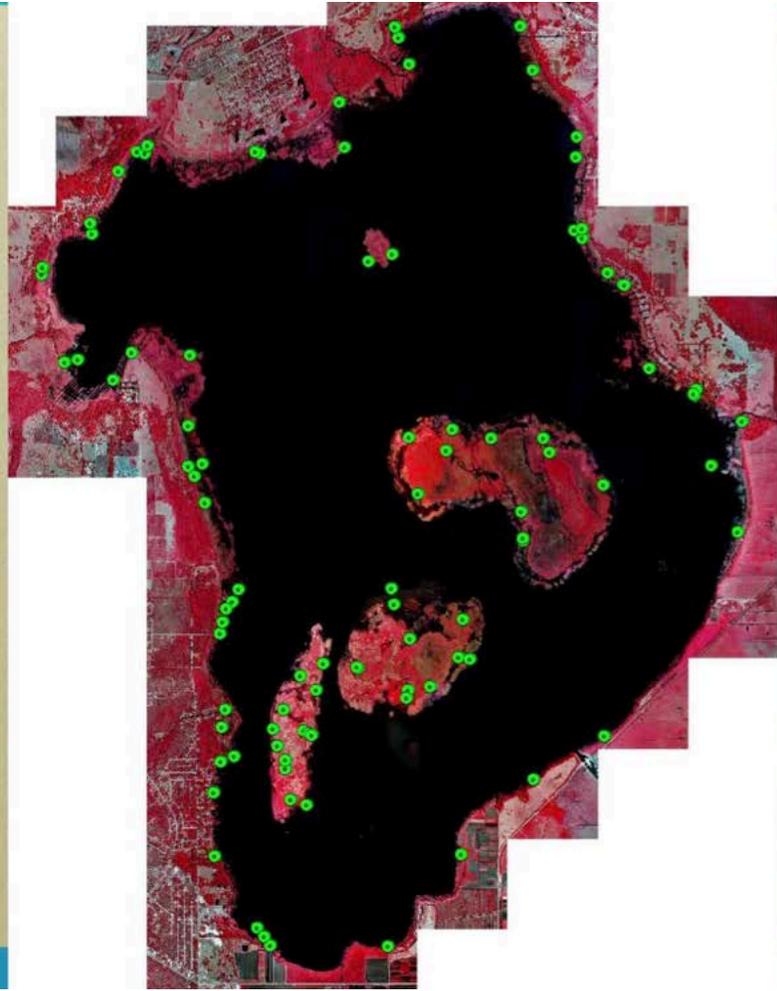


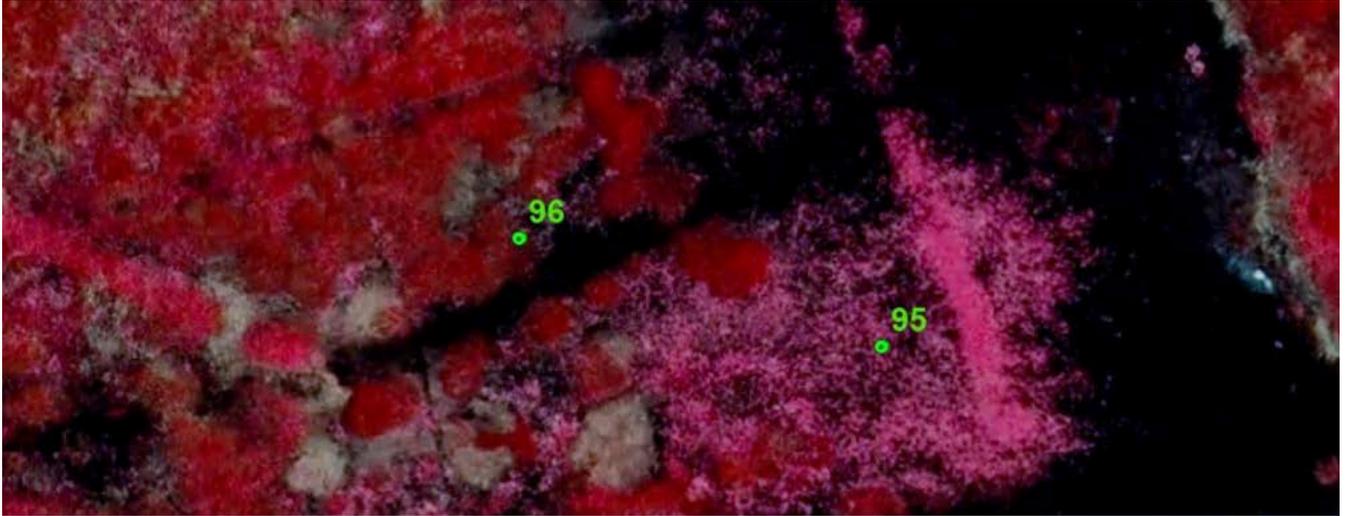
Lake Istokpoga

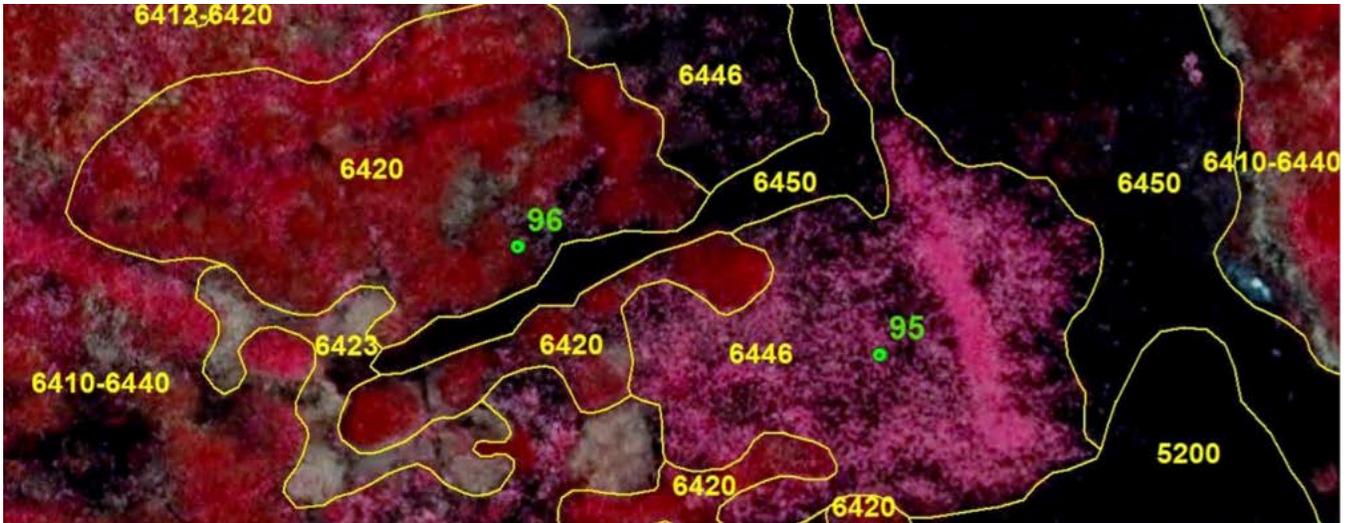
2009

Field survey

locations





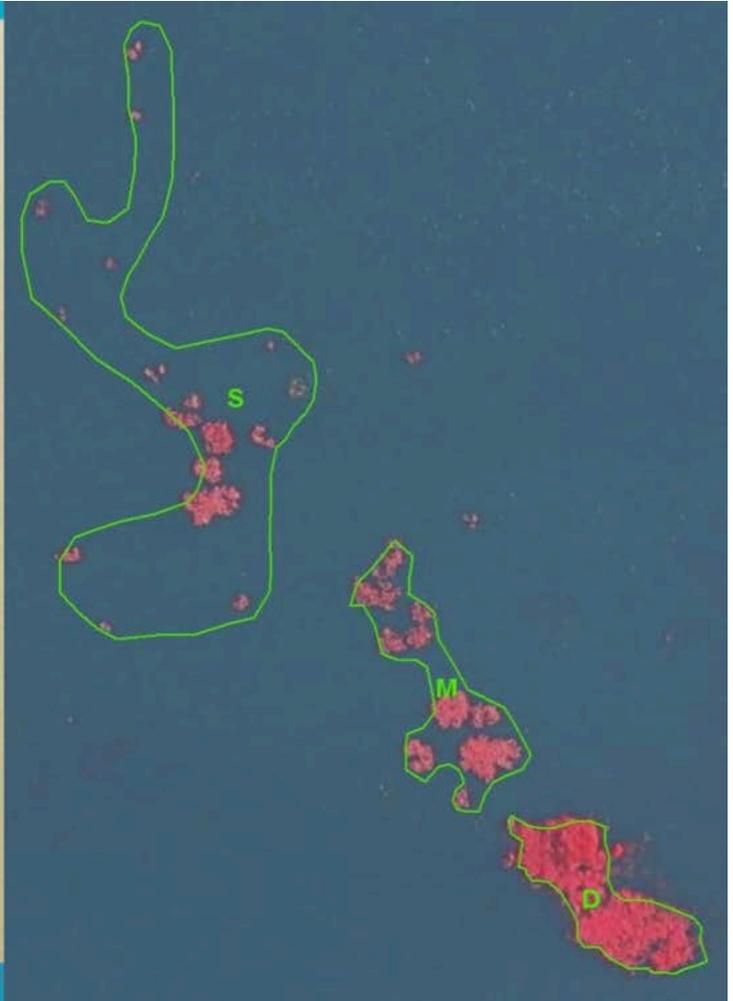


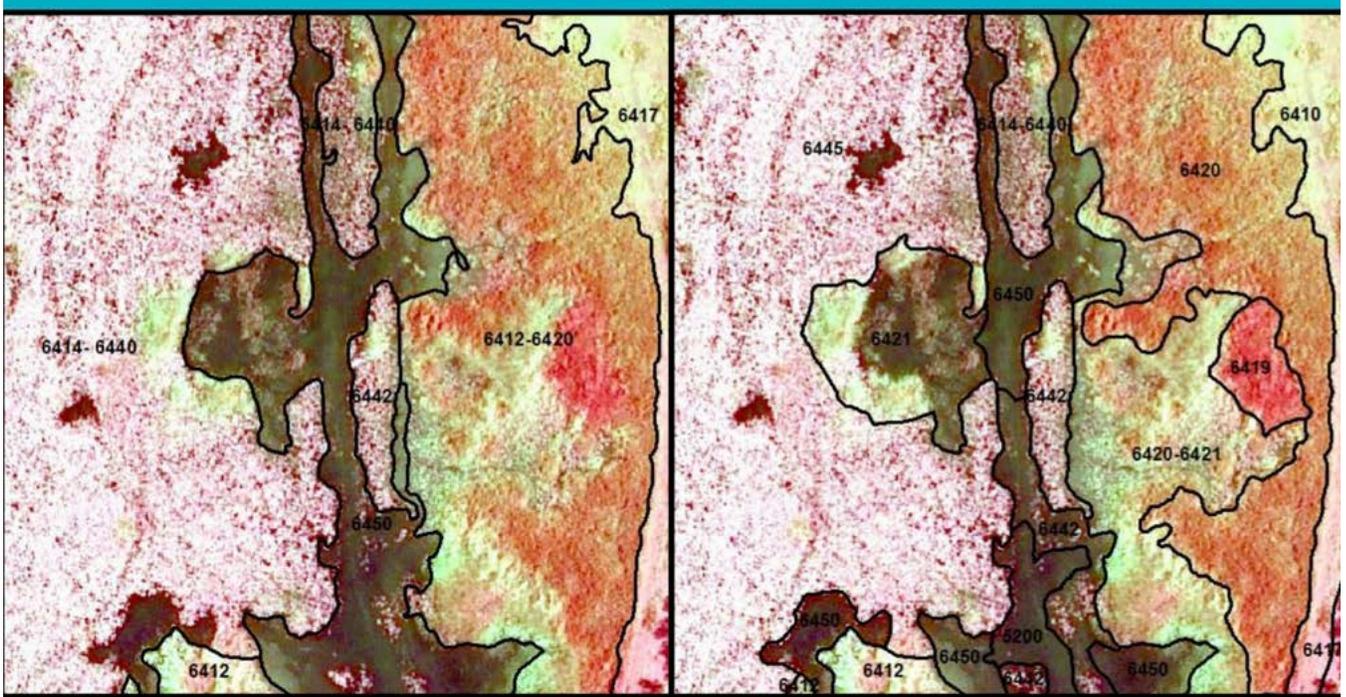
Plant coverage

S = sparse (1-33%)

M = medium (34-66%)

D = dense (67-100%)





