

Trends in Atmospheric Nitrogen Oxides Concentrations and Implications for Nitrogen Deposition to Tampa Bay

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Summary of CALPUFF Modeling Results

Impacts of Power Plant Reconfigurations on N Deposition

Non-Point Source Contributions to N Deposition

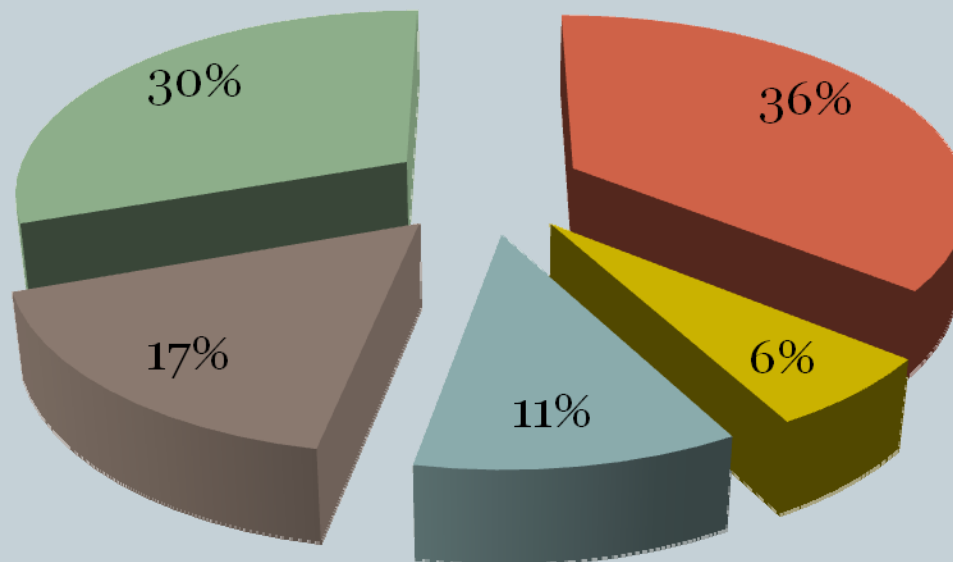
CALPUFF Modeling of Atmospheric Nitrogen (N) Deposition to Tampa Bay

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■ Hillsborough ■ Manatee ■ Pinellas ■ Polk ■ Other

**Total N deposition:
1,100 metric tons/yr.**

**Assumes that 18% of
the N deposited to
the watershed
reaches Tampa Bay.**



Nitrogen Emission/Deposition Ratios for Air Pollution Sources That Contribute to Nitrogen Loading of Tampa Bay, Final Report, Noreen D. Poor, prepared for Environmental Protection Commission of Hillsborough County, Pollution Recovery Fund Agreement Number 06-02A, December 31, 2008, 55 pp.

Other Estimates of Total N Deposition

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- **2,550 metric tons/yr
(based on measurements)**

Atmospheric Nitrogen Deposition to Tampa Bay, Florida: What Have We Learned from BRACE? Noreen Poor, prepared for Florida Department of Environmental Protection, July 2006, 33 pp.

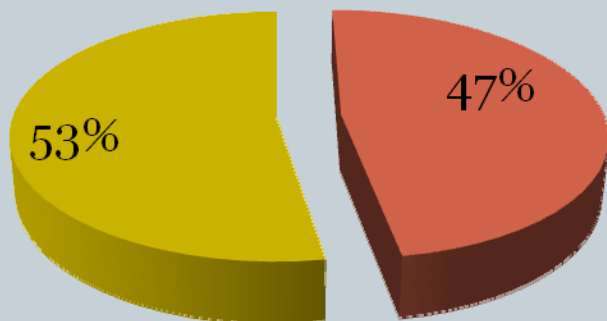
- **1,600 metric tons/yr
(based on modeling)**

CMAQ-UCD Atmospheric Deposition Estimates to Tampa Bay Watershed Sub-basins and Tampa Bay Waters, Robin L. Dennis and Jeff Arnold, Letter Report for Tampa Bay Estuary Program, 9-18-07, 32 pp.

