

**MINUTES OF THE MEETING
of the
HARRIS CHAIN OF LAKES RESTORATION COUNCIL**

October 5, 2007

The regular meeting of the Harris Chain of Lakes Restoration Council (Council) was held at 9:00 AM on October 5, 2007 at the Lake County Board of County Commissioners' Chambers, 315 West Main Street, Tavares, Florida.

Members Present

Skip Goerner, Chairman
Hugh (Dave) Davis II, Vice Chairman
Keith Farner
Robert Kaiser, P.E.
Don Nicholson
Richard Royal
Edward M. Schlein, M.D.

Members Absent

Rick Powers, P.G., Secretary

1. CALL TO ORDER

Chairman Skip Goerner called the meeting to order at 9:05 AM.

2. INVOCATION AND PLEDGE OF ALLEGIANCE

An Invocation was given by Councilman Bob Kaiser, followed by the Pledge of Allegiance.

3. ROLL CALL

Chairman Goerner called roll. Councilman Rick Powers was absent.

Chairman Goerner noted that since the resignation of Ted Woodrell, applications for a new Council member have been received and the appointment for the new member should occur by the November meeting.

4. APPROVAL OF MINUTES

Chairman Goerner called for a discussion of the August Meeting Minutes. Minor edits were suggested by the Chairman. The minutes were approved with the suggested edits by unanimous vote.

Chairman Goerner called for a discussion of the September Meeting Minutes. One minor edit was suggested by the Chairman. The minutes were approved with the suggested edit by unanimous vote.

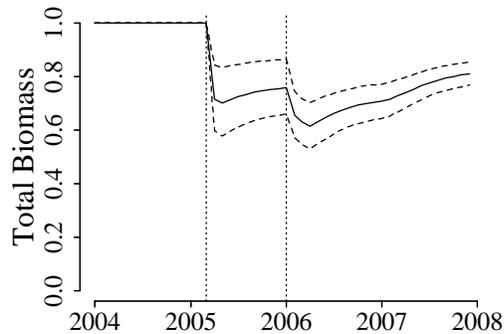
5. DISCUSSION ITEMS

As a note: These minutes have been prepared to coincide with the published agenda and the order of the information presented may not be the order in which the discussions occurred.

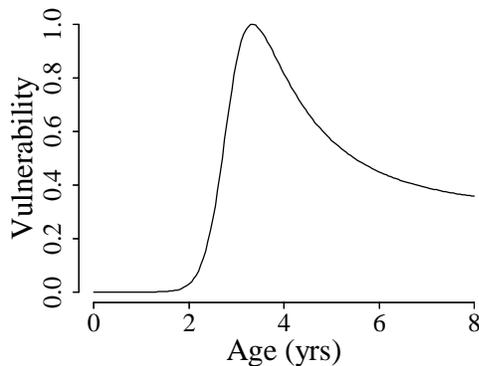
Shad Harvesting Report – Mike Allen, University of Florida

Dr. Mike Allen of the Department of Fisheries and Aquatic Sciences at the University of Florida (UF), gave a presentation on the results of the gizzard shad harvesting program. Below are highlights from his presentation and the complete presentation is provided in Attachment 1.

- Project Components
 - Two years of harvesting data from Lake Dora
 - Lake Harris and Lake Eustis were used as control lakes
- Commercial Harvest
 - Estimated a 40% reduction in the total gizzard shad biomass



- Shad Response to Harvest
 - No change in growth rates.
 - Size at maturity declined.
 - Evidence suggested that recruitment did not decline, but more two more years of sampling is planned.
 - Vulnerability by age to gill nets.



Councilman Don Nicholson asked if there is a peak spawning age for the shad. Dr. Allen said the peak spawning age is two years, and continued with his presentation:

- Biomanipulation Strategies
 - Literature suggests that 75 - 80% biomass reductions are needed to achieve water quality improvements.
 - Using gill nets such reductions could only be achieved by;
 - Smaller mesh (less than 4 inches currently used)
 - Very intensive fishing
 - Fishing every year

Councilman Ed Schlein asked what would be the cause of water quality improvements if there were a 75 – 80% reduction in shad biomass. Dr. Allen explained that he does not believe there would be significant improvements in water quality with that large biomass reduction however; water quality has improved in lakes where 100% of the fish were removed. He went on to say that gizzard shad in Florida lakes actually consume the sediments, which resuspends the isolated nutrients and then they excrete bio-available nitrogen and phosphorus.

Councilman Schlein then asked if it would be fair to say: if the [nutrient-rich] sediments were removed from the lakes, the gizzard shad biomass would be reduced naturally. Dr. Allen said that given the trophic levels of these lakes, that would be a fair statement. He also said that reducing phosphorus concentrations in the lakes would reduce gizzard shad populations.

Councilman Keith Farner asked at what age are the shad too large to be eaten by predator fish. Dr. Allen said that is about one year because they grow 8 – 10 inches in the first year.

Councilman Kaiser asked if there were any natural predators of gizzard shad. Dr. Allen said that once they become spawning age, the only predators are birds and alligators; and then continued with his presentation:

- Gizzard shad feeding
 - Gizzard shad are omnivores.
 - They also clearly feed on bottom sediments. All gizzard shad feed on sediments at some point in their lives.
- Changes in water chemistry
 - No changes in chlorophyll, phosphorus, or zooplankton were observed at Lake Dora.
 - Could require stronger manipulation (greater than 40%) to improve water quality.
- Black crappie bycatch
 - Anglers harvested 32,000 and 39,000 crappie in 2005 and 2006, respectively.
 - Recreational fishing bycatch mortality is high at 42%.
 - Bycatch of crappie were 17,000 and 30,000 in 2005 and 2006, respectively.
 - The bycatch mortality was 31 – 45%.

Chairman Goerner noted that there have been complaints by tournament anglers regarding the black crappie fisheries in Lake Dora. He also said he understands that gill net mortality is higher than the percentages presented. Dr. Allen explained that could be true, however; the gill nets are only set for a period of two hours which helps to reduce mortality.

Councilman Farner asked if the use of seine nets could reduce the bycatch mortality rate. Dr. Allen said perhaps; but seine nets have other problems which cause mortality; and then continued with his presentation:

- Management Recommendations
 - Literature suggests that large biomass reductions are needed to cause water quality changes.
 - Results show that this is unlikely with current fisheries configurations.
 - The biomass reductions required for Florida lakes is unknown.
 - Smaller mesh and more intensive fishing is needed.
 - Bycatch would increase with smaller mesh nets.
 - Lake Dora experiment did not optimize biomanipulation or fisheries objectives.

Chairman Goerner asked if the smaller mesh size would greatly impact the sport fisheries. Dr. Allen said it would greatly increase the number of crappie caught, but other factors could have a greater impact on the sport fisheries.

Chairman Goerner and Councilman Ed Schlein both noted that commercial harvests [of shad] would have to be conducted every year, in order to see improvements. Dr. Allen said that with an 80% reduction in shad biomass, coupled with increased plant coverage, there is a potential to change the lake where the harvests would not have to be conducted every year, however; they are not certain.

Councilman Richard Royal asked if there were smaller lakes where this experiment could be conducted. Dr. Allen said yes and added that haul seine netting in Lake Denham produced an 80% biomanipulation, after which the lake cleared up. Councilman Farner noted that Lake Denham may not have the [nutrient] loading from Lake Apopka, as Lake Dora does. Dr. Allen agreed.

Chairman Goerner suggested that perhaps other methods of lake restoration need to be explored. Chairman Goerner and Councilman Kaiser thanked Dr. Allen for his presentation.

Chairman Goerner asked if Bill Johnson had any comments on the shad report.

Bill Johnson of the Florida Fish and Wildlife Conservation Commission (FWCC) said they are working on models for Lake Apopka to determine the effects of smaller mesh nets and on Lake Griffin to better understand the fisheries.

