A Management Plan for Walton County's Coastal Dune Lakes

Sponsored by:

Choctawhatchee Basin Alliance, under guidance from the
Walton County Coastal Dune Lakes Advisory Board

Report by:

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October 2008

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Introduction

In early 2006, Mr. Phillip Ellis with the Choctawhatchee Basin Alliance (CBA) and Mr. Scott Jackson with the University of Florida's IFAS Extension Service (UF/IFAS) under the guidance of the Coastal Dune Lakes Advisory Board (CDLAB) hosted a series of community meetings to initiate the development of management plans for Walton County's coastal dune lakes. Unfortunately, after Phillip and Scott hosted the community meetings, they each began to pursue other career opportunities and the development of the Coastal Dune Lakes Management Plan stalled. Therefore, Ms. Julie Terrell, Director of CBA, requested that Florida LAKEWATCH from UF/IFAS finish developing the management plan for Walton County's coastal dune lakes using an approach called TEAM (Together for Environmental Assessment and Management).

The TEAM approach with LAKEWATCH leadership was selected because LAKEWATCH has successfully used the TEAM approach to develop lake management plans for several Florida lakes, including the Tsala Apopka Chain of Lakes in Citrus County, Lake Wailes in Polk County and the Forest Hills Lakes in Hillsborough County. TEAM is a three-step process for developing comprehensive and integrative lake management plans and water resource policy. Technical experts, stakeholders, and other citizens from the community identify, define, and prioritize their concerns and potential courses of action concerning a water resource issue(s). Then, "pro" and "con" information is developed by LAKEWATCH for each issue. Once this pro/con information is provided to the citizens, participants in the TEAM process come together in a final meeting to discuss and ultimately vote on a course(s) of action with regard to a lake management plan or water resource policy.

The formal development of the Coastal Dune Lakes Management Plan by LAKEWATCH began on February 2008, when a representative group of coastal dune lakes stakeholders was assembled to advance their concerns regarding potential problems at Walton County's coastal dune lakes. Following a write-up of this meeting (see Appendix III in Hoyer and Canfield 2008, the Pros and Cons of Issues Identified by Stakeholders Regarding the Future Management of Walton County's Coastal Dune Lakes), all available data were gathered and analyzed by LAKEWATCH to help develop lake management options.

In early August 2008, the citizens involved in the February meeting received a compilation of the available information with the "pro" and "con" of each issue discussed. The participants were also provided viable options, based on facts as best known, for the management of Walton County's coastal dune lakes (see Appendix I - "Pros and Cons of Issues Identified by Stakeholders Regarding the Future Management of Walton County's Coastal Dune Lakes"). On August 25, 2008, over 50 interested stakeholders (Table 1) took time from their day-to-day schedule and met for nearly six hours to discuss the proposed management options and advance their ideas about how to manage Walton County's coastal dune lakes.

This document constitutes the proposed Walton County Coastal Dune Lakes Management Plan. The plan follows very closely the recommendations of the stakeholders and is written to provide the attending stakeholders, appropriate policy makers, the overall public and any future interested parties with documentation when considering issues associated with Walton County's

coastal dune lakes. Like all issues in life, there is a lack of appropriate information for some subjects. Consequently, certain investigative projects are proposed to enhance any future adjustments to the coastal dune lake management plan. Most likely, there shall be a need to modify this management plan within 4-8 years as the community changes and if new evidence indicates a change is needed. Current readers or future stakeholders should not view the existence of this need as a problem because any lake management plan must be adaptable when new information becomes available or experience dictates a change. It is important to remember that any successful lake management plan must be considered a "living document", just like the Constitution of United States.

Table 1. List of Stakeholders who attended the final lake management meeting for Walton County's coastal dune lakes (August 25, 2008).

First Name	Last Name	City
Marsha	Anderson	not provided
Jennifer	Asuncion	Panama City Beach
Anthony	Austermann	not provided
Mark	Brady	Santa Rosa Beach
Connie	Brady	Santa Rosa Beach
Richard	Bryan	Panama City Beach
Bill	Bullock	Seagrove Beach
Susan	Burgess	DeFuniak Springs
Bill	Crane	Santa Rosa Beach
Bill	Cunningham	Seagrove Beach
Earl	Day	Seagrove Beach
Mike	Flynt	Miramar Beach
Richard	Fowlkes	Santa Rosa Beach
Ann	Haigh	not provided
Chandra	Hartman	Santa Rosa Beach
Gloria	Hollingsworth	DeFuniak Springs
Sonny	Hollingsworth	DeFuniak Springs
Garrett	Horn	Seagrove Beach
Donna	Kay	Santa Rosa Beach
Nate	Kelly	not provided
Cliff	Knauer	Santa Rosa Beach
Susan	MacDonald	Santa Rosa Beach
Eric	Marcus	Santa Rosa Beach
Jacquee	Markel	Santa Rosa Beach
Billy	McKee	Santa Rosa Beach
Carrie Nelle	Moye	Santa Rosa Beach

Table 1. *Cont.*

First Name	Last Name	City
Meg	Nelson	Panama City Beach
Anita	Page	Santa Rosa Beach
Susan	Paladini	Santa Rosa Beach
Laura	Pennington	Milton
Matt	Phillips	Tallahassee
Chris	Pickren	Santa Rosa Beach
Melissa	Pullen	Santa Rosa Beach
James	Radtke	Santa Rosa Beach
Brenda	Rees	Santa Rosa Beach
Charlie	Reichman	Rosemary Beach
Louise	Reichman	Rosemary Beach
Hal	Rhodes	Miramar Beach
Brooke	Saari	not provided
Ken	Sloan	not provided
Harold	Smith	Santa Rosa Beach
Leah	Strattman	not provided
Janet	Strutzel	Santa Rosa Beach
Rebecca	Sullivan	Santa Rosa Beach
William	Sullivan	not provided
Rosa	Sullivan	not provided
Nick	Vlahos	Santa Rosa Beach
Christian	Wagley	not provided
Loyal	Weaver	Niceville
Vanette	Webb	not provided
Jeannie	Wilson	Santa Rosa Beach
Charlotte	Wright	Seagrove Beach

This document is divided into three sections. The first section, *Review of Options for the Management of Walton County's Coastal Dune Lakes, Originally Proposed in August 2008*, provides the reader with all the proposed management options for each of the seven major issues that were originally identified by the stakeholders. The second section, *Stakeholder Evaluations of Options for the Management of Walton County's Coastal Dune Lakes***,** details the stakeholders' response to the proposed management options, options retained by the stakeholders attending the August 25, 2008 lake management meeting and any recommended modifications. The third section, *Prioritization of Options for the Management of Walton County's Coastal Dune Lakes*, takes all the recommendations and divides them into three priority categories.