Zoomed area of Lake Kissimmee 2015

Draft Map

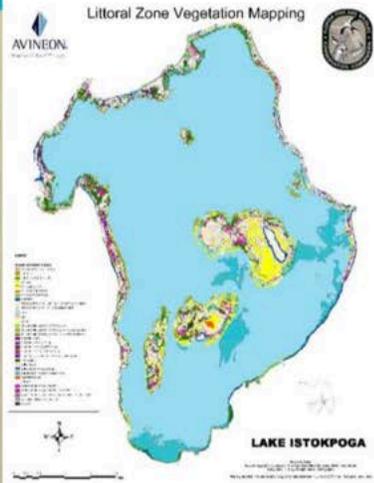
7 polygons, 6 classes

Final Map

17 polygons, 12 classes



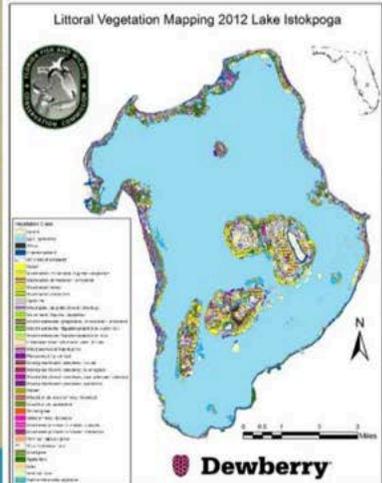
2007



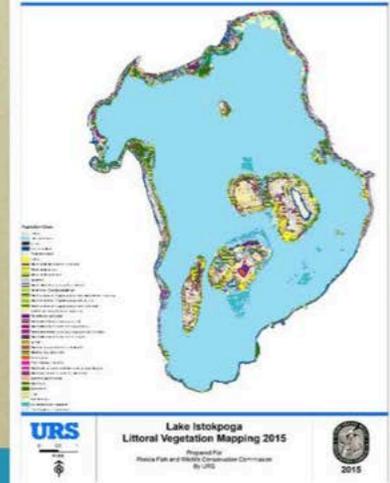
2009



2012



2015

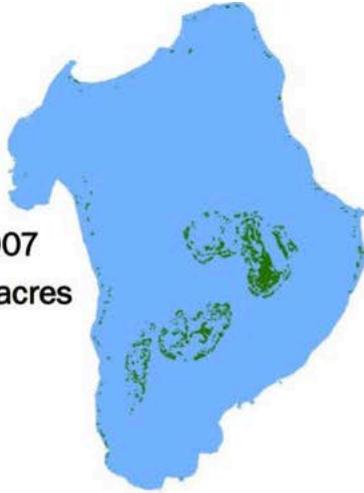


Lake
Istokpoga

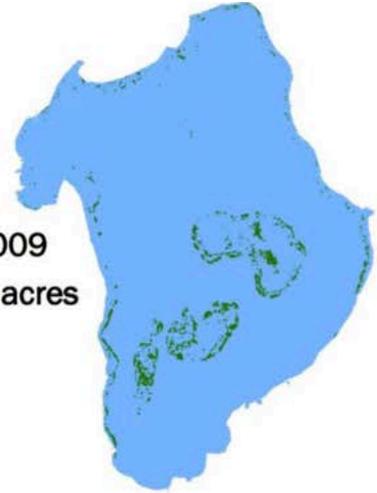
Cattail



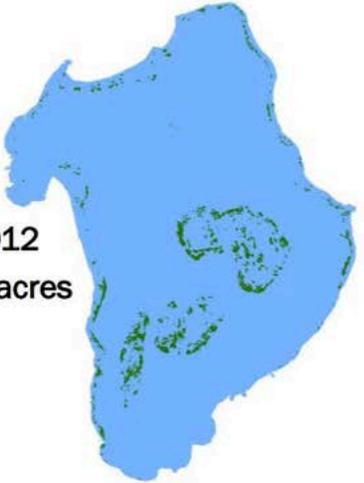
2007
767 acres



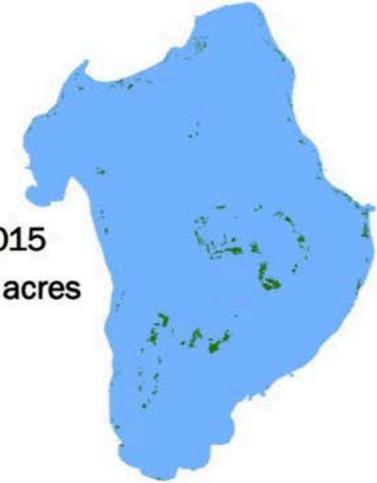
2009
716 acres



2012
731 acres



2015
340 acres

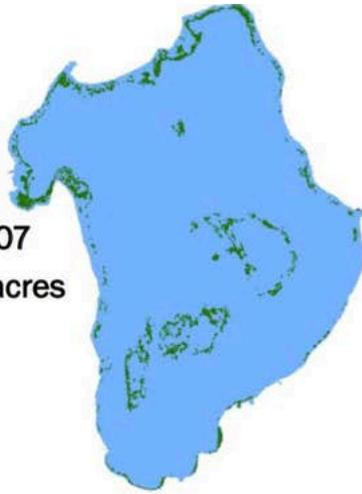


Lake
Istokpoga

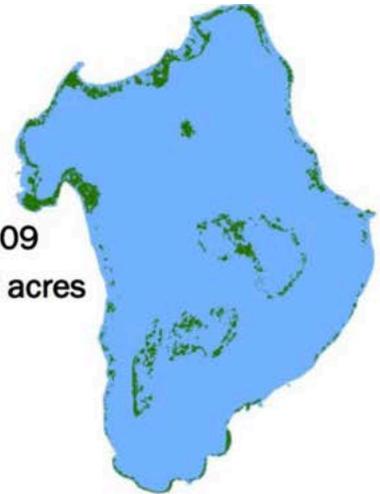
Pads:
spatterdock
water lily
lotus
mixed pads



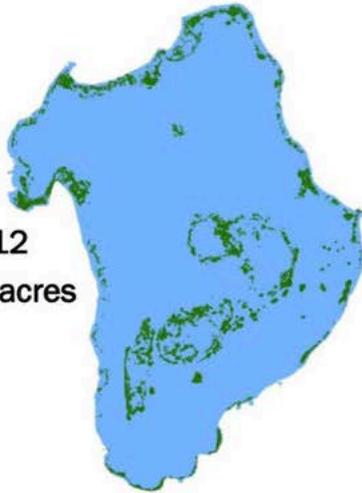
2007
940 acres



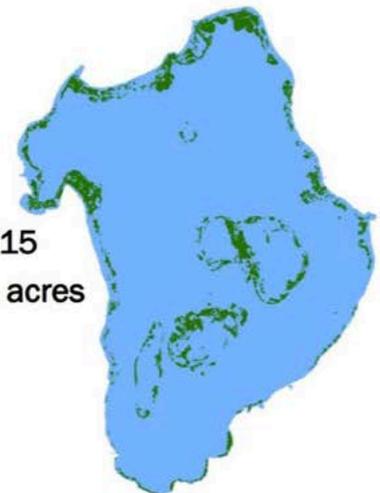
2009
1,083 acres



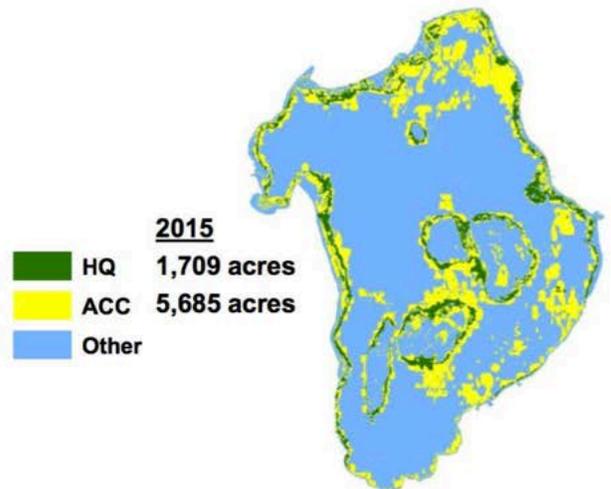
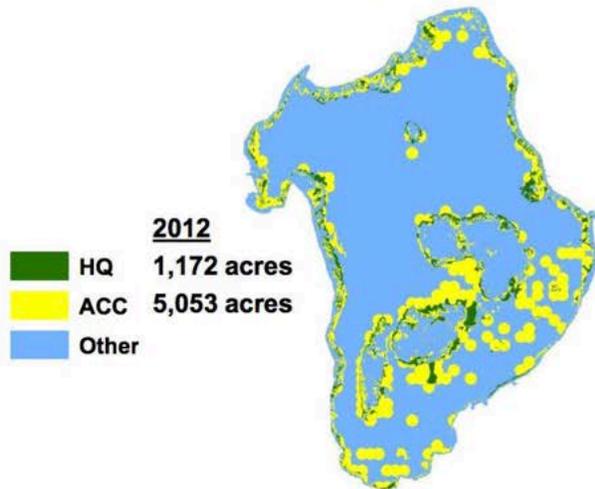
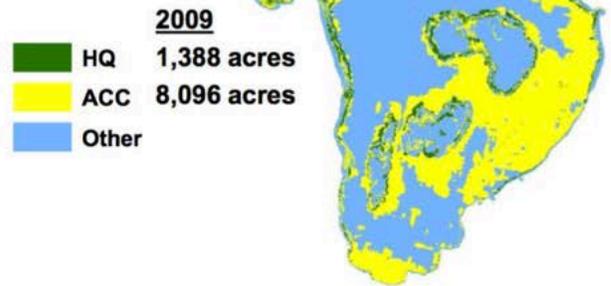
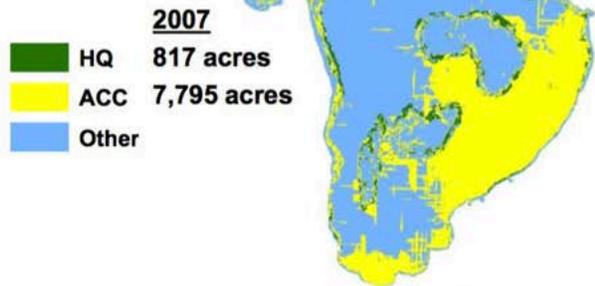
2012
1,706 acres



2015
1,751 acres



Lake Istokpoga
Fish habitat

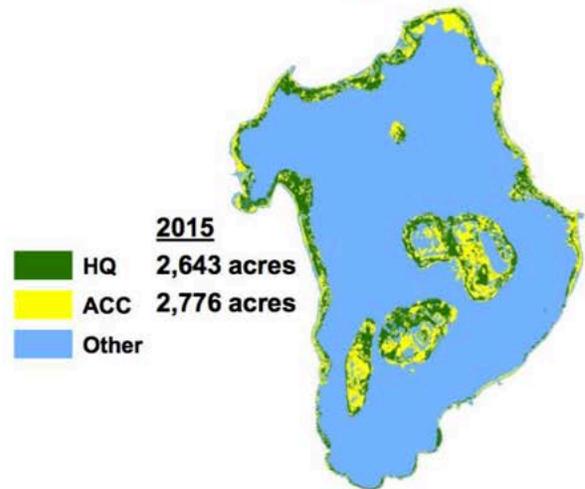
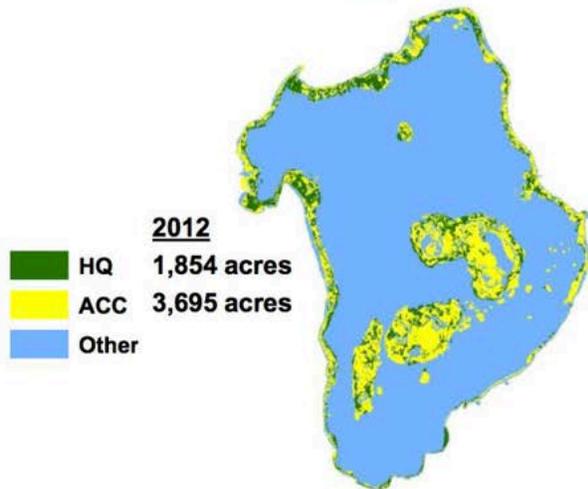
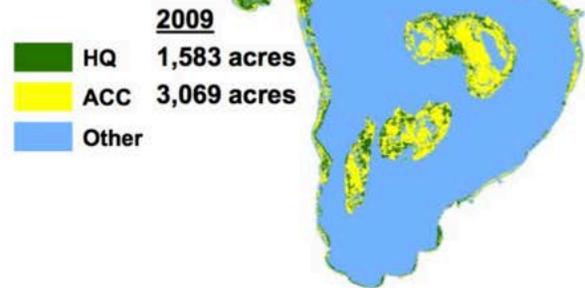
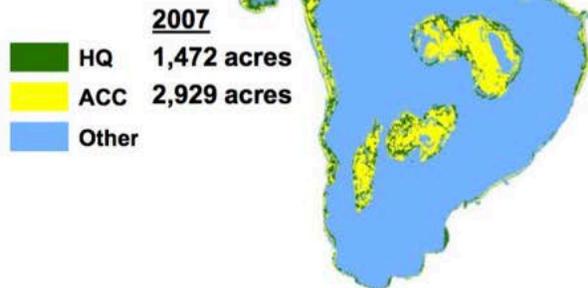


Lake Istokpoga – High-quality fish habitat

Fish habitat	2007	2009	2012	2015
SAV	265	727	422	563
Lotus *	42	59	196	256
Bulrush	281	253	254	229
Cattail-mixed pads *		12	20	144
Mixed pads *			19	115
Bulrush-mixed pads				111
Spatterdock *	16	129	24	110
Open water	81	22	35	35
Other emergent plants *	131	186	202	146
Total	817	1,388	1,172	1,709
* with SAV understory				

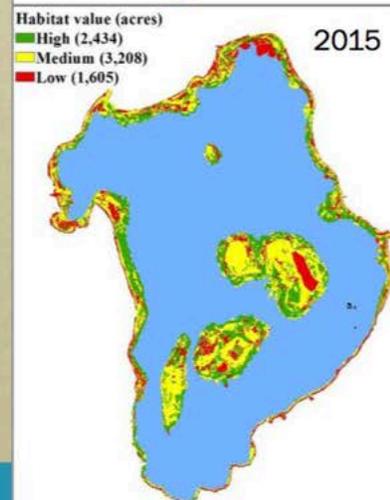
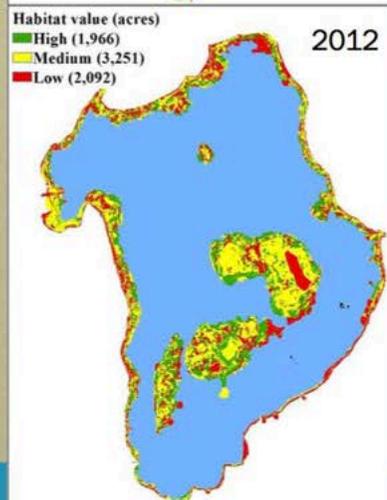
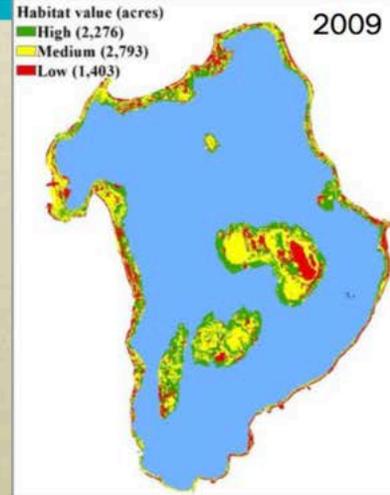
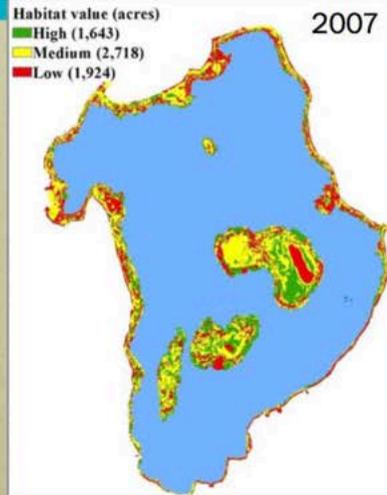


Lake Istokpoga
Alligator foraging
habitat



Lake Istokpoga

Combined habitat value



Pros

- High accuracy: reliable comparisons of plant communities over time
- High resolution photography picks up sparse vegetation
- High detail: ability to evaluate habitat conditions for F&W
- Digital maps useful for multiple analytical strategies

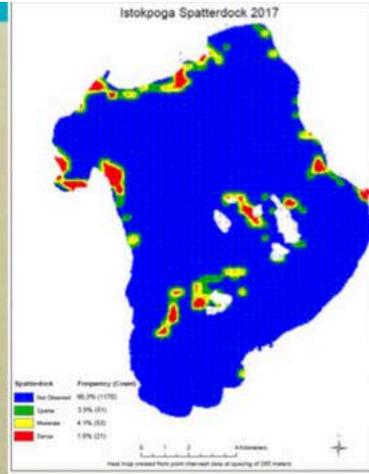
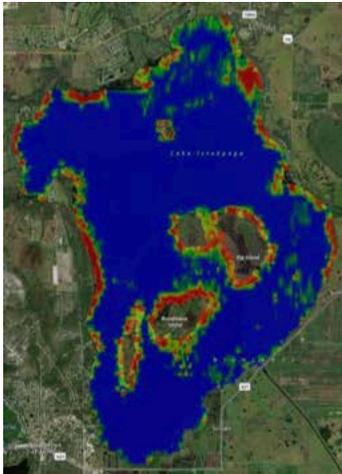
Cons

