Tampa Bay Nitrogen Management Consortium: A Partnership for Progress

20-Years of Collaboration & Consensus to Achieve Seagrass Recovery Goals

Moderator: Ed Sherwood
Tampa Bay Estuary Program

Session 22: Tuesday, Nov. 15th
8:30AM-10:00AM
AWRA Annual Conference
Orlando, FL
Panelists

• Jeffry Greenwell
  – TBNMC Government Co-Chair

• Anthony Janicki, Ph.D.
  – TBNMC Technical Consultant

• Santino Provenzano
  – TBNMC Industry Co-Chair
Session Format

• Background & History (~60 minutes)
  – Development of the TB Nitrogen Management Consortium
  – Early Voluntary Load Reduction Efforts that Transitioned to Regulatory Requirements
  – Development of Equitable Nitrogen Loading Responsibility
  – Government & Industry Perspectives on TBNMC’s Success
  – Ecosystem Results

• Panelist Q&A (~30 minutes)
Tampa Bay: An Urban Estuary

- Urban centers in Pinellas County & City of Tampa
- 1980s: 1.5 million people, 2010s: 2.5 million+
- Agriculture / Phosphate Mining activities in eastern watershed
- Port Tampa Bay
Tampa Bay in the 1970s - Early 1980s

- Poorly-treated Domestic Point Sources, Untreated Industrial Point Sources & Stormwater, Rampant Dredge & Fill Activities
- Phytoplankton and macroalgae dominated
- Loss of subtidal & emergent wetlands
- Newspapers declared Tampa Bay “dead”
Citizens Demanded Action (1970s-1980s)

- Citizens in Tampa (w/ water views) demanded legislative action.
- Citizens desired a bay that resembled 1950s conditions, rather than the polluted condition of the 1980s.
- Led to Tampa Bay’s first kick-start to recovery (Reduced DPS loads through FL Legislative Acts).

Clearer water, Better fishing
Tampa Bay Estuary Program: Regional Partnership Formation

- Tampa Bay designated as an “estuary of national significance” in 1991 → Established as an NEP under U.S. EPA

- TBEP partners enter into an Interlocal Agreement (1998) forming an Independent Special District (Florida Statute 189)
  - Local funding commitments based on municipality population
  - Public sector reporting
  - Independent from State

- Mission: Develop and implement a science-based, management and restoration plan for the Tampa Bay estuary
Partners

[Logos of various entities including Hillsborough County, Pinellas County, Manatee County, Clearwater, Tampa, St. Petersburg, and others related to environmental protection and management.]

[Map showing locations such as Tampa, Clearwater, St. Petersburg, Hillsborough County, Pasco County, and Manatee County.]
Tampa Bay Nitrogen Management Strategy

- Reduce Nitrogen Loads
- Reduce Chlorophyll
- Increase Water Clarity
- Increase Seagrass Cover
Tampa Bay Nitrogen Management Consortium

- Formed in 1998, now includes 45+ public/private partners
- Members include TBEP government and regulatory agency participants, local phosphate companies, agricultural interests and electric utilities
- Mid-1990s, collectively accepted responsibility for meeting nitrogen load reduction goals
- Consortium members chose to implement any combination of projects to maintain loads to Tampa Bay at 1992-1994 levels
Tampa Bay’s Early Recovery Path: Transitioning from Voluntary Reduction Goals to Regulatory Required Reductions

Jeffry Greenwell
Hillsborough County
NPDES Permitting in Tampa Bay and Grizzle-Figg Act of 1987

• Required Domestic WWTFs to Convert to Advanced Treatment
• Presumed Allowable
• Deadline October 1990
On a Parallel Track

• In 1991, Tampa Bay National Estuary Program (TBEP) was established
• In August 1996, the TBNEP helped form the Tampa Bay NMC
• In 1997, FDEP submitted a TMDL for nitrogen for Tampa Bay to EPA (EPA approved June 1998)
• In 1999, Florida Watershed Act which recognized that in cases where WQ was be attained through and existing program No TMDL was needed
• In 2002, TBEP and TBNMC submitted the TB Reasonable Assurance
• In 2002, the State Codified the Florida Watershed Act under the Identification of Impaired Waters Rule
What is Reasonable Assurance?

The Florida Watershed Restoration Act (Section 403.067(4)) explicitly allows DEP to not list impaired waters in EPA’s Category 5 (Impaired and needs TMDL) if they already have control programs in place that will assure that water quality standards will be restored.
What is Reasonable Assurance?

The FWRA requires the Department to evaluate whether existing or proposed pollution control mechanisms will effectively address the impairment before placing a water on the verified list.
If the Department can document there is REASONABLE ASSURANCE that the impairment will be effectively addressed by the control measure, then the water will not be listed on the final verified list.
What is Reasonable Assurance?