The Category I (TOP) Priorities constitute an accomplishable set of management options/actions that, if initiated, will have relatively quick and major impacts on Walton County's coastal dune lakes and address many of the stakeholders' immediate concerns. Category II and III Priorities are also important, but issues may arise where some of the options cannot be implemented right away. Do first what is "doable" and work hard for the long-term to accomplish all the viable options. Sometimes lower priority options can be accomplished first, so just do it! Sometimes, legal requirements may preclude the timely implementation of the recommendation (for example, eliminating culverts at the Oyster Lake outlet) so move on to options that are *doable*! Also, monetary considerations must be addressed. Given citizen concerns about availability of money, it might be determined that an option (for example, purchasing land at the coastal dune lakes' outlets) cannot be implemented quickly. Finally, there is nothing wrong with deferring a recommendation if new evidence supports such a decision.

Section III is followed by a Summary of Recommended Priorities, something like a Coastal Dune Lakes To-Do List. This will help everyone involved to remain focused on prioritized actions and to track progress as it advances.

Section I: Review of Options for the Management of Walton County's Coastal Dune Lakes, Originally Proposed in August 2008

Issue 1: Who is in Charge?

Option 1: The "Do Nothing" Option.

Option 2: Select the Coastal Dune Lakes Advisory Board of Walton County with an expansion of the ex-officio members or Technical Advisory Group.

Issue 2: Outlet Management

Option 1: Monitor the dates and times of all the coastal dune lakes' outlet openings and closings, and collect information on rainfall, water table level, watershed area, and lake morphometry to help model the frequency, magnitude, and duration of outlet openings. These data need to be combined into a master database, continually updated as monitoring occurs and analyzed over time for trends.

Option 2: Walton County staff should identify property adjacent to the coastal dune lakes outlets and located in the historical sweep distance. The Walton County Commission should be advised to buy and preserve these properties if it is possible to leverage monies with existing conservation groups, private individuals or state/federal government. Where money is not available, Walton County should strive to prohibit any additional building of major permanent structure in the historical sweep area. This may require legal adjustments to building restrictions and strict enforcement of permitting that is already outlined in the County's Land Development Code. However, private property rights must always be considered.

Option 3: Install deep wall barriers into the sand on private property to reduce outlet migration.

Issue 3: Water Quality

Option 1: Maintain current citizen water quality monitoring program conducted by Florida LAKEWATCH and CBA to monitor long-term nutrient concentrations, chlorophyll levels, water clarity and other basic water chemistry parameters. Additionally, find volunteers to begin sampling identified coastal dune lakes that are currently not being sampled by Florida LAKEWATCH (Stewart, Horseshoe, Tresca and Little Deer Lake).

Option 2: Because Oyster Lake was the only coastal dune lake showing a definitive increase in nutrient concentration; increase the sampling effort on Oyster Lake to determine where nutrient enrichment is originating.

Option 3: Initiate a comprehensive total and fecal coliform bacteria-scan monitoring program to determine if Walton County's coastal dune lakes are being contaminated by fecal material from urban/residential development. If high bacteria counts are found, do further tests to determine if high counts are due to false positives (natural occurrences).

Option 4: Initiate a comprehensive chemical, heavy metal and/or pesticide-monitoring program to determine if Walton County's coastal dune lakes are being contaminated by watershed development and/or initiate a chemical scanning of the fish population to determine if fish are safe to eat.

Issue 4: Watershed/Inlet Management

Option 1: "Do Nothing" to change current watershed management.

Option 2: Examine Walton County's coastal dune lakes watershed problems identified by Hartman and Associates (2001) to see if they still present a potential problem to the water quality of the coastal dune lakes. Additionally, because the report is almost 10 years old, and tremendous population growth and urban development have occurred during that ten years, identify other potential sources of storm water pollution. Identified problems should be prioritized and cost-effective solutions should be found to repair or replace problem situations.

Issue 5: Aquatic Plant Management

Option 1: "Do Nothing" to manage aquatic plants in Walton County's coastal dune lakes.

Option 2: Initiate a bi-annual (once every two years) aquatic plant survey to monitor the changes in the aquatic plant communities of the Walton County's coastal dune lakes, continually looking for invasions from new exotic aquatic plants and changes in established populations of exotic plants (primarily torpedograss).

Option 3: Establish a maintenance control program for torpedograss with proper herbicides and begin revegetation efforts with native plants.

Issue 6: Education

Option 1: The "Do Nothing" Recommendation.

Option 2: If the CDLAB creates a TAG (technical advisory group), this group should immediately be charged with planning and assisting the CDLAB with implementing a comprehensive community education program for the coastal

dune lakes. By incorporating programs that already exist and adding programs in areas where stakeholders are not receiving information pertinent to the preservation and management of the coastal dune lakes, the TAG under the direction of the CDLAB could enhance the educational program for the coastal dune lakes at a minimal cost.

Issue 7: Fish and Wildlife

Option 1: Initiate a monitoring program for the fish communities using Walton County's coastal dune lakes.

Option 2: Remove obstructions to fish passage at Oyster Lake and monitor the return of saltwater species.

Section II: Stakeholder Evaluations of Options for the Management of Walton County's Dune Lakes (August 25, 2008)

Issue 1: Who is in Charge?

Option 1: The "Do Nothing" Option.

Stakeholders who attended the August 25, 2008 lake management meeting rejected this option.

Justification: Some attendees voiced the concern that this management option actually meant do nothing in the future. When explained that the "Do Nothing" options actually meant that the status quo should be maintained, all attendees rejected the options because they felt no single organization was focused on the coastal dune lakes or had the breadth of expertise needed to properly manage or address issues associated with the coastal dune lakes.

Option 2: Select the Coastal Dune Lakes Advisory Board of Walton County with an expansion of the ex-officio members or Technical Advisory Group.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option and recommend it for immediate action.

Justification: The primary advantage of selecting the existing Coastal Dune Lakes Advisory Board of Walton County (with some modifications) as the lead lake management group would be that the CDLAB could channel the agreed upon management approaches (getting something done) through the proper channels to the Board of County Commissioners. The CDLAB would also have the interest needed to shepard and modify, when needed, the Walton County Coastal Dune Lakes Management Plan because they sponsored the development of the plan and are the group designated to hear citizen concerns.

In establishing the seven (7) member Coastal Dune Lakes Advisory Board (Ordinance 2002-02), the Board of County Commissioners recognized that there is a strong need for a diversity of representation by the citizens and established language for adding ex-officio members (up to 10 members per Ordinance 2002-02) to the Coastal Dune Lakes Advisory Board. This structure provides the greatest assurance that what is decided upon by the Coastal Dune Lakes Advisory Board is acceptable to most Walton County citizens and if action is taken by the Board of County Commissioners that something will most likely happen. The stakeholders attending the August meeting agreed that expanding the CDLAB membership through the appointment of ex-officio members would strengthen the Board and assist with the development of the non-partisan political will to accomplish things for the lakes.

It is important that the diversity of representation on the advisory board needs to be expanded to insure all groups are represented. For example, the South Walton Tourist Development Council, the real estate industry, Topsail Hill State Park, and a representative that shall voice concerns regarding any infringement of property rights should all be represented.

