

**Presentation for  
October 19, 2011  
Upper Ocklawaha BWG  
meeting**

**Rolland Fulton**



# Outline

- Septic tank loading estimates for Harris Chain lakes
- Summary of TP loadings and concentrations in Harris Chain lakes
- Loading and water quality trends in lakes Beauclair, Griffin, and Harris
- Water quality monitoring changes in Harris Chain lakes

# Septic tank loading estimates

- Assume only septic systems within 200 meters of lakes, wetlands, or tributaries contribute nutrients
- Belanger et al. 2011 —
  - High nutrient and bacteria concentrations are usually rapidly reduced down-gradient of non-failing septic tank drainfields
  - Septic systems at the majority of study sites do not appear to have significant groundwater plumes containing nutrients or bacteria

# Septic tank loading estimates

- Estimates excluded residences connected to municipal WWTFs
- Received database of all residences connected to Mt. Dora WWTF
- For other municipal WWTFs received maps of service areas - assumed all residences within service area were connected to WWTF

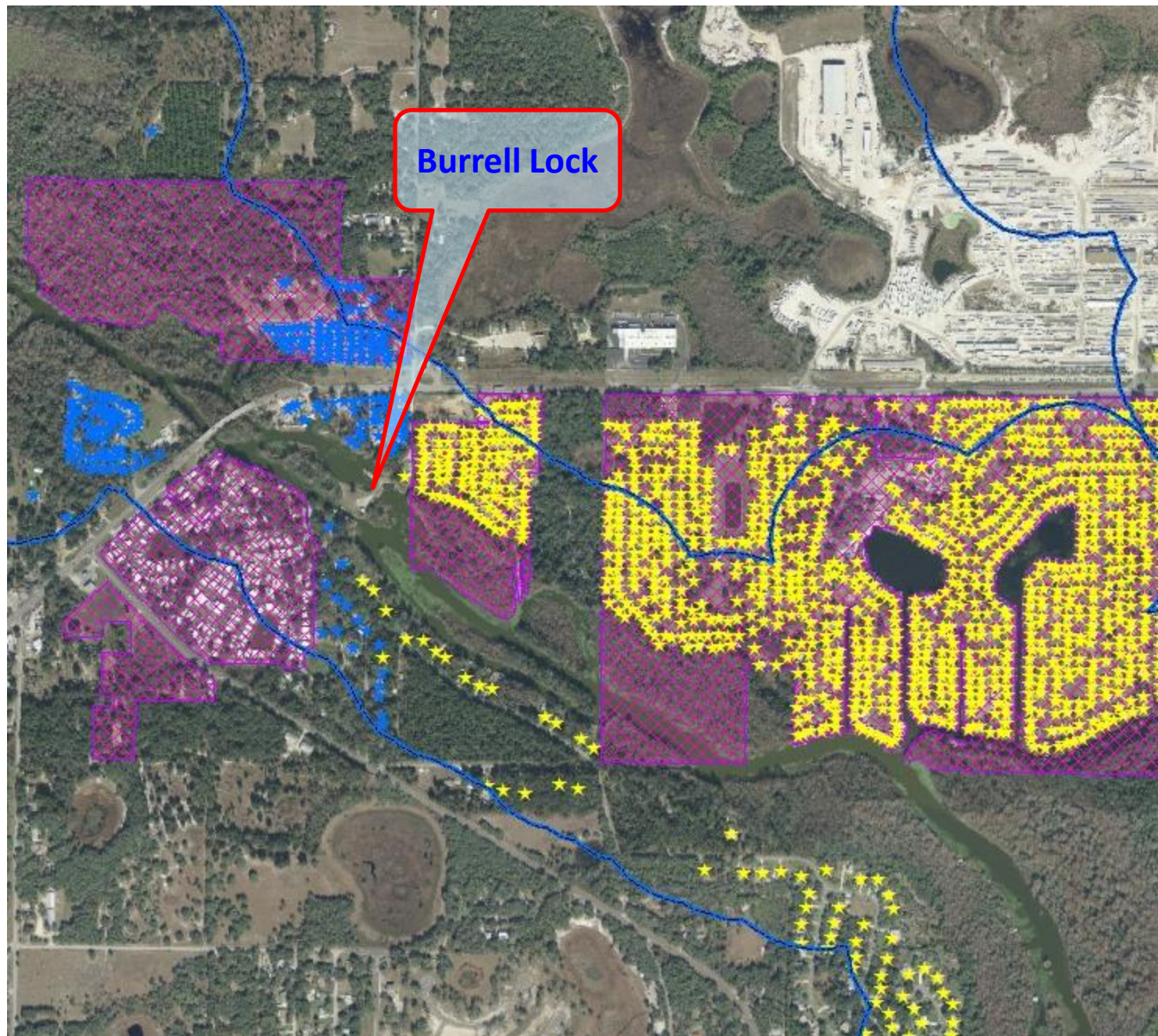
# Septic tank loading estimates

- Received map locations of package WWTFs from FDEP
- Received assistance from FDOH in determining service areas for package WWTFs
- If package WWTF was within 200 m of lakes, assumed that houses in the service area released nutrients at same rate as individual septic systems



You are  
here

Lake Harris



# Estimates of septic systems contributing to Harris Chain of Lakes

|                                | Septic systems<br>in 200 meter<br>buffer zone | Residences<br>contributing to<br>WWTFs in 200<br>meter buffer<br>zone |
|--------------------------------|-----------------------------------------------|-----------------------------------------------------------------------|
| 1995 (TMDL<br>baseline period) | 4,238                                         | 4,776                                                                 |
| 2004                           | 5,338                                         | 5,764                                                                 |
| 2009                           | 8,243                                         | 5,598                                                                 |

