WINTER HAVEN

The Chain of Lakes City

CITY OF WINTER HAVEN MEMORANDUM

DATE: May 13, 2010

TO: Dale L. Smith, City Manager

FROM: T. Michael Stavres, Director, Community Services
Mike Britt, Division Director, Natural Resources

SUBJECT: Status of Nutrient Criteria/Impaired Waters in Winter Haven

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Nutrients

One of the primary considerations in managing water quality for lakes is 'nutrients'. Phosphorus and nitrogen, which are two of the primary nutrients, affect the amount of algae in water. A healthy amount of nutrients in lakes is good, but excess nutrients can produce large amounts of algae, which are commonly referred to as an 'algae bloom'. If algae blooms get overly productive, they can turn into 'blue-green algae blooms' which is an indication of very poor water quality. The measurement for the amount of algae in the water is the chlorophyll content, commonly referred to as 'Chl-a'. Chlorophyll is the green cell component of plants that uses light to create energy.

The federal and state criteria for water quality are designed to keep lakes 'fishable and swimmable'. This refers to the health of lakes for wildlife and people. All lakes in Winter Haven are classified as Class III waters which are required to meet 'fishable/swimmable' uses.

History of Water Quality Regulations

The initial federal legislation for improving water quality was enacted in 1948 as the Federal Water Pollution Control Act. This legislation was significantly reorganized and expanded in 1972. The name "Clean Water Act" (CWA) became common with the 1977 amendments.

Under the CWA, the Environmental Protection Agency (EPA) implemented pollution control programs such as wastewater standards. They also established standards for contaminants in surface waters.

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's National Pollutant Discharge Elimination

System (NPDES) permit program controls industrial, waste water and stormwater discharges. The City of Winter Haven maintains NPDES Permits for wastewater treatment plants and the stormwater system.

In 1998, the Florida Department of Environmental Protection (FDEP) began reviewing water quality information to determine if standards were being met. The standard used by the FDEP was a 'narrative standard' that was interpreted as lakes exceeding a Trophic State Index (TSI) of 60, which is a number indicating how many nutrients and algae are in the water. The initial result of this data collection determined that 18 lakes in Winter Haven (all in the Southern and Northern Chain of Lakes) showed signs of not meeting the 'fishable/swimmable' narrative standard because of nutrients. These lakes were placed on the 'impaired' list. Since this initial listing, the list has been modified and expanded to include the following lakes:

Southern Chain of Lakes: Lulu, Shipp, May, Howard, Mirror, Cannon, Jessie, Idylwild, Spring, Roy
Northern Chain of Lakes: Conine, Smart, Haines, Rochelle, Hamilton
Lakes Not Part of a Chain: Silver, Martha, Maude, Buckeye, Deer
Peace Creek Canal: The primary conveyance of water from Winter Haven to the Peace River (also listed for a lack of dissolved oxygen).

This means that about half of the 39 lakes listed as impaired in Polk County are within or adjacent to Winter Haven. This also means that 20 out of the 50 lakes in Winter Haven are on the state's impaired list. It is anticipated that this list could grow in the future as additional water quality information becomes available.

Environmental Protection Agency: Federal Involvement

While FDEP was in the process of establishing nutrient criteria for Florida, the Florida Wildlife Federation (FWF) and other environmental groups filed a lawsuit in 2008 to require that EPA establish nutrient standards for Florida. EPA determined that Florida's existing *narrative* nutrient criteria was insufficient to ensure protection of the State's water bodies and *numeric* nutrient standards were necessary to meet the requirements of the Clean Water Act. The determination recognized that, despite Florida's efforts to diagnose and control nutrient pollution, substantial water quality degradation from nutrients remains a significant challenge and is likely to worsen with continued population growth and land-use changes.

EPA is proposing nutrient criteria for the following four water body types in Florida: lakes, streams, springs, and canals. For Florida lakes, EPA is proposing to classify lakes into three groups: colored, clear & alkaline, clear & acidic. The criteria are based on the biological response (Chl-a production) to nutrient levels in lakes. The end result of this standard is that colored lakes and clear/alkaline lakes would have to meet a Chl-a standard of 20 ug/l, and clear/acidic lakes would have to meet a standard of 6 ug/l. These standards are much more specific than the Trophic State Index standard of 60 proposed by FDEP.

For rivers and streams (including the Peace Creek Canal and Peace River), EPA is proposing four different watershed-based regions within Florida with different TN and TP criteria for each region. In developing these proposed numeric nutrient criteria for rivers and streams, EPA also evaluated their effectiveness for assuring the protection of downstream lakes and estuaries.

The EPA is also proposing an approach for using local information and lake management strategies called 'site-specific alternative criteria' (SSAC). Previously developed Total Maximum Daily Load (TMDL) targets and local water quality planning information could be used for this SSAC process.