- High cost: \$25,000 - \$40,000 per lake per year
- High effort: 20 days per lake (8 field, 12 office)
- Time lag: production requires 9-12 months for final map
- Ineffective on SAV except where topped out



**Craig Mallison - Associate Research Scientist
Florida Fish & Wildlife Conservation Commission
craig.mallison@myfwc.com**





Long Term Aquatic Habitat Monitoring for Florida Lakes

Kevin Johnson

Freshwater Fisheries Research Section

Long-Term Monitoring (LTM) Program

Eustis Fisheries Lab



LTM Habitat Project – Partners

- FWC

- Invasive Plant Management Section
- Aquatic Habitat Restoration & Enhancement Subsection
- Division of Freshwater Fisheries Management
- Freshwater Fisheries Research Section



LTM Habitat Project – Applications

- Baseline dataset that's monitored through time
- Could help explain changes in sport fish or fish community data
- Inform or focus management and research



Submersed Aquatic Vegetation (SAV)



Mapping Submersed Aquatic Vegetation

- Hydro-acoustic sensing

- Lowrance Sonar unit, coupled with BioBase company sonar log processing software

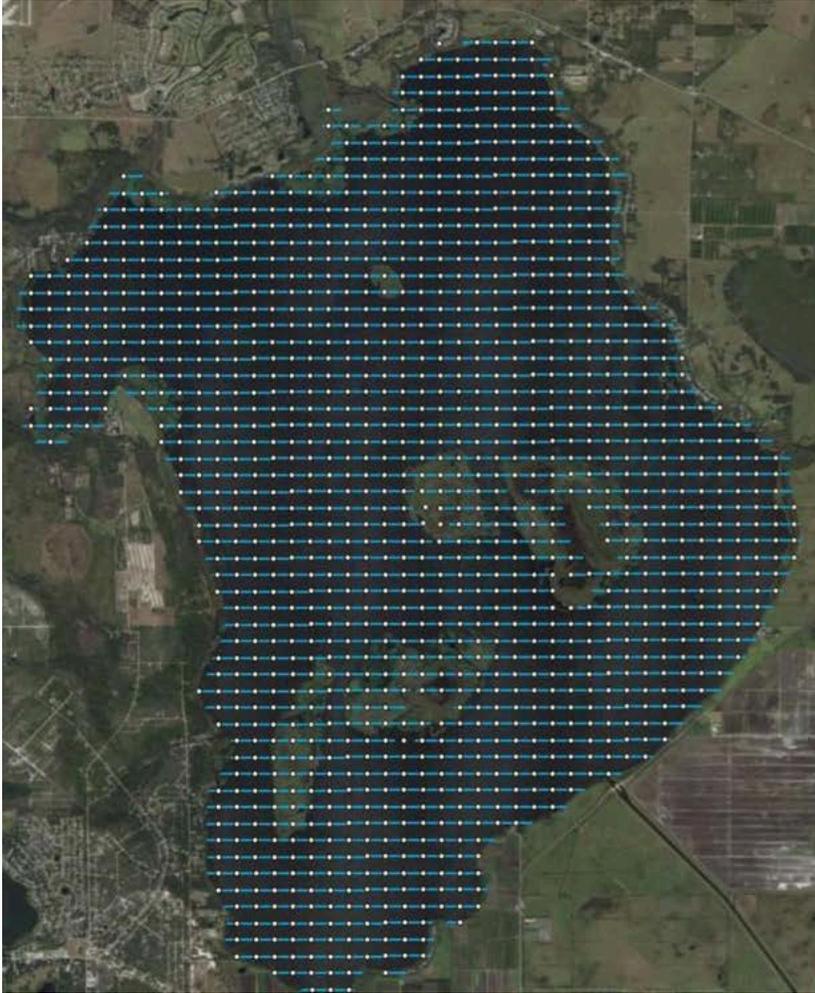
- BioBase  **ECO**SOUND

- Web-based algorithms/software

- Automated processing

- Outputs of lake-wide vegetation maps & data



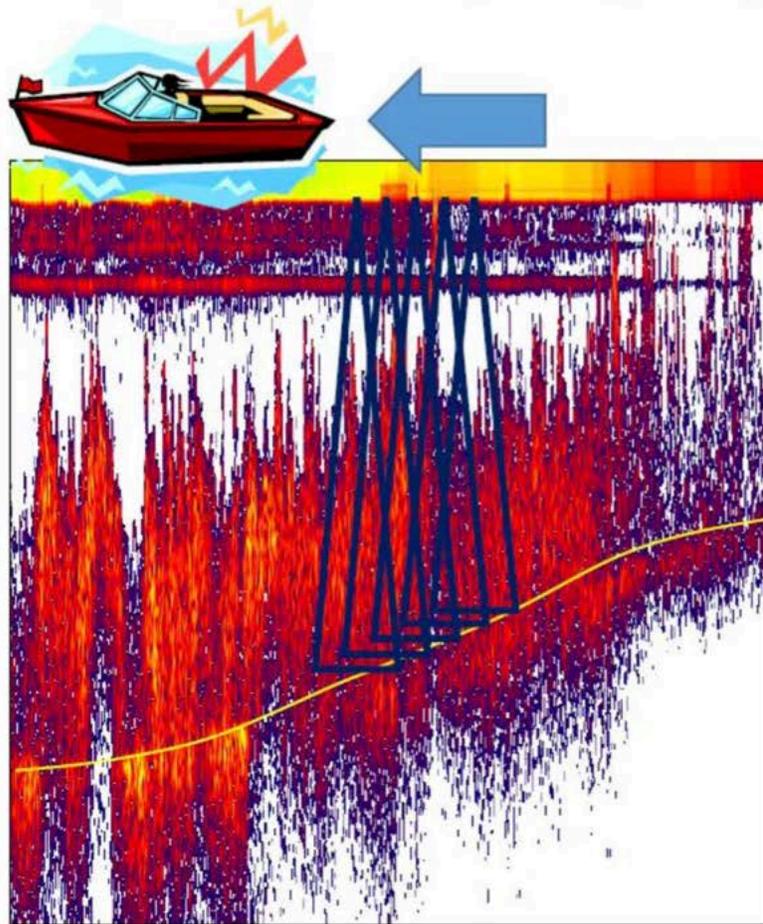


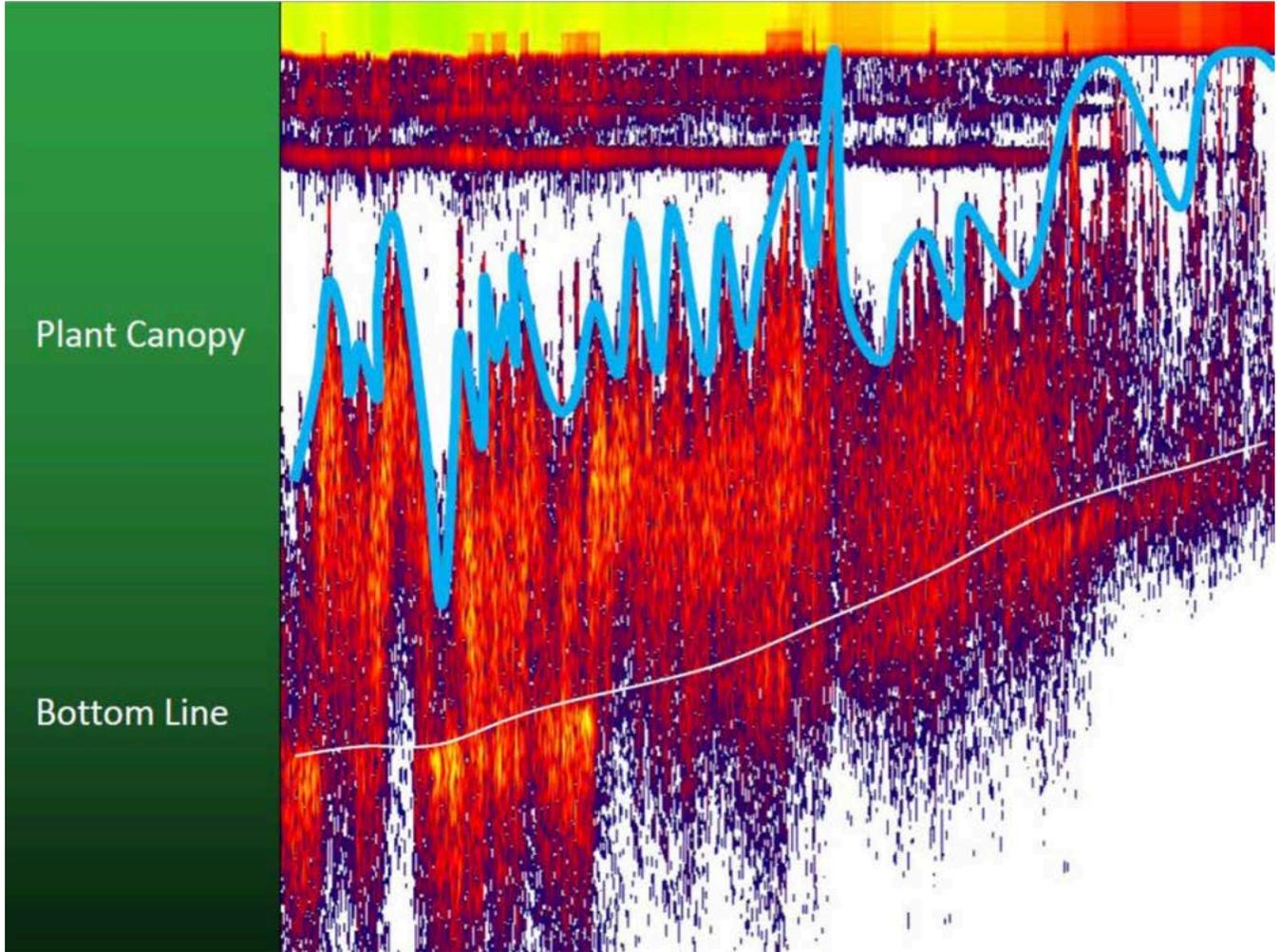
1 point per 20 acres

285 meter transect/
point spacing

Lowrance

(200 khz 20°)





Lake Istokpoga, Highlands County, Florida

Single Trip

NOW VIEWING: DKISTOK2.s12, 11/10/2015

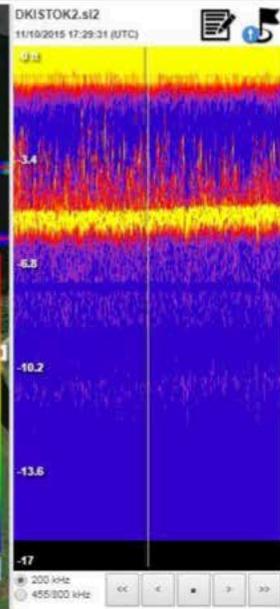
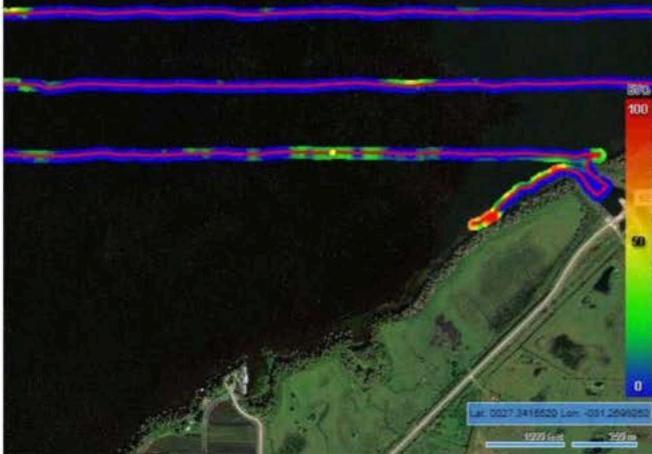
[VIEW REPORT](#)

[DOWNLOAD REPORT](#)

[ASK THE EXPERTS](#)

Map Data Offset Trip Reprocessing Merge Trips Export Data EcoSat Surveys

Track | Contours | Layers | Polygons | Clear

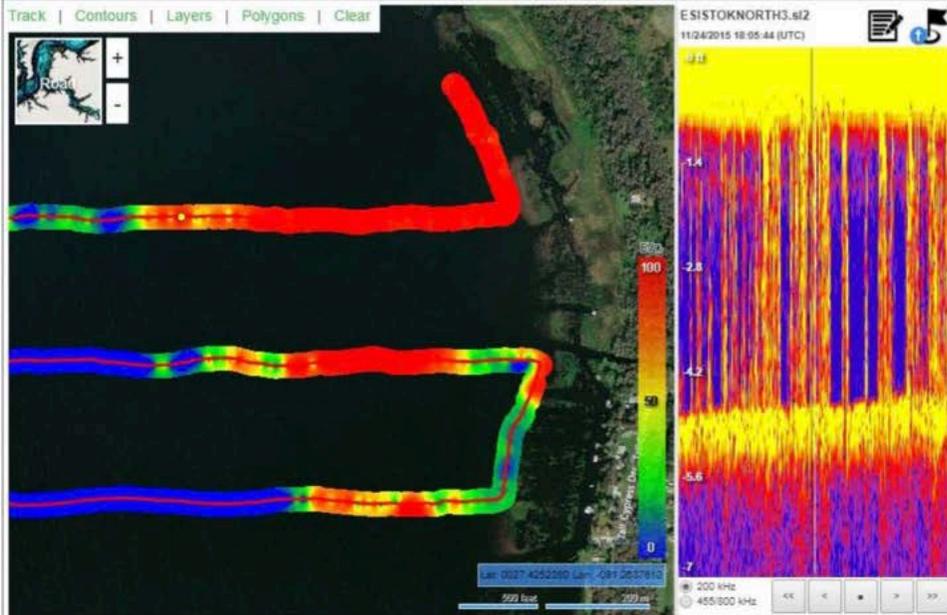


Lake Istokpoga, Highlands County, Florida

Single Trip

NOW VIEWING ESISTOKNORTH3.sl2, 11/24/2015 VIEW REPORT DOWNLOAD REPORT ASK THE EXPERTS

Map Data Offset Trip Reprocessing Merge Trips Export Data EcoSat Surveys



Lake Istokpoga, Highlands County, Florida

Merged Trips

NOW VIEWING: Merge, 11/9/2015

[VIEW REPORT](#)

[DOWNLOAD REPORT](#)

[ASK THE EXPERTS](#)

Map

[Data Offset](#)