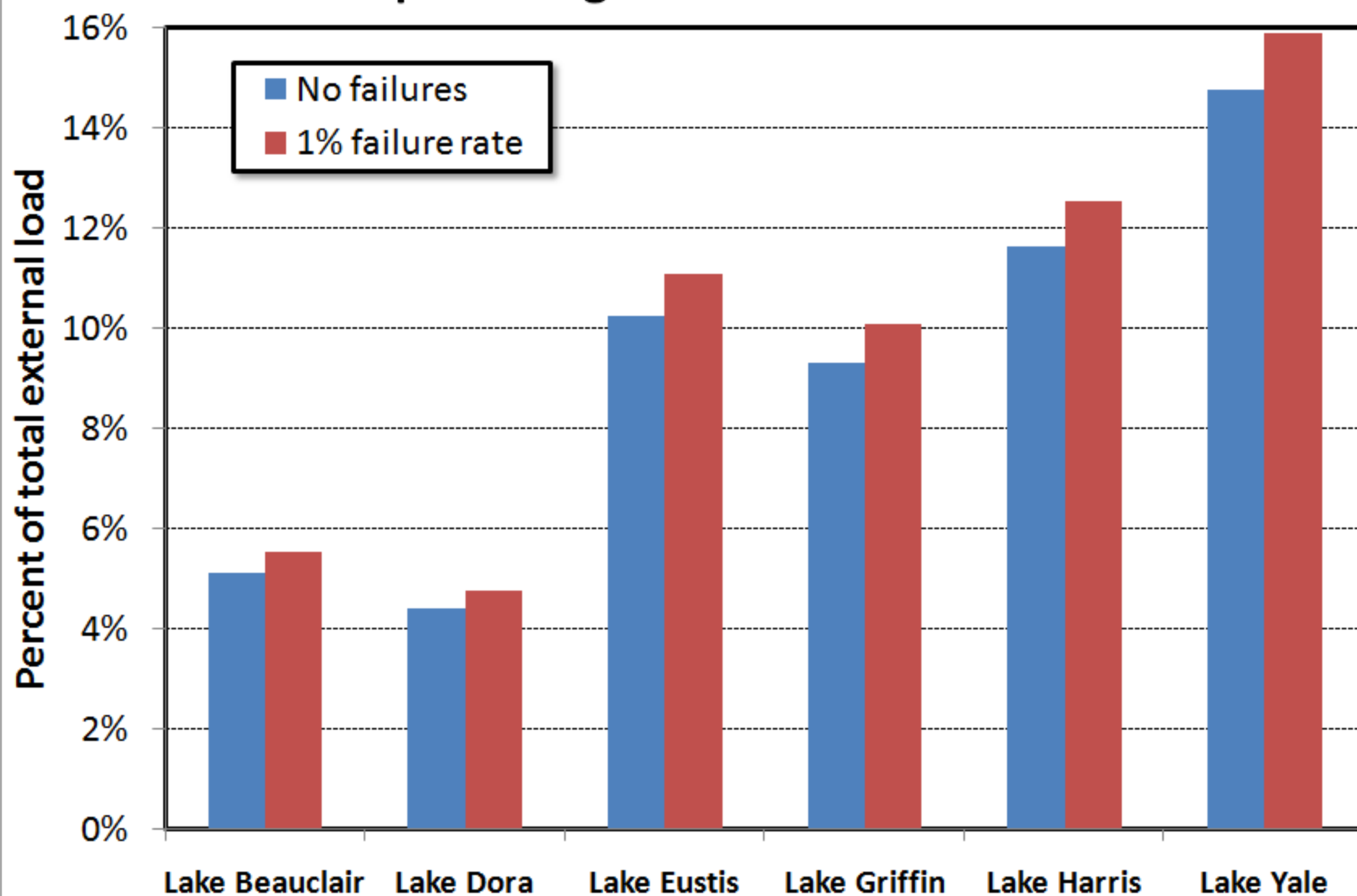
# Septic tank loading estimates

- For contributing septic systems:
  - 6.7 pounds TP/year discharged to drainfield
  - 90% of TP discharged is retained within drainfield
  - Assumed no septic tank failures

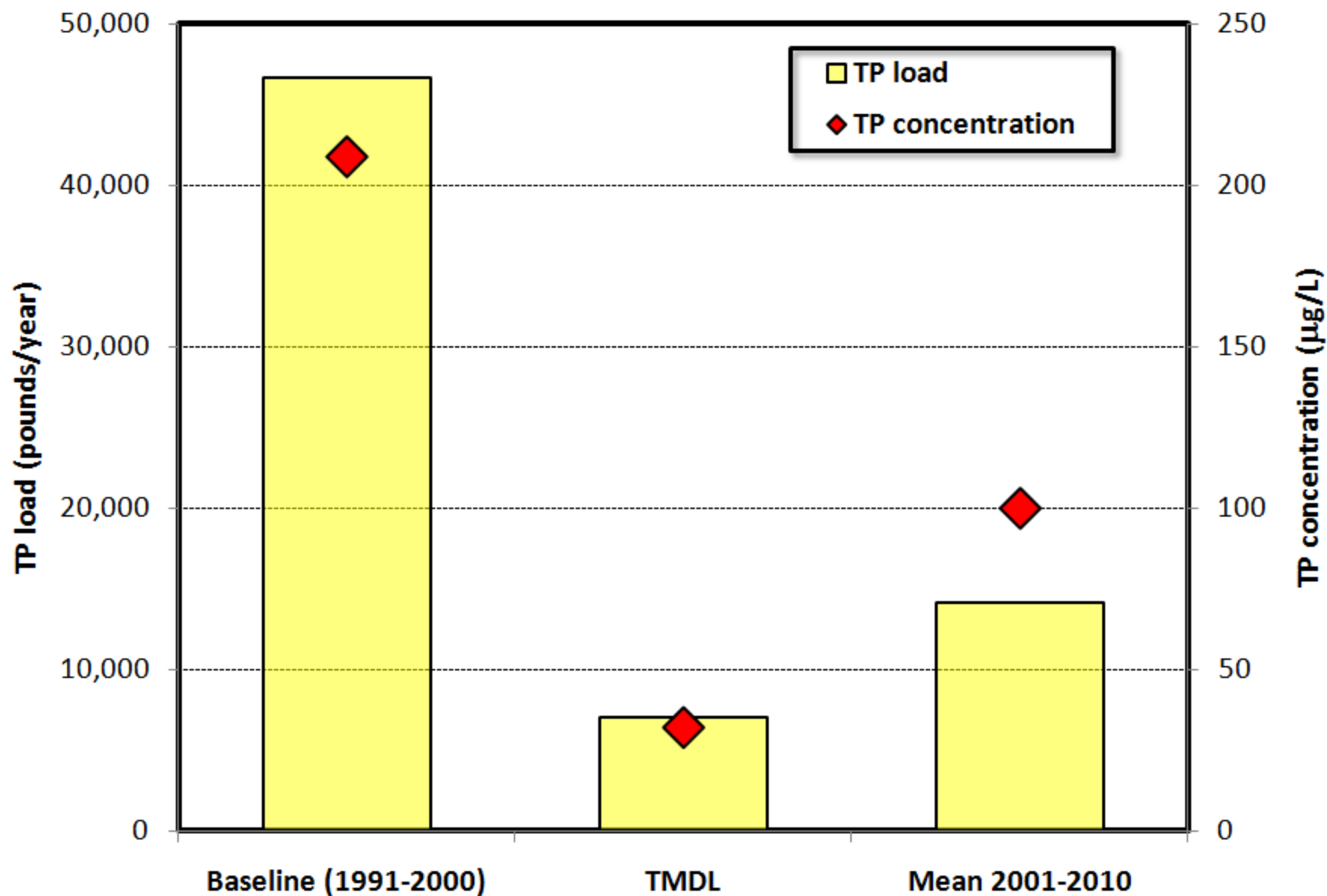
# Septic tank failure rates

- FDOH website - tables of septic tanks installed and repair permits by county, 1991-2010
- Lake County 1991-2010:
  - 14% of septic tanks repaired
  - Average annual repair rate of 0.8%
  - Most repairs are not totally failed systems
- To gauge potential impact of failures on TP loading, assumed upper bound failure rate of 1% per year, with 0% retention of TP by drainfields of failed septic systems

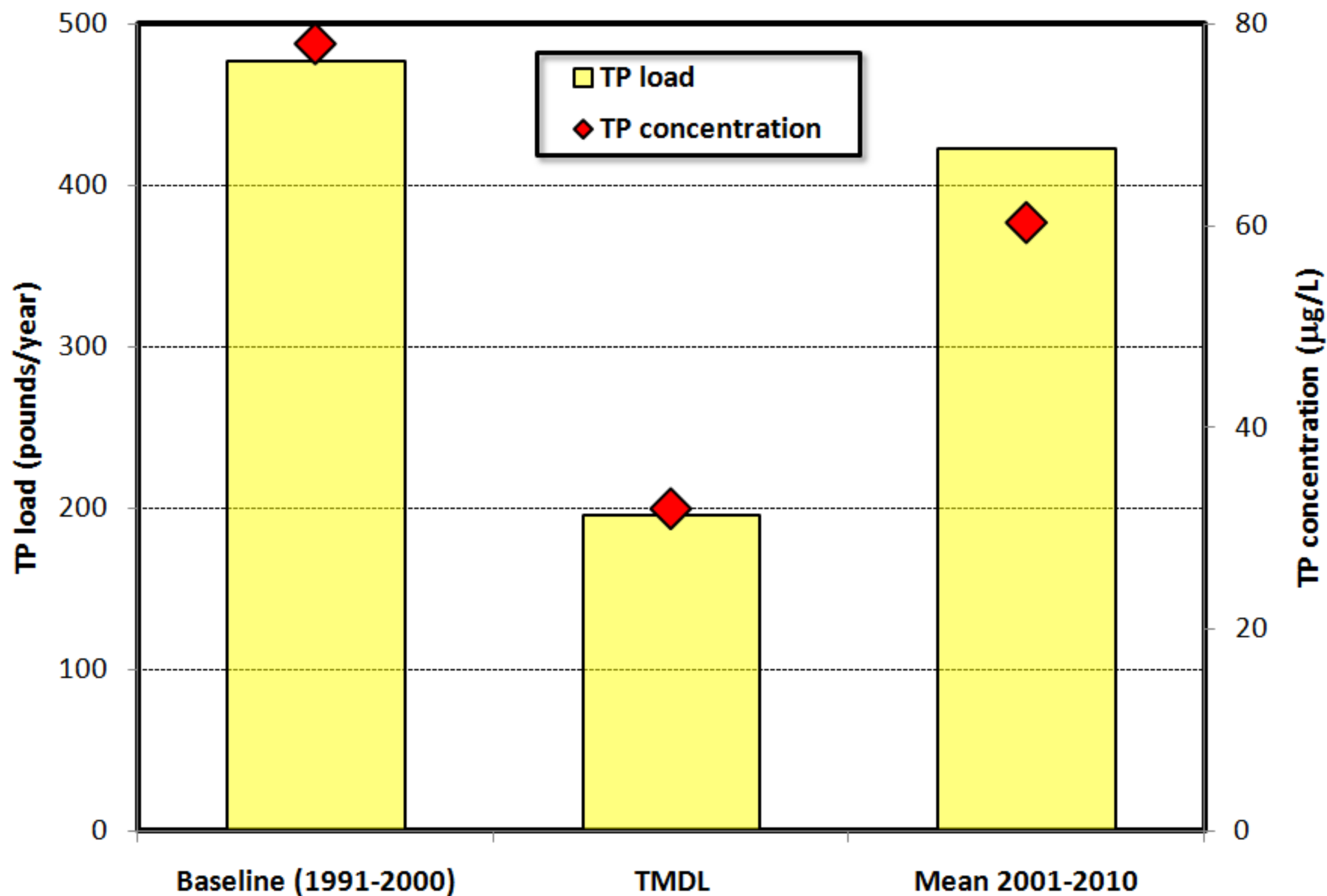
## 2010 estimated TP loading from septic tanks as a percentage of the total external load