Chairman Goerner asked Mr. Johnson for his thoughts on the bycatch issue. Mr. Johnson agreed that the bycatch is high and if smaller mesh net were used, more crappie would be caught. He explained that the FWCC was going to be tagging crappie in Lake Griffin next year and starting this Winter, they are going to be conducting creel counts in lakes Harris and Dora.

Councilman Farner said he is concerned that the bycatch is unacceptable and asked if there are any predator fish that could help control the shad populations. Mr. Johnson said no and that they have tried a number of different ways to control the shad populations. He added that the shad take advantage of the poor water quality in the lakes and when the water quality improves, the shad populations would decrease naturally.

Dr. Larry Battoe of the St. Johns River Water Management District (SJRWMD) said that the shad report was very well written and it was a good, collaborative effort by all of the agencies involved. He then explained that the study was conducted to determine the effects of harvesting on population and not conducted for water quality improvement. He also said that shad are 0.5% phosphorus, so phosphorus is removed whenever you remove shad and harvesting is the cheapest way to remove phosphorus from the lakes. Dr. Battoe reminded the Council that the SJRWMD is working on several projects to restore the lakes and shad harvesting is just one method to be studied. He also said they are finished harvesting in Lake Dora and are moving on to lakes Griffin and Apopka.

Councilman Royal asked if the bycatch in Lake Griffin will be similar to that of Lake Dora. Mr. Johnson he is not sure and they are currently working on that data.

Councilman Schlein noted from the study report that as the larger shad are removed, a greater percentage of smaller shad begin feeding on the sediments. He believes that this introduces another issue for the harvesting program.

Councilman Royal asked how much is being spent on the harvesting program. Dr. Battoe said he is not sure but believes it to be several hundred thousand dollars.

Chairman Goerner said he is concerned about the economic impact of reducing sport fish populations and a loss of angler interest as a result of the bycatch.

Mr. Johnson said he believes that if there were a demonstrated benefit to removing the gizzard shad, then losing black crappie as bycatch might be worth the benefit. He added that this does not appear to be the case.

Vice (V.) Chairman Dave Davis suggested that perhaps putting a bounty on gizzard shad could help control the population. Dr. Battoe said that is possible, however; it would take a considerable number of participants for it to be effective.

Councilman Nicholson asked how much the SJRWMD paid for a pound of shad. Dr. Battoe believes it is about \$0.25 per pound. Councilman Nicholson said that people line up to turn in metal for recycling for less than \$0.25 per pound and maybe the bounty idea could work.

Dr. Dan Canfield of the University of Florida (UF) and member of the Technical Advisory Group (TAG) to the Council, said that the shad harvesting was originally proposed for water quality improvement, however; it would take extensive effort. He believes that haul seine netting would have a much greater impact, but the anglers would be opposed to it. Dr. Canfield also disagreed with Dr. Battoe's statement that harvesting gizzard shad was the least expensive

method for reducing phosphorus. He believes the most cost effective and fastest means of removing phosphorus is through dredging. Dr. Canfield reminded the Council of Dr. Mike Coveney's (SJRWMD) presentation on the phosphorus budget, which indicated that more phosphorus enters Lake Apopka from the North Shore Restoration Area (NSRA) than they are removing with all of their other projects [on the lake]. He also said that although dredging is not cheap, it is more cost effective than the total amount of money that has been spent on studies and all of the other restoration projects.

Chairman Goerner thanked Dr. Canfield for his comments.

Councilman Kaiser suggested that filtration of the water could be effective in improving water quality and there are ways to reduce the costs including solar and wind power. He also said that if the goal is to clean up the lakes in a reasonable amount of time, then the Council needs to look at more serious projects.

Councilman Farner said that the Council needs a comprehensive plan that includes restoring the marshes, dredging, and the Lake Beauclair Nutrient Reduction Facility (NuRF) to take to the Legislature and request funding.

Chairman Goerner reminded Councilman Farner that at their special workshop several years ago, the Council agreed that dredging of the lakes should be included in their plan for restoration. Councilman Schlein also believes that in order to restore the lakes, the top layer of nutrient-rich muck would need to be removed from the lakes.

An extended discussion was held on dredging, reconnecting the marshes, and improving aquatic habitat. The Council generally agreed that all of these elements are necessary to restore the lakes.

Annual Legislative Report 2nd Draft – Patrick Hunter

An extended discussion was also held on the Draft Annual Report to the Legislature. A summary of the issues on which the Council held a vote are discussed below. The majority of the discussion involved edits that will be recorded in the Annual Report.

With respect to Rough Fish Harvesting, Chairman Goerner put forth a motion to include the following language in the annual report:

This lake management technique addresses the potential reduction of phosphorus and improvement of water quality through the removal of rough fish, primarily gizzard shad, from the lakes. The Council in past Legislative reports noted that rough fish removal for phosphorus reduction associated with fish removal is an experimental technique.

The SJRWMD contracted with the University of Florida to determine the effectiveness of the harvests to reduce phosphorus in the Harris Chain of Lakes. Reports to the Council by the university researcher in charge of the study indicated that the current level of gizzard shad harvest was insufficient to impact phosphorus levels in the Harris Chain of

Lakes. Additionally, increased harvest levels would adversely affect sport fish populations.

The Council no longer supports gizzard shad harvest as a possible method for improving water quality in the Harris Chain of Lakes. The Council further believe funding should cease and appropriations be redirected to proven techniques or other experimental techniques that offer greater promise of restoration.

The motion to include the language was seconded and after extended discussion, was approved by unanimous vote.

With respect to the Lake Apopka Marsh Flow-way (LAMF), Councilman Royal expressed his opinion that the LAMF is not providing the water quality improvements expected and that the funding used to operate the facility should be used for other restoration projects. Councilman Farner expressed his support for continued operation of the LAMF. Councilman Kaiser expressed his concern for the amount of energy used to move water from the facility.

Chairman Goerner discussed the issue of sediment build-up at the ends of the canals along the Apopka-Beauclair (A-B) Canal. He explained that during a recent visit to the area, he observed that fluid muck has restricted access to the canals and that the waters in the canals were clear and full of bass.

Chairman Goerner also discussed the fact that after one of the hurricanes in 2004, the SJRWMD estimated that 20 acre-feet of suspended sediments were sent down the A-B Canal. He noted that if 20 acre-feet of muck contains 100,000 cubic yards, and one cubic yard weighs 1 metric tonne (1.1 tons), then that one event discharged seven times the amount of sediments the LAMF has removed in four years of operation; which has been reported as a cumulative total of 13,000 metric tonnes (14,330 tons). Chairman Goerner added that over \$7 million will be spent on the NuRF project, with an additional \$1 to \$1.5 million per year in operational costs; and it would not have been able to handle the slug of sediments from that single event. He believes the most beneficial solution to this issue is going to be dredging in Lake Apopka and the A-B Canal. The Council members agreed.

Councilman Farner offered his support to the NuRF project but said the Council needs to develop a plan and request funding for the dredging projects. Councilman Royal suggested that the funds being used for other restoration projects of the SJRWMD could possibly be used for dredging.

Chairman Goerner offered the following language regarding support for the LAMF:

In November 2003, the SJRWMD began operation of the Lake Apopka Marsh Flow-way located near the northwest portion of Lake Apopka. The flow-way was proposed as a cost-effective technique to restore water quality in Lake Apopka. Since the establishment of the Council, reviews of the performance of the flow-way indicated there were operational problems, but the Council felt the flow-way program was so important, the SJRWMD needed time to correct problems.

It is now clear that the flow-way is not performing according to the original expectations for phosphorus removal. The SJRWMD is currently proposing to add alum treatment to the flow-way to enhance phosphorus removal. The treated marsh-flow water, which is pumped back into the Apopka-Beauclair Canal, typically contains low concentrations of dissolved oxygen during the summer months. Dissolved oxygen levels during these months are often below the State Water Quality Standard of five (5) milligrams per liter (mg/L).

The Council no longer believes the marsh-flow way can be relied upon as primary management technique for restoring Lake Apopka or the Harris Chain of Lakes. The Council believes alternatives such as fish stocking and dredging need to be implemented. Dredging becomes especially important because of the amount of phosphorus that can be removed per dollar expended, the potential reduction in wind resuspension of bottom sediments, and the potential to restore the marshes in the Lake Apopka North Shore Restoration Area and then reconnection to the lake.