The CDLAB also needs technical advice. It is now clear that there is a wealth of scientific information available on the coastal dune lakes, but it is unrealistic for the citizens of the CDLAB to become limnologists, oceanographers, meteorologists, or any other professional expert. Members of the CDLAB, however, can interpret technical information when presented to them. The Florida Legislature recognized the importance of a technical advisory group when the Legislature established the Harris Chain of Lakes Restoration Council (373.467 F.S.). Stakeholders attending the August meetings clearly saw the need for a TAG group and urged that adding such a group would strengthen the CDLAB's leadership position regarding Walton County's coastal dune lakes.

Finally, the CDLAB needs to establish a political liaison advisory group that would bring appropriate information to the Walton County Legislative delegation. There is a lack of communication or information provided, so the Walton County Legislative delegation cannot be as effective as they could be in directing assistance. However, before forwarding information to the liaison group, the CDLAB should insure that the Board of County Commissioners is also in agreement with any forwarded issues.

Approach: In discussions with the stakeholders, it was recommended that the current members of the CDLAB reach out to the community to find three to five potential Ex-officio members (up to 10 members per Ordinance 2002-02) that could be appointed by the Board of County Commissioners. As mentioned previously, a representative from the real estate industry or another business group could provide important insight for many future issues. Certainly, a representative from the State Park System might be an excellent addition given the importance of Topsail to the area, and a representative of the South Walton Tourist Development Council would be valuable due to the interest in water resources by the enormous population of tourists who visit Walton County.

The Florida Legislature in establishing the Harris Chain of Lakes Restoration Council created a technical advisory group (TAG) consisting of one representative each from the appropriate Water Management District, the Department of Environmental Protection, the Department of Transportation, the Florida Fish and Wildlife Conservation Commission, the Lake County Water Authority, the United States Army Corps of Engineers, and the University of Florida, each of whom shall be appointed by his or her respective agency, and each of whom, with the exception of the representatives from the Lake County Water Authority and the University of Florida, shall have had training in biology or another scientific discipline. For the CDLAB, it seems that for their TAG to function effectively, it will need to be chaired by a local organization familiar with the issues. At this point in

time, Ms. Julie Terrell, Director of the Choctawhatchee Basin Alliance (CBA), would seem to be the best choice to chair the TAG.

Getting the sustained participation of scientists and technical experts from agencies outside of Walton County could be difficult given the economic climate. The Walton County Board of County Commissioners should, therefore, be requested by CDLAB to contact the appropriate organizations regarding the sending of a knowledgeable representative. If need be, the Commission could seek help from the local Legislative delegation to determine if representatives from the state agencies can be assigned. Obviously, the mix used for the Harris Chain of Lakes Restoration Council will not be appropriate for the coastal dune lakes. However, representatives from the Northwest Water Management District, the Department of Environmental Protection, and the Florida Fish and Wildlife Conservation Commission are needed. A representative from Walton County Public Works (storm water expertise) and the Planning & Development Division are also needed. Because there are excellent professionals at Northwest Florida State College, it is strongly recommended that Ms. Terrell as the TAG chair seek another representative from that fine educational institution that has familiarity with the coastal dune lakes for the CDLAB's TAG.

Issue 2: Outlet Management

Option 1: Monitor the dates and times of all the coastal dune lakes' outlet openings and closings, and collect information on rainfall, water table level, watershed area, and lake morphometry to help model the frequency, magnitude, and duration of outlet openings. These data need to be combined into a master database, continually updated as monitoring occurs and analyzed over time for trends.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option with the suggestion that water levels in surrounding wells also be monitored to keep track of ground water fluctuations.

Justification: Information provided in the Pro/Con report to the stakeholders showed that coastal dune lake outlets open and close depending on rainfall, water table level, the physical aspects of the lake's watershed and lake morphometry. Much of the information was available with detailed database searching and is now recorded in the Pro/Con report for any interested readers. Stakeholders were informed that other data that they were interested in is already being monitored (e.g., rainfall) and just needs to be requested from Eglin Air Force Base to maintain a continuous database. However, other limnological data and some forms of monitoring to obtain continuous data on some lakes are lacking, including: watershed areas, good bathymetric maps for calculating lake volumes, stage gauges in the lakes to monitor water levels, and local wells to monitor groundwater levels. When this information is collected, combined in a database and continually examined over time, it will help in determining if there are changes in the

functioning of the coastal dune lake outlets as Walton County's population continues to grow. However, without these data, decisions shall continue to be made based on opinions rather than facts. Consequently, the stakeholders attending the August meeting recognized that many of the harsher community debates could be eliminated with a comprehensive coastal dune lakes database accessible to the CDLAB and other interested parties.

Approach: The stakeholders often expressed concerns regarding the cost of various approaches, but there are ways to minimize costs using local resources like Northwest Florida State College and Choctawhatchee Basin Alliance (CBA) personnel associated with the college. For example, watershed areas and land use information are already available for all of Walton County's coastal dune lakes from GIS (Geographical Information Systems) maps used by Hartman and Associates (2001) when they wrote the Walton County Stormwater Master Plan. Personnel from CBA should acquire these data and maintain them in a master database. Similarly, rainfall-monitoring data are available from stations in Pensacola and Eglin Air Force Base. These data could also be acquired by CBA personnel, added to the master database and continually updated for analyses for the CDLAB by the CBA.

The nearest monitored groundwater well to Walton County's coastal dune lakes that is continuously monitored for water level by USGS (United States Geologic Survey) is in Greenhead, Florida which is about 25 miles northeast of the nearest coastal dune lake in Walton County. Again, CBA personnel could work with Walton County staff to determine if other wells exist closer to the coastal dune lakes that could be monitored for water level. If other wells exist, CBA personnel could find a volunteer(s) who could monitor the water levels on a regular basis. If a closer well does not exist, then CBA could work with Walton County for funds to sink a well for water level monitoring purposes. These data, when acquired, should again be added to the master database.

Few lake-level staff gauges are positioned in Walton County's coastal dune lakes for recording water levels. Once again, the highly qualified CBA personnel could be funded to work with Walton County staff to acquire funds to put "good and workable" staff gauges in each of the coastal dune lakes. These gauges should be calibrated to mean sea level for comparisons with Gulf of Mexico water levels. Florida LAKEWATCH and CBA volunteers, who sample the lakes for water quality, could inexpensively and regularly record the water levels and add them to their monthly data sheets for recording in the master database. Volunteers who live on the lakes could also be asked to record if the outlet was open or closed. All this data would be maintained by Florida LAKEWATCH personnel and shared with CBA for addition to the master database.

Florida LAKEWATCH has already developed bathymetric maps for six of Walton county's coastal dune lakes. These maps, however, were created in the year 2000 and LAKEWATCH has since upgraded the methodology used to create bathymetric maps. It is recommended that if money becomes available, LAKEWATCH should be contracted to create new bathymetric maps for each of Walton County's coastal dune lakes

calculating lake areas, lake volumes and mean depth. This data should be added to the master database maintained by CBA and made available to everyone.

Option 2: Walton County staff should identify property adjacent to the coastal dune lakes outlets and located in the historical sweep distance. The Walton County Commission should be advised to buy and preserve these properties if it is possible to leverage monies with existing conservation groups, private individuals or state/federal government. Where money is not available, Walton County should strive to prohibit any additional building of major permanent structure in the historical sweep area. This may require legal adjustments to building restrictions and strict enforcement of permitting that is already outlined in the County's Land Development Code. However, private property rights must always be considered.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option with the understanding that this is a long-term goal because it is a very expensive and time consuming option.