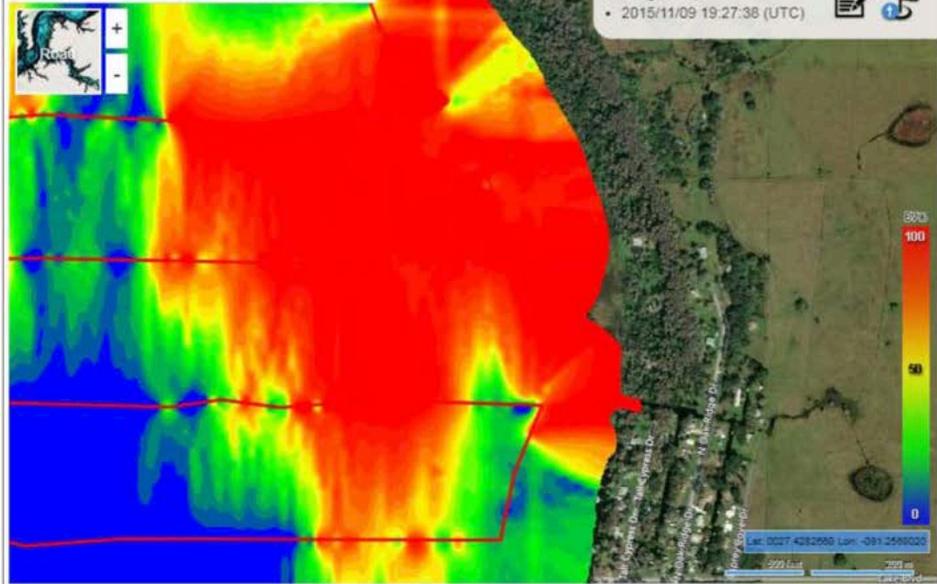
[Trip Reprocessing](#)

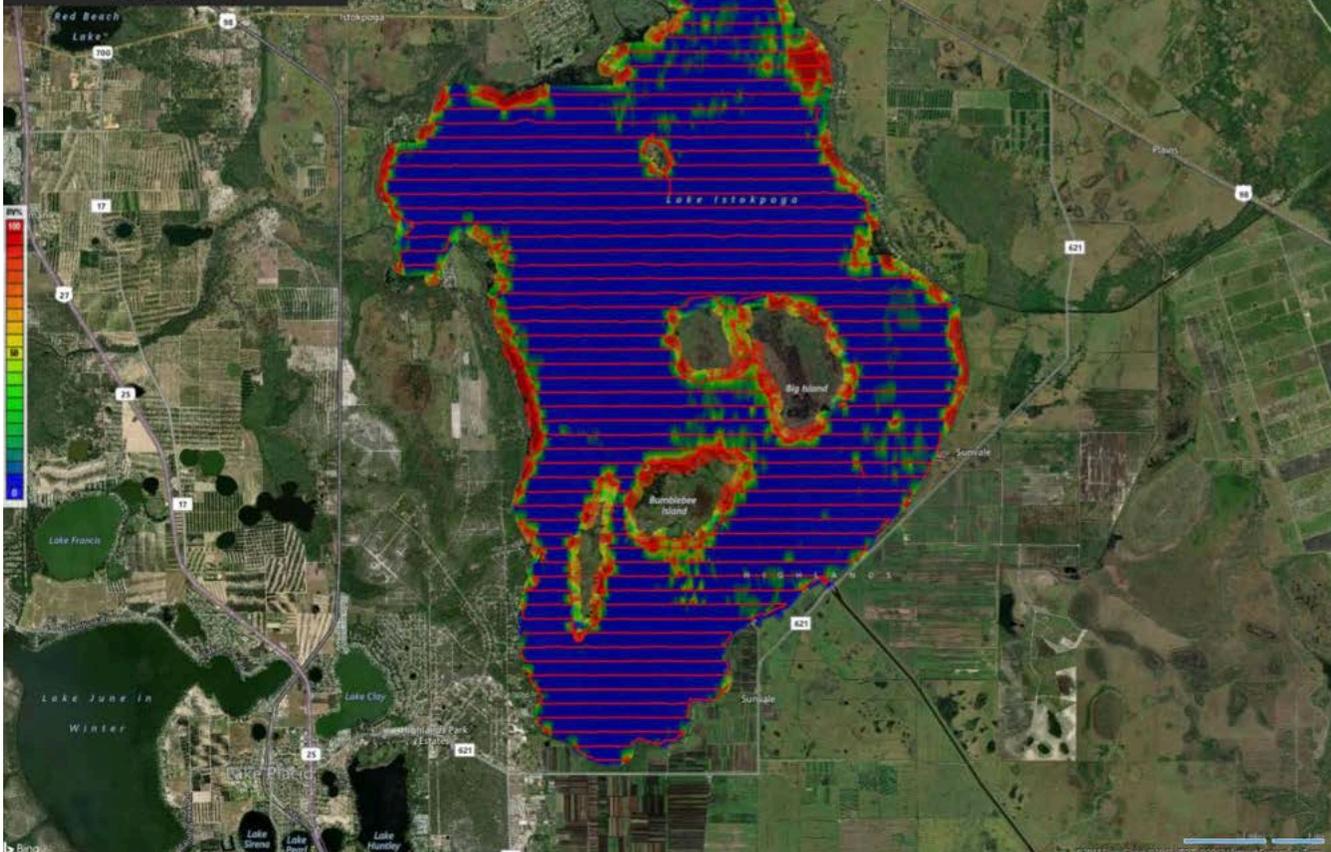
[Merge Trips](#)

[Export Data](#)

[EcoSat Surveys](#)

[Track](#) | [Contours](#) | [Layers](#) | [Polygons](#) | [Clear](#)





Lake Istokpoga, Highlands County, Florida

Merged Trips

NOW VIEWING: Merge, 11/9/2015

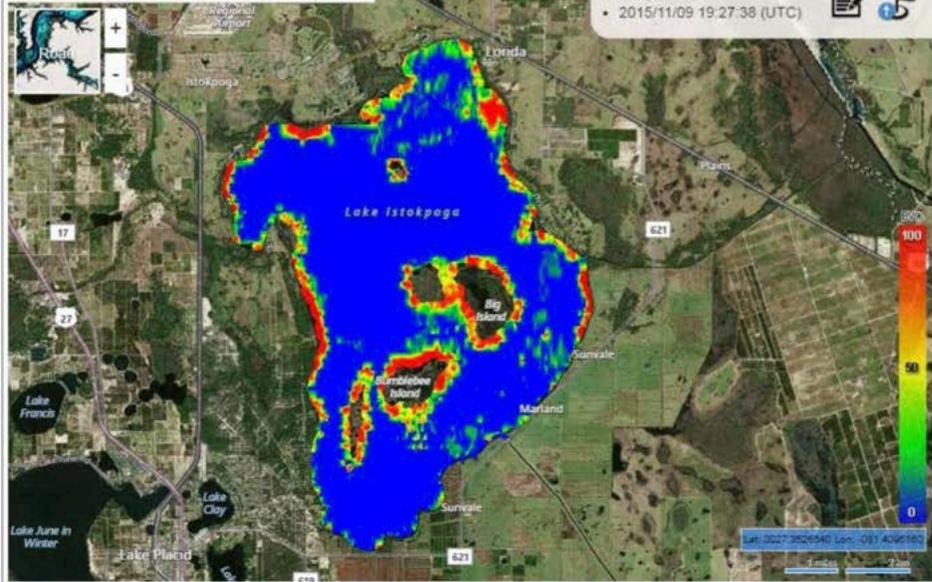
[VIEW REPORT](#)

[DOWNLOAD REPORT](#)

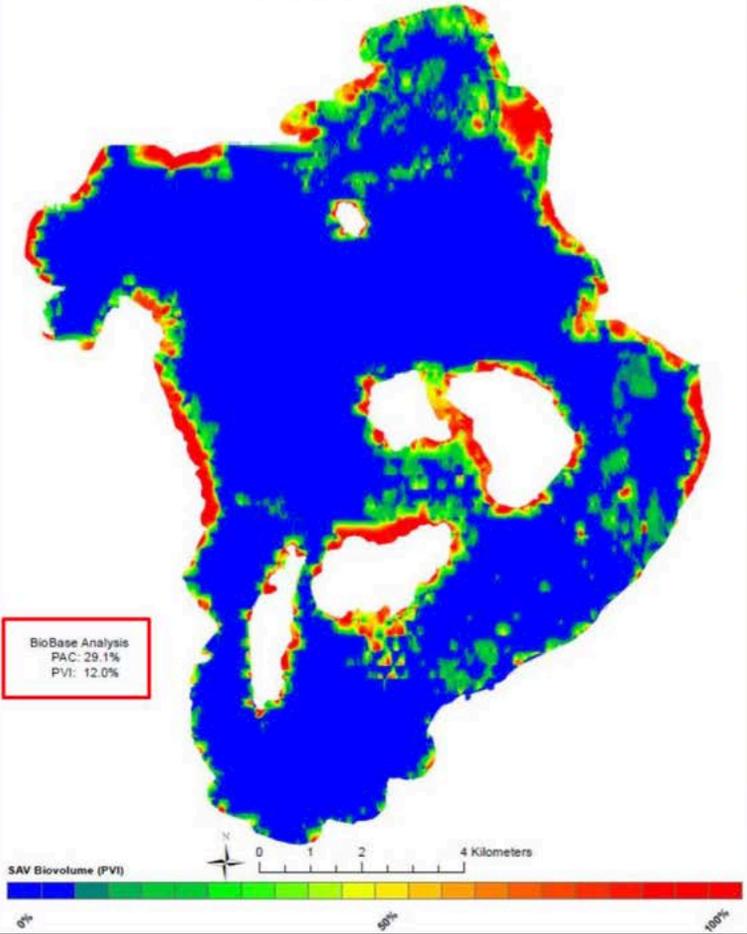
[ASK THE EXPERTS](#)

Map Data Offset Trip Reprocessing Merge Trips Export Data EcoSat Surveys

Track | Contours | Layers | Polygons | Clear



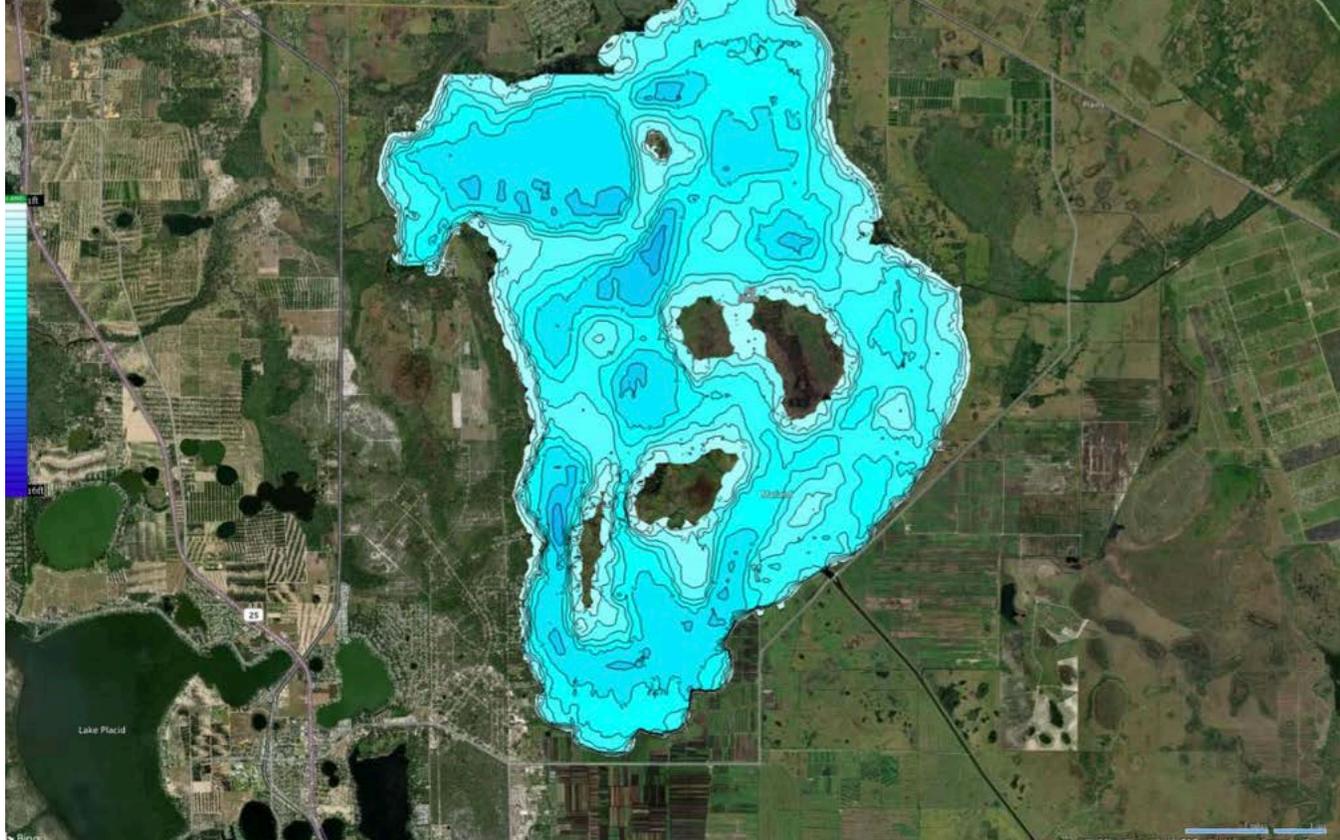
Lake Istokpoga 2015



- Percent Area Covered (**PAC**) = 29%
 - Overall surface area that has vegetation growing
- Percent Volume Infested (**PVI**) = 12%
 - Average percentage of the water column taken up by vegetation across the entire lake



BIOBASE
Lake Istokpoga
11/9/2015
www.biobasemaps.com



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285 meter point-intercept
spacing

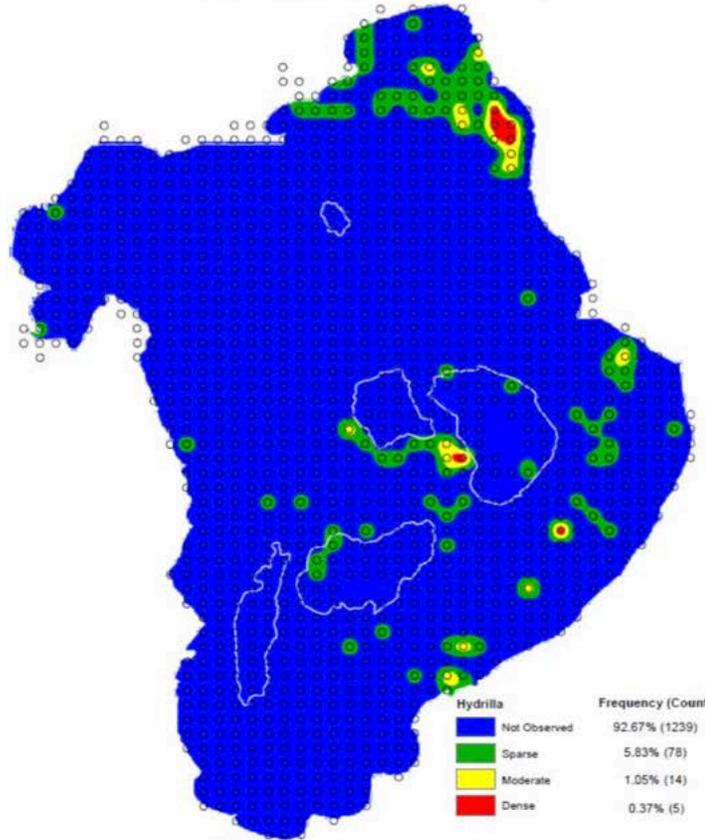
1 point per 20 acres

Point-Intercept Mapping

- Species richness, frequency of occurrence, density
 - Record ALL species present (10 ft. radius), at ALL points
 - Record species density
 - (1 sparse, 2 moderate, 3 dense)