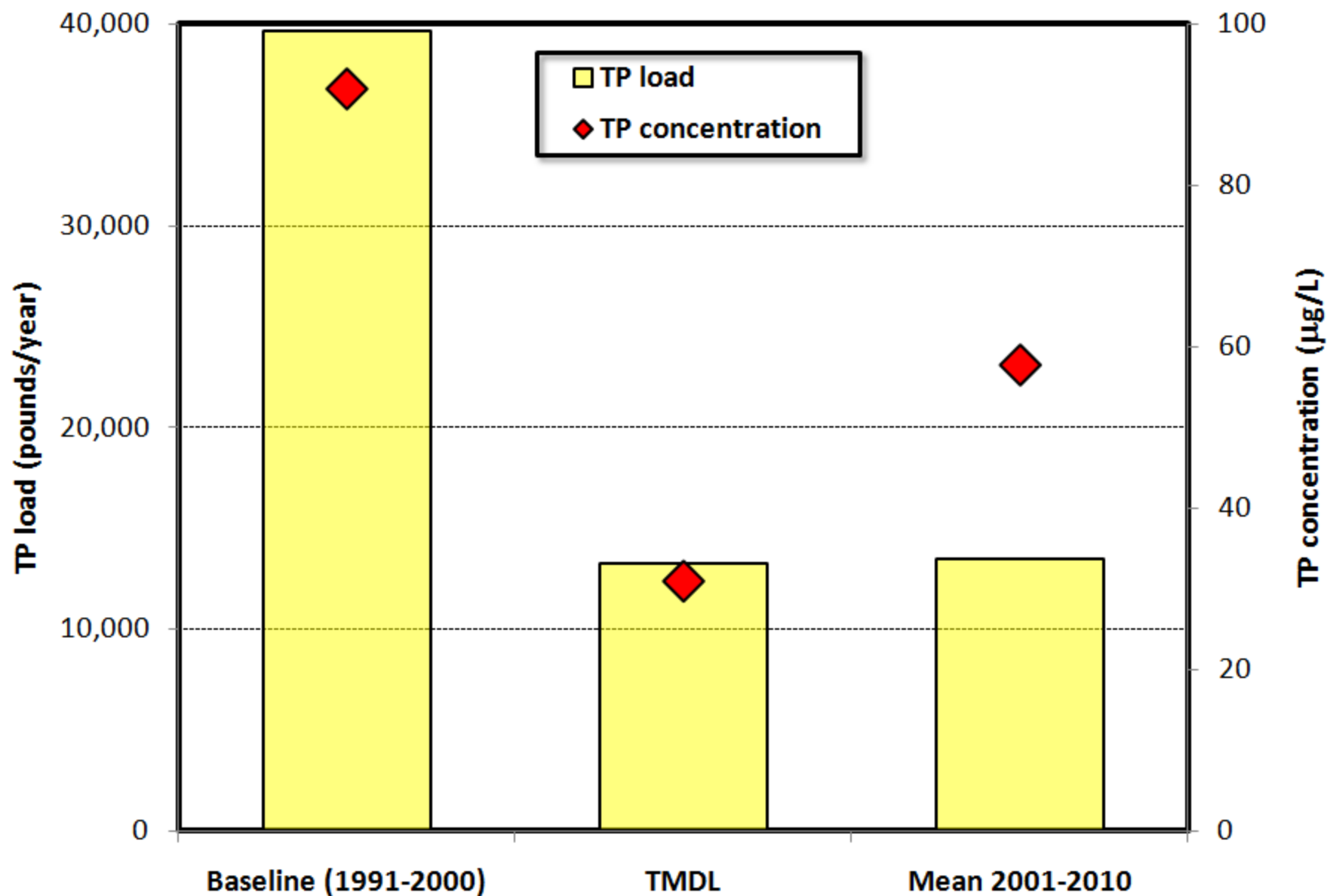
## Lake Beauclair total phosphorus loads and concentrations



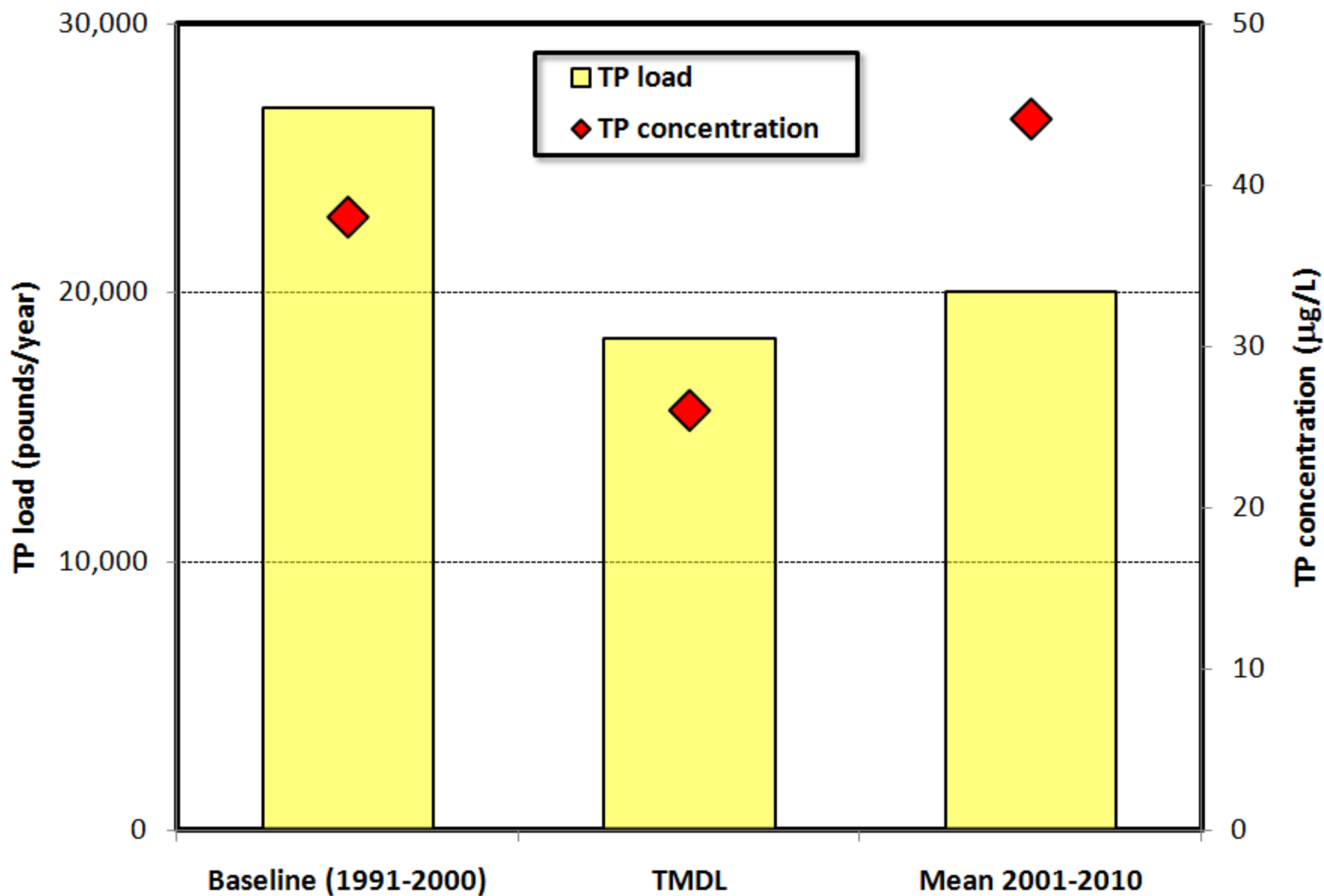
## Lake Carlton total phosphorus loads and concentrations



