

# **PROTECTING THE LAKES IN WINTER HAVEN, FLORIDA FOR FUTURE GENERATIONS: IMPLEMENTING SUSTAINABLE WATER RESOURCE MANAGEMENT**

## Introduction

Fifty freshwater lakes border or are contained within the city limits of Winter Haven, Florida, “the Chain of Lakes City.” The lakes which cover almost one-third of the 25 square miles of the City are the lifeblood of the community: *environmentally, socially, and economically*. The lakes are a reflection of the enormous stores of water—for people and natural systems—that are potentially contained within the landscape. The City’s economy, its quality of life, and its current and future viability depend on preserving and sustaining the health of its water resources, the most valuable of which are the lakes.

The lakes and water resources in Winter Haven are damaged and depleted. The Florida Department of Environment Protection has determined that 25 of the 50 lakes in the City have impaired water quality (18 of 25 in the Winter Haven Chain of Lakes). The Southwest Florida Water Management District has designated all of DeSoto, Hardee, Manatee and Sarasota counties, and parts of Charlotte, Highlands, Hillsborough, and Polk counties—an area encompassing 5,100 square miles, including Winter Haven—water use caution areas. Groundwater withdrawals throughout the region have lowered aquifer levels more than 50 feet in some areas and lowered lake levels in the upland areas of Highlands and Polk counties. Lake levels in some of Winter Haven’s lakes may have been lowered by as much as ten feet due to regional water use and local navigation and drainage projects.

Past efforts to manage water by draining, piping, and covering recharge areas in the City’s watershed and regional aquifer drawdowns have had, and will continue to have, negative effects on Winter Haven’s water resources, including its lakes. At best, today’s regulations keep things the same but do not provide for restoration. At worst, they allow the further gradual degradation of water resources. The current rules for wetland mitigation and stormwater management encourage further degradation of the watershed.

To address the long-term water quality, water supply, flood protection, and environmental needs of the City, Winter Haven has conducted impact assessments and developed plans for water quality restoration and water resource sustainability, including:

- Winter Haven Sustainable Water Resource Management Plan (<http://tlsingletonconsulting.com/Projects.html>)
- Winter Haven Chain of Lakes Water Quality Management Plan
- Winter Haven Interior Lakes Water Quality Management Plan

With economic recovery (local, state, and national), the development of the CSX Integrated Logistics Center (a transportation hub that uses trucks and railways to distribute goods across the country), continued growth in the regional telecommunications network, and the opening of the entertainment park at LegoLand, the small community of Winter Haven will experience rapid economic growth. How the community chooses to manage its limited water resources in the face of this economic opportunity will determine the fate of the community for better or worse.

The four presentations in this session detail the City's approach to sustainable water resource management, lake restoration, valuing ecosystem services, and building an institutional framework for local, regional, state, and national decision-making for sustainability.

## **SUSTAINABLE WATER RESOURCE MANAGEMENT: LINKING ENVIRONMENTAL, SOCIAL, AND ECONOMIC DEMANDS**

*Thomas L. Singleton<sup>1</sup>*

<sup>1</sup>Thomas L. Singleton Consulting, Inc., Monticello, FL

Human economic and social systems are inextricably linked to ecosystems and the physical environment that sustains all living things, including humans. Sustainable water resource management is the coordinated development and management of water, land, and related resources to maximize social and economic welfare—without compromising the vital ecosystems upon which we depend. The consumption of renewable natural resources is sustainable if it *does not* exceed the rate of long term renewal and impair the health and productivity of ecosystems, communities, or the economy. In the environmental-social-economic model presented (Swackhamer, 2010), something is sustainable if it is viable, bearable, and equitable.

