CONSIDERATION OF THE INFLUENCE OF HYDROLOGIC LOADING ON THE RESPONSE IN TAMPA BAY TO NITROGEN LOADING

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Setting the Right TMDL Loads

- The 1998 TMDL set the TMDL loads at the mean 1992-1994 TN loads
- Therefore, it was assumed that these were the appropriate loads to maintain chlorophyll at the desired levels
- Monitoring data indicate that the desired chlorophyll levels are being met in all bay segments for the vast majority of years
Historic Chlorophyll a Compliance

- FDEP Recognized Targets:
  - Hillsborough Bay - 15.0 µg/L
  - Old Tampa Bay - 9.3 µg/L
  - Middle Tampa Bay - 8.5 µg/L
  - Lower Tampa Bay - 5.1 µg/L
- More than 250 nutrient-reduction projects included in Action Plan
- Baywide TN load reduction goal met since 1995
- Seagrass acreage increased by ~3,000 acres since 1995
Setting the Right TMDL Loads

• Examination of TN loads showed that the TMDL loads (mean 1992-1994 baseline period) have been exceeded in a number of years in all bay segments

• Since desired chlorophyll levels are being achieved, there is a logical disconnect between the observed chlorophyll and TN load estimates
OLD TAMPA BAY

HILLSBOROUGH BAY

MIDDLE TAMPA BAY

LOWER TAMPA BAY

TN Loads (tons/yr)


1992-1994 Average

TN Loads (tons/yr)


1992-1994 Average

TN Loads (tons/yr)


1992-1994 Average

TN Loads (tons/yr)


1992-1994 Average
Setting the Right TMDL Loads

• Therefore, some factor that influences the TN load-chlorophyll response in all bay segments exists
Examination of TN loads showed there was a distinct reduction in the ratio of TN load to hydrologic load since 1992-1994 baseline period.
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Setting the Right TMDL Loads

• Therefore, these data indicate suggest that there is less nitrogen being delivered to Tampa Bay relative to the amount of water being delivered.

• This strongly suggests that the management of nitrogen loads in the Tampa Bay watershed has been and continues to be successful.
• It is hypothesized that the ratio of TN loads to hydrologic loads from the 1992-1994 baseline period are appropriate loads to maintain chlorophyll at the desired levels
EFFECT OF FRESHWATER INFLOW ON CHLOROPHYLL RESPONSE TO TN LOADING
Setting the Right TMDL Loads

- Objective – to identify a method that normalizes the observed TN load for differences in hydrologic load from the 1992-1994 levels

Normalized TN Load = Observed Hydrologic Load \times \frac{TN \ Load}{Hydrologic \ Load \ Ratio}
Application of the above algorithm gives this range of TN loads, i.e., the target TN loads.
This is TMDL TN load

Given this hydrologic load
TN and Hydrologic Loads
Relationship

If TN load is above line
Non-compliance

If TN load is below line
Compliance
OLD TAMPA BAY
1995-2007 TN and Hydrologic Loads

1992-1994 TN Load:Hydrologic Load Ratio = 1.08
HILLSBOROUGH BAY
1995-2007 TN and Hydrologic Loads

MIDDLE TAMPA BAY
1995-2007 TN and Hydrologic Loads

LOWER TAMPA BAY
1995-2007 TN and Hydrologic Loads

1992-1994 TN Load:Hydrologic Load Ratio = 0.97