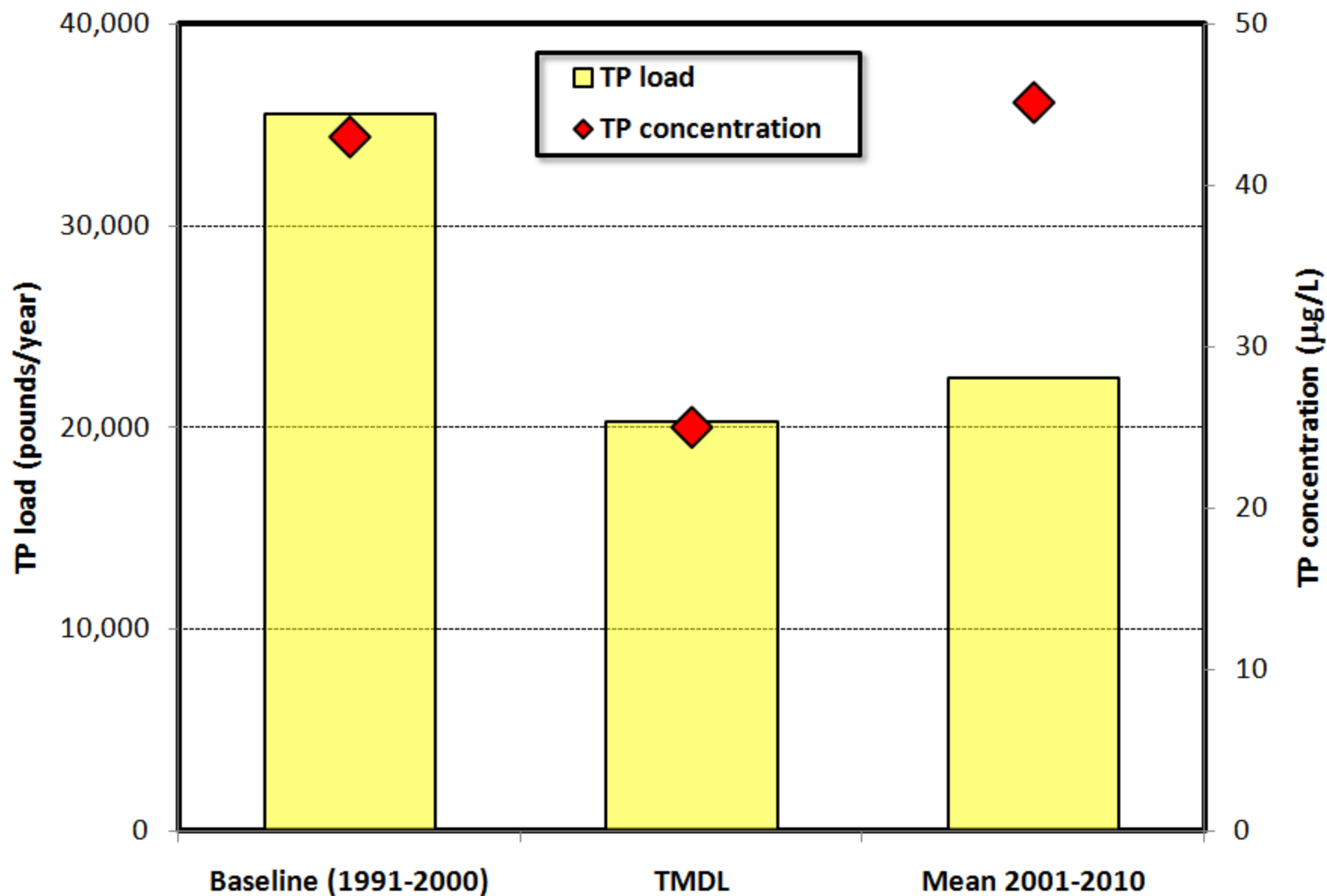
## Lake Dora total phosphorus loads and concentrations



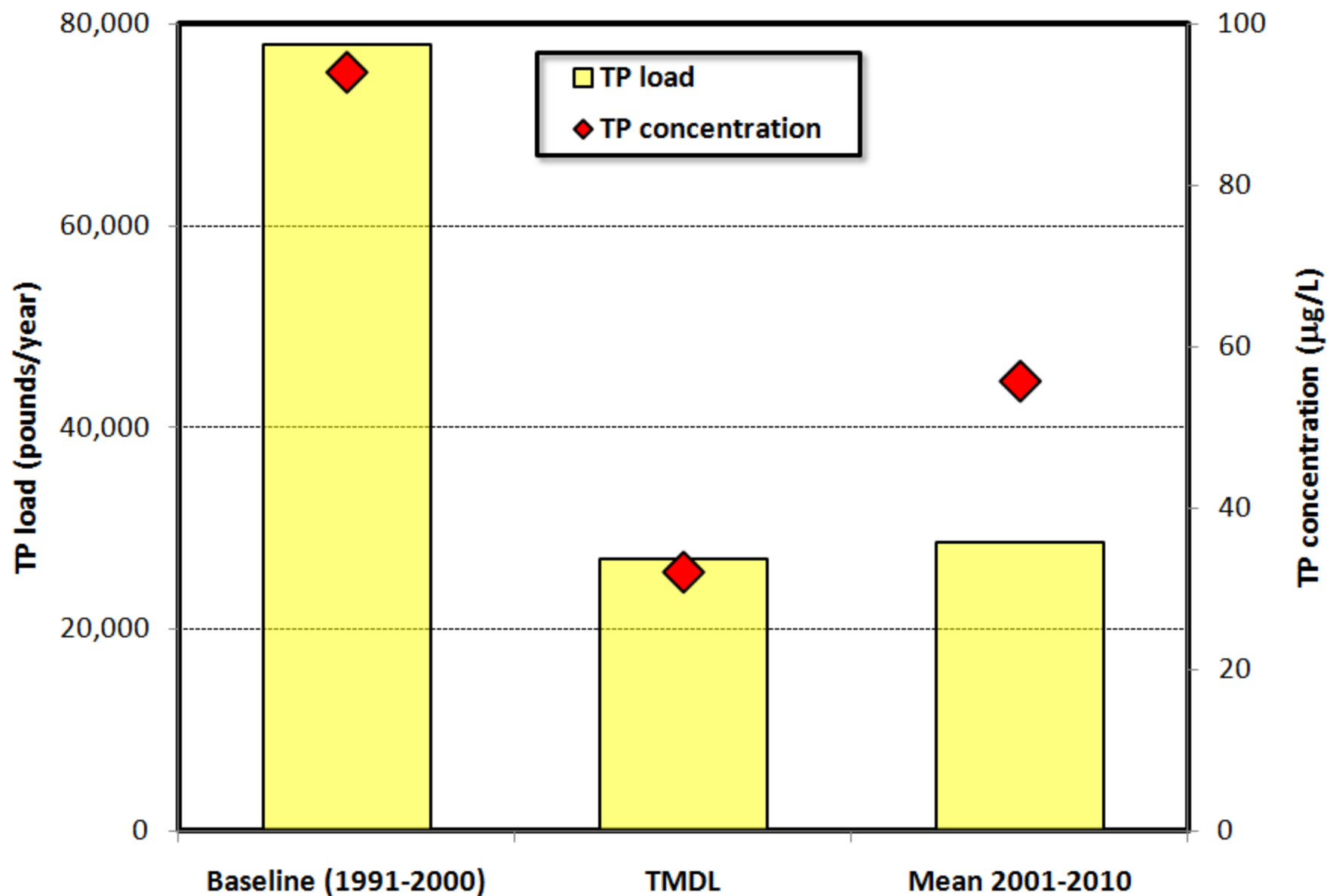
## Lake Harris total phosphorus loads and concentrations