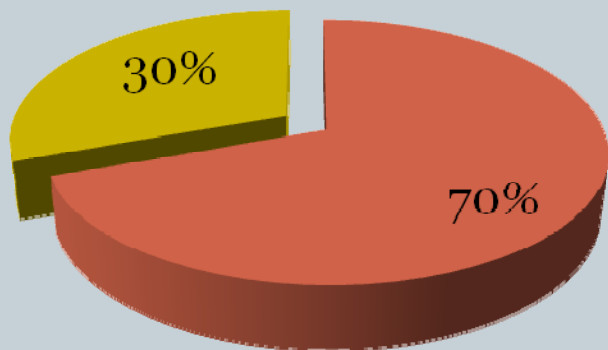
CALPUFF Modeling Results

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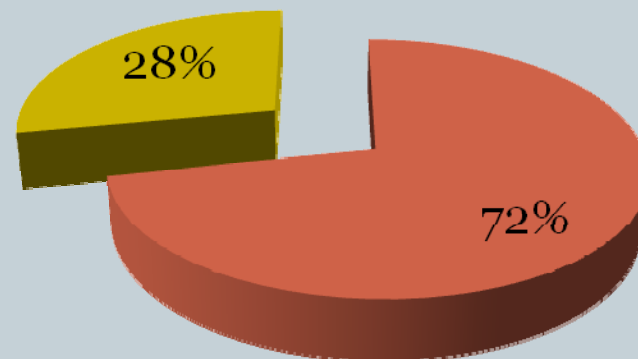
■ Direct ■ Indirect



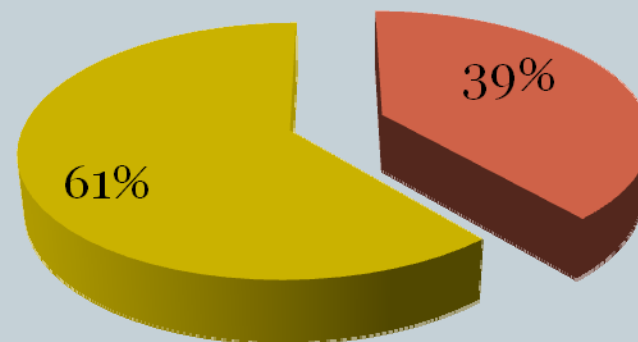
■ Dry ■ Wet



■ NOx-N ■ NH3-N



■ Point ■ Non-Point



Trends in NO_x-N Deposition to Tampa Bay

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Power Plant	Control	Change in Nitrogen Emissions	Change in Nitrogen Deposition	Ratio, Emission/Deposition
Big Bend* (NO _x : 1998/2010)	Installed SCR for NO _x control	9,240	66	140
F. J. Gannon** (NO _x : 1998/2005)	Re-powered from coal to natural gas	8,810	63	140