• These types of water bodies – impaired but with control programs already being implemented to reduce pollutant loadings – can be placed in EPA Category 4B.

• In the Tampa Bay case, however, the TMDL still applies.
## Federally-recognized TMDL for Nitrogen in Tampa Bay

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ALLOCATING TMDL LOADS TO PERMITTED AND NON-PERMITTED ENTITIES

Tony Janicki
Janicki Environmental
The Saga Continued…

• 2008 – EPA informed DEP that in order to meet the TMDL requirements that loading limits are needed in permits

• This required the determination of load allocations to entities responsible for loads to the bay

• Allocations were also required by the Reasonable Assurance
Tampa Bay Nitrogen Management Consortium
Load Allocation Process

• **Step 1)** Estimate mean 2003-2007 bay segment TN load.

• **Step 2)** Estimate mean 2003-2007 Set Allocations

• **Step 3)** Calculate Remaining Load as the difference between the segment TN load and the Set Allocations. This provides the segment TN load remaining after the Set Allocations are removed.

• **Step 4)** Estimate the percentage contribution for a given entity/source as the ratio of the entity/source 2003-2007 average annual TN load to the Remaining Load for the segment.
Compliance with TMDL Loads and Entity-Specific Allocations

• Whatever the alternative may be, it should be consistent with the observed conditions in the Bay (i.e., chlorophyll concentrations, nitrogen loadings and seagrass cover) should be considered.

• Regardless of the method derived, the primary goal must be to comply with the 1998 TMDL loads.

• The method should also allow assessment of any slippage or trending in the entity-specific loadings.
Compliance with TMDL Loads and Entity-Specific Allocations

• 2009 Reasonable Assurance document outlined an entity-specific compliance assessment method

• In simple terms, the 2017 RA compliance assessment will compare the mean 2012-2016 point source loads to their set allocations
What Did the Process Provide to NMC Partners?

- Equitable Allocation
- Ability to Control Our own Destiny
- Minimized Delays in Permit Issuance
- Shared Costs
- Unified Approach
What Did the Process Provide to Private Industry Partners?
What Happened Next

• 2004 – EPA informs DEP there may be a problem
• DEP contacts the TBEP and the process of developing cooperative solution begins
• During the permitted Facilities Agreed to accept the annual average from the previous 5 year period plus 5%
• DEP develops WQBELs by Bay segment with the help of NMC and TBEP
• Two Final Orders are developed
Did it Work?
Reduced TN Loads to Tampa Bay

Reduced Nitrogen Loads

Graph showing the total nitrogen load to Tampa Bay over different time periods: Worst case (~1976), 1985-1989, 1990-1999, and 2000-2011. The graph indicates a significant reduction in nitrogen loads over time, with the worst case showing the highest load and the later periods showing lower loads.
Per Capita TN Load Reduced by 80%

- **1976 (Worst Case)**: TN Load Entering Tampa Bay per Capita Estimate (lbs./yr./person)
- **1990**: Loads from 1985-1990
- **2000**: Loads from 1991-2000
- **2010**: Loads from 2001-2010
Water Quality Has Improved

Hillsborough Bay

![Graph showing Chlorophyll-a levels in Hillsborough Bay over the years from 1972 to 2016 with TBEP Target 13.2 ug/L.](chart)

Middle Tampa Bay

![Graph showing Chlorophyll-a levels in Middle Tampa Bay over the years from 1972 to 2016 with TBEP Target 7.4 ug/L.](chart)

- **AWT & Reuse Standards Implemented**
- **Stormwater Regulations Enacted**
- **TBEP Partner & NMC Actions Implemented**
- **Power Plant Upgrades**
- **Port Facility Upgrades**
- **Fertilizer Restrictions**

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Seagrass Coverage Now Exceeds Goal

Seagrass Coverage Recovery Goal (38,000 acres)
Sustaining Success: Adaptive Management

- Can recovery be maintained with increasing population?
- Expected to double by 2050
- New Actions / Offsets will be Needed
Panelist Q & A

  – [http://dx.doi.org/10.1016/j.ecss.2014.10.003](http://dx.doi.org/10.1016/j.ecss.2014.10.003)

  – [http://dx.doi.org/10.1016/j.rsma.2015.05.005](http://dx.doi.org/10.1016/j.rsma.2015.05.005)
NPDES and Watershed Protection Collide

- 2002 – EPA informs DEP that load limits are need to be in NPDES permits
- Load allocations were developed and placed in NPDES permits
- Calculating Compliance

Total Annual Load ($A_{tot}$):

\[
= (\text{Nitrogen Concentration, mg/l})(\text{Annual Volume, MG})(8.3454)
\]

2000 lbs