Lake Istokpoga Hydrilla 2015



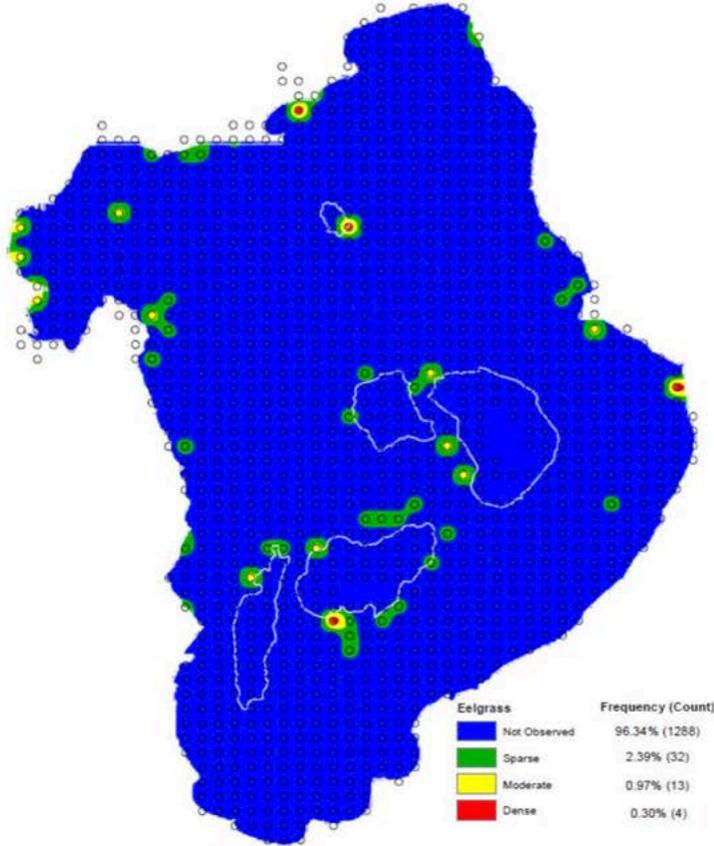
Hydrilla	Frequency (Count)
Not Observed	92.67% (1239)
Sparse	5.83% (78)
Moderate	1.05% (14)
Dense	0.37% (5)



Heat map created from point intercept data at a spacing of 285 meters.



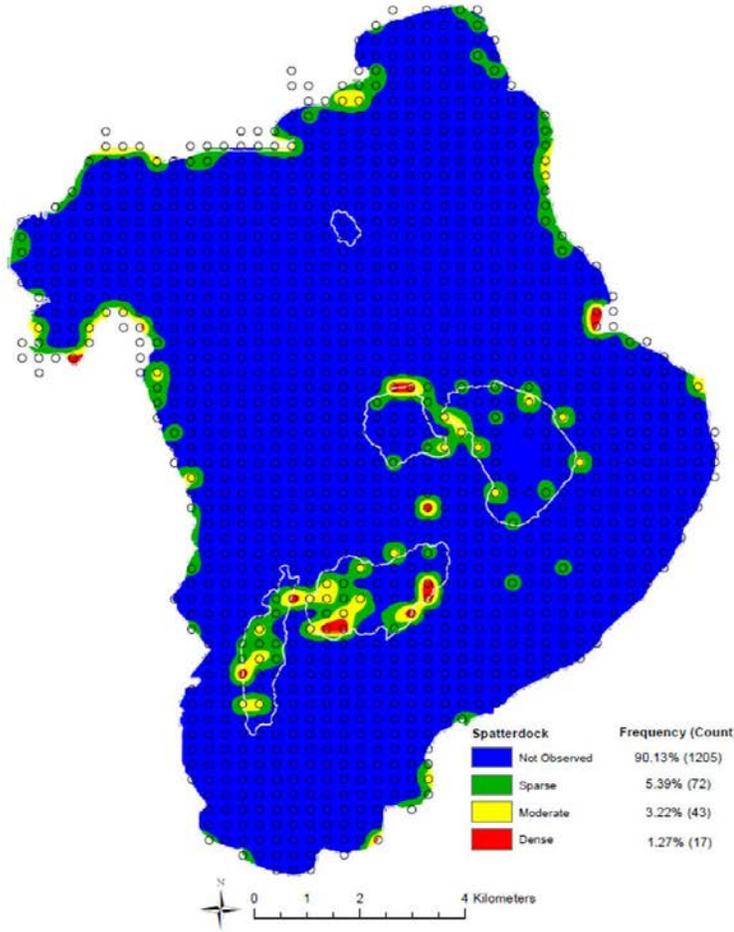
Lake Istokpoga Eelgrass 2015



Heat map created from point intercept data at a spacing of 285 meters.



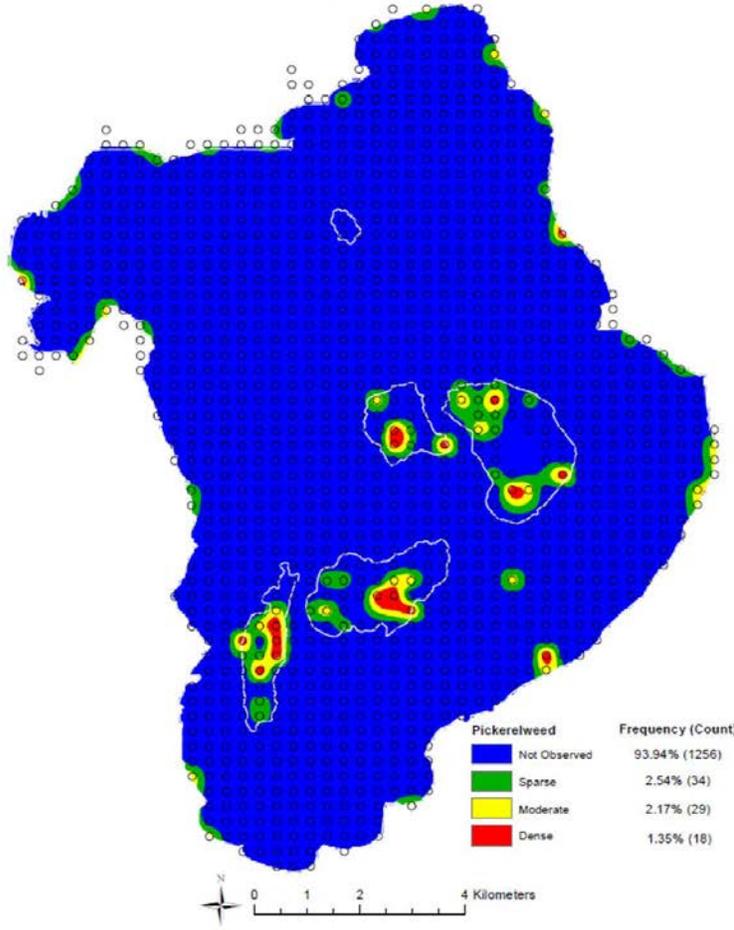
Lake Istokpoga Spatterdock 2015



Heat map created from point intercept data at a spacing of 285 meters.



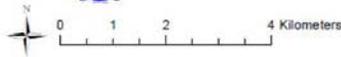
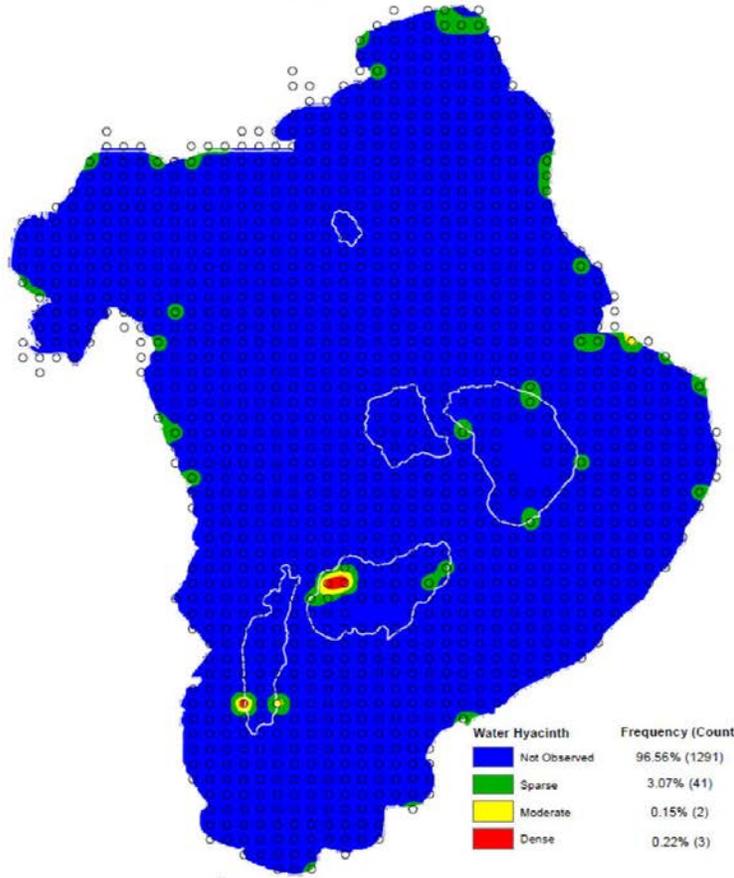
Lake Istokpoga Pickerelweed 2015



Heat map created from point intercept data at a spacing of 285 meters.



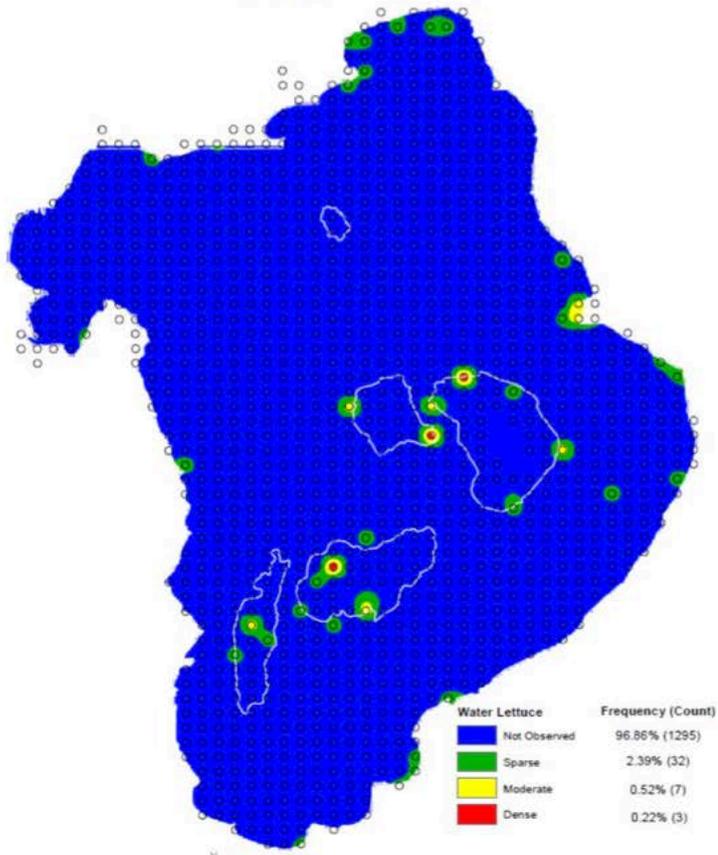
Lake Istokpoga Water Hyacinth 2015



Heat map created from point intercept data at a spacing of 285 meters.



Lake Istokpoga Water Lettuce 2015



Heat map created from point intercept data at a spacing of 285 meters.



Lake Istokpoga Aquatic Vegetation Observed
November (2015) - January (2016)

Common Name:

Spatterdock
Cattail
Water fern
Hydrilla
Pickerelweed
Water primrose
Burhead sedge
American lotus
Water pennywort
American eelgrass
Water-hyacinth
Water lettuce
Duck-potato
Bladderwort
Fragrant water-lily
Illinois pondweed
Coontail
Fern
Bulrush
Spikeshush
Smartweed
Duckweed
American cupscale grass
Southern naiad
Banana lily
Begger-ticks
Old world climbing fern
Maidencane
Lemon bacopa
Torpedo grass
Bald cypress
Hibiscus
Sugarcane
Pond apple
Wax myrtle
Buttonbush
Para grass
Rush
Frog's bit
Mosquito fern
Climbing hempweed
Barnyard grass
Red ludwigia
Egyptian paspalum
Baby tears
Stonewort
West Indian marsh grass
Rush Fuirena
Red-root
Reed grass
Green fanwort
Filamentous algae
Floating fern
Water-spider-orchid
Lizard's tail
Elephant-ear
Yellow-eyed grass
Feathered mosquitofern

Scientific Name:

Nuphar luteum
Typha sp.
Sagittaria sp.
Hydrilla verticillata
Pontederia cordata
Ludwigia sp.
Oryzarium cubense
Nelumbo lutea
Hydrocotyle sp.
Vallisneria spiralis
Eichhornia crassipes
Pistia stratiotes
Sagittaria lancifolia
Utricularia sp.
Nymphaea odorata
Potamogeton illinoensis
Ceratophyllum demersum
Fern
Schoenoplectus sp.
Eleocharis sp.
Polygonum sp.
Lemna sp.
Sagittaria striata
Najas guadalupensis
Nymphaoides aquatica
Bidens sp.
Old world climbing fern
Panicum hemitomon
Bacopa caroliniana
Panicum repens
Taxodium distichum
Hibiscus sp.
Saccharum sp.
Annona glabra
Morella cerifera
Cephalanthus occidentalis
Utricularia mutica
Juncus sp.
Limnium spongium
Azolla caroliniana
Mikania scandens
Echinochloa sp.
Ludwigia repens
Paspalum geminatum
Micranthemum sp.
Nitella sp.
Hymenocline amplexicaulis
Fuirena scirpoides
Lachnanthes sp.
Phragmites australis
Cabomba caroliniana
Filamentous Algae
Ceratopteris sp.
Habenaria repens
Saururus cernuus
Colocasia esculenta
Xyris sp.
Azolla pinnata