*Assumed in 89% reduction in NO_x emissions

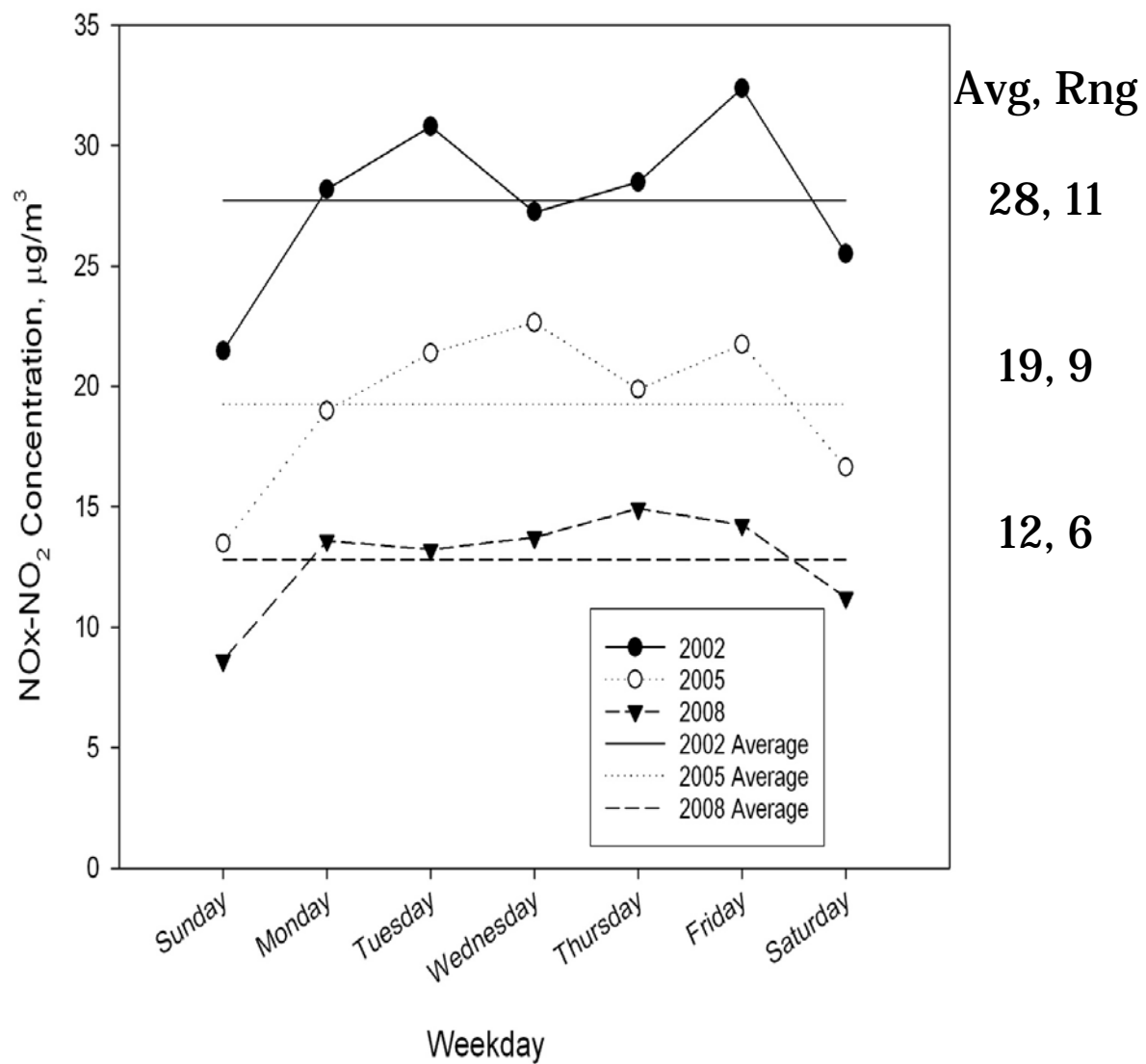
**Used 2005 emissions for Bayside Power Plant

Trends in NO_x-N Deposition to Tampa Bay

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County	2002 Non-Point Nitrogen Emissions	2002 Nitrogen Deposition	Ratio, Emission/Deposition
Hillsborough	10,344	152	68
Manatee	3,307	28.7	115
Pinellas	8,220	67.4	122
Polk	4,962	56.4	88

Trends in NO_x Concentrations at an Urban Monitor in Hillsborough County 2002-2008



2002 CALPUFF-Modeled Contributions to NO_x Concentrations at an Urban Monitoring Site

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Monitoring Site	All Non-Point Sources $\mu\text{g}/\text{m}^3$	All Power Plant Sources $\mu\text{g}/\text{m}^3$	All Remaining Point Sources $\mu\text{g}/\text{m}^3$
Gandy Bridge	14	7	1

What would explain the large drop in annual average NO_x concentration at the Gandy Bridge site between 2002 and 2008?