Councilman Royal made a motion to accept the language for inclusion in the annual report. After extended discussion, the motion was approved by unanimous vote.

The Council also held extended discussion on their support of the NuRF project. Chairman Goerner suggested that funds used to operate the LAMF could be redistributed to support the NuRF Project. Councilman Farner disagreed saying the two projects are connected. Councilman Royal said he does not support funding for either project.

Mike Perry of the Lake County Water Authority (LCWA) explained that both projects are connected because the LAMF is designed to treat 150 cubic feet per second (cfs) and the NuRF will treat 300 cfs; which is the vast majority of flows down the A-B Canal. He added that the LAMF has not been effective in removing soluble phosphorus from the water and the NuRF will remove at least 80% of the phosphorus, both particulate and soluble.

Councilman Goerner suggested the following language outlining the Council's support of the NuRF project:

The Council will continue to review the information provided by the LCWA for the design and implementation of the Lake Beauclair Nutrient Reduction Facility, as a means to reduce phosphorus concentrations in water released through the Apopka-Beauclair Canal to downstream lakes. The Council supports the construction of the Lake Beauclair Nutrient Reduction Facility as a means to reduce nutrients discharged to lakes downstream of the facility.

Councilman Nicholson made a motion to accept the language. The motion was approved with Councilman Royal casting a dissenting vote.

Chairman Goerner then discussed the Legislative funding requests to be made by the Council. He suggested that the Council make the same request for the funding of cyanobacteria monitoring, as they made last year.

The Council passed a motion to support of the appropriation of \$250,000 in State funds to support cyanobacteria monitoring in cooperation with the Florida Department of Health, LCWA, and Florida LAKEWATCH volunteers to monitor for algal blooms and educate the public on the potentially toxic effects of cyanobacteria in the Harris Chain of Lakes.

Councilman Kaiser made a motion to accept the funding request. After further discussion the motion was approved by unanimous vote.

Chairman Goerner also suggested that the Council make the same request for funding for their Combined Initiative as they made last year:

The Council passed a motion to support the appropriation of \$500,000 in their 2007 – 2008 Funding Initiative for the purpose of Florida largemouth bass and sport fish restocking to improve the economic vitality of the Harris Chain of Lakes.

The Council passed a motion to support the appropriation of \$250,000 in their 2007 – 2008 Funding Initiative for the purposes of revegetation of aquatic habitat, restoration of wetland habitat, and cypress tree plantings.

Councilman Kaiser made a motion to accept the funding request. After further discussion, the motion was approved by unanimous vote.

Chairman Goerner asked if the Council should request Legislative funding for support of the NuRF project. After extended discussion, it was determined that the NuRF project has sufficient funding available.

Chairman Goerner also suggested the Council should request funding for dredging the A-B Canal and the entrances to residential canals along the A-B Canal, as previously presented by the Restore Our Waterways homeowners group. Councilman Kaiser put for the motion that the Council support the appropriation of \$5 million in Legislative Funding to assist in the Lake Beauclair Dredging Project and dredging of the A-B Canal and entrances of residential canals along the A-B Canal, in an effort to reduce sediment build-up and restore navigation. The motion was approved by unanimous vote.

Chairman Goerner then notified the Council that he would attend a meeting of the Legislative Delegation on October 31st and he was going to discuss the funding requests approved by the Council and the other issues, as discussed and agreed upon.

6. PRESENTATIONS

Local Government Cypress Tree Planting Program

Chairman Goerner noted that no one was present from local governments to make presentations for cypress tree planting.

Lakeview Crest Cypress Tree Program – Mr. Tom Hofmeister

Chairman Goerner said he was contacted by a representative of Lakeview Crest and they requested their presentation to the Council be postponed until the November meeting.

Review and Action regarding the engineering report for Red Howley regarding conditions at the Burrell Lock and Dam

Red Howley, owner of Spillway Park, explained that the engineer's report has been delayed because the discharge channel maintenance data has been slow in coming from the SJRWMD. He said the report should be completed before the November Council meeting.

Chairman Goerner suggested that the presentation on the matter be postponed and asked that Mr. Howley contact him before the presentation is put back on the agenda. Mr. Howley agreed.

COUNCIL AND PUBLIC – QUESTIONS & ANSWERS

No Council or public comments were made.

Agency Updates

Mr. Johnson (FWCC) indicated that he had no further updates for the Council.

Dr. Canfield provided the following updates to the Council:

- Harvester Update
 - Currently working on the area around Little Lake Harris Estates.
 - Routine maintenance is being performed on the harvester.

Councilman Farner suggested that the Council write a letter of appreciation to the Mission Inn for their assistance in obtaining the harvester for the Council and use of their ponds for the bass restocking program. The Council generally agreed.

- Lake Dora Bass Stocking
 - He has not received the stocking permit from the FWCC.
- Toxic Algae
 - Microcystin concentrations of approximately 30 micrograms per liter ($\mu\text{g/L}$), above the recommended World Health Organization (WHO) Recreational Standard of 20 $\mu\text{g/L}$ have been measured in a localized area of Lake Beauclair.
- Cypress Tree Planting
 - This project has been funded and should move forward.

Councilman Farner agreed with Dr. Canfield and said that the appropriated funds should be used for revegetation of aquatic habitat and cypress tree plantings.

Councilman Royal suggested that cypress trees should be planted on former farmlands in the NSRA, as a low management restoration project. He further suggested that the plants could be

obtained from the Belle Glade Research Station to ensure the faster growing cypress trees are used.

Chairman Goerner suggested the FWCC will assist with planting cypress trees in the Lowrie Brown marsh, as part of the reconnection project to the lake. Mr. Johnson said that typically the FWCC does not get involved with planting cypress trees, but perhaps they could assist with aquatic plantings.

Dr. Canfield suggested that vegetating the marshes prior to reconnection to lakes is important and if the available funds were pooled for these projects, perhaps the Council could have increased support.

Councilman Royal asked if there was land available in the area marshes which could be planted with cypress trees before being flooded. Mr. Johnson said that water levels are low and there are many places available for planting. Councilman Royal then suggested that some solid proposals should be discussed at the next meeting.

Chairman Goerner asked if Dr. Battoe could suggest a cypress tree planting project in the NSRA. Dr. Battoe said he would talk with Dave Walker (SJRWMD) about the matter.

Councilman Farner requested that the Council invite cities around the Harris Chain of Lakes (HCOL) to make requests for matching funds for cypress trees. The Council agreed.

Dr. Battoe reminded the Council that he had sent (via email) the most recent water quality graphs for the HCOL. Copies of those graphs are included as Attachment 2. He also provided a written project update via email prior to publishing of these minutes. A copy of that update is provided in Attachment 3.

Mr. Perry asked the position of the Council on shad harvesting. Chairman Goerner said he would discuss the Council's position at the next LCWA Board of Trustees Meeting.

Mr. Perry then provided the following updates to the Council:

- The NuRF groundbreaking ceremony will be held on October 17th
- Lake Apopka Consumptive Use Permit (CUP)
 - Suspended for six months
 - They are considering:
 - A reservoir in the NSRA
 - Further review of minimum lake water levels
 - Further review of a water conservation program
- Water Levels
 - Lakes Dora, Beauclair, and Eustis are approximately 6 inches above their all time record low.
 - Lake Griffin is approximately 2.5 feet above record low.
 - Lake Apopka is approximately 2.25 feet above record low.

- The LCWA has requested that Dave Walker (SJRWMD) review water levels and operation of the water control structures in order to increase water levels in lakes Dora, Beauclair, and Eustis.

Mr. Perry had no further updates for the Council.

7. OTHER PUBLIC COMMENTS

Carolyn Dillon, a homeowner on a canal off of the A-B Canal said that since 1999, she had seen the number of trees across from her property has decreased dramatically. She asked if the loss of trees could be attributed to herbicide application in the area. Chairman Goerner said one environmental factor for the loss of trees may have been the drought of 1999 – 2002, but could not comment on any effects by herbicides.