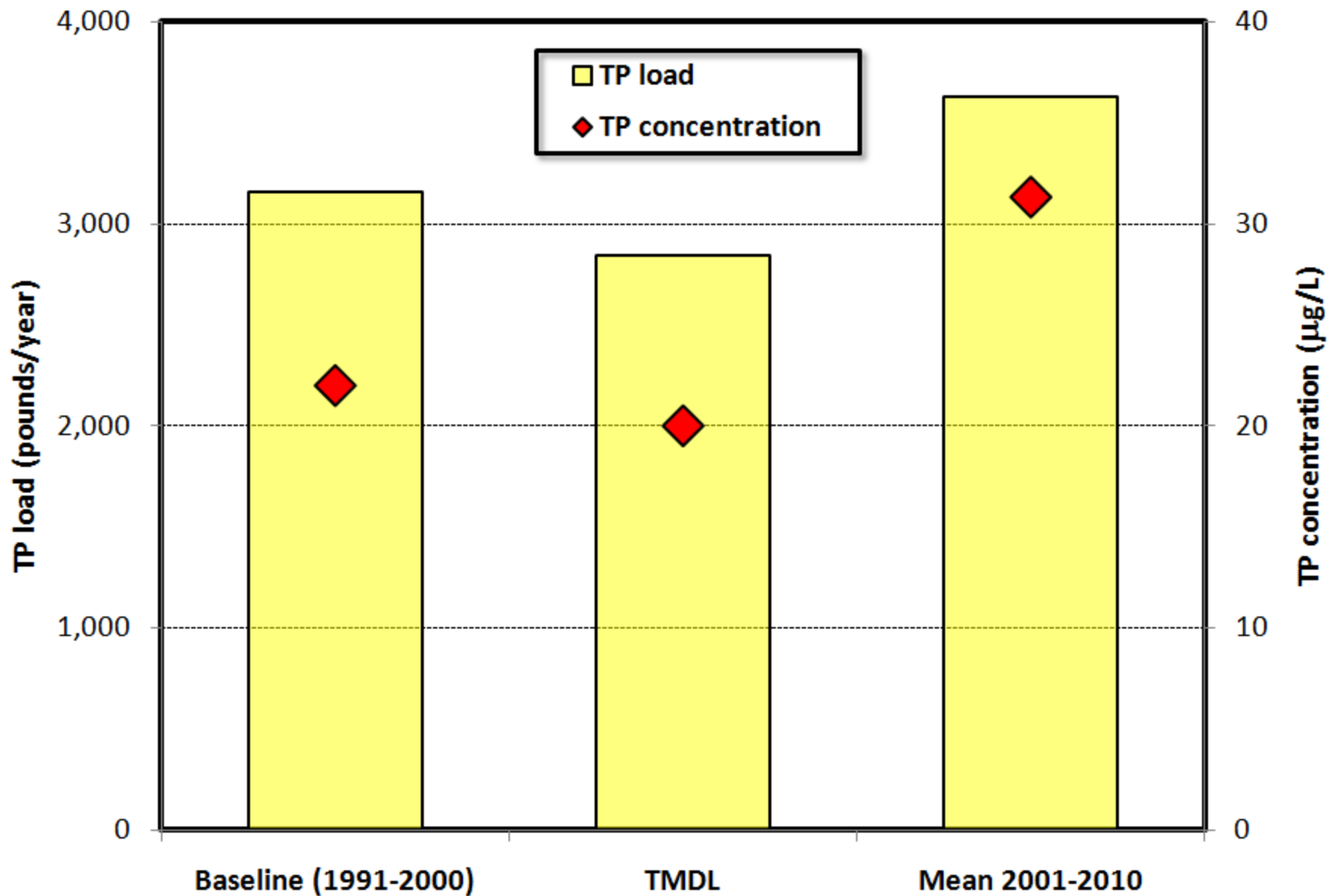
## Lake Eustis total phosphorus loads and concentrations



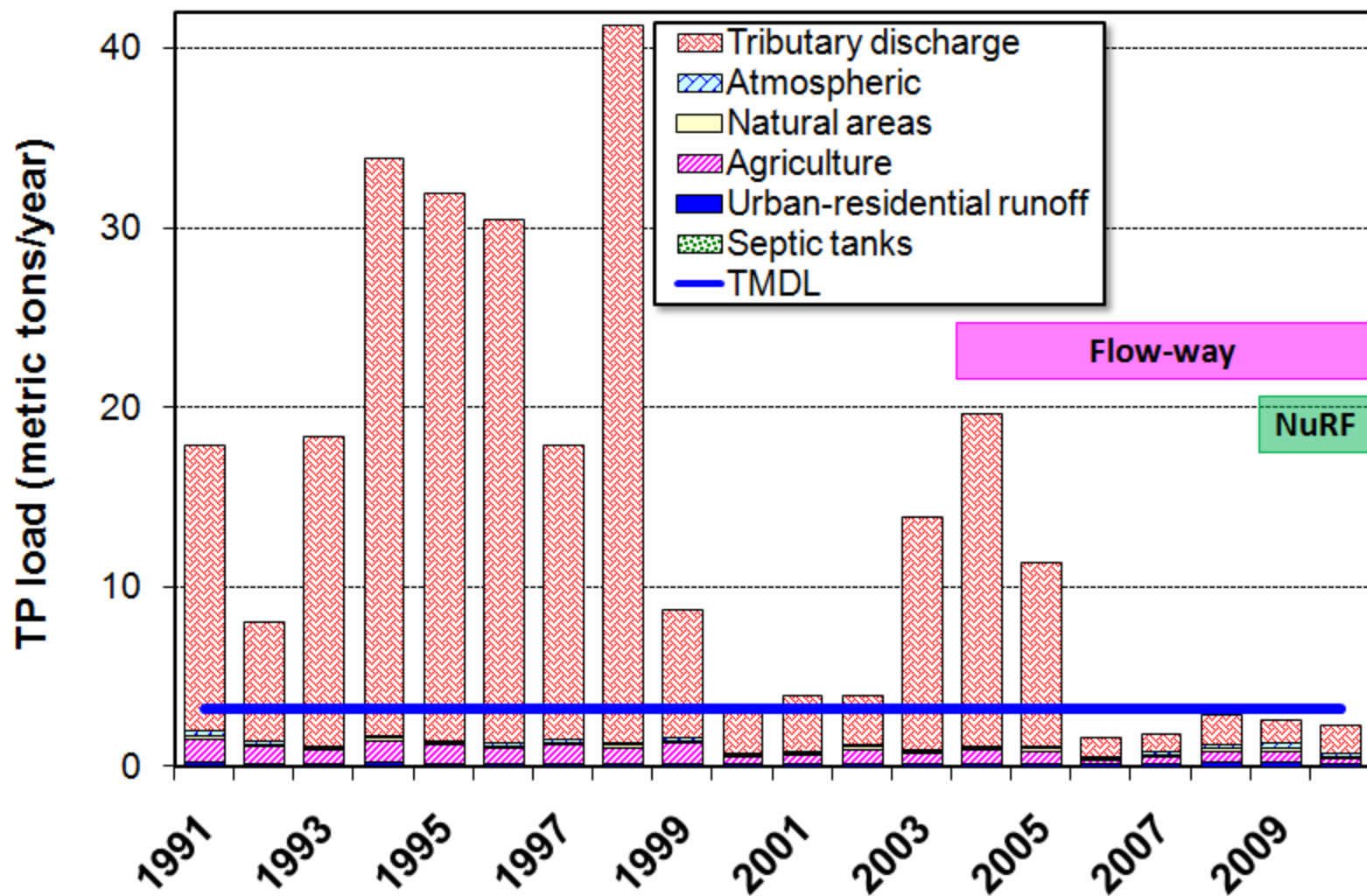
## Lake Griffin total phosphorus loads and concentrations