Water Quality Management in Winter Haven

The City of Winter Haven, Polk County and the Southwest Florida Water Management District (SWFWMD) have a long history of proactively managing water quality for lakes in Winter Haven. Beginning in the late 1980's, the City began constructing small stormwater treatment projects at a few of its many stormwater outfalls. Since that time, Polk County has led large projects to treat stormwater at Lakes Cannon, Howard, Jessie and Marianna. The City has led projects to treat stormwater on Lake Howard (2 projects), Lake Hartridge, Lake May, and Lake Lulu. SWFWMD cooperatively funded each of these projects. The City also constructed smaller projects on a number of other lakes, including Lakes Silver, Maude, Elbert, and Otis. One of the highlights of these programs is that all of the largest stormwater outfalls discharging to the Southern Chain of Lakes have been treated.

In 1998, the City Commission adopted a unique Stormwater Quality Utility Fee in order to establish a dedicated source of funding for stormwater quality projects. The primary purpose of this fee was to construct stormwater treatment projects for water quality improvement. The City later modified this fee to be specific for each parcel. A Stormwater Maintenance Fee was added in 2007 for maintaining the overall drainage system.

The City also adopted a stormwater 'redevelopment' ordinance which requires redeveloped areas to treat stormwater which is above and beyond that required by state and regional agencies. The City also maintains an aggressive educational program to make sure citizens understand how their activities on the land affect our water resources.

Existing Studies/Projects

Sediment Removal Feasibility Study:

Staff has just completed the Sediment Removal Feasibility Study for Lakes May, Shipp and Lulu (Muck Study) which determined the nutrient contributions of the bottom sediments of the three study lakes. This information is critical since any improvement in

water quality for these lakes is dependent upon knowing the overall nutrient contributions. This information can also be used as examples for other lakes.

The results of the Sediment Removal Feasibility Study are as follows:

Lake May – 13.2 million cubic feet of muck contribute 46% of phosphorus inputs
Lake Shipp – 27.0 million cubic feet of muck contribute 48% of phosphorus inputs
Lake Lulu – 36.9 million cubic feet of muck contribute 69% of phosphorus inputs

The conclusion from this study is that treating stormwater, which accounts for 31%, 22% and 7% of nutrient loads to Lakes May, Shipp and Lulu respectively will not be effective until the bottom sediments are either removed or treated.

The study recommends that the bottom sediments either be treated with aluminum sulfate (alum) or be removed by dredging. For Lakes Shipp and Lulu, the study recommends that either treatment or removal be considered, depending on local preference. Treating sediments in the two lakes would cost approximately $1.94 million for Lake Shipp and $1.41 million for Lake Lulu. Removing these sediments would cost an estimated $10 million and $13.7 million, respectively. The benefit of treating sediments is cost, whereas the benefits of removal are improved navigation and habitat. For Lake May, the study only recommends that the sediments be removed at an estimated cost of $4.9 million.

Chain of Lakes Water Quality Management Plan:

The City has also hired a consultant to develop a Chain of Lakes Water Quality Management Plan for the Northern and Southern Chains of Lakes to determine the projects and programs necessary to ensure that the lakes meet water quality goals. Staff proposed this effort in December, 2004 and is receiving funding assistance from SWFWMD.

This plan will incorporate existing information, obtain additional data, and use previously developed models and plans to develop a more detailed water quality approach for the lakes. The study will evaluate alternatives and best management practices to develop a water quality management master plan which will in turn be evaluated for meeting nutrient criteria. All sources of pollution, including stormwater, point sources, sediments, ground water, dry fall, and septic tanks are to be addressed in the plan. This study is scheduled for completion in December, 2010. It is anticipated that this study will be used to help meet water quality criteria.

Downtown Low Impact Development/Raingarden Project:

The City just signed an agreement with SWFWMD to develop a series of small raingarden/percolation swales in and around the downtown/Winter Haven ridge area. This grant makes $250,000 available to develop these projects which will restore percolation into the ground water system and treat stormwater. Staff anticipates that up

to 40 raingarden projects will be created as a result of this effort. Presently, staff is evaluating project sites to determine which projects to initiate for design and permitting.

Lake Conine Wetland Treatment Project:

The City has an approved grant with SWFWMD and FDEP to design and construct a project on the south side of Lake Conine (Northern Chain of Lakes). This project will use 34 acres of City property to treat stormwater from a 328 acre urban watershed. The project will also create a new nature park. This project is in the design and permitting phase and should be under construction in spring, 2011.

Water Resource Sustainability Plan:

This program has evaluated every component of water resources in the Winter Haven/Peace Creek Watershed area and proposes to use natural infrastructure (lakes, wetlands, ridge soils and aquifers) to provide water resource services for the future. One of the assumptions of the plan is that improving water quality will always be a challenge until the hydrology affecting lakes is restored. The plan will be recommending that more stormwater and reuse water be percolated into the ridge areas and the creation of water storage nature parks where there are drainage ditches today. This plan is in draft form and should be ready for adoption in July, 2010.

Conclusions

Treating stormwater, which is one of the primary focuses of EPA, is a part of the City's overall water quality management plan, but more than likely will not solve long-term water quality problems. Previous efforts to treat stormwater in Winter Haven have shown good results, but have not met the requirements for nutrient criteria by themselves. In many lakes, past efforts have met the initial pollutant load reductions, but the water quality is still listed as impaired.