No additional public comments were made.

8. COUNCIL MEMBER COMMENTS

Council Member Comments

Councilman Nicholson expressed his gratification that the Council is moving towards the primary solutions of restoring the lakes through dredging.

Councilman Royal said that he would like an explanation as to why the LCWA decided it was better to build the NuRF than it was to utilizing the Double Run Swamp for filtration. Mr. Perry said he would provide that information.

Chairman Goerner said his understanding the Double Run Swamp is that there was not sufficient land owned by the State to allow for sheet flow into the marsh and if there were, it would flood the land of private owners.

With this being Gene Caputo's last meeting as the Council's SJRWMD representative; the Council offered their sincere appreciation for all of his efforts.

Discussion of November 2, 2007 Meeting

Mr. Caputo introduced Linda Girardin (SJRWMD) as his temporary replacement. The Council welcomed Ms. Girardin. Mr. Caputo then outlined the agenda items for November meeting of the Council:

- Discussion of the 3rd draft of the Annual Report
- Local Government Cypress Tree Planting Presentations
- Dr. Battoe's presentation on study areas for cypress tree plantings
- Lake View Crest Cypress Tree Program Presentation
- Review of the Burrell Lock and Dam Engineer's Report
- FWCC presentation on study areas for cypress tree plantings

9. ADJOURNMENT

The meeting was adjourned at 12:40 PM.

Respectfully submitted by:

Chairman Skip Goerner

Vice Chairman Dave Davis II

Attachment 1

Shad Harvesting Report

Dr. Mike Allen – University of Florida

October 2007

Biomanipulation Impacts on Gizzard Shad Population Dynamics, Lake Water Quality, and a Recreational Fishery

M. Catalano, J. Dotson, L. Brabandere,
M. Allen and T. Frazer
Department of Fisheries and Aquatic Sciences
University of Florida

Participants

SJRWMD

Walt Godwin

Mike Coveney

Larry Battoe

Virginia Wesleyan

Maynard Schaus

FWC

Jim Estes

Bill Johnson

Marty Hale

John Benton

Steve Crawford

Support

- SJRWMD
- FWC
- SFWMD
- Lake County Water Authority
- Harris Chain of Lakes Restoration Council



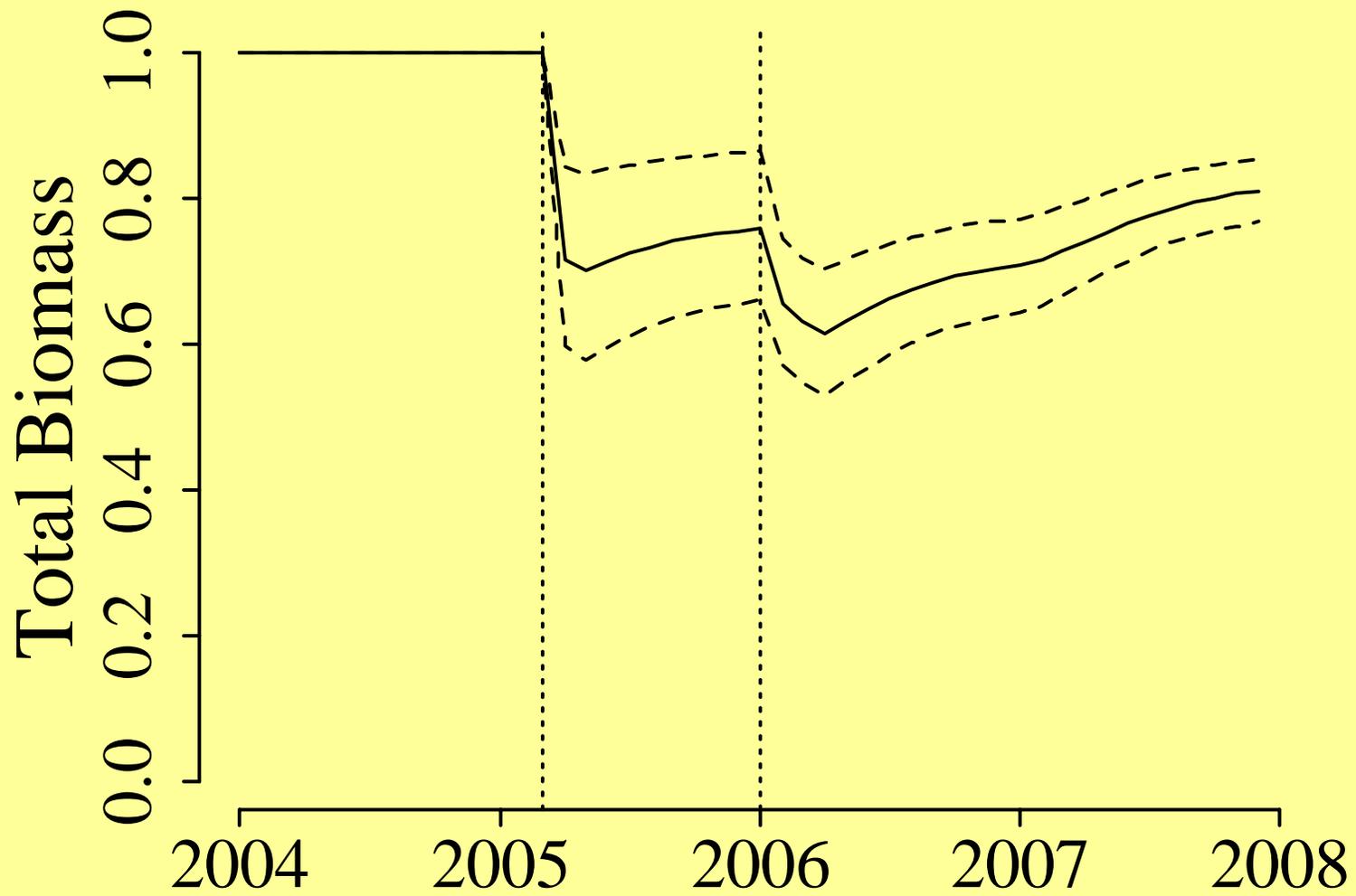
Project Components

1. Gizzard shad population response to harvest
2. Harvest strategies for shad
3. Gizzard shad feeding
4. Changes in water quality
5. Bycatch impacts for black crappie fisheries