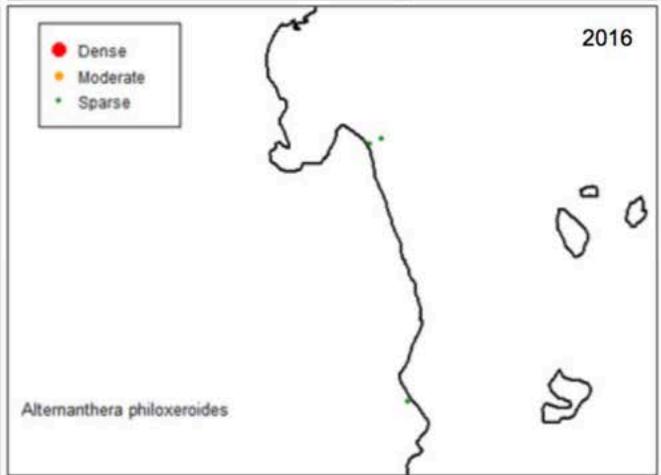
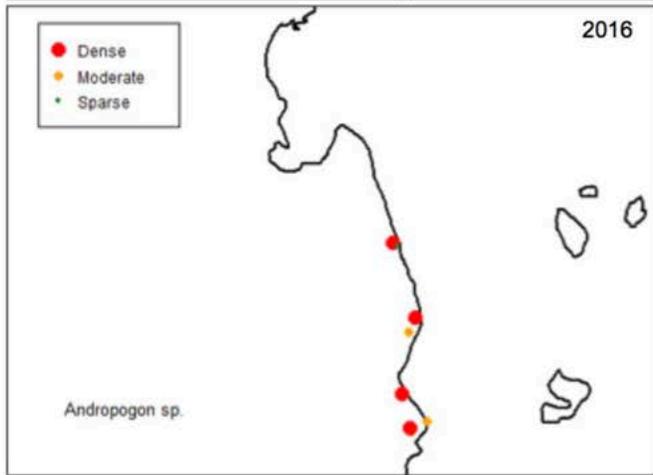
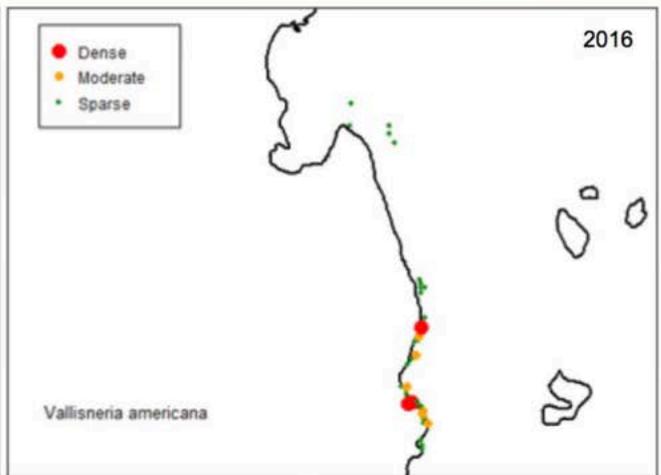
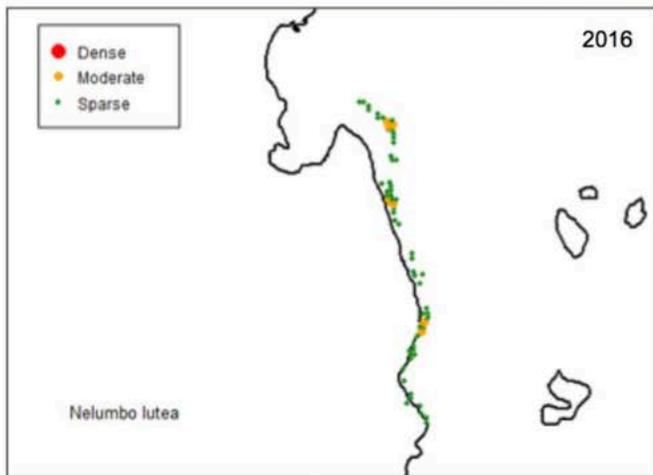


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus
ASPPH, IGN, IGP, swisstopo, and the GIS User Community

Started 2016

90 meter point-
intercept spacing

1 point per 2 acres



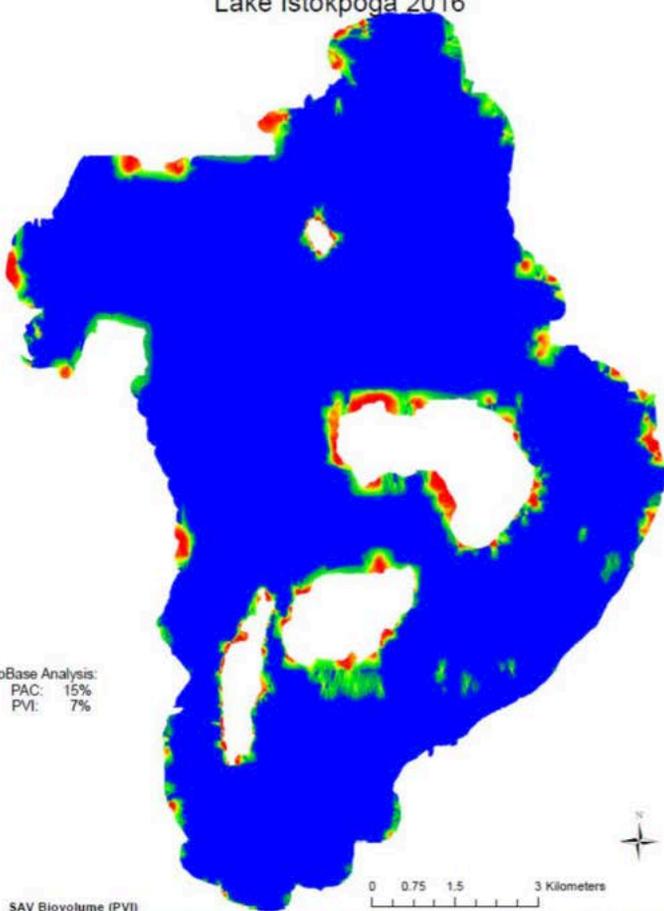
SAV & Point-Intercept Mapping

- Sample once during growing season
 - Summer to early fall months (mid May – Sept.)
 - » Istokpoga – early-November
- Started summer 2015
 - Dedicated crew of 6 field biologists
- Statewide project
 - Map ~50 lakes every year



Lake Istokpoga 2016

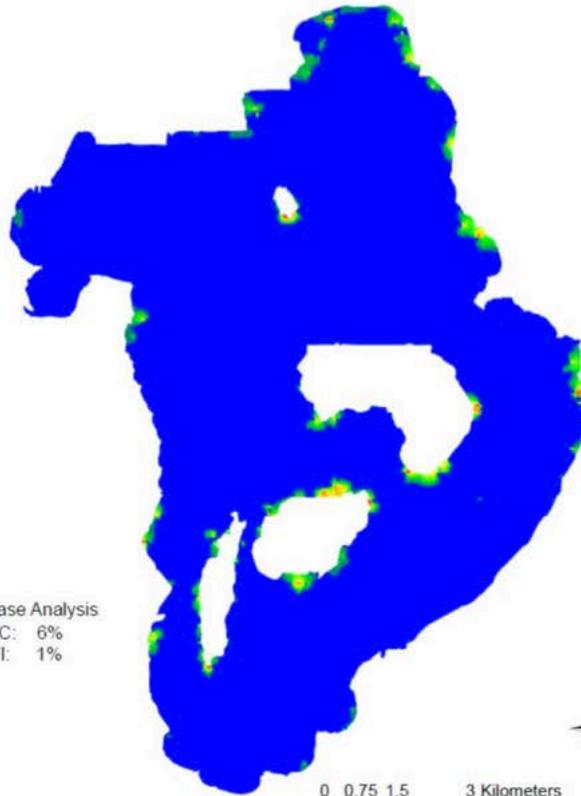
BioBase Analysis:
PAC: 15%
PVI: 7%



SAV Biovolume (PVI)



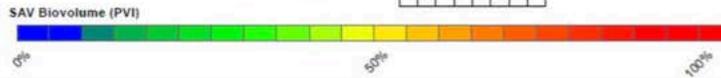
Lake Istokpoga 2017



BioBase Analysis
PAC: 6%
PVI: 1%

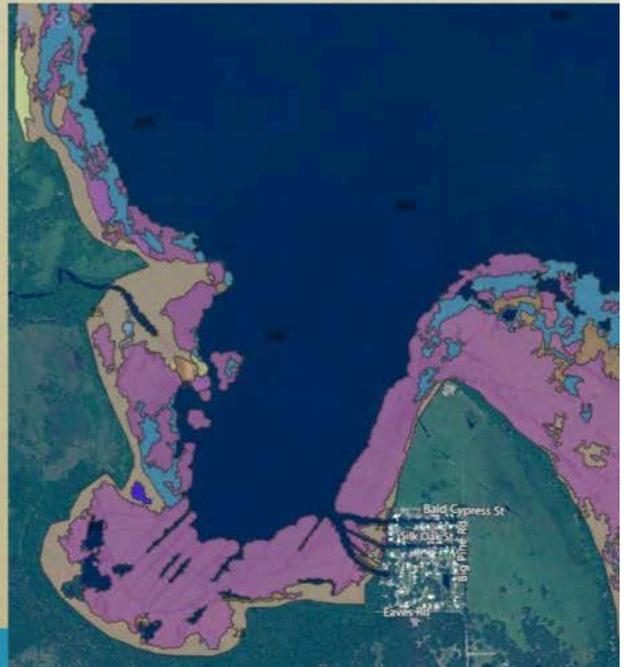
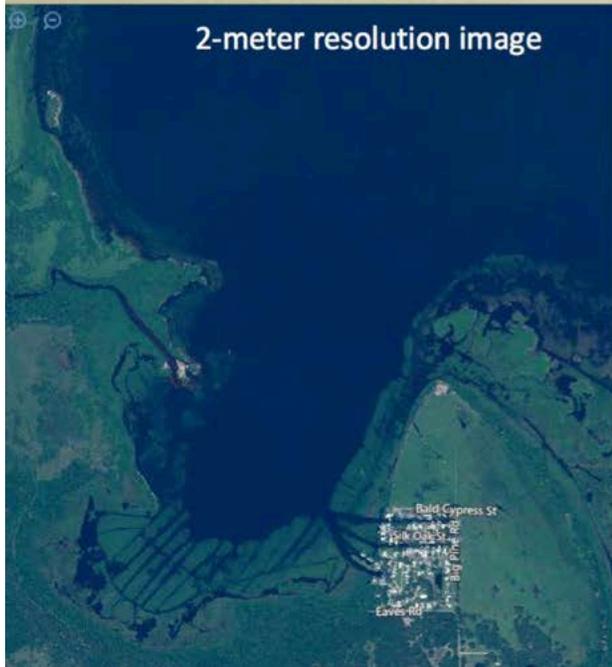


0 0.75 1.5 3 Kilometers



Mapping Emergent Vegetation

- Interpretation of high resolution satellite imagery



Methods

- Acquire tasked multispectral satellite imagery
 - 2-meter resolution
 - Summer 2018
 - » 5 lakes



Lake Istokpoga
6/19/2018



- Collect GPS points
 - Dominant vegetation species
 - Large monotypic stands





- Algorithm to classify based on the spectral information and training point data to assign vegetation classes
- Achieve a minimum mapping unit of 0.25 acres



Map



Istokpoga 2018 Emergent Vegetation MMU1000
Classifications

[Edit](#)

Id	Id 2	Classification
3	3	Torpedograss
4	4	Maidencane
5	5	Egyptian paspalidium
6	6	Spikerush
7	7	Bulrush
10	10	Cattail
23	23	American Cupscale Grass
25	25	Other wetland forest
41	41	Spatterdock
208	208	Unknown 8
209	209	Unknown 9
210	210	Unknown 10
211	211	Unknown 11
290	290	Cloud / cloud shadow
300	300	Open Water

[All Major Class Ids & Colors](#)

- **ID/Class:** Original Classification ID
- **ID2/Override:** New user-entered classification ID.
 - User can lump any classes together
 - Enter a name to delete a classification. This will

Istokpoga 2018 Emergent Vegetation MMU1000

Generated: 11/1/2018 12:57:21 PM

8/19/2018 4:04:00 PM

Customer Name		Data Collection Date	
Johnson, Kevin		8/19/2018 4:04:00 PM	
Settings			
Sensor Name:	WorldView-2	Survey Size	
Imagery Resolution:	2.0m	Area:	112.09 km ²
Minimum Mapping Unit:	1000.0m		27,698.32 acres
Projection:	4326 (EPSG)	Location	
Off Nadir Angle:	29.0°	Centroid: 27.3709208046715, -81.2929899107771	
Cloud Cover:	0.0%		

To acquire full metadata information, download the GIS files from your BioBase account

▲ Satellite Vegetation

Classification	Name	m ²	Acres
3	Torpedograss	8,714	2.1534
4	Maldencane	9,715	2.4007
5	Egyptian paspalidium	53,047	13.1083
6	Spikerush	166,787	41.2139
7	Bulrush	5,813,812	1,436.6221
10	Cattail	2,078,318	513.5627
23	American Cupscale Grass	21,300	5.2633
25	Other wetland forest	3,435,025	848.8119
41	Spatterdock	10,276,903	2,539.4742
208	Unknown 8	1,424,432	351.9842
209	Unknown 9	7,702	1.9031
210	Unknown 10	392,564	97.0045
211	Unknown 11	91,272	22.5538
290	Cloud / cloud shadow	26,632	6.5809
300	Open Water	88,275,929	21,813.4234



- Accuracy assessments

- *Goal 80% overall accuracy

Istokpoga	Total	Accuracy
Bulrush	72	0.9167
Cattail	20	0.7500
Egyptian Paspalidium / Maidencane	24	0.1667
Lilies / Spatterdock	90	0.9778
Pickerelweed	5	0.0000
Spikerush	3	0.3333
Torpedograss	4	0.0000
Total	218	
	Overall Accuracy	0.7982

Challenge: Incorrect Classifications

Istokpoga 2018 Emergent Vegetation MMU1000 Classifications

Id	Id 2	Classification
3	3	Torpedograss
4	4	Maidencane
5	5	Egyptian paspalidium
6	6	Spikerush
7	7	Bulrush
10	10	Cattail
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25	25	Other wetland forest
41	41	Spatterdock
208	208	Unknown 8
209	209	Unknown 9
210	210	Unknown 10
211	211	Unknown 11
290	290	Cloud / cloud shadow
300	300	Open Water

[All Major Class Ids & Colors](#)

- ID/Class: Original Classification ID
- ID2/Override: New user-entered classification ID.
 - User can lump any classes together
 - Enter a zero to delete a classification. This will

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Challenge: Incorrect Classifications