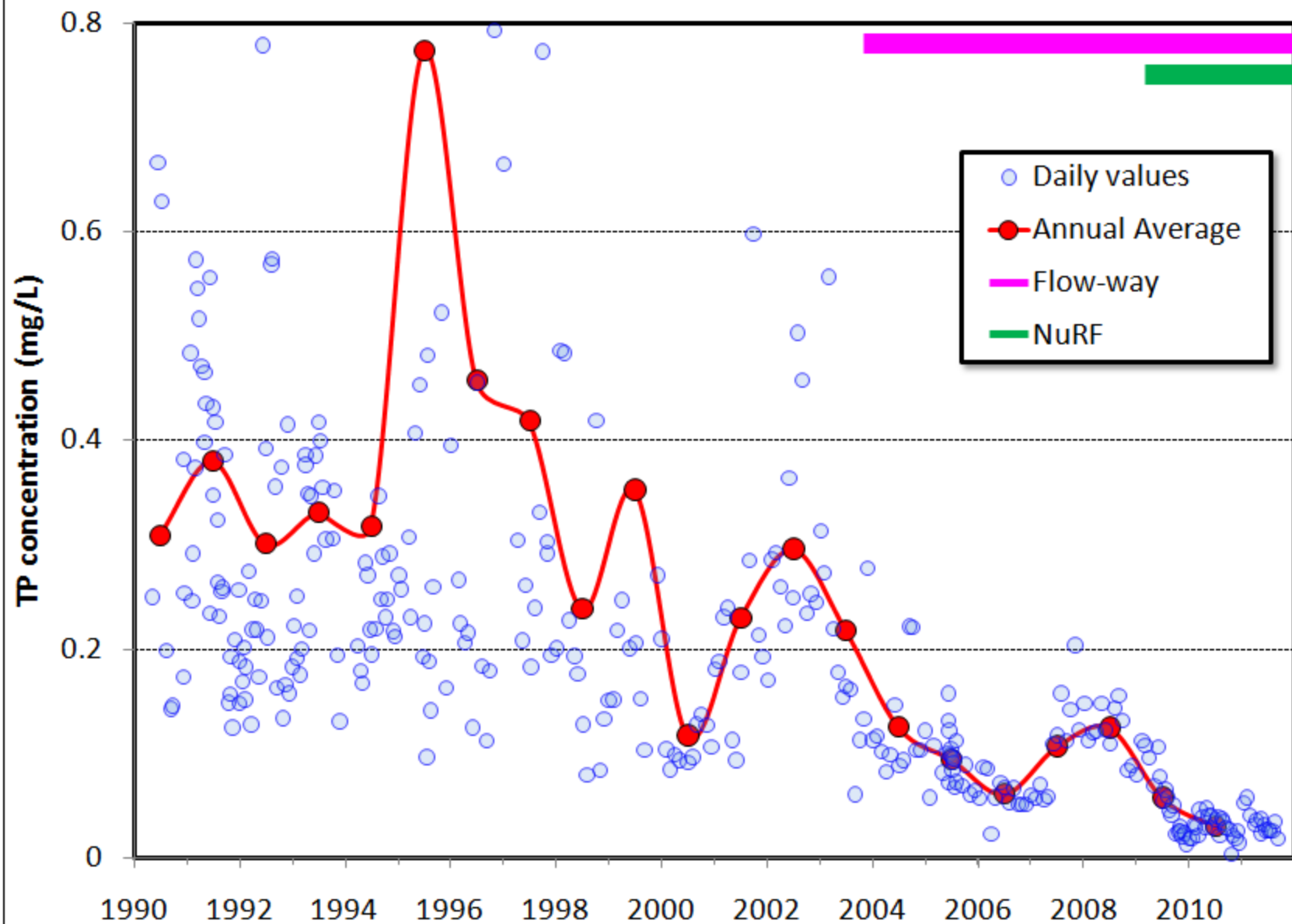
## Lake Yale total phosphorus loads and concentrations



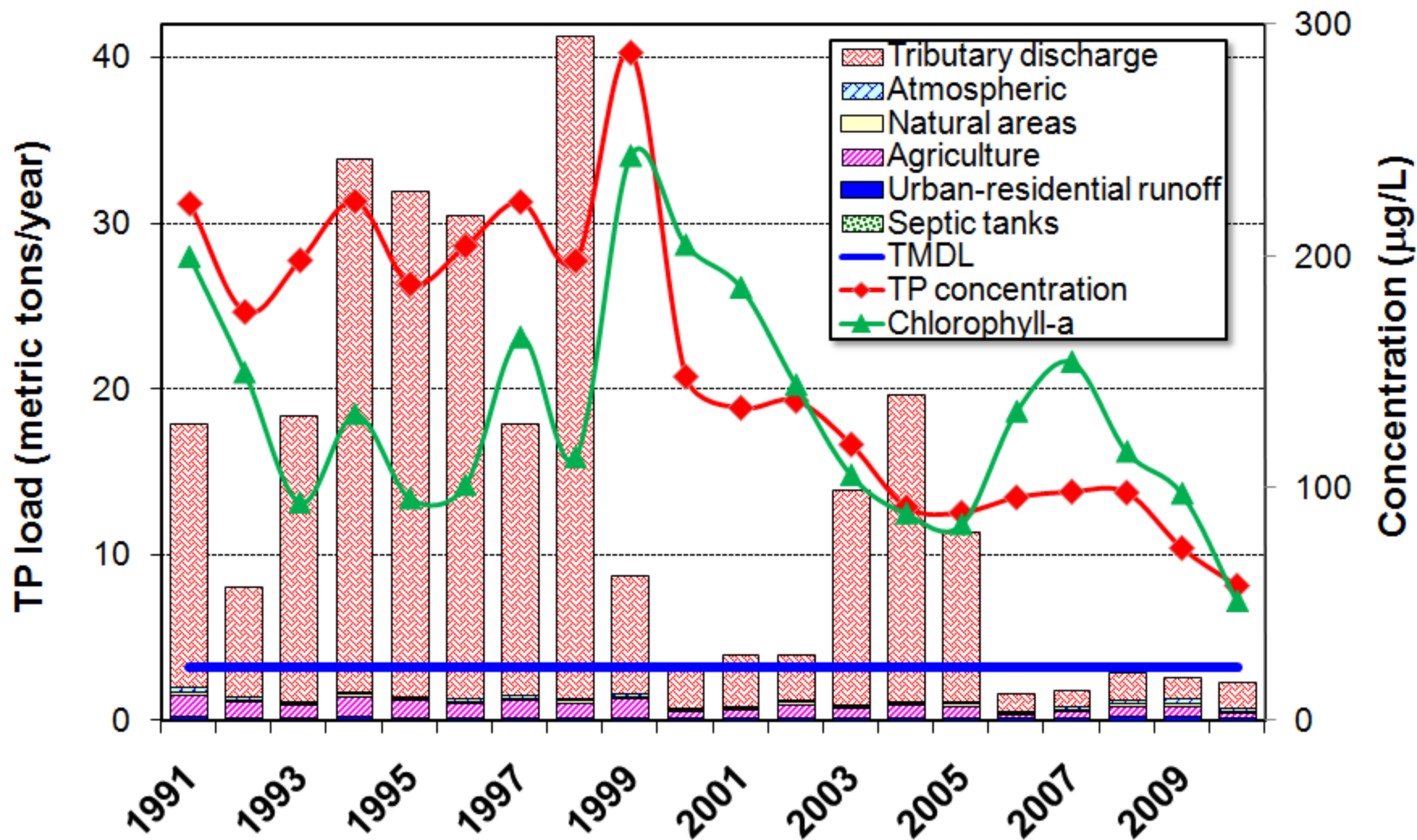
## Lake Beauclair estimated annual external total phosphorus loads