Justification: Research from several investigators has shown that the outlets for the coastal dune lakes have migrated east and west for thousands of years and that they will likely continue to do so. The Florida Department of Environmental Protection (FLDEP) has developed maps identifying Coastal Construction Control Lines (CCCL). These maps identify the location of the CCCL, which delineates the State's jurisdiction in coastal matters. Construction seaward of these lines requires a special permit from FLDEP. However, Browder and Dean (1998) noted that the CCCL in the vicinity of Walton County's coastal dune lakes has generally been diverted landward of the historical sweep areas, reducing (but not eliminating) the threat of structural damage due to migration of the outlet. Because of this, any construction within the sweep area stands a high chance of structural damage at some undetermined time. County (or other sources) purchase of this land will not only help minimize future structural damage, but permit the outlets to function more naturally into the future. *The need for natural functioning of the outlets was one of the most often voiced opinions by the vast majority of stakeholders.*

Approach: Walton County Commissioners should, when possible, allocate county funds or seek private, state and/or federal funds (e.g., Water Management District, Nature Conservancy, etc.) for purchasing land adjacent to Walton County's coastal dune lakes' outlets.

The Walton County Land Development Code now enforces a 300 ft zone of protection for coastal dune lakes (Section 4.02.03) and a 50 ft buffer around each of the coastal dune lakes' outlets. However, the identified sweep area for many of the coastal dune lakes exceeds these protection areas. Therefore, Walton County should consider changing the building restriction of the Land Development Code to include the entire zone of the sweep areas, but set it for individual lakes rather than making a blanket rule to insure the

protection of private property rights. Purchase of private lands from willing sellers, even over the long-term, will be the best way to protect property rights because once the land is in public ownership it can be left undeveloped.

Option 3: Install deep wall barriers into the sand on private property to reduce outlet migration.

Nearly all stakeholders who attended the August 25, 2008 lake management meeting rejected this option. Two attendees thought it was an option that should be made available to public officials.

Issue 3 - Water Quality

Option 1: Maintain current citizen water quality monitoring program conducted by Florida LAKEWATCH and CBA to monitor long-term nutrient concentrations, chlorophyll levels, water clarity and other basic water chemistry parameters. Additionally, find volunteers to begin sampling identified coastal dune lakes that are currently not being sampled (Stewart, Horseshoe, Tresca and Little Deer Lake).

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option understanding that monitoring the coastal dune lakes is the only way to keep track of potential changes that may be occurring.

Justification: Nutrient enrichment of lakes has been a major concern in Florida since at least 1960. Stakeholders around Walton County's coastal dune lakes have also shown considerable concern about the potential eutrophication of the coastal dune lakes. However, analysis of the existing water quality data (available due to volunteer sampling efforts supported by CBA and Florida LAKEWATCH) indicates that there has been no significant enrichment of most coastal dune lakes to date and that the nutrient concentrations are at levels that would be expected from the geology in which the coastal dune lakes exist. Thus, nutrient enrichment is not the water quality problem that many stakeholders once feared/believed it was. However, stakeholders now also understand that it is prudent to continue existing nutrient-related water quality monitoring to insure (the citizens' insurance policy) that a problem does not arise in the future.

Approach: Florida LAKEWATCH is the State of Florida's volunteer citizen lake monitoring program (Chapter 91-69; s 240.5329, F.S.). The program is designed to work with citizens who collect monthly water samples which are analyzed for total phosphorus, total nitrogen and chlorophyll concentrations. The citizens also measure water clarity by use of a Secchi disc. Currently, citizens around Walton County's coastal dune lakes with the assistance of CBA are monitoring the water in all but four of Walton County's coastal dune lakes; some of the four are not recognized by the CDLAB at this

time. Thus, there is now a monitoring system in place to detect any potential adverse effects of additional nutrient inputs.

Stakeholders believe the most cost-effective method for monitoring the coastal dune lakes is to continue the efforts of CBA and Florida LAKEWATCH. LAKEWATCH is operated by the University of Florida and is funded by several sources interested in protecting Florida water resources including the Florida Department of Environmental Protection's Water Quality Assurance Trust Fund. With continued Florida Legislative funding support, and the continued efforts of citizen volunteers, Florida LAKEWATCH should be able to continue the existing nutrient-related monitoring on the coastal dune lakes for the long-term. The only caveat to consider is that LAKEWATCH, as just mentioned, requires an annual appropriation from the Florida Legislature for operation. Annual expenses continue to rise while the Legislative appropriation remains constant. These two constraints shall limit expansion of LAKEWATCH efforts in Walton County unless additional operating funds are allocated by the Legislature or local sources of support are found.

Option 2: Because Oyster Lake was the only coastal dune lake showing a definitive increase in nutrient concentrations; increase the sampling effort on Oyster Lake to determine where nutrient enrichment is originating.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option.

Justification: Stakeholders living around Walton County's coastal dune lakes have consistently voiced considerable concern, as noted for Option 1, about the potential eutrophication of the coastal dune lakes. Although the available evidence has indicated there has been no significant nutrient enrichment of *nearly all* coastal dune lakes to date, Oyster Lake *has* shown a significant increase in phosphorus since 1981. Thus, additional sampling is needed to determine the source of this nutrient enrichment for future restoration/management activities.

Approach: Citizens around Oyster Lake, with the assistance of CBA and Florida LAKEWATCH, have been monitoring the water of Oyster Lake regularly since October of 2001. Thus, there is currently a monitoring system in place that can be expanded to seek out potential sources of major nutrient enrichment. LAKEWATCH and CBA are prepared to work with the volunteers to increase sampling efforts at Oyster Lake and try to find the source of nutrient enrichment. Utilizing the expertise of CBA and Florida LAKEWATCH offers the citizens concerned about Oyster Lake an efficient, cost-effective platform for investigating Oyster Lake's potential problems as well as potential problems facing the other coastal dune lakes.

Although the other coastal dune lakes have shown no definitive increase in nutrients, especially phosphorus, stakeholders remain concerned about lawn fertilization. The fertilizer industry has recently developed specially formulated blends that contain slow-release nitrogen (the nutrient responsible for keeping grass green) and contain no

phosphorus. Availability of these new blends is limited in Florida, so the user will have to pay more to purchase the phosphorus-free fertilizers, but stakeholders living around the dune lakes could take direct action on their concerns by using phosphorus-free fertilizer.

Option 3: Initiate a comprehensive total and fecal coliform bacteria scan-monitoring program to determine if Walton County's coastal dune lakes are being contaminated by fecal material from urban/residential development. If high bacteria counts are found, do further tests to determine if high counts are due to false positives (natural occurrences).

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option. CDLAB (the group selected to be in charge of this management plan) should contact a group called the Surfrider Foundation who have indicated the group may possibly be able to fund a bacterial monitoring initiative (Contact person is Melissa Pullen). Under the guidance of CBA and LAKEWATCH, who have both initiated a preliminary screening of bacteria on the coastal dune lakes, a bacteria scan monitoring program should be able to be developed.