Even though the word 'impairment' is used by EPA and FDEP to describe water quality concerns, there are other considerations in Winter Haven that could cause more significant impairments, such as low lake levels and hydrilla. Lakes in the Chain of Lakes may have good water quality in the future, but if there is not enough water in the lakes for navigation, they would still be 'impaired' from a local perspective. The same is true with hydrilla: lakes may have good water quality, but if they have significant amounts of hydrilla affecting their use, they would still be considered 'impaired'.

On a similar line of thought, if many of the lakes in Winter Haven are considered to be impaired by EPA and FDEP, there must be something happening other than stormwater discharges causing underlying problems. Considerations for restored hydrology, sediment treatment/removal, and aquatic plant management must be given equal, if not greater, consideration than treating stormwater. If not, Winter Haven could be required to spend millions of dollars, with insignificant results.

Some of the lakes in Winter Haven listed as impaired, including lakes in the Northern and Southern Chain, are still considered to be meeting the standard for 'fishable and swimmable' from a local perspective. Algae content is not always the best measurement of whether lakes are meeting these criteria. The amounts of bacteria in the lake are also a consideration, especially for the swimmable aspects. The fishing in both Chains of Lakes is considered to be excellent. One of the lakes listed as impaired – Lake Shipp – is one of the busiest recreational and fishing lakes in Winter Haven. The public perception is that this lake is not impaired until there is a fish kill or blue-green algae bloom. These criteria should be listed as priorities for consideration.

There are two on-going efforts that will help water quality in Winter Haven. SWFWMD is implementing a part of its stormwater management rules which require higher standards within watersheds of impaired lakes. In the past, stormwater treatment systems were presumed to be adequate if they treated a certain volume of runoff. Within the watersheds of impaired lakes and watercourses, new development will have to design stormwater treatment systems to 'not contribute to any existing violations' of water quality standards. This will require a more rigorous approach using multiple technologies, as opposed to traditional stormwater ponds.

Also, FDEP is in the process of developing a new statewide stormwater rule which will accomplish the same goals as the SWFWMD rule for impaired water bodies. This rule should go into effect in mid-2011, pending legal challenges.

Staff agrees with the intent behind nutrient and chlorophyll-a criteria as *goals* for water quality improvement, but not necessarily as federal *standards*. Consideration for a community's priority for improving local impairments should be considered since significant local funds will be required for restoration. Requiring stormwater treatment may be only one consideration in the overall management of the system.

Some of the specific recommendations for the future are as follows:

1) Continue to develop the Water Quality Management Plan in conjunction with SWFWMD for meeting long-term water quality goals.
    a. Evaluate long-term impairments to the lakes such as changes in hydrology (draining, recharge areas, aquifer declines) as part of a long-term strategy for improving water quality. The City's Water Resource Sustainability Plan will guide this effort. The assumption is that it is better to improve the water quality of all of the lakes by improving hydrology than initially focusing on just a few lakes for specific projects.
    b. Evaluate impairments such as hydrilla and aquatic plant coverage to ensure that the lakes are managed as a natural system, as opposed to just looking at stormwater treatment projects; also, reconnecting wetlands and floodplains to lakes may provide the required results more so than treating stormwater inflows or treating sediments.
    c. Include results from the Sediment Removal Feasibility Study in the Water Quality Management Plan.

d. Recommend that EPA consider the Water Quality Management Plan as meeting the site specific alternative criteria (SSAC) for prioritizing projects.

2) Continue to monitor EPA nutrient criteria proposals to ensure that the criteria are appropriate for lakes in Winter Haven.
   a. Provide a response to EPA with the following points:
      i. Lakes in Florida should be considered on a geographic basis as is the case for rivers and streams; lakes in Polk County within the 'Bone Valley' phosphate region should be considered as a separate unit.
      ii. Areas with long-term hydrologic impacts, such as decades of drainage, reduced recharge and lowered aquifers, should be evaluated in light of these impacts.
      iii. EPA's criteria should consider the prevention of blue-green algae blooms as a priority consideration.
      iv. Using one criteria state-wide for parameters such as color, acidity and alkalinity are limiting, with some lakes 'flipping' between different categories. A sliding or regional scale should be developed for lakes.
      v. Require that the SSAC process be user-friendly and not require burdensome requirements.
   b. Continue to work with our consultant to develop an approach that combines local priorities for meeting proposed nutrient criteria.

Summary

Overall, the criteria established by EPA are consistent with the local water quality goals for lakes in Winter Haven. Mostly, concerns are with implementation (methods and timeframe) which have yet to be determined.

It has taken the City decades to become comfortable with a long-term approach for managing lakes, which includes managing the entire system, including hydrology, aquatic plants, lake levels, wetland connections and stormwater treatment. The intent of staff's current approach is to ensure that the City is not required to manage for statewide lake criteria at the expense of managing lakes as a part of our long-range water resource management strategy. Having federally imposed criteria could mean spending significant local funds for stormwater treatment as opposed to managing lakes in context of the overall hydrologic system which provides multiple benefits.