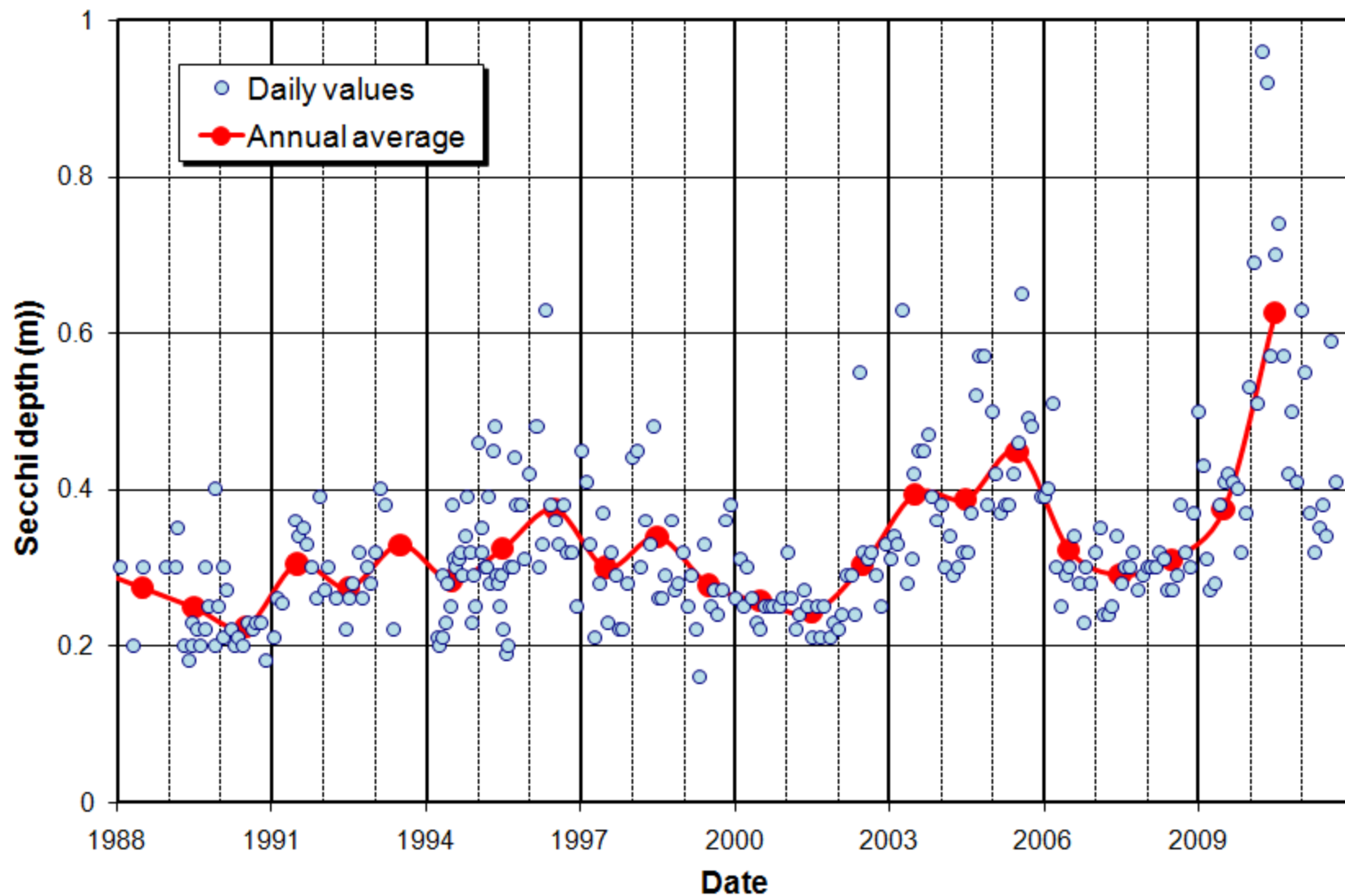
# Apopka-Beauclair Canal total phosphorus concentrations



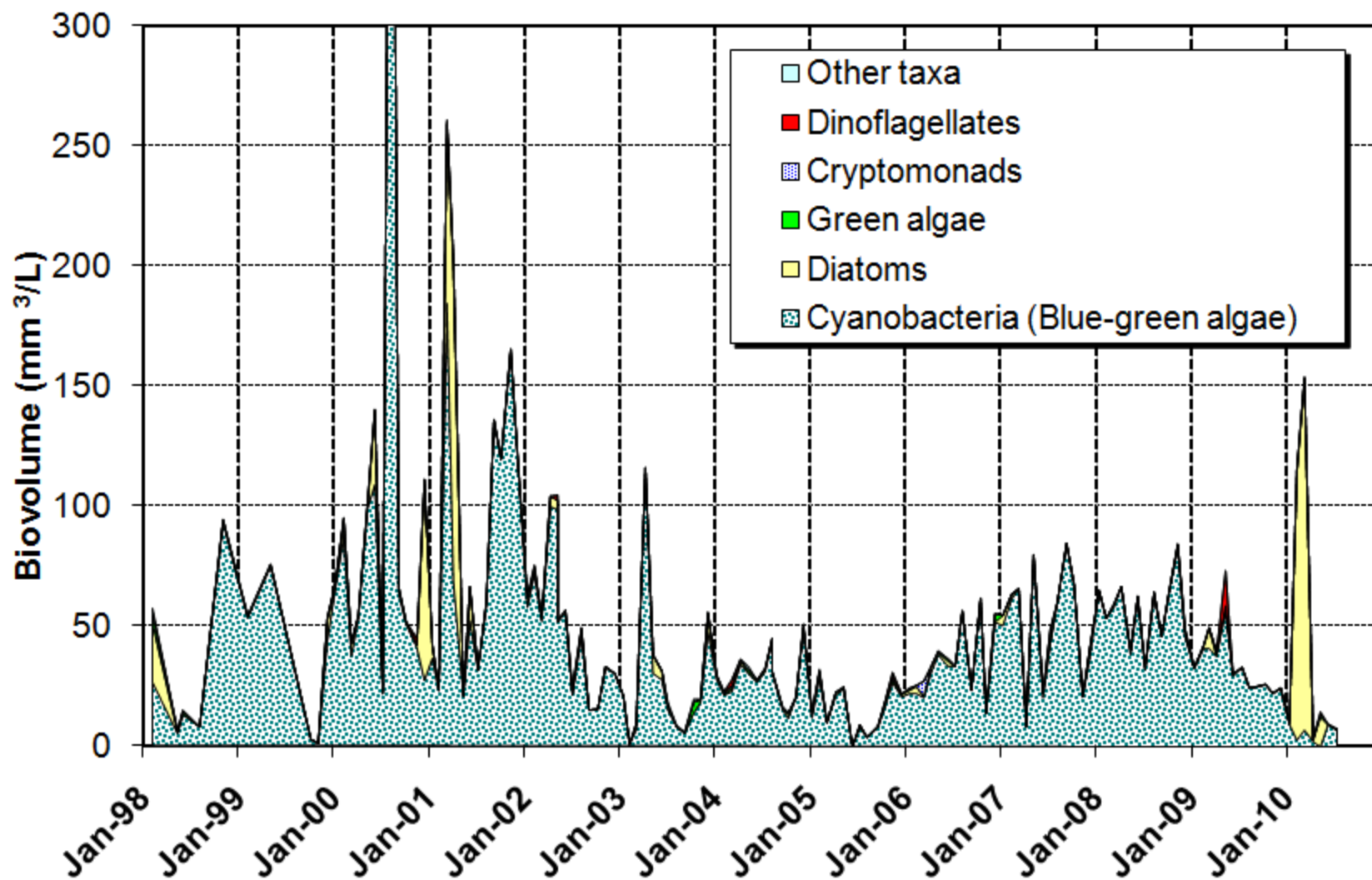
# Lake Beauclair estimated annual external total phosphorus loads, and concentrations of TP and chlorophyll-a