Justification: Walton County's coastal dune lake stakeholders participating in the TEAM Approach were concerned greatly by the possible effects of bacterial contamination at the coastal dune lakes. Limited bacterial monitoring on four of the lakes has not detected any biological contamination that threatens human health, but concerns continue to persist because of potential bacterial contamination from poorly functioning septic tanks and/or storm water.

Initiating a low-cost monitoring program would go a long way towards alleviating lake users' concerns and alerting lake users of any impending problem. It has also been proven elsewhere in the State of Florida that fixing the "real" problem (correct the one malfunctioning septic tank) is far less expensive to the taxpayers than fixing a "perceived" problem by constructing a central collection system and requiring structure (all homeowners) to connect for wastewater service.

Approach: Financial as well as legal constraints often make it difficult if not impossible for local public health offices to conduct a comprehensive, routine bacteriological-monitoring program. If funding were to be available or obtainable, it would be ideal if monitoring was to be done by Walton County's public health office. Total and fecal coliform tests (the primary tests needed) taken by this office would provide legally defensible information if the County needed to close any lake to public use.

As an alternative to doing nothing because of the high cost of sampling by professionals, sampling by volunteers has shown to be a cost-effective alternative. There are tests available that can be used by volunteers. Florida LAKEWATCH and/or CBA can provide assistance, but it must be remembered that volunteer results have no legal standing authority for closing a lake; the bacterial results could only be used as a way of scanning for potential problems.

If a suitable volunteer monitoring program was developed in Walton County, citizens using the coastal dune lakes could monitor the lakes more frequently and more intensely than professionals. After evaluating the results of one study by Florida LAKEWATCH, monitoring probably could initially be limited to every other month, sampling total and fecal coliforms at 10 stations to provide a level of reasonable certainty that the water is safe to use. This type of sampling can also assist the volunteers in finding the sources of contamination, which professionals could then confirm and work toward fixing the problem.

Whether a bacterial monitoring program is conducted by professionals or volunteers, attention should be directed toward determining if any high fecal coliform counts are due to false positives before the lake is closed for human use. Bacteria from the genus Klebsiella, a natural soil bourne bacterium, can cause abnormally high fecal coliform counts. The other potential source that needs to be considered is aquatic birds roosting near the lake. Aquatic birds have been identified as a major source of contamination at other lakes both in and outside of Florida. Birds, however, represent a natural source over which humans have little control.

During the discussions among the stakeholders, a local organization called the Surfrider Foundation indicated the group might be able to fund a bacterial monitoring initiative; Ms. Melissa Pullen was identified as a point of contact. This offer represents a wonderful opportunity to begin a volunteer bacteriological monitoring program and it is strongly advise that Ms. Terrell of the CBA initiate contacts and discuss the possibilities.

Option 4: Initiate a comprehensive chemical, heavy metal and/or pesticide-monitoring program to determine if Walton County's coastal dune lakes are being contaminated by watershed development and/or initiate a chemical scanning of the fish population to determine if fish are safe to eat.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option understanding that it is an expensive option that may have to be postponed until the future when funding can be appropriated.

Justification: The possible effects of chemical, heavy metals and/or pesticide contamination on the coastal dune lakes concerned Walton County's coastal dune lakes stakeholders participating in the TEAM Approach, like many Floridians. However, there is no current information available on chemical, heavy metals and/or pesticide concentrations in Walton County's coastal dune lakes. Despite the fact there are no indications that chemical, heavy metal and/or pesticide contamination is impacting aquatic organisms in Walton County's coastal dune lakes, the majority of stakeholders strongly believe some monitoring should be done if funding becomes available to alleviate concerns amongst those who use the coastal dune lakes.

Approach: While CBA and Florida LAKEWATCH volunteers are already monitoring water chemistry in the Walton County dune lakes at a relatively minimal cost, this program only addresses trophic state variables.

Another type of sampling program would have to be started in order to monitor chemical, heavy metal and/or pesticides. This would require the appropriation of new funds and lots of them. Some commonly measured constituents found in storm water runoff and wastewater that potentially could occur in surface waters include: surfactants (alkylbenzenesulfonate), toxic organic compounds (1,4-dichlorobenzene, toluene, xylenes, 1,1-dichloroethane, 1,1,1-trichloroethane, and acetone) and metals (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver and zinc). The cost of analyzing these constituents varies considerably among laboratories, but the costs per constituent are much higher than current costs for trophic state constituents ($3 to $10). Surfactant costs are about $35 to $65 per sample, toxic organic compounds around $90 to $125 per compound, and metals about $15 to $25 per sample. These figures do not account for the time and personnel used to collect the samples. The sampling design (location and frequency) for Walton County's coastal dune lakes would have to be considered carefully before starting such a program. Currently, CBA and Florida LAKEWATCH sample three stations monthly in 20 Walton County coastal dune lakes locations for trophic state data. Assuming the same number of samples (504) would be collected for additional chemical analysis, it would cost approximately $400,000 dollars to analyze each of the above variables for one year. Additional money would also be needed for sample collection and data analyses. So, it is easy to see how costs soar.

If concerns remain and costs are an issue, the appropriate and most cost-effective approach should focus on the contamination of fish (or any other organism living in the coastal dune lakes that may be eaten by humans). Biological organisms can accumulate contaminants in their flesh. If measured levels are below established food consumption guidelines, there most likely is not a serious environmental contamination problem. Analyzing tissue is not cheap, but CBA and Florida LAKEWATCH could work with the volunteers to collect samples appropriately. Once collected, the samples should be delivered to a state or university research laboratory where the samples could be analyzed relatively inexpensively This type of monitoring would be far less expensive than general contaminant monitoring programs, could be implemented relatively quickly and would directly address the one major concern – Is it safe to eat?

Issue 4: Watershed/Inlet Management

Option 1: "Do Nothing" to change current watershed management.

Stakeholders who attended the August 25, 2008 lake management meeting overwhelmingly rejected this option.

Justification: Stakeholders were of the strong opinion that for far too long nothing of importance has been done to definitively protect the lakes and now is the time to act.

Option 2: Examine Walton County's coastal dune lakes watershed problems identified by Hartman and Associates (2001) to see if they still present a potential problem to the water quality of the coastal dune lakes. Additionally, because the report is almost 10 years old and tremendous population growth and urban development have occurred during that ten years, identify other potential storm water sources of pollution. Identified problems should be prioritized and cost-effective solutions found to repair or replace problem situations.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option with the understanding that some new data may need to be gathered because the Stormwater Management Plan (Hartman and Associates 2001) is over 10 years old.

Justification: Population growth and urban development in a watershed have the potential to increase nutrient loading to lake systems. Well-designed developments (according to proper codes) have much less potential to increase nutrient loading to lake systems. Therefore, any identified potential storm water problems should be identified and prioritized for replacement or repair. This is a proactive approach to maintaining the current water quality of Walton County's coastal dune lakes.