The sustainable water resource management principles that guide the Winter Haven sustainability plan are (Sustainable Water Resource Roundtable, 2010):

- **Value and limits of water** - as a natural resource and a social and economic good; there are environmental, social, and economic costs of depleting or damaging water resources;
- **Shared responsibility** - water does not respect political boundaries; a participatory and multi-disciplinary approach to managing water is required;
- **Equitable access** - including equitable allocation and costs; continuous monitoring is required to detect problems as they occur, as are means to correct problems;
- **Stewardship** – understanding the implications of water resource decisions on future generations and the ecosystems upon which they will rely

There are different types of sustainability ranging from technical/structural solutions that balance supply and demand and offer least cost solutions to institutional/nonstructural solutions that provide the capacity to plan, manage, and operate the systems for natural resource protection, social welfare, and economic development (modified from Katsiardi et al. 2005). In the new paradigm of sustainable water resource management, water, regardless of its form—wastewater, stormwater, floodwater—is managed as a resource rather than a waste product or nuisance; and the services and goods provided by ecosystems, including clean water, water supply, flood protection, habitat, and food, are valued for the benefits they provide.

Sustainable water resource management is an iterative process of planning, implementing, measuring, and learning. It is an adaptive approach that can accommodate emerging challenges, constraints, and changing social priorities. It is a means to sustainability and not an end. It is a cooperative approach that integrates the resources of the public and private sectors to the benefit of the community.

## THE NEED FOR HOLISTIC WATER MANAGEMENT: AN EXAMPLE FROM WINTER HAVEN, FLORIDA

David Tomasko, PhD<sup>1</sup>

<sup>1</sup>Atkins, Tampa, FL

While Florida is the fourth largest state in the US (and predicted to be the third largest by 2015), in terms of population, it is only 22<sup>nd</sup> in terms of size. Inland waters comprise slightly less than 8 percent of the land area of Florida, a total of 4,511 square miles. While an impressive amount, the totality of inland waters in Florida is smaller than the smallest of the Great Lakes (Lake Ontario) and it is less than 5 percent of the combined area of the Great Lakes. As of 2011, however, the State of Florida had contributed more than 30 percent of all the water quality data in STORET, the nation's water quality data warehouse. Those 24 million data entries result in Florida having a greater density of water quality data than anywhere else in the US. Despite this data richness, various water management programs in Florida are quick to use complex water quality models for resource management plans. These water quality models are often notable for their use of rate coefficients that aren't locally derived. This has often resulted in water quality models being "calibrated" through the modification of rate coefficients that have never been locally measured.

The over-reliance on complex water quality models to develop lake management plans has given rise to a number of problematic TMDLs for a variety of Florida lakes. This issue may be related to the tight timelines laid out in the TMDL program's authorization. The enabling legislation for TMDLs automatically leads from the determination of impairment to the development of TMDLs and nutrient reduction strategies, without time for consideration of the totality of impacts that can affect the water quality and ecology of Florida lakes.

Florida is in need of a more holistic approach to lake management, where the effects of hydrologic alteration, *Hydrilla* eradication efforts, and internal nutrient loads from discontinued point sources are considered, as well as the current focus on nutrient loads from stormwater. In this presentation, examples are given of the importance of hydrologic modifications and other factors, and how incorporating such into lake management strategies can increase the probability of success of lake management strategies.

## VALUING ECOSYSTEM SERVICES

*Valerie Seidel<sup>1</sup>*

<sup>1</sup>The Balmoral Group, Winter Park, FL

Economics is what makes sustainability sustainable. If there is no measurable benefit to a change in behavior, there is little incentive for policymakers to shift from a traditional approach to an untested approach. Fortunately, there are economic tools to assist in this process. In considering the comparison of natural approaches to engineered solutions, the critical link is the ability to monetize ecosystem services. Without the ability to quantify the benefits that are not immediate cash impacts, it is very difficult to meaningfully compare alternatives that have both tangible and intangible implications. We may “know it when we see it,” as the Supreme Court Justice has said, but until we can show it in dollars and cents, we are unlikely to move the needle.