Lakes: Dora, Eustis, Harris

Commercial Harvest

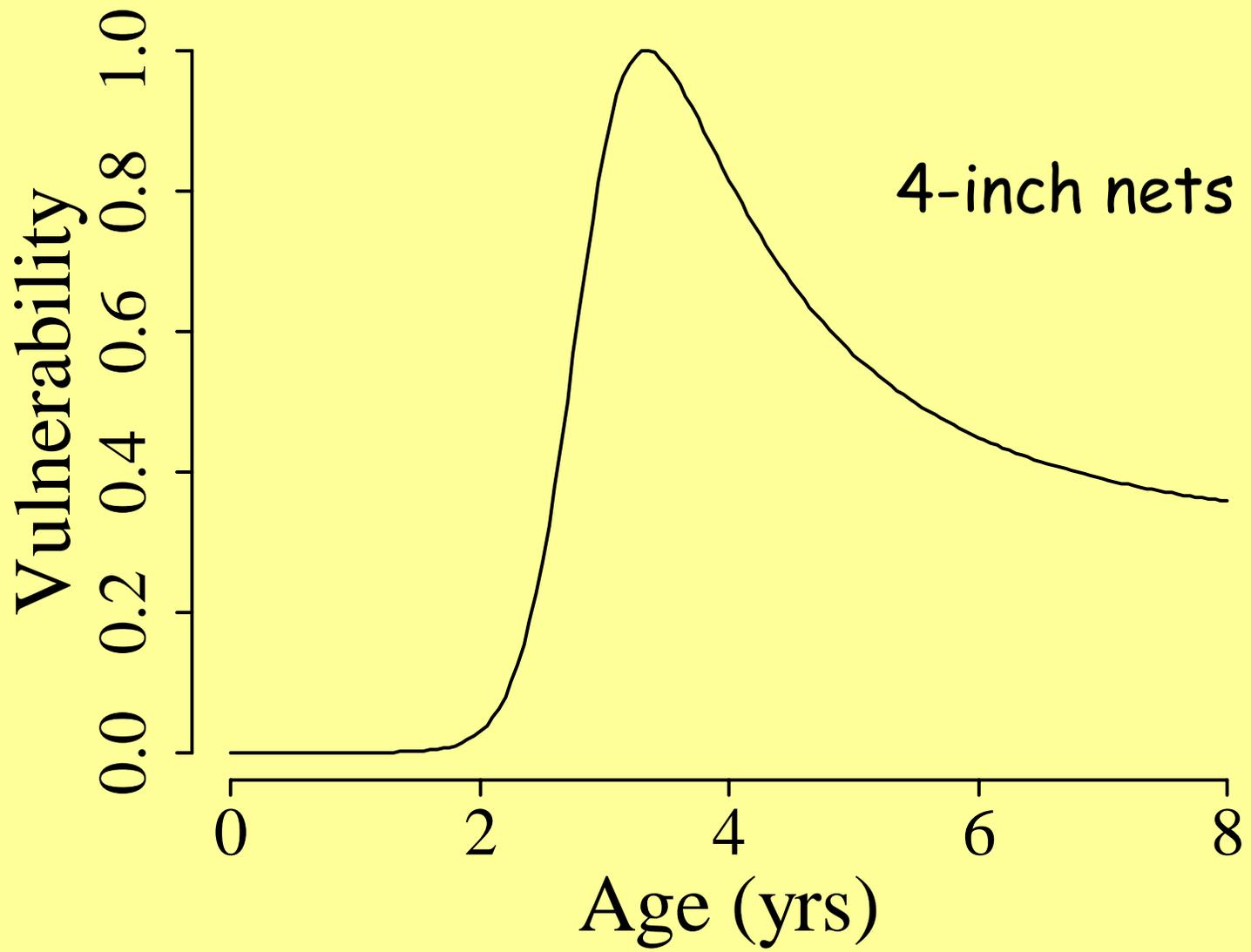
- Two commercial fishing years
- Estimated a 40% reduction in total gizzard shad biomass



Shad Response to Harvest

- No change in shad growth rates
- Size at maturity declined
- Evidence suggests that recruitment did not decline, but more sampling planned

Shad vulnerability to commercial nets

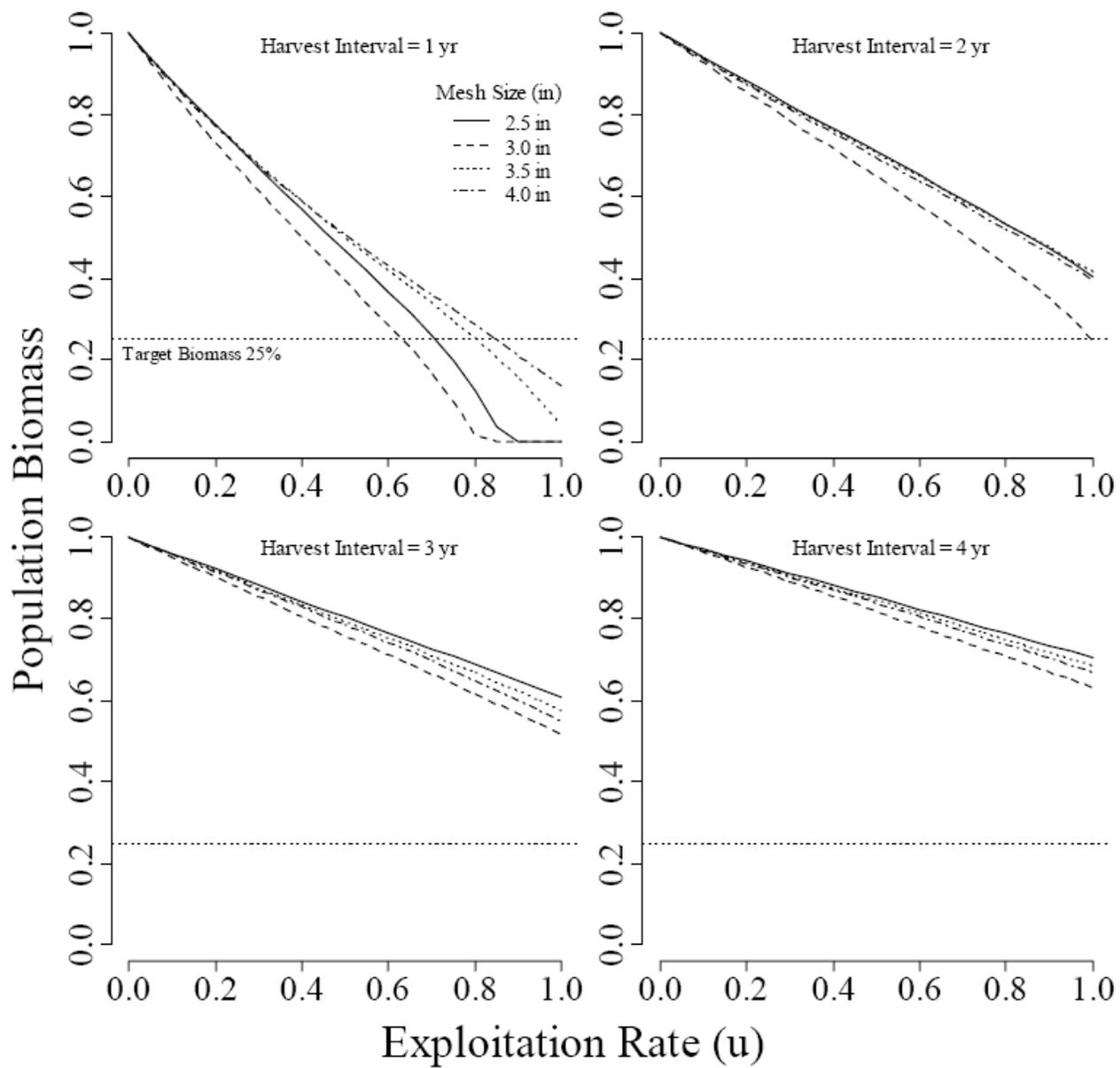


Biomanipulation Strategies

Literature suggests that 75-80% biomass reductions are needed to achieve water quality improvements

Using gill net fisheries, such reductions could only be achieved by:

- smaller mesh
- very intensive fishing
- fishing every year

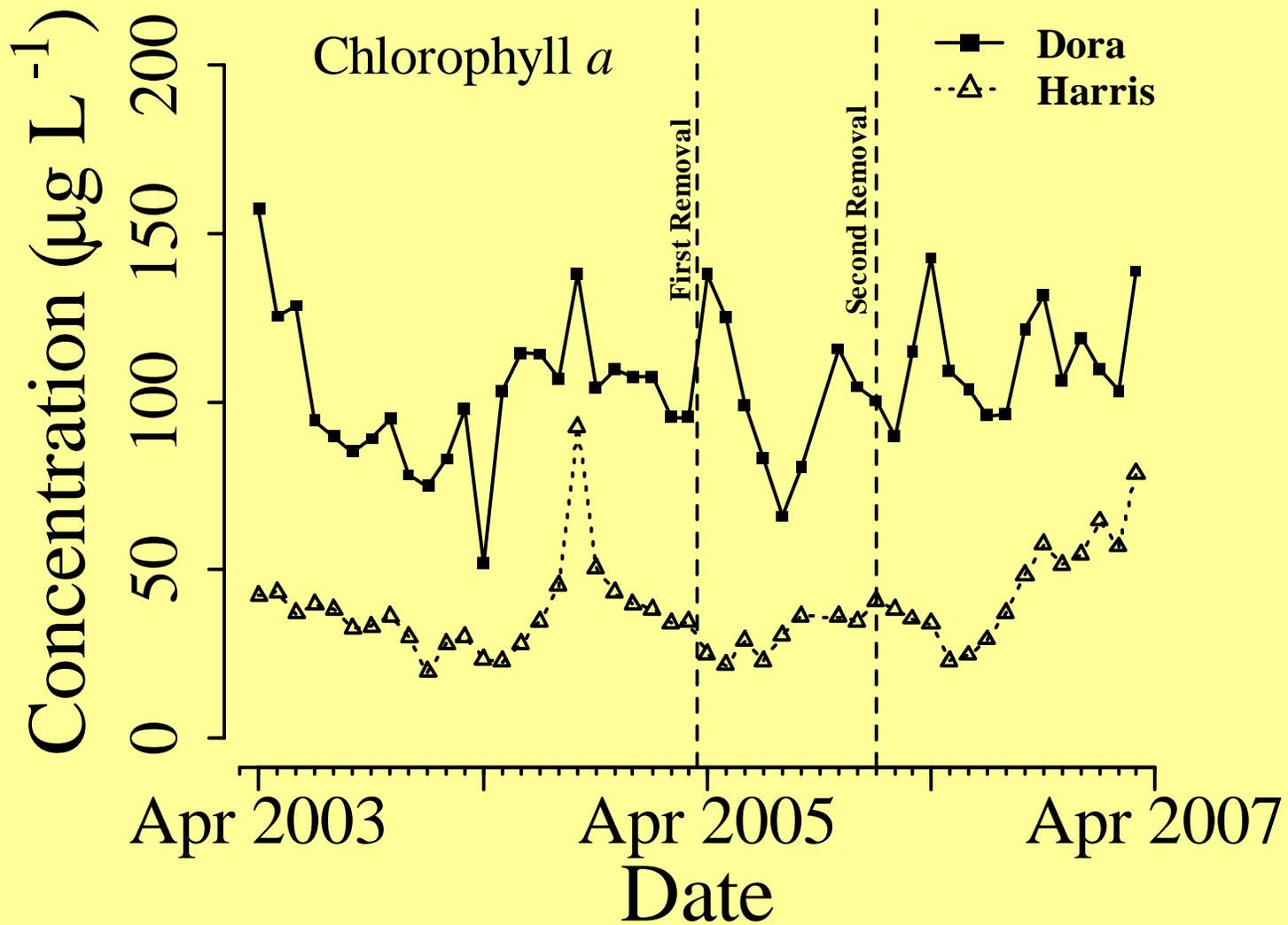


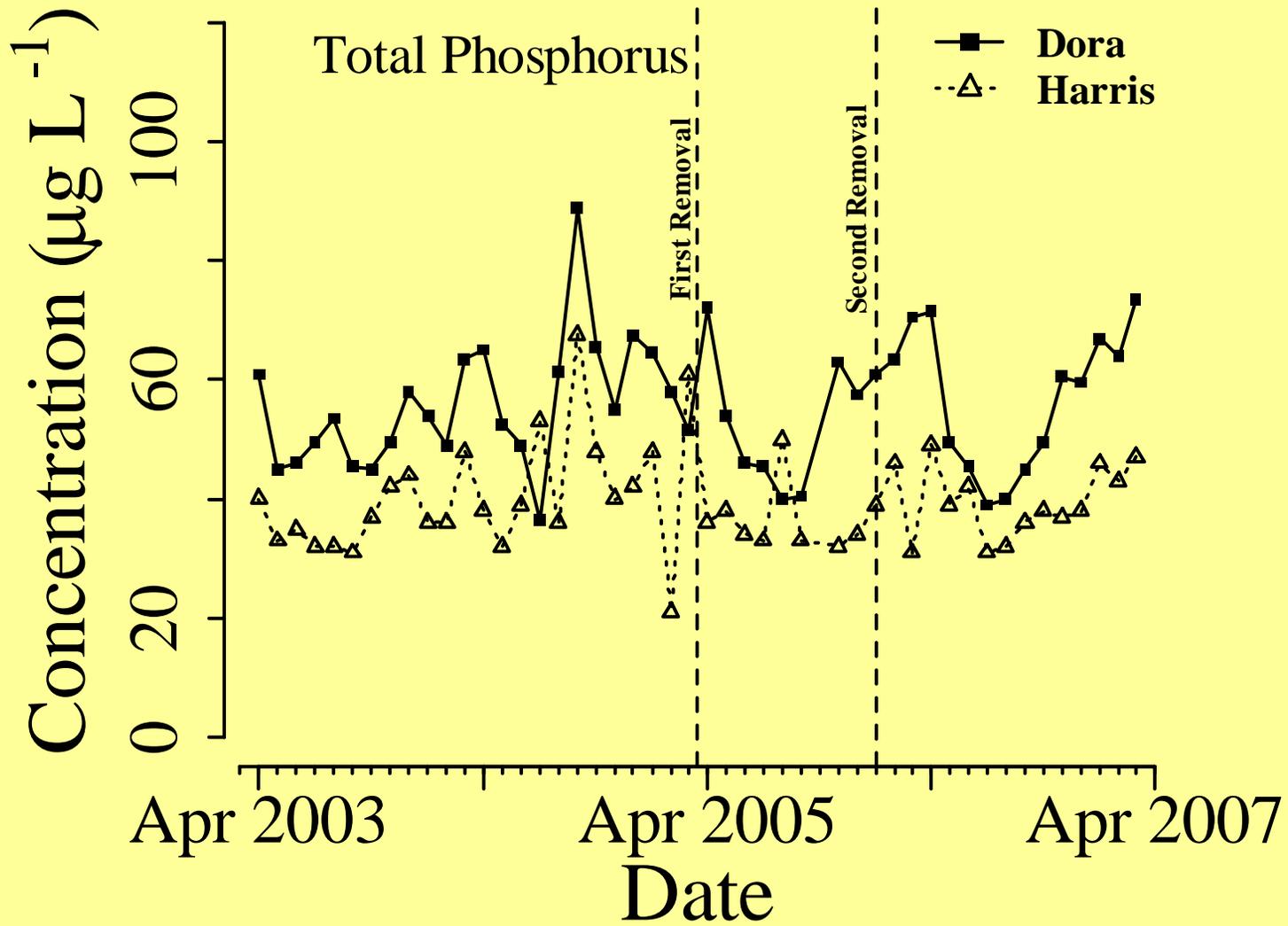
Gizzard Shad Feeding

- Shad are omnivores
- Clearly shad feed in the sediment
- All gizzard shad showed evidence of feeding in sediments and from the water column

Changes in Water Chemistry

- No change in chlorophyll, phosphorus, or zooplankton at Lake Dora





Changes in Water Chemistry

- 40% reduction over two years had no impact at Lake Dora
- Could require a stronger manipulation
- Objective 5...

Black Crappie Bycatch

- Anglers harvested 32,000 to 39,000 fish in 2005 and 2006

Bycatch was:

17,000 in 2005

30,000 in 2006

*bycatch mortality 31-45%

Black Crappie Bycatch

- Lake Dora is a popular black crappie fishery
- Fishing mortality for the recreational fishery was high (42%)
- We estimated 12% additional fishing mortality from commercial bycatch
- Near maximum sustainable fishing mortality rates from both fisheries combined

Black Crappie Bycatch

- Commercial bycatch is a concern for fisheries like Lake Dora, when angler harvest is also high
- Could harm recreational fisheries
- Lake Apopka comparison

Management Recommendations

- Literature suggests that large biomass reductions are needed to cause water quality changes
- Our results show that this is unlikely with current fishery configurations
- Biomass reduction needed for FL lakes unknown
- Smaller mesh nets, more intensive fishing needed

Management Recommendations

- Bycatch is an important consideration, would increase with smaller mesh sizes
- Future projects should set biomanipulation as the primary objectives, with fisheries objectives secondary
- Lake Dora experiment did not optimize either objective (biomanipulation or fisheries)

Thank You!