Approach: Personnel from Walton County Public Works should be charged with examining storm water problems identified in Hartman and Associates (2001) that occur in watersheds of Walton County's coastal dune lakes. From various discussions with professionals in the coastal dune lakes area, it seems this report was widely unknown or placed on a shelf and forgotten. Therefore, personnel from Public Works should initiate a field reconnaissance on all coastal dune lakes' watersheds to assess the findings of Hartman and Associates and to identify other potential storm water problems. Once all potential problems are identified during the updated field reconnaissance, identified storm water problems should be prioritized and monies should be appropriated to repair or replace the problems in order of most potential impact to the lake systems.

Issue 5 - Aquatic Plant Management

Option 1: "Do Nothing" to manage aquatic plants in Walton County's coastal dune lakes.

Stakeholders who attended the August 25, 2008 lake management meeting rejected this option.

Justification: Personnel from the Florida Fish and Wildlife Conservation Commission are currently working with stakeholders and CBA to manage identified problems so doing nothing would most likely exacerbate existing problems.

Option 2: Initiate a bi-annual (once every two years) aquatic plant survey to monitor the changes in the aquatic plant communities of Walton County's coastal dune lakes, continually looking for invasions from new exotic aquatic plants and changes in established populations of exotic plants (primarily torpedograss).

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option with an emphasis on the continual monitoring of all *exotic and invasive plants that may cause problems.*

Justification: While the native aquatic plant community (composition and abundance) fluctuates naturally in Walton County's coastal dune lakes, there is always the possibility of invasions from exotic aquatic plants. It takes constant monitoring to guard against invasions from new exotic aquatic plant species. Torpedograss is present in most if not all of Walton County's coastal dune lakes, but is currently not causing any severe aquatic weed problems. However, torpedograss has the growth ability to create huge monocultures inhibiting many lake uses. Therefore, monitoring an expanse of torpedograss through time would send a red flag for the control and/or management of this plant if the existing growths get out of hand.

Approach: Florida LAKEWATCH uses an aquatic plant sampling procedure that can be used to quickly and easily determine the species composition, abundance and distribution of aquatic plants in lake systems. If funding could be found to use this procedure every year or every other year, the aquatic plant communities in Walton County's coastal dune lakes could be monitored by LAKEWATCH and CBA and any changes occurring due to other than natural environmental conditions could be detected. If new exotic aquatic plants are found or torpedograss populations expand causing problems, then maintenance-control programs like those used elsewhere in Florida could be initiated.

Option 3: Establish a maintenance control program for torpedograss with proper herbicides and begin revegetation efforts with native plants.

Stakeholders who attended the August 25, 2008 lake management meeting embraced this option with the addition of Phragmites and all exotic/invasive plants to the maintenance control program.

Justification: Invasive aquatic plants can cause problems including but not limited to impairing lake access and displacing other native aquatic plants and associated wildlife. Torpedograss is an exotic invasive plant that was identified in all of Walton County's coastal dune lakes that were surveyed for aquatic plants (seven lakes) and would be a good candidate for a maintenance control approach.

Maintenance control (or management) refers to controlling plants at low levels and doing it before the plants reach a problem level. It has been defined in a Florida Statute as follows:

> ....a maintenance program is a method for the control of non-indigenous aquatic plants in which control techniques are utilized in a coordinated manner on a continuous basis in order to maintain the plant population at the lowest feasible level as determined by the department [Department of Natural Resources now Florida Fish and Wildlife Conservation Commission.] F.S. 369.22

Maintenance control of aquatic weeds (both native and non-native) reduces the detrimental environmental effects caused by the weeds and reduces the potential for environmental impacts from aquatic plant control activities. Maintenance control offers the following advantages:

1. Detrimental impacts of aquatic non-indigenous weeds on native plant populations are reduced.

2. Detrimental impacts of aquatic weeds on water quality are reduced.

3. The amount of organic matter deposited on the lake bottom from natural processes is reduced.

4. The amount of organic matter deposited on the lake bottom after control of aquatic plants is reduced.

5. Less herbicide and therefore money is used in the long term.

A problem experienced when conducting a maintenance control program is that people do not perceive a weed problem and question the need to spray. Therefore, public education is an important part of a successful maintenance control program. Maintenance management is the most environmentally sound method for managing invasive non-native plants. For example, unmanaged water hyacinth can double every 7 - 10 days. Ten plants under the right environmental conditions can grow to cover one acre in a single growing season, often weighing 200 tons. Therefore, the benefit of controlling those 10 plants early should be obvious.

Approach: If this option is selected, an aquatic plant biologist with the Florida Fish and Wildlife Conservation Commission should be contacted to discuss the development of an overall aquatic plant management program for Walton County's coastal dune lakes. Questions to be addressed are how many and where the aquatic plants should be controlled and what permits are required. Once the basics are established, the riparian owners should be contacted to determine their preferences.

Control of torpedograss and other invasives should be linked with a major aquascaping program for each lake. The Stakeholders participating in the TEAM process were not apposed to aquatic plants as long as they were native plants and were not causing major lake use problems. Planting plants like giant bulrush (*Scirpus californicus*), duck-potato (*Sagittaria lancifolia*), slender spikerush (*Eleocharis baldwinii*), maidencane (*Panicum*

hemitomon) sawgrass (*Cladium jamaicense*) and others in selected locations to enhance plant diversity, but not interfere with lake use was a desired option. Selecting desirable plants and planting them in areas once dominated by torpedograss and other undesirable species will not only reduce future undesirable species growth, but also enhance the aesthetic beauty of the coastal dune lakes. However, success of an aquascaping program will require close coordination with the riparian owners and a clear delineation of total costs and who will pay.

Issue 6 - Education

Option 1: The "Do Nothing" Recommendation.

Stakeholders who attended the August 25, 2008 lake management meeting rejected this option.

Justification: Walton County continues to experience rapid growth. Many new residents are unaware of the coastal dune lakes and they certainly have little or no understanding of the ecological importance of the lakes. Support for identified management issues rests on providing strong environmental educational programs for the coastal dune lakes so that the community is basing lake management decisions on facts rather than opinions.

Option 2: If the CDLAB assigns a TAG, this group should immediately be charged with planning and assisting the CDLAB with implementing a comprehensive community education program focused on the coastal dune lakes. This program would need to incorporate a multi-pronged approach to education on the coastal dune lakes. Residents living along the lake as well as new residents who move into the area need to be approached and offered special information about the lakes. Not only do residents need to understand the importance of the coastal dune lakes and know how to utilize and enjoy this resource without damaging it, but so do the over two million tourists who visit the area. Educational material can also be developed and brought into the local schools from kindergarten through high school. Local municipal staff also needs to be updated as new information about the lakes is collected and analyzed. By incorporating programs that already exist and adding programs in areas where stakeholders are not receiving information pertinent to the preservation and management of Walton County's coastal dune lakes, the TAG under the direction of the CDLAB could enhance the educational program for the coastal dune lakes at a minimal cost.

Stakeholders in attendance embraced this option. They also emphasized that education is tremendously important and should be incorporated with every issue of the management plan.

