1. Determine and Synthesize Historical Data
2. Reconnaissance Field Trips, QA/QC sampling across study area
3. Identify Long-Term Monitoring Stations and Outline Sampling Design
4. Identify Laboratories & Volunteer Networks to Collect & Analyze Samples
FAU – Data Analysis Charlotte Harbor

Population vs. Numeric Nutrient Criteria

Chlorophyll a (μg/L)

Charlotte County Population (thousands)

Year:
- 1965
- 1975
- 1985
- 1995
- 2005
- 2015

Population:
- Starting low and rising

Numeric Nutrient Criteria:
- Static level
FAU – Data Analysis

• Long-term historical data obtained from public records
• Data include canals and estuaries within Charlotte County
• Values above line exceed NNC
• Nitrogen peaks evident in El Niño years
• Reveals a history of impairment
FAU – Data Analysis Conclusions

- NNC exceedance at reconnaissance sites
  - TN ≥ NNC at all 4 sites
  - TP > NNC at El Jobean
  - Chl a > NCC at Yacht Club

- Strong septic signal in surface waters and groundwaters
  - Stable nitrogen isotopes
  - C:N ratio
  - Sucralose

- These data support previous studies that septic systems are a significant source of pollution to Charlotte Harbor
Septic Tanks: A Primary Nutrient Source

- Over 27,000 septic tanks
- Significantly more septic tanks possible
- All septic tanks discharge nutrients
- Local water table is close to surface
Septic Tanks: Estimated Installations Per Year
Septic Tanks: A Primary Nutrient Source

- 2014 Maximum Load
- 2014 Minimum Load
- Discharged Nitrogen Range
Septic Tanks: A Primary Nutrient Source

- 2014 Maximum Load
- Load Based on Field Measurement
- 2014 Minimum Load

Nitrogen Discharged (tons)

Year

Charlotte County Utilities Dept.
Septic Tanks: Groundwater Flow
Septic Systems – Ideal Treatment

Treatment Conditions
- Moderate Soil Permeability
- Balanced Bacteria to Food Source
- Low Water Table
- Proper Oxygen Content
Septic Systems – Non-ideal Treatment

...in Florida it has been estimated that nearly three-fourths (74%) of the soils have severe limitations to conventional septic-system usage.
- Report #EPA/625/R-00/008
Surface Water Quality: April 2015 (2.1” Rain)
Surface Water Quality: August 2015 (13.6” Rain)
Surface Water Quality: September 2015 (8.2” Rain)
Surface Water Quality: April 2016 (1.4” Rain)
Septic Tanks: Environmental Criteria

- Lots of Criteria Considered
- Eliminated Duplicates and Subjective Criteria
- Selected Criteria:
  - Proximity to Surface Waters
  - Estimated Age
  - Nitrogen Loading
Environmental Scores – Surface Water Proximity
Environmental Scores – Septic Tank Age
Environmental Scores – Nitrogen Loading
Overall Environmental Scores
Recommended Priority Conversion Areas

<table>
<thead>
<tr>
<th>Project Areas with ENV Scores &gt; 4</th>
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</thead>
<tbody>
<tr>
<td>Years 1 through 5</td>
</tr>
<tr>
<td>Year 6 through 10</td>
</tr>
<tr>
<td>Areas with ENV Scores &lt;= 4</td>
</tr>
<tr>
<td>Scores 1 to 4</td>
</tr>
</tbody>
</table>

Charlotte County Utilities Dept.
5-Year Conversion Plan
Buildout Conversion Plan
5-Year Prioritization
- 6,166 existing developed units
- 8,971 total parcels including vacant
- Project cost $105.2 million (excluding onsite costs)

Funding Plan
- No adverse affect on CCUD ratepayers
- Relies on achievable level of outside funding sources
- Property owner costs subsidized
Mid-County Five-Year Funding Plan

• 5-Year Financial Plan
  • 28% Outside Funding
    • $25.0 million Discretionary Sales Tax Revenue ($5.0 million/yr.)
    • $4.0 million RESTORE Act Funds ($0.8 million/yr.)
    • Mix/match with other grants/appropriations
  • 72% Funding from Property Owners
    • Debt issuance for $76 million of project costs
    • Repayment from property owner assessments or loans and net sewer revenue
• Summary of Payments to CCUD
  • $11,200 per residential home
    • Connection and Capital (see prior slide)
    • Prepayment amount
    • Subsidized

• Assessment and Rate Summary
  • $731/year installment/assessment ($61/month)
  • 3,000 gallons usage = $49/month (per existing CCUD rate schedule)
  • Total assessment + sewer bill = $110/month
  • Affordability target $95/month
Advantages to Central Sewer

- Increase in property value
- Longer lasting improvement compared to septic tanks
- Eliminates the uncertainty of septic tank maintenance and failure
- Removal of harmful nutrients = water quality protection

Protection of the Charlotte Harbor Estuary
References

Local Studies


- Lapointe, B; Herren, L; Paule, A; Sleeman, A; and Brewton, R. 2016b. Charlotte County Water Quality Assessment, Phase I: Data Analysis and Recommendations for Long-Term Monitoring. Prepared for Charlotte County Board of County Commissioners by Harbor Branch Oceanographic Institute at Florida Atlantic University Marine Ecosystem Health Program. November 2016.


Additional Research


Additional Research


References (continued)


- Mallin, M.A. 2013. *Septic systems in the coastal environment: Multiple water quality problems in multiple areas. Chapter 4 in Monitoring Water Quality - Pollution Assessment, Analysis and Remediation*. Ahuja, Satinder (Ed.).
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QUESTIONS

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