Attachment 2

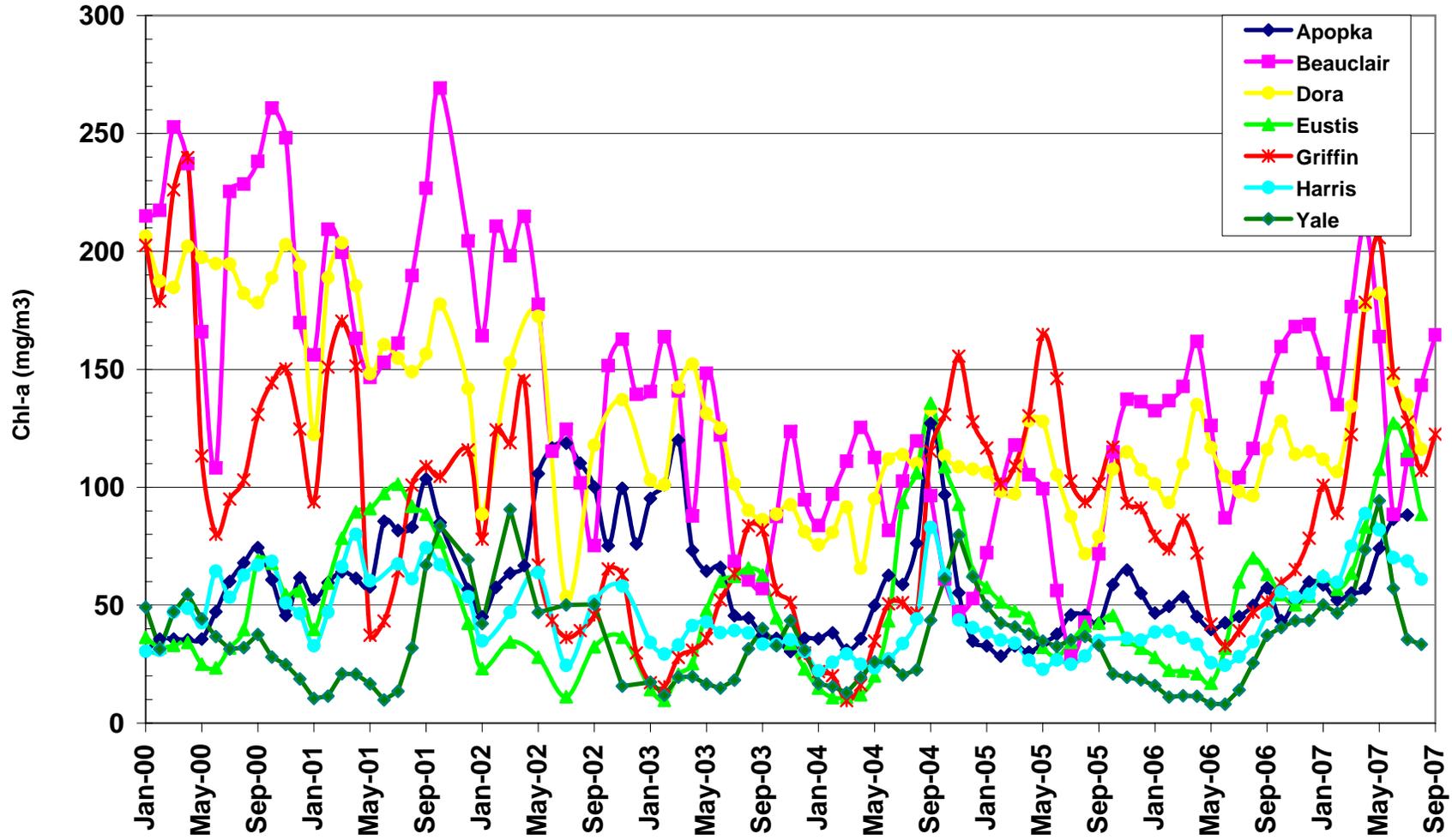
Harris Chain of Lakes

Water Quality Graphs

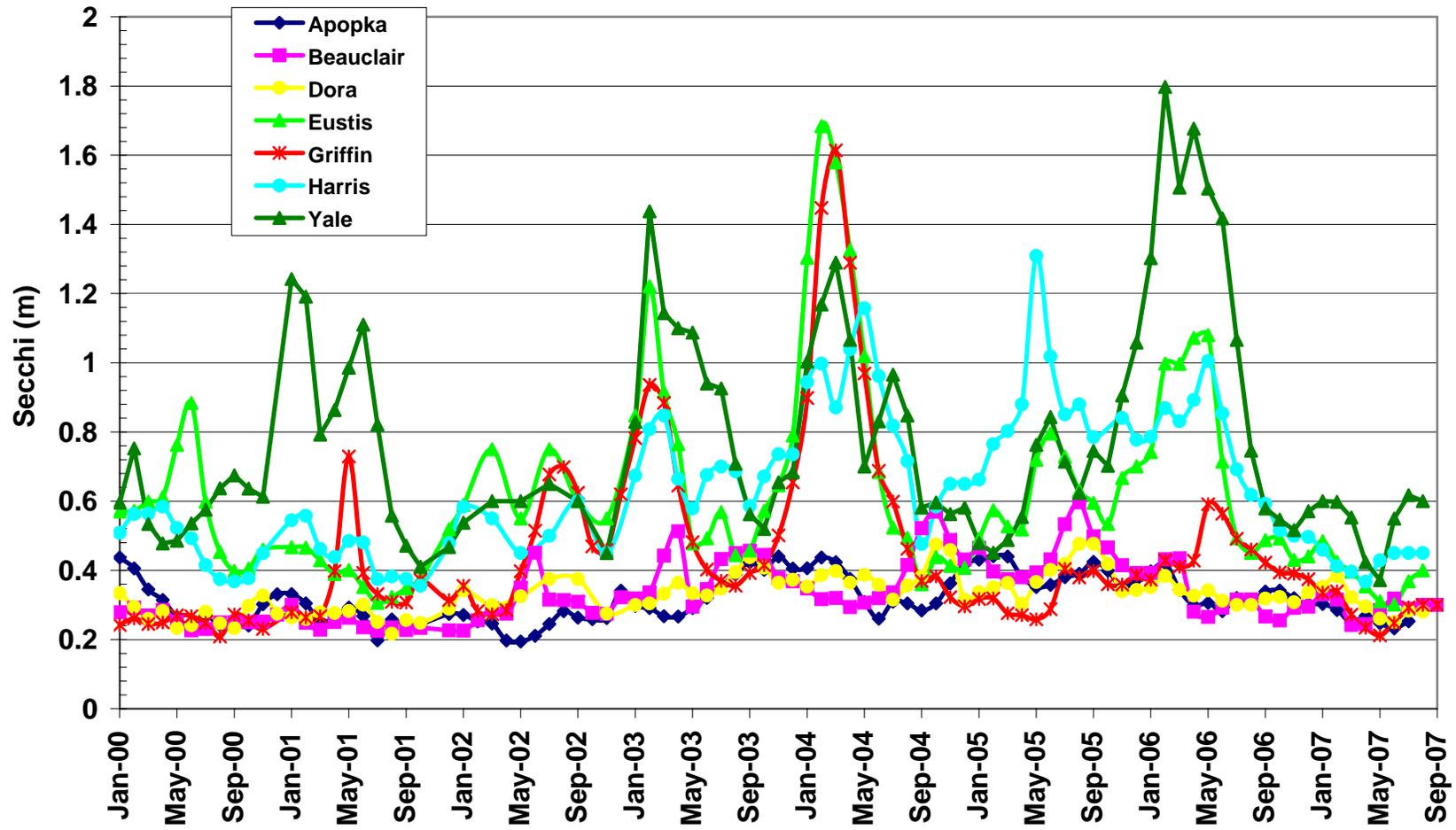
Dr. Larry Battoe - SJRWMD

October 2007

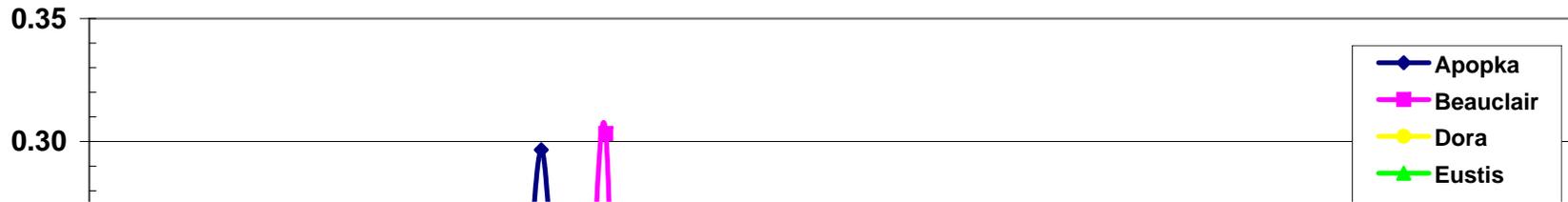
Harris Chain of Lakes Chlorophyll

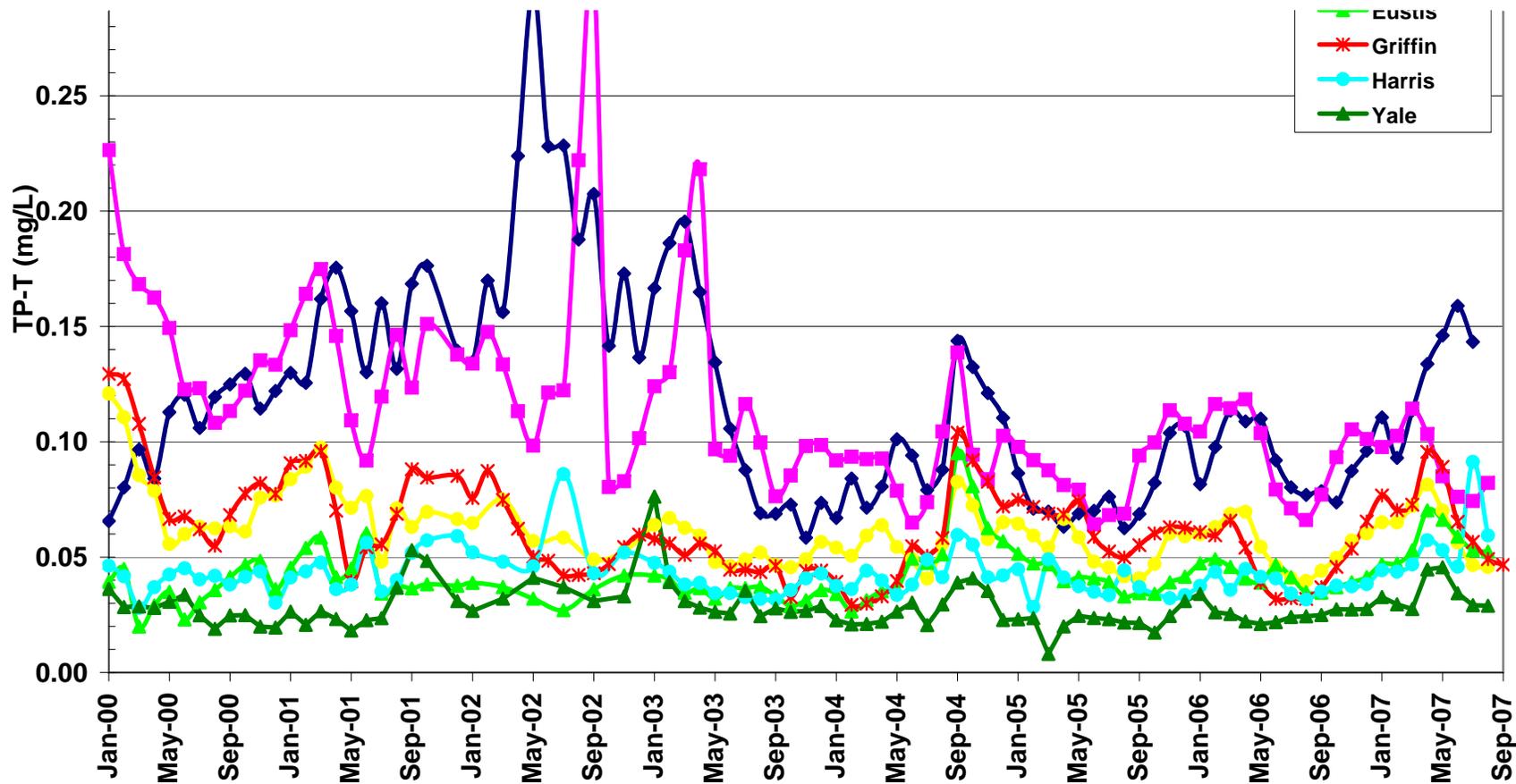


Harris Chain of Lakes Secchi Depth



Harris Chain of Lakes Total Phosphorus





Attachment 3

SJRWMD Project Update

Dr. Larry Battoe - SJRWMD

October 2007

Project Summary – Dr. Larry Battoe SJRWMD October 2007 (via email)

Upper Ocklawaha River Basin

- ORB Rough Fish Harvesting - Monitoring of the year-round program gizzard shad catches was continued this month under Contract #SK404RA. The year-round harvest by two boats in

Lake Apopka is reporting about 20,000 to 25,000 pounds of shad harvested per month. Staff received annual reports for Experimental Gill Net Sampling and Rough Fish harvesting in basin lakes.

- UORB Environmental Assessment - Previously elevated levels of total phosphorus and chlorophyll continue to decline in basin lakes from the latest water quality samples. There was no surface water discharge from the EMCA again this month. Annual discharge from the EMCA this calendar year is a small fraction of the allowable target P loading from the site to Lake Griffin. Completed sampling and analyses of residual pesticide levels in fish tissue from 21-1

the Harris Bayou and coordinated results with FDOH to address potential human health risks

from consumption of fish from the site. Conducted a field test of the mechanical removal of

hydrilla as an alternative method for control of hydrilla in basin restoration areas and other lake

areas.

- UORB Emeraldal Marsh - Water levels across the Emeraldal Marsh continue below normal due

to low rainfall. The interim infrastructure modifications are being completed. Area 4 was

