Solving Water Pollution Problems in the Wakulla Springshed

The City of Tallahassee’s Efforts to Reduce Stormwater Pollution

Hydrogeology Workshop
May 12-13, 2005
City of Tallahassee shares the goal of preserving water quality with Leon and Wakulla Counties, FDEP, EPA, Friends of Wakulla Springs and all Stakeholders.

Best accomplished through technically sound planning and goal setting.
The Reality of Our Working Environment

- There are many competing needs for a community’s financial resources; fire, police, schools, roads.....
- Managing and improving water quality is an expensive endeavor.
- Due diligence must be used to ensure that the limited funding that is available, is effectively applied.
- Failure to do so, actually works against the goal of preserving water quality.
City of Tallahassee’s – Stormwater Pollution Reduction Planning

- The objective -- maximize progress with focus on problem magnitude and remediation effectiveness.
  - 140,000 acres modeled
  - 145 discrete catchments
Monitoring sites were used to characterize the pollution in runoff from different land uses.
City of Tallahassee’s – Stormwater Pollution Reduction Planning

- Typical monitoring site used to collect and measure the pollution in runoff.
TALLAHASSEE STORMWATER

- **Nitrogen values**
  Less than National and Statewide Averages

- **Phosphorus, BOD, and TSS values**
  Higher than National and Statewide Averages for Residential, Recreational and Open Land.
  Lower or equal to Statewide Averages for Other Land Uses.

- **Metals values**
  Less than National and Statewide Averages except for Pb
City of Tallahassee’s – Stormwater Pollution Reduction Planning

- Pollutant loading data was applied to the land use map across 140,000 acres.

- This enables quantification of pollutant loads by watershed.
Pollutant Loading Model was combined with BMP data to develop a Program Cost Model.

Done by evaluating actual pond sites and developing cost estimates and removal rates.

Yielded cost curves for a variety of alternative program levels.
Target Watersheds Alternative

- Revenue limitations led to examination of alternative approaches.
- Identified 20 Target Watersheds with highest loadings.
Target Watersheds Alternative

- $60 million in investment over approx. 20 years
- Not a “end-all” solution but - a realistic start for what will be a long term effort.
- Even this approach presents challenges.
Tallahassee’s SW Utility Fee With W/Q Increase

Tallahassee with $1.70 increase for total of $7.95 per ERU.

Tallahassee with current rate of $6.25 per ERU.

Florida Survey of Stormwater Utility Rates
## Impact of $1.70 SW Fee Increase on 20 Largest Customers

<table>
<thead>
<tr>
<th>Current Annual</th>
<th>Annual Change with $1.70 Increase</th>
<th>Current Monthly</th>
<th>Monthly Change with $1.70 Increase</th>
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<tr>
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<td>$17,183</td>
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<td>$1,432</td>
<td>$389</td>
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Lake Lafayette
Nutrient Removal Project Evaluation
Continued Application of Conventional Stormwater Management Practices
Capital Cascades Trail Stormwater System

- Cost - $110 million.
- Part of City & County Blue Print 2000 Initiative.
- 15 New Ponds or Wetlands totaling 50 acres.
- Removes approximately
  - 2000 lbs N / yr
  - 600 lbs P / yr
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Nutrient Removal Project Evaluation

Application of Innovative Stormwater Management
Nutrient Removal with Algal Turf Scrubber Process
A Working ATSTM

Wave surge motion aids in nutrient exchange between algal cells and water medium
Highlights of Local Project Under Consideration
Managed Aquatic Plant System

- Approximate Size = 12 ac.
- Harvest Cycle of 7 Days.
- Total Mass P Percent Removal 35% @ 25 MGD Avg Daily Flow.
- Removal Considers Warm Season (243 da.) and Cool Season (122 da.) Reduced Performance Period.
- Compost Assumed to be Most Likely End Product.
### Estimated Cost and Performance of Managed Aquatic Plant System

<table>
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<th>ITEM</th>
<th>Weems Pond NRF</th>
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<tr>
<td>Bench Scale Testing</td>
<td>$81,390</td>
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<tr>
<td>Capital Construction Cost</td>
<td>$2,484,000</td>
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<tr>
<td>Annual Operation</td>
<td>$252,000</td>
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<tr>
<td>Phosphorus Removal (Lbs/Yr)</td>
<td>3,560</td>
</tr>
<tr>
<td>Annual Compost (Tons /Yr)</td>
<td>331</td>
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Groundwater Nitrate Loading – Various Sources
Nitrate Loading – Stormwater

<table>
<thead>
<tr>
<th></th>
<th>Nitrate Level (mg/L)</th>
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<tbody>
<tr>
<td>Wakulla Springs</td>
<td>0.783</td>
</tr>
<tr>
<td>Tallahassee Stormwater</td>
<td>0.126</td>
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</table>
Inverse relationship between flow and Nitrate concentration indicates that stormwater is not the likely source of high nitrate levels at Wakulla Springs.
Nitrate Loading – Wastewater Systems
Comparison of Sprayfield Nitrogen Load with Nitrogen Discharge at Wakulla Springs

![Bar Chart]

- Wakulla Springs Discharge
- Sprayfield Effluent (after plant uptake)
Nitrate Loading – Septic Tanks
Comparison of Nitrogen Load From Sprayfield with Load from Leon and Wakulla County Septic Tanks

![Bar chart showing comparison of nitrogen load from sprayfield effluent and septic tanks in Leon and Wakulla County. The chart displays the nitrogen load in lbs N/year × 1000 for each type of system.]
Comparison of Nitrogen Load from Sprayfield and Septic Tanks in Springshed Area

Septic Tanks (after treatment and assuming only 1/3 of total are within Springshed Area)

Sprayfield Effluent (after plant uptake)
Septic Tanks – How To Manage Problem

Perhaps limit proliferation – by ordinance - No central water w/o central sewer.
Questions?

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