**Lake Beauclair water quality data - Secchi depth**



## Lake Beauclair phytoplankton biovolume



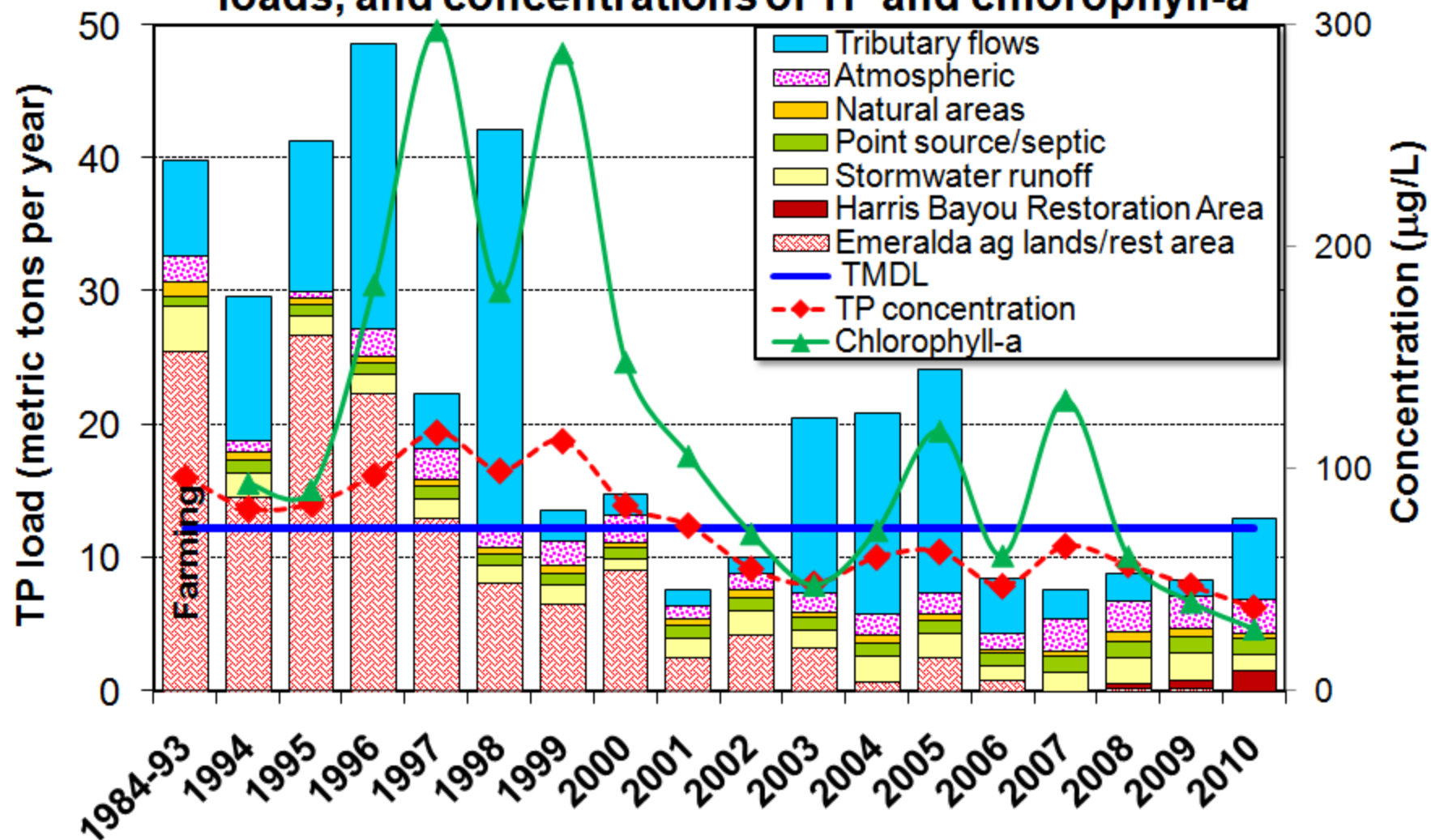
# LAKE GRIFFIN -

## BACK FROM THE DEAD?

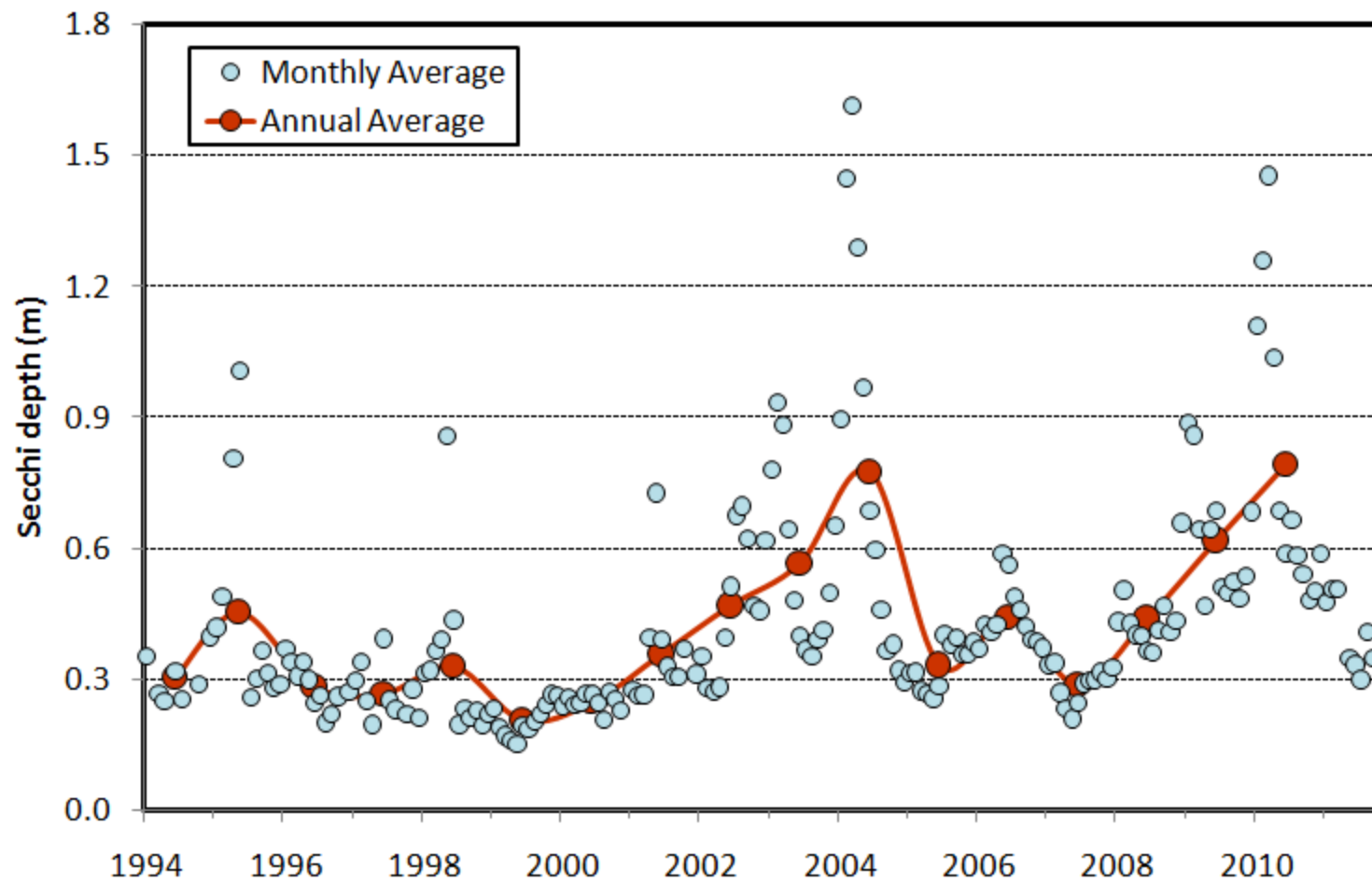
Rolland Fulton,  
Walt Godwin, and  
Brian Sparks