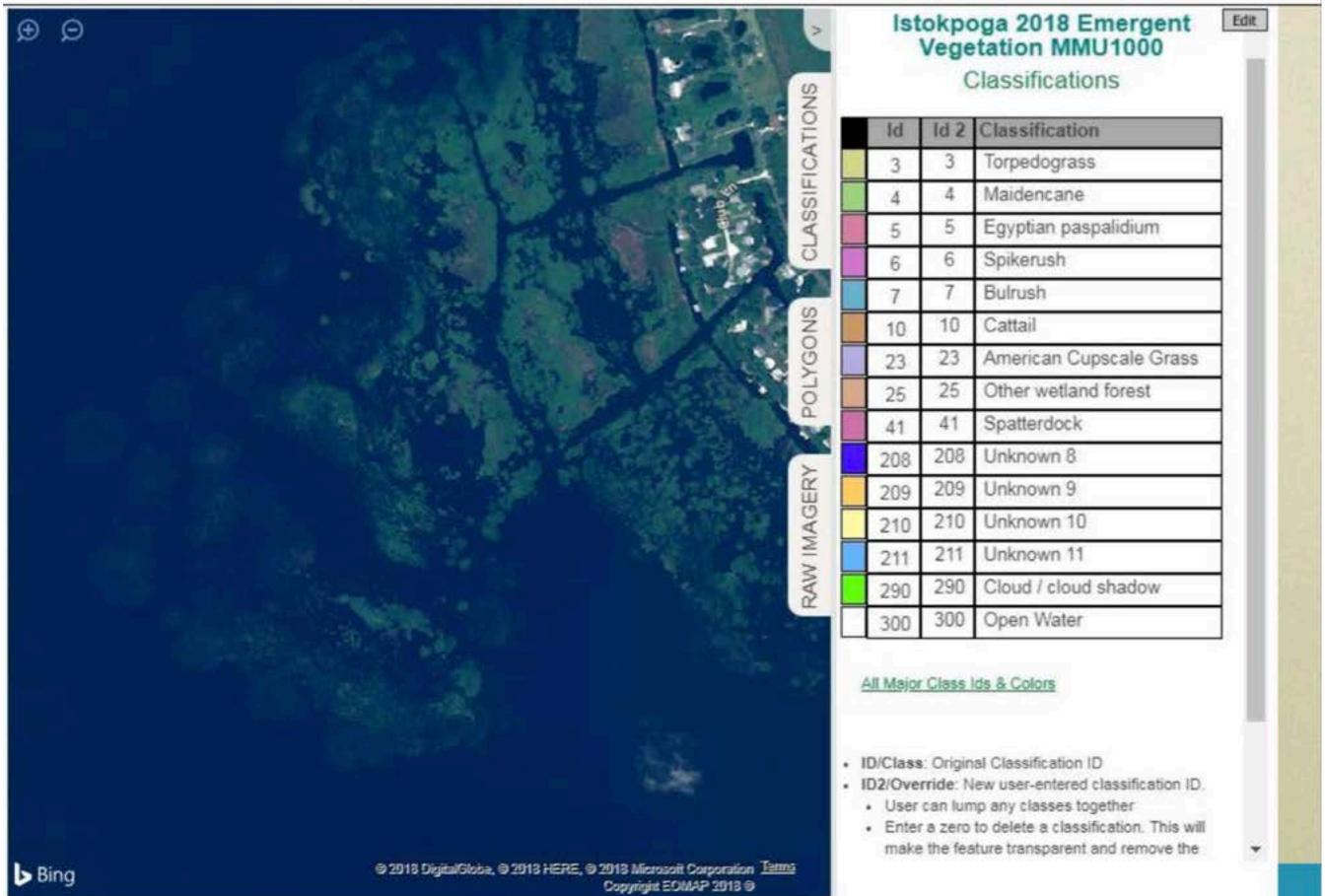
Istokpoga 2018 Emergent Vegetation MMU1000 Classifications

Id	Id 2	Classification
3	3	Torpedograss
4	4	Maidencane
5	5	Egyptian paspalidium
6	6	Spikerush
7	7	Bulrush
10	10	Cattail
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41	41	Spatterdock
208	208	Unknown 8
209	209	Unknown 9
210	210	Unknown 10
211	211	Unknown 11
290	290	Cloud / cloud shadow
300	300	Open Water

[All Major Class Ids & Colors](#)

- ID/Class: Original Classification ID
- ID2/Override: New user-entered classification ID.
 - User can lump any classes together
 - Enter a name to delete a classification. This will

Challenge: Mixed Community Classes



Istokpoga 2018 Emergent Vegetation MMU1000
Classifications

Id	Id 2	Classification
3	3	Torpedograss
4	4	Maidencane
5	5	Egyptian paspalidium
6	6	Spikerush
7	7	Bulrush
10	10	Cattail
23	23	American Cupscale Grass
25	25	Other wetland forest
41	41	Spatterdock
208	208	Unknown 8
209	209	Unknown 9
210	210	Unknown 10
211	211	Unknown 11
290	290	Cloud / cloud shadow
300	300	Open Water

[All Major Class Ids & Colors](#)

- **ID/Class:** Original Classification ID
- **ID2/Override:** New user-entered classification ID.
 - User can lump any classes together
 - Enter a zero to delete a classification. This will make the feature transparent and remove the

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Challenge: Mixed Community Classes

Istokpoga 2018 Emergent Vegetation MMU1000 Edt

Classifications

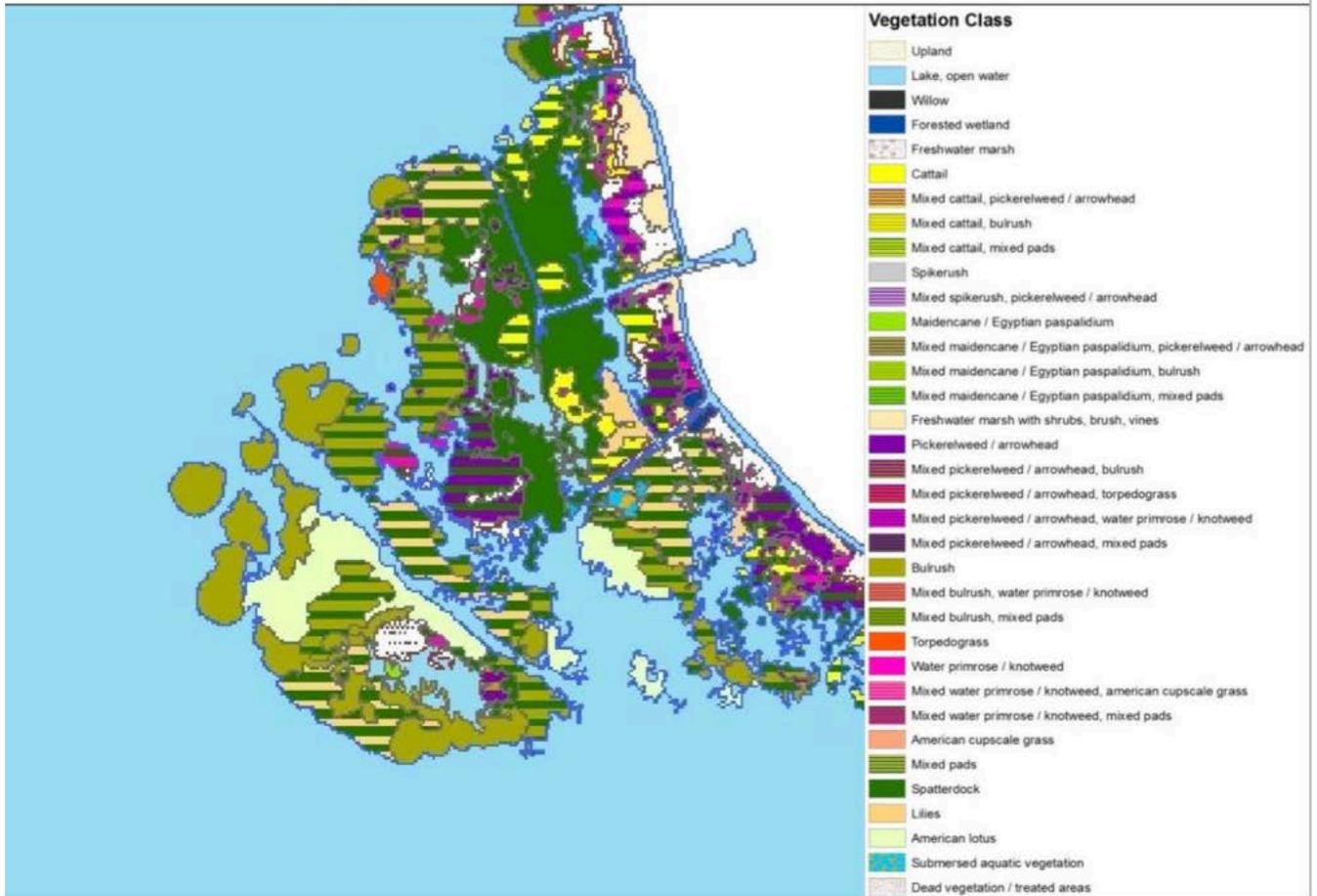
Id	Id 2	Classification
3	3	Torpedograss
4	4	Maidencane
5	5	Egyptian paspalidium
6	6	Spikerush
7	7	Bulrush
10	10	Cattail
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25	25	Other wetland forest
41	41	Spatterdock
208	208	Unknown 8
209	209	Unknown 9
210	210	Unknown 10
211	211	Unknown 11
290	290	Cloud / cloud shadow
300	300	Open Water

[All Major Class Ids & Colors](#)

- **ID/Class:** Original Classification ID
- **ID2/Override:** New user-entered classification ID.
 - User can lump any classes together
 - Enter a zero to delete a classification. This will make the feature transparent and remove the

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Challenge: Mixed Community Classes



Not same as Craig's Maps

- Alternative technique
- 1 foot aerial vs. 2 meter satellite resolution
- Manually digitizing vs. computer algorithm
- 90% vs. ~75% accurate
- Turn around time
- Cost



Satellite Mapping – Moving Forward

- Continue to test & refine this technique
- >1 map per year per lake
 - Before/after habitat enhancement/change



Questions?



Appendix XII: Lake Istokpoga Vertebrate Species Lists

Bird Species found in Lake Istokpoga

<u>Common Name</u>	<u>Scientific Name</u>
American Bittern	<i>Botaurus lentiginosus</i>
American Black Duck	<i>Anas rubripes</i>
American Coot	<i>Fulica americana</i>
American Crow	<i>Corvus brachyrhynchos</i>
American Goldfinch	<i>Carduelis tristis</i>
American Kestrel	<i>Falco sparverius</i>
American Redstart	<i>Setophaga ruticilla</i>
American Robin	<i>Turdus migratorius</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>
American Wigeon	<i>Mareca americana</i>
Anhinga	<i>Anhinga anhinga</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Baltimore Oriole	<i>Icterus galbula</i>
Bank Swallow	<i>Riparia riparia</i>
Barn Owl	<i>Tyto alba</i>
Barn Swallow	<i>Hirundo rustica</i>
Barred Owl	<i>Strix varia</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Black Vulture	<i>Coragyps atratus</i>
Black-and-white Warbler	<i>Mniotilta varia</i>
Black-bellied Whistling Duck	<i>Dendrocygna autumnalis</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>
Blue Jay	<i>Cyanocitta cristata</i>
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>
Blue-headed Vireo	<i>Vireo solitarius</i>
Blue-winged Teal	<i>Anas discors</i>
Boat-tailed Grackle	<i>Quiscalus major</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>
Brown Pelican	<i>Pelecanus occidentalis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
Canvasback	<i>Aythya valisineria</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Cattle Egret	<i>Bubulcus ibis</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Chimney Swift	<i>Chaetura pelagica</i>

Chuck-will's-widow		<i>Antrostomus carolinensis</i>
Common Goldeneye	Common	<i>Bucephala clangula</i>
Grackle		<i>Quiscalus quiscula</i>
Common Ground Dove		<i>Columbina passerina</i>
Common Loon		<i>Gavia immer</i>
Common Gallinule		<i>Gallinula galeata</i>
Common Nighthawk		<i>Chordeiles minor</i>
Common Yellowthroat		<i>Geothlypis trichas</i>
Cooper's Hawk		<i>Accipiter cooperii</i>
Crested Caracara		<i>Caracara cheriway</i>
Double-crested Cormorant		<i>Phalacrocorax auritus</i>
Downy Woodpecker		<i>Picoides pubescens</i>
Eastern Bluebird		<i>Sialia sialis</i>
Eastern Kingbird		<i>Tyrannus tyrannus</i>
Eastern Meadowlark		<i>Sturnella magna</i>
Eastern Phoebe		<i>Sayornis phoebe</i>
Eastern Screech Owl		<i>Megascops asio</i>
Eastern Towhee		<i>Pipilo erythrophthalmus</i>
Eastern Wood-Pewee		<i>Contopus virens</i>
Eurasian Collared-Dove		<i>Streptopelia decaocto</i>
European Starling		<i>Sturnus vulgaris</i>
Fish Crow		<i>Corvus ossifragus</i>
Forster's Tern		<i>Sterna forsteri</i>
Fulvous Whistling Duck		<i>Dendrocygna bicolor</i>
Gadwall		<i>Mareca strepera</i>
Glossy Ibis		<i>Plegadis falcinellus</i>
Gray Catbird		<i>Dumetella carolinensis</i>
Gray Kingbird		<i>Tyrannus dominicensis</i>
Great Blue Heron		<i>Ardea herodias</i>
Great Crested Flycatcher		<i>Myiarchus crinitus</i>
Great Egret		<i>Ardea alba</i>
Great Horned Owl		<i>Bubo virginianus</i>
Greater Scaup		<i>Aythya marila</i>
Greater Yellowlegs		<i>Tringa melanoleuca</i>
Green Heron		<i>Butorides virescens</i>
Green-winged Teal		<i>Anas carolinensis</i>
Hairy Woodpecker		<i>Leuconotopicus villosus</i>
Hermit Thrush		<i>Catharus guttatus</i>
Herring Gull		<i>Larus argentatus</i>
Hooded Merganser		<i>Lophodytes cucullatus</i>
Horned Grebe		<i>Podiceps auritus</i>
House Wren		<i>Troglodytes aedon</i>
Killdeer		<i>Charadrius vociferus</i>

King Rail	<i>Rallus elegans</i>
Laughing Gull	<i>Leucophaeus atricilla</i>
Least Bittern	<i>Ixobrychus exilis</i>
Least Sandpiper	<i>Calidris minutilla</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Lesser Scaup	<i>Aythya affinis</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Limpkin	<i>Aramus guarauna</i>
Little Blue Heron	<i>Egretta caerulea</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Louisiana Waterthrush	<i>Parkesia motacilla</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh Wren	<i>Cistothorus palustris</i>
Merlin	<i>Falco columbarius</i>
Mottled Duck	<i>Anas fulvigula</i>
Mourning Dove	<i>Zenaida macroura</i>
Muscovy Duck	<i>Cairina moschata</i>
Northern Bobwhite	<i>Colinus virginianus</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Harrier	<i>Circus hudsonius</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Northern Parula	<i>Parula americana</i>
Northern Pintail	<i>Anas acuta</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern Waterthrush	<i>Parkesia noveboracensis</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Osprey	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Palm Warbler	<i>Dendroica palmarum</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Pine Warbler	<i>Dendroica pinus</i>
Prairie Warbler	<i>Dendroica discolor</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Purple Gallinule	<i>Porphyrio martinicus</i>
Purple Martin	<i>Progne subis</i>
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>