The Winter Haven Sustainability Plan has at its crux two critical ecosystem services: recharge, and storage. While there are more than 70 specific actions in the Plan, they boil down to these two overarching categories. How do you value recharge and storage? There are engineered solutions, as we all know: building reservoirs, constructing new water treatment and storage facilities, rapid infiltration basins, and the list go on. The costs of building, maintaining, and at some point replacing, these capital improvements are relatively straightforward. The natural alternative is less so, at least in Florida.

There are other communities in the US and internationally where the natural approach is the first and assumed option. Generally, in these communities, a holistic analysis of the social, environmental, and financial costs and benefits associated with the policy decision at hand is required by the public. The Pacific Northwest, Australia, New Zealand and Canada offer some great examples. At some point, those communities required infrastructure choices to take into account viability for the environment and equitable distribution of both the immediate and long-term costs.

Valuing the ecosystem services associated with improved recharge and storage will take into account the expected water quality improvements; the avoided costs of alternative water supply associated with additional treatment facilities; the improved recreational opportunities and economic impact they create; the improved habitat for wildlife—with an eye to values accepted by experts in the field, calibrated to Winter Haven’s demographic, topographic, and logistic conditions and corrected to avoid double-counting; and reflective of Winter Haven’s stakeholder preferences. A sophisticated analysis also considers whether impacts—both costs and benefits—are distorted to certain groups, and if so, whether such market distortions make sense for the community.

Winter Haven’s Sustainability Plan reflects the growing recognition in Florida society that change is needed in our approach to many public policy choices. The economic analysis of policy choices recognizes—sometimes with surprising results—that the costs of alternatives are only one small piece of the resource allocation question.

## **DECISION-MAKING FOR SUSTAINABILITY BEGINS AT THE LOCAL LEVEL**

Mike Britt, PE<sup>1</sup>

<sup>1</sup>City of Winter Haven, Winter Haven, Florida

Luna Leopold, famous Chief Hydrologist with the U.S. Geological Survey in the 1950's and 1960's once said: "Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land". This premise represents an absolute truth linking land and water management. In Florida, the long-term health of our waters is uncertain. With many lakes, springs and rivers falling below acceptable standards for water quality and quantity, we are having difficulty upholding this basic principle.

Local governments make land use and many other decisions related to water resources, including water supply, stormwater, flooding, water quality and wastewater management. Local governments are also at the center of making decisions related to economic development and social/cultural improvements. Local governments generally do not have the expertise or inclination to make long term water resource management decisions partly due to the short term nature of the political process and the demand for economic growth. State and regional agencies are inclined to operate within a regulatory framework, granting permits after the land use and economic development decisions are made at the local level. Both parties generally encourage the other to continue a pattern of unsustainable short term decisions, with little consideration that actions will result in the continued long-term decline of water resources.

Accountability for water resource decisions is difficult to discern, but since local communities ultimately bare the social, economic and environmental costs of water resource decisions, local communities are the logical choice to begin a sustainable decision-making process. Water is unique in that the sustainability of water is easily discernible at the local level. The sustainability decision making model is also unique in that it is a process as well as a framework that builds consensus from the grass-roots level.

A commitment to follow a sustainable approach puts local communities and watersheds in a leadership role. Local communities, operating within their watersheds and ground water basins, must envision the desired balance between economic growth, cultural resources and the environment. Once this process takes place, interagency and private sector tools such as water quality credits, mitigation banking, regional stormwater permitting and ecosystem management planning can be applied. Significant education and leadership will be required at the local, regional and state levels to begin a sustainable approach, but there are many examples that indicate that communities and agencies are ready for this challenge.

The Sustainable Water Resource Management Plan for the Peace Creek Watershed was adopted by the City of Winter Haven, Polk County and the Charlotte Harbor National Estuary Program and begins this process in Central Polk County. This plan will be used to outline the initial stages to achieve sustainable water resources. One thing is certain, without a new approach, many of Florida's water resources will have a difficult recovery.