reconnected to Lake Griffin and Haynes Creek. District staff is designing an alum injection

system for use with the new infrastructure modifications. The Eustis Farm site (Area 7)

continues to receive dredged spoil from the LCWA canal-dredging project on Lake Griffin.

Project should be complete by March 2008.

- UORB Harris Bayou - District construction on the Harris Bayou continues according to plan.

The headwall and box culvert under the new Sleepy Hollow Road is progressing. The floor of

the box has been poured and the contractor is working on the walls. The excavation for the

connecting section between Sleepy Hollow and US441 has begun. Construction on the project

will be by June 2008.

Lake Apopka

- Lake Apopka Marsh Flow-Way Project - Maintenance of the B1 and B2 cells has been

completed and the cells are slowly being re-flooded. They will be left in a shallow flooded

condition for approximately 30 days to encourage new vegetation growth prior to operation.

Operation of the C1 and C2 cells has commenced. Alum dosing system for the B1 cell is nearing completion. Alum treatment will be used to reduce phosphorus levels while maintaining the shallow flooded condition.

- Lake Apopka North Shore Restoration - The soil inversion project is nearing completion for

this fiscal year. The contractor has completed remediation of 300 acres of former farm fields

with a reduction in contaminant levels of up to 70%. Based on these results, staff negotiated

with the contractor for Renewal 1 in FY 2007-08. The contractor will provide heavier

equipment and has also agreed to a performance based SOW where the contractor will re-plow

field blocks that do not show a 50% reduction in contaminant levels or plow new field blocks of

equivalent acres. District staff are also developing Restoration Plans for Zellwood Unit 1 & 2 as

part of the cost-share agreements with NRCS.