Justification: The Walton County Dune Lakes Advisory Board with its own technical advisory group or the CBA Director should guide a community education program for the

coastal dune lakes. CDLAB and CBA, having been strongly involved in varying capacities with the development of the coastal dune lake management plans, will maintain sufficient interest in implementing agreed upon recommendations. Over time these two groups will have the ability to insure the plan is a "living" document and that changes to the plan can be made in a timely manner when the facts dictate. The groups are also in an excellent position to identify riparian owner concerns and reach out to existing community education programs to provide the information needed to make cost-effective management decisions. The groups together are positioned to take advantage of educational resources already available through local and state governmental agencies as well as educational institutions.

Approach: There is already considerable lake management information available that could be coalesced into a complete coastal dune lakes management educational program produced by CBA, Walton County and others. Additionally, the Northwest Florida Water Management District, the South Walton Tourist Development Council, the Florida Department of Environmental Protection, and the Florida Fish and Wildlife Conservation Commission represent important sources of educational outreach material and professional insight into real or perceived problems. Florida LAKEWATCH has many information circulars that can also be used to educate people on all aspects of lake management. All of the resources could be assembled by the TAG under the direction of the CDLAB in a very short time. While this team is working, a first step for Walton County's coastal dune lakes stakeholders would be for the CDLAB to give each riparian land owner a copy of this report to show them the major issues of concern and basic information on how coastal dune lakes function.

Issue 7 - Fish and Wildlife

Option 1: Initiate a monitoring program for the fish communities using Walton County's coastal dune lakes.

While both proposed management Options in Issue 7 – Fish and Wildlife were ranked lowest by attendees, the stakeholders agreed that this option should be accomplished.

Justification: The status of Walton County's coastal dune lakes' fish communities often becomes the focal point of stakeholders' concerns regarding the overall quality of Walton County's coastal dune lakes. Unfortunately, professionals from state agencies, because of cost factors do not routinely monitor fish communities in small lakes like Walton County's coastal dune lakes. Without information on the status of the fish populations, it will be impossible to determine if a problem truly exists that needs to be addressed. Conducting assessments over the long-term would provide the Walton County Dune Lakes Advisory Board with a quantitative basis for assessing various lake management decisions relative to the fish communities.

Approach: Funds should be sought to monitor the fish communities in Walton County's coastal dune lakes. FFWCC, academic institutions, or private consulting firms could complete sampling. The fish community of Walton County's coastal dune lakes should be assessed in the spring using electrofishing, seining and gillnet equipment. With the fisheries information that would be obtained by single-day sampling events, the status of the coastal dune lakes' fish communities could routinely be compared for year-to-year trends. The data could also be compared with similar data found in other Florida lakes with similar size and productivity to determine if the lakes are functioning naturally.

Option 2: Remove obstructions to fish passage at Oyster Lake and monitor the return of saltwater species.

Stakeholders agreed that eventually all of the barriers to fish and wildlife movement in the coastal dune lakes should be removed, but there were higher management priorities.

Justification: Oyster Lake has fewer saltwater species residing in the lake than expected and there are known obstructions to fish passage. Oyster Lake could therefore become a test case for assessing the effect of blockages originating due to development upon coastal dune lake fauna.

Approach: The CDLAB should approach Walton County Public Works to ascertain what would be needed to clear a passage to Oyster Lake and what the projected cost would be. Once a plan is developed, funding sources should be sought, recognizing this type of endeavor might be an excellent opportunity for agencies to partner in a coastal dune lakes restoration project. If a partnership can be developed, the cost to a single group might not be so onerous in difficult financial times. FFWCC might also be able to bring some federal dollars to bear because fish passage in the nation's water is a national concern.

Section III: Prioritization of Options for the Management of Walton County's Coastal Dune Lakes

The State of Florida has and is spending hundreds of millions of dollars for eutrophication control and lake restoration. In the 1980s and 1990s, many professional lake managers said the most important elements in lake management are phosphorus and nitrogen. However, experience has shown the most important elements in lake management are silver and gold!

In a utopian world, cost would not be considered, but the reality at Walton County's coastal dune lakes and other Florida lakes is that costs and who will pay need to be considered in order to fully implement any management plan. This is especially true when the citizens and their elected officials desire to keep taxes low and make sure dollars that are spent provide the greatest return. It must, however, be recognized that funding opportunities can materialize at any time and from sources that are unexpected.

It is also true that many "Lake Management Plans" (like so many other government plans) end up either filed away or shelved. After a short period of time, the whole effort is forgotten. There are probably many reasons why people tend to move on, but there are two truths that need to be recognized. First, America is a country of doers. Second, success tends to breed success and can ultimately breed support from a wide range of Americans. Because there is no reason to think the people of Walton County will not act as good Americans, it is therefore the opinion of the LAKEWATCH staff that the recommendations made in this report must be prioritized into groupings where some issues can be resolved immediately with success (Category I (TOP) Priorities), some can be worked on over a short period of time (Category II Priorities), and some management options can become part of a long-term coastal dune lakes management strategy(Category III Priorities).

Based on the discussions from stakeholders attending the August 25th meeting, LAKEWATCH's priority recommendations are as follows:

Category I (Top) Priorities

Group I

Issue 1: Who is in Charge? - Option 2: Select the Coastal Dune Lakes Advisory Board of Walton County with an Expansion of Advisory Board Membership and Establishment of a Technical Advisory Group (TAG).

Issue 6 – Education - Option 2: If the CDLAB assigns a TAG, this group should immediately be charged with planning and assisting the CDLAB with implementing a comprehensive community education program on the coastal dune lakes. This program would need to incorporate a multi-pronged approach to education on the coastal dune lakes. Residents living along the lake as well as new residents who move into the area need to be approached and offered special information about the lakes. Not only do residents need to understand the importance of the coastal dune lakes and know how to utilize and enjoy this resource without

damaging it, but so do the over two million tourists who visit the area. Educational material can also be developed and brought into the local schools from kindergarten through high school. Local municipal staff also needs to be updated as new information about the lakes is collected and analyzed. By incorporating programs that already exist and adding programs in areas where stakeholders are not receiving information pertinent to the preservation and management of the coastal dune lakes, the TAG under the direction of CDLAB could enhance the educational program for the coastal dune lakes at a minimal cost.

These options could be accomplished in early 2009 and would firmly establish for Walton County stakeholders exactly who is in charge of this lake management plan. They would also provide a first point of contact for stakeholders to find out what type of work is being done on their lakes. Implementation of these options can be done without significant cost. If this management plan is not to become a dusty document on someone's shelf, it is important to remember that a group of individuals needs to oversee the process. We, therefore, believe implementation of these options is a critical first step.

Group II

Issue 2: Outlet Management - Option 1: Monitor the dates and times of all coastal dune lake outlet openings and closings, and collect information on rainfall, water table level, watershed area, and lake morphometry to help model the frequency, magnitude, and duration of outlet openings. These data need to be combined into a master database, continually updated as monitoring occurs and analyzed over time for trends.

Issue 3: Water Quality - Option 1: Maintain current citizen water quality monitoring program conducted by Florida LAKEWATCH and CBA to monitor long-term nutrient concentrations, chlorophyll levels, water clarity and other basic water chemistry parameters. Additionally, find volunteers to begin sampling identified coastal dune lakes that are currently not being sampled by Florida LAKEWATCH (Stewart, Horseshoe, Tresca and Little Deer Lake).

