

Tampa Bay Nitrogen Management Strategy and the Role of Atmospheric Deposition

Holly Greening Tampa Bay Estuary Program

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ATMOSPHERIC DEPOSITION in 1991: "Unknown, but probably minor"

ATMOSPHERIC DEPOSITION in 2006: One of the most important issues facing restoration and protection of Tampa Bay

National Estuary Program (NEP) 28 Jewels in America's coastal necklace

Local watershed programs making a difference



Focus on the watershed or ecosystem Collaborative problem solving Integrate good science with sound decision making Public participation

TBEP Policy Board Partners





SEAGRASS BEDS AND MANGROVES NEAR WEEDON ISLAND ON TAMPA BAY



Tampa Bay Seagrass Restoration Goal



Difference Between 1950 and 1990 Seagrass Cover

Tampa Bay Nitrogen Management Strategy Paradigm

TN Load Chlorophyll Light Attenuation



Seagrass Growth ____ Seagrass Light & Reproduction

Requirement

Population of the three counties surrounding Tampa Bay, 1940-2000.



Seagrass Goal: Restore 13,000 acres over 1999 coverage, while preserving the existing 25,000 acres.



Nitrogen Management Goal:

"Hold the line" on nitrogen loading at 1992-1994 average level. To compensate for expected increase in load with population growth, reduce or preclude an additional 17 tons per year.

Tampa Bay Nitrogen Management Goal To provide water quality conditions necessary to restore seagrasses to target levels, "hold the line" at nitrogen loading estimated for 1992-1994. To compensate for expected growth, reduce or preclude additional nitrogen loading by 17 tons per year (starting in 1995)

Year 2000 reduction goal: 84 tons/year

The yearly reduction goal has now been extended through 2004

Total Nitrogen Loadings to Tampa Bay (1999-2003)



Tampa Bay Nitrogen Management Consortium

A Nitrogen Management Consortium (made up of TBEP government participants, local phosphate companies, agricultural interests and electric utilities) accepts responsibility for collectively meeting nitrogen load reduction goals. Consortium members may choose to implement any combination of projects to reach their reduction goals.









SEAGRASS RESTORATION AND PROTECTION: 2004 UPDATE



GOAL: Recover an additional 10,976 acres of seagrass over 2004 levels, while preserving the bay's existing 27,024 acres.

STATUS: Between 1988-1996, seagrass acreage increased 200-300 acres per year. El Niño rains resulted in seagrass losses of about 2,000 acres between 1996-1999. In January 2002, seagrass acreage increased by 1,237 acres. By January 2004, seagrass acreage had increased an additional 946 acres, resulting in the highest observed acreage estimate since 1950

First things first

Atmospheric deposition is the largest single source to Tampa Bay nitrogen loading now, but ONLY because wastewater treatment plants were required to implement AWT standards in 1980, reducing nitrogen loading from WWTPs by 90%.



- Overall TN load reduction and large shift in predominant sources
- -Total TN loading in 1970s about 10,000 tons/year
- -Total TN loading 1998-2003 about 4,100 tons/year, due primarily to WWTP reductions

- Estimates of direct deposition to the bay remained proportionally constant, but indirect deposition (via nonpoint source loading) became a much larger fraction of the total Tampa Bay Atmospheric Deposition Study (TBADS) 1995 - 2005 Directly Applicable to Management

- Contribution to Total Nitrogen load: direct deposition to the Bay
- Contribution to stormwater load: indirect
- Relative contributions from source types
- Local versus regional sources: relative contribution
- Contribution from ammonia sources
- Relationship between emissions and deposition
- Effect of sea salt on deposition (poster)

• Preliminary results indicate the nitrogen airshed for Tampa Bay includes all of Florida and north almost to Atlanta. Estimates indicate that more than 35% of the atmospheric deposition of nitrogen to Tampa Bay is not local.



Atmospheric Deposition contribution to Stormwater: Conclusions

N retention based on estimates of background Cl for Tampa Bay range from 76.3 to 90.6%. The best estimate is approximately 82%. Therefore, an estimated 18% of the atmospheric nitrogen falling on the watershed is delivered to the Bay.

C. Pollman and N. Poor, USF College of Public Health

Bottom Line: NOx emissions and atmospheric deposition in Tampa Bay

A one-ton reduction in NOx emissions equates to about a one-pound reduction in total nitrogen loading to the bay Atmospheric Deposition and Tampa Bay management: Critical for the future

Significant reductions from local power plants

- coal-fired to natural gas
- additional scrubbers for NOx

Mobile sources: cleaner fleet with expected Clean Air Act requirements, but more cars with population growth- it's a wash

RECOMMENDATIONS FOR A NITROGEN MANAGEMENT STRATEGY

- Initiate discussions with potential partners for managing nitrogen (local, state, nationalprivate and public, citizens)
- -Maintain focus on managing largest sources (wastewater), BUT find out how important other sources (including atmospheric deposition) are to the nitrogen budget
- -Develop nutrient management strategy that includes all sources