Redhead	<i>Aythya american</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Ring-neck Duck	<i>Aythya collaris</i>
Roseate Spoonbill	<i>Platalea ajaja</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Ruby-throated Hummingbird	<i>Archilochus colubris</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Sandhill Crane	<i>Grus canadensis</i>
Sedge Wren	<i>Cistothorus stellaris</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Short-tailed Hawk	<i>Buteo brachyurus</i>
Snail Kite	<i>Rostrhamus sociabilis</i>
Snow Goose	<i>Chen caerulescens</i>
Snowy Egret	<i>Egretta thula</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Sora	<i>Porzana carolina</i>
Spotted Sandpiper	<i>Actitis macularius</i>
Swallow-tailed Kite	<i>Elanoides forficatus</i>
Swamp Sparrow	<i>Melospiza georgiana</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Tricolored Heron	<i>Egretta tricolor</i>
Tufted Titmouse	<i>Baeolophus bicolor</i>
Turkey Vulture	<i>Cathartes aura</i>
Virginia Rail	<i>Rallus limicola</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
White Ibis	<i>Eudocimus albus</i>
White-eyed Vireo	<i>Vireo griseus</i>
White-winged Dove	<i>Zenaida asiatica</i>
Wild Turkey	<i>Meleagris gallopavo</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Wood Duck	<i>Aix sponsa</i>
Wood Stork	<i>Mycteria americana</i>
Yellow Warbler	<i>Denroica petechia</i>
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Yellow-throated Vireo	<i>Vireo flavifrons</i>
Yellow-throated Warbler	<i>Setophaga dominica</i>

Fish Species found in Lake Istokpoga

<u>Common Name</u>	<u>Scientific Name</u>
Atlantic Needlefish	<i>Strongylura marina</i>
Black crappie	<i>Poxomis nigromaculatus</i>
Blue tilapia	<i>Oreochromis aurea</i>
Bluefin killifish	<i>Lucania goodei</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluespotted sunfish	<i>Enneacanthus gloriosus</i>
Bowfin	<i>Amia calva</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Brown hoplo	<i>Hoplosternum littorale</i>
Brook silverside	<i>Labidesthes sicculus</i>
Chain pickerel	<i>Esox niger</i>
Coastal shiner	<i>Notropis petersoni</i>
Dollar sunfish	<i>Lepomis marginatus</i>
Eastern mosquitofish	<i>Gambusia holbrooki</i>
Everglades pygmy sunfish	<i>Elassoma evergladei</i>
Florida gar	<i>Lepisosteus platyrhincus</i>
Flagfish	<i>Jordanella floridae</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden topminnow	<i>Fundulus chrysotus</i>
Inland silverside	<i>Menidia beryllina</i>
Lake chubsucker	<i>Erimyzon sucetta</i>
Largemouth bass	<i>Micropterus salmoides</i>
Least killifish	<i>Heterandria formosa</i>
Longnose gar	<i>Lepisosteus osseus</i>
Lined topminnow	<i>Fundulus lineolatus</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Redear sunfish	<i>Lepomis microlophus</i>
Sailfin molly	<i>Poecilia latipinna</i>
Seminole killifish	<i>Fundulus seminolis</i>
Spotted sunfish	<i>Lepomis punctatus</i>
Swamp darter	<i>Etheostoma fusiforme</i>
Tadpole madtom	<i>Noturus gyrinus</i>
Taillight shiner	<i>Notropis maculatus</i>
Threadfin shad	<i>Dorosoma petenense</i>
Vermiculated sailfin catfish	<i>Pterygoplichthys disjunctivus</i>
Walking catfish	<i>Clarias batrachus</i>
Warmouth	<i>Lepomis gulosus</i>
White catfish	<i>Ameiurus catus</i>
Yellow bullhead	<i>Ameiurus natalis</i>

Mammal Species found in Lake Istokpoga

<u>Common Name</u>	<u>Scientific Name</u>
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Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Brown rat	<i>Rattus norvegicus</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Eastern pipistrelle	<i>Perimyotis subflavus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern woodrat	<i>Neotoma floridana</i>
Evening bat	<i>Nycticeius humeralis</i>
Feral hog	<i>Sus scrofa</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Long-tailed weasel	<i>Mustela frenata</i>
Marsh rabbit	<i>Sylvilagus palustris</i>
Marsh rice rat	<i>Oryzomys palustris</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Raccoon	<i>Procyon lotor hirtus</i>
River otter	<i>Lontra canadensis</i>
Round-tailed muskrat	<i>Neofiber alleni</i>
Seminole bat	<i>Lasiurus seminolus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Reptile and Amphibian Species found in Lake Istokpoga

<u>Common Name</u>	<u>Scientific Name</u>
American alligator	<i>Alligator mississippiensis</i>
American bullfrog	<i>Lithobates catesbeianus</i>
Barking treefrog	<i>Hyla gratiosa</i>
Bullfrog	<i>Rana catesbeiana</i>
Common musk turtle	<i>Sternotherus odoratus</i>
Corn snake	<i>Pantherophis guttatus</i>
Cuban brown anole	<i>Anolis sagrei</i>
Cuban treefrog	<i>Osteopilus septentrionalis</i>
Dwarf salamander	<i>Eurycea quadridigitata</i>
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>
Eastern garter snake	<i>Thamnophis sirtalis</i>
Eastern lesser siren	<i>Siren intermedia intermedia</i>
Eastern mud snake	<i>Farancia abacura</i>
Eastern kingsnake	<i>Lampropeltis getula</i>
Eastern narrow-mouthed toad	<i>Gastrophryne carolinensis</i>
Florida brown snake	<i>Storeria victa</i>
Florida cottonmouth	<i>Agkistrodon piscivorous conanti</i>
Florida cricket frog	<i>Acris gryllus dorsalis</i>
Florida green water snake	<i>Nerodia floridana</i>
Florida kingsnake	<i>Lampropeltis getula floridana</i>
Florida leopard frog	<i>Rana sphenoccephala utricularia</i>
Florida redbelly turtle	<i>Pseudemys nelson</i>

Florida Snapping turtle	<i>Chelydra serpentina</i>
Florida softshell turtle	<i>Apalone ferox</i>
Florida water snake	<i>Nerodia fasciata pictiventris</i>
Greater siren	<i>Siren lacertian</i>
Green anole	<i>Anolis carolinensis</i>
Green treefrog	<i>Hyla cinerea</i>
Indo-Pacific gecko	<i>Hemidactylus garnotii</i>
Little grass frog	<i>Pseudacris ocularis</i>
Mediterranean gecko	<i>Hemidactylus turcicus</i>
Narrow striped dwarf siren	<i>Pseudobranchius axanthus axanthus</i>
Northern dwarf siren	<i>Pseudobranchius striatus</i>
Peninsula cooter	<i>Pseudemys peninsularis</i>
Peninsula newt	<i>Notophthalmus viridescens</i>
Peninsula ribbon snake	<i>Thamnophis sauritus sackenii</i>
Pig frog	<i>Rana grylio</i>
Pinewoods treefrog	<i>Hyla femoralis</i>
Red-bellied slider	<i>Trachemys scripta scripta</i>
Red-eared slider	<i>Trachemys scripta elegans</i>
Rough green snake	<i>Opheodrys aestivus</i>
South Florida black swamp snake	<i>Seminatrix pygaea</i>
Southern black racer	<i>Coluber constrictor priapus</i>
Southern ring-neck snake	<i>Diadophis punctatus punctatus</i>
Squirrel tree frog	<i>Hyla squirella</i>
Striped mud turtle	<i>Kinosternon baurii</i>
Two-toed amphiuma	<i>Amphiuma means</i>
Yellow rat snake	<i>Elaphe obsoleta quadrivittata</i>

Appendix XIII: Wading Bird Monitoring Protocol

Monitoring Wading Birds on Lake Istokpoga

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Florida has historically possessed the largest number of species and populations of wading birds in the United States (**Runde 1991**). Florida's resident population of wading birds is augmented by migratory birds from more northern latitudes (especially the Atlantic coastal populations) during the months of October-March (**Palmer 1962, Hancock and Kushlan 1984**). Lake Istokpoga and other central Florida lakes and wetlands are important to both resident nesting and foraging wading birds and migrant wading birds that disperse into the state during the winter. Degradation of these wetlands and marshes through poor habitat management practices (e.g., ecologically-inappropriate hydrologic cycles, expansion of invasive and noxious plant species, transition of wetlands to uplands) can result in decreased numbers of wading birds using Lake Istokpoga and adjacent lakes in central Florida. To that end, the goal of any wetland and marsh habitat management for wading and marsh birds on Lake Istokpoga should be, at a minimum, to maintain suitable nesting and foraging habitat for wading bird populations and refuge for both resident and migratory populations.

It is generally assumed that success of wading bird populations depends on quality and quantity of nesting and foraging habitat. Good quality foraging habitat should improve foraging success rates, which ultimately would result in higher nestling survivorship and fledging rates when coupled with available nesting substrate. Good quality nesting substrate provides a stable nesting platform, which should lessen the probability of nest collapse and whole nest failure. Without suitable foraging habitat, wading birds cannot access the food resources of a wetland and provide nourishment for their nestlings.

Evidence suggests that nesting habitat is not a limiting factor for wading birds (**Rodgers et al. 1996**). Rather, prey availability or accessibility to these food resources is the limiting factor on reproductive success and population growth of wading birds. However, having available nesting habitat in proximity to good foraging habitat may provide the stimulus for breeding. Lastly, the dynamic nature of the littoral zone and prey availability on Lake Istokpoga requires wading birds to use off-lake foraging sites, especially ephemeral rich food resources. Thus, wading birds are not entirely dependent upon a single foraging area, such as Lake Istokpoga, and any evaluation of wading bird population strength should be based more on a regional assessment.

Monitoring Strategies

The Florida Fish and Wildlife Conservation Commission's (FWC) monitoring of wading bird use of Lake Istokpoga will involve two strategies to provide an index for both foraging and nesting use. These strategies are designed to answer initial questions and are intended to be "living and evolving". Survey methods and protocol are expected to be modified as knowledge of habitat use and population structure are better understood.

Monitoring techniques selected for foraging habitat on Lake Istokpoga are intended to answer these initial questions: 1) how many and what species of wading birds use the lake for foraging, 2) are there foraging "hot spots" within the lake, and 3) how does lake stage affect wading bird use of the lake? Monitoring techniques selected for nesting use by wading birds will seek to identify: 1) the number and species of wading birds that use the lake for nesting, and 2) nesting "hot spots" within the lake.

Foraging: The foraging monitoring should be conducted at different times of the year (at least biannually; survey frequency will be determined by FWC Species Conservation Planning [SCP] staff and will be modified as data is collected) within shallow-water littoral (suitable for foraging) habitat. This area, which at times represents over 1,800 hectares (4,450 acres), will be surveyed using an airboat. All wading bird species, along with limpkins (*Aramus guarauna*), Florida mottled ducks (*Anas fulvigula*), and Everglade snail kites (*Rostrhamus sociabilis*) will be recorded.

The airboat will travel through areas of foraging habitat at a constant speed, but only fast enough to remain on-plane, to maximize observation. In addition to the airboat driver, an observer will identify and record the number and species, and, if known, the following information: water depth (estimated), vegetation cover type and density, and the approximate location using a hand-held GPS unit. If a second observer is available, they will serve as the recorder, assist with GPS locations, and constantly check the data sheets to make sure the identification number on the sheet and in the GPS unit are identical. All data will be entered into Excel and ArcGIS for analysis.

Surveys should revisit the same areas each time for consistency. As areas of more frequent wading bird use (“hot spots”) are identified, future foraging monitoring may be shifted toward these areas to more efficiently monitor the lake. This survey technique for wading birds may be combined with other surveys on the lake, such as those done regularly for snail kites.

Nesting: Previously, FWC staff, in coordination with Audubon Florida staff, have used the flight line technique for estimating the numbers of nesting wading birds on Lake Istokpoga. This method was developed by Richard and Ann Paul (**Paul and Paul 2004**) and is based on the knowledge that nesting wading birds take turns at the nest, each parent incubating the eggs or brooding the young while the mate forages for food. The greater regularity of the morning foraging flight allows more accurate estimates than afternoon counts. (Night herons cannot be censused successfully with this technique because they forage primarily at night).

Monitoring protocol is to count all inbound and outbound adult wading birds in standard counts of each flight-line. Normally two or more count periods are necessary at each colony, since the “traffic” may come from any direction and observers must sample all possible flight-lines. Observers are posted in several locations around the colony simultaneously to account for the probability of multiple flight-lines. One-hour counts are best, although future surveys may confirm that half-hour counts are sufficient to document large colonies. All observer-counts are added together, to give a total number of birds in and out per hour from all sides of the colony to determine the “flight rate”. The flight rate is multiplied by 1.5 to give an estimate of the number of breeding pairs (**Paul and Paul 2004**).

Surveys on Lake Istokpoga colonies should occur during the incubation or guard stage (very small nestlings). Although nesting colonies are rarely synchronized in Florida because of the long nesting season, previous monitoring has shown that, when surveys are conducted mid-nesting season, the flight line technique is a simple and appropriate way to census a colony without causing disturbance to the colony. While the initiation of nesting is variable from year to year, April and May are good months to survey Lake Istokpoga.

Aerial Surveys: As deemed appropriate, data from the South Florida Water Management District’s (SFWMD) annual “South Florida Wading Bird Report” to supplement the data collected by SCP staff on Lake Istokpoga (general methodology is below;

https://www.sfwmd.gov/sites/default/files/documents/southflorida_wadingbird_report.pdf [pp. 44-47]):

As part of the KRREP [Kissimmee River Restoration Evaluation Program], the SFWMD performed ... surveys ... at known wading bird nesting colonies on Lake Kissimmee, along the Kissimmee River, and on Lake Istokpoga. Observers sat on both sides of a helicopter flying at an altitude of 244 meters while flying between known colonies within the Kissimmee River Restoration Project Area, which includes Lakes Kissimmee, Cypress, Hatchineha, and Istokpoga.

Indicator species

Although all wading bird species will be documented, recommended indicator species for fish-eating wading birds on Lake Istokpoga include (based on surveys conducted in 2006; these species were found to be the most common):

Great Egret. The great egret (*Ardea alba*) is a large white wading bird and second largest in species in North America. The species is a year round resident in Florida. It feeds in a variety of wetlands, including marshes, swamps, streams, rivers, ponds, lakes, tide flats, canals and flooded fields. Their prey includes fish, invertebrates, amphibians, reptiles, birds and small mammals (**McCrimmon et al. 2001**). The great egret captures prey by walking slowly, and stabbing prey with its bill.

Little Blue Heron. The little blue heron (*Egretta caerulea*) is a medium-sized wading bird and a year round resident in Florida. It breeds and forages in various wetland and estuarine habitats. It feeds on small fish, aquatic invertebrates, and amphibians by foraging slow and methodically (**Rodgers and Smith 1995**). The little blue heron is a Florida designated species of special concern. Habitat loss and human-caused changes in local water dynamics are the most serious threats to this species.

Tricolored Heron. The tricolored heron (*Egretta tricolor*) is a medium-sized wading bird and a year round resident in Florida (**Fredrick 1997**). They forage in water in wetland habitats and feed on aquatic invertebrates, fish, reptiles and amphibians. They are listed in Florida as a species of special concern.

Great Blue Heron. The great blue heron (*Ardea herodias*) is the largest heron in North America. The Great Blue Heron is one of the most widespread and adaptable wading birds in North America. It is a year round resident in Florida. Although this species is primarily a fish eater, wading (often belly deep) along the shoreline of oceans, marshes, lakes, and rivers, it also stalks upland fields for rodents, especially in winter (**Butler 1992**).

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**ADD REFERENCE: SFWMD 2005; Report on Minimum Flows and Levels (cited on p. 22)

** ALSO, put refs in order, as shown in Anne's paper edits.