Issue 3: Water Quality - Option 2: Because Oyster Lake was the only coastal dune lake showing a definitive increase in nutrient concentrations; increase the sampling effort on Oyster Lake to determine where nutrient enrichment is originating.

Issue 3: Water Quality - Option 3: Initiate a comprehensive total and fecal coliform bacteria scan-monitoring program to determine if Walton County's coastal dune lakes are being contaminated by fecal material from urban/residential development. If high bacteria counts are found, do further tests to determine if high counts are due to false positives (natural occurrences).

Issue 5: Aquatic Plant Management - Option 2: Initiate a bi-annual (once every two years) aquatic plant survey to monitor the changes in the aquatic plant communities of Walton County's coastal dune lakes, continually looking for invasions from new exotic aquatic plants and changes in established populations of exotic plants.

Category II Priorities
(Recommended to be Accomplished After Category I)

Issue 4: Watershed/Inlet Management - Option 2: Examine Walton County coastal dune lakes watershed problems identified by Hartman and Associates (2001) to see if they still present potential problems to the water quality of the coastal dune lakes. Additionally, because the report is almost 10 years old and tremendous population growth and urban development have occurred during that ten years, identify other potential storm water sources of pollution. Identified problems should be prioritized and find cost-effective solutions to repair or replace problem situations.

Issue 5 - Aquatic Plant Management - Option 3: Establish a maintenance control program for exotic/invasive plant species with proper herbicides and begin revegetation efforts with native plants.

Issue 7: Fish and Wildlife - Option 1: Initiate a monitoring program for the fish communities present in Walton County's coastal dune lakes.

Category III Priorities
(Recommended to be Accomplished After Category I and Category II)

Issue 3: Water Quality - Option 4: Initiate a comprehensive chemical, heavy metal and/or pesticide-monitoring program to determine if Walton County's coastal dune lakes are being contaminated by watershed development and/or initiate a chemical scanning of the fish population to determine if fish are safe to eat.

Issue 7: Fish and Wildlife - Option 2: Remove obstructions to fish passage at Oyster Lake and other lakes and monitor the return of saltwater species.

Issue 2: Outlet Management - Option 2: Walton County staff should identify property adjacent to the coastal dune lakes outlets and located in the historical sweep distance. The Walton County Commission should be advised to buy and preserve these properties if it is possible to leverage monies with existing conservation groups, private individuals or state/federal government. Where money is not available, Walton County should strive to prohibit any additional building of major permanent structure in the historical sweep area. This may require legal adjustments to building restrictions and strict enforcement of permitting that is already outlined in the County's Land Development Code. However, private property rights must always be considered.

Note – *The Category III priority options are the most difficult, costly and time-consuming options to accomplish in this lake management plan. They are still important, but they require*

much more planning and organization than is in the scope of this management plan. These options should be further discussed by the CDLAB with the possible creation of additional steering committees to push these options forward.

Final Thoughts

Implementation of the Category I Priorities, Group II management options is critical to provide stakeholders and the CDLAB useful information on the overall limnology of Walton County's coastal dune lakes for future decisions on the management of these lakes. Additionally the implementation of these options will do more for alleviating the citizens' environmental concerns about Walton County's coastal dune lakes than most of the other recommendations. Currently, Northwest Florida (NWF) State College and CBA assist Florida LAKEWATCH in the organization and training of volunteers who collect water quality monitoring data at 182 locations (36 coastal stations, 133 lake stations, and 13 river stations) in Walton County. However, Florida LAKEWATCH receives no direct funding from Walton County for these efforts; to increase the amount and type of monitoring listed above would require Walton County to appropriate new monitoring monies for Florida LAKEWATCH because state funds for expansion by LAKEWATCH are not available. However, in writing the final report, the LAKEWATCH staff realized there was a commonality that was imbedded in all the issues and management programs. This hidden commonality was not directly addressed by the stakeholders, but represents an opportunity for the entire northwest Florida community!

Stakeholders clearly want to expand education programs, enhance environmental monitoring, and initiate new research on the coastal dune lakes (and the Bay). In evaluating finances, the cost rose because everyone was pointing to agencies of the state, private consultants or LAKEWATCH to do the work. What was being overlooked is the potential of NWF State College to meet many of the targeted needs.

If infrastructure (primarily operational dollars) can be enhanced at NWF State College for the program that is operated by Ms. Terrell at NWF State College, the taxpayers would use expended dollars much more effectively. Invested dollars would put NWF State College on the map for environmental education dealing with lakes and coastal waters, it would prepare graduating students very effectively for graduate education at the major research universities. It would also provide NWF State College with a research component that could address nearly all the education/monitoring/management issues raised by the stakeholders participating in the coastal dune lakes meeting.

Discussions with the executive director of CBA, NWF State College, the CLDAB, members of the Walton County Commission, and citizen leaders in the area indicated that establishing an institute called the Choctawhatchee Basin Alliance Water Resources Center (LAKEWATCH's proposed name!) at NWF State College would be a project that nearly everyone in the area could support, especially because a funded initiative would help local students while simultaneously working on Bay and Lake issues.

NWF State College, in our professional opinion is a “diamond in the rough” and for too long the State of Florida has basically ignored the panhandle relative to major environmental programs. An annual investment by the State of Florida of $450,000 directly into a Choctawhatchee Basin Alliance Water Resources Center at NWF State College would provide the State of Florida a great positive return on investment. The size of the financial investment (small compared to project dollars expended elsewhere in Florida) is also something key political leaders in the Florida Legislature might find most acceptable. LAKEWATCH could also assist the Water Resources Center during the development phase to insure implemented projects are successful. Bottom line, this could be an opportunity that will not emerge again for a long time!

Summary of Recommended Priorities (Coastal Dune Lakes To-Do List)

CATEGORY I PRIORITIES
Designate the CDLAB as "who's in charge."
Expand ex-officio CDLAB membership and establish a TAG.
Plan and implement a comprehensive community education program for the coastal dune lakes.
Monitor outlet openings/closings, rainfall, water table level, watershed area, and lake morphometry.
Add CBA/LAKEWATCH volunteers on Stewart, Horseshoe, Tresca, and Little Deer.
Increase sampling on Oyster Lake to determine where nutrients are entering the system.
Begin a bacteria monitoring program.
Initiate bi-annual (once every two years) aquatic plant survey.
CATEGORY II PRIORITIES
Research storm water problems identified by Hartman & Associates and new ones in the field. Prioritize storm water problems and find cost-effective solutions.
Establish an aquascaping program to control exotic/invasive plants and revegetate with native plants.
Initiate monitoring program for fish communities.
CATEGORY III PRIORITIES
Begin comprehensive chemical, heavy metal and/or pesticide monitoring program and/or initiate chemical scanning of the fish population.
Remove obstructions to fish passage at Oyster Lake and other lakes and monitor the return of saltwater species.
Identify properties in the historical sweep distances of the lakes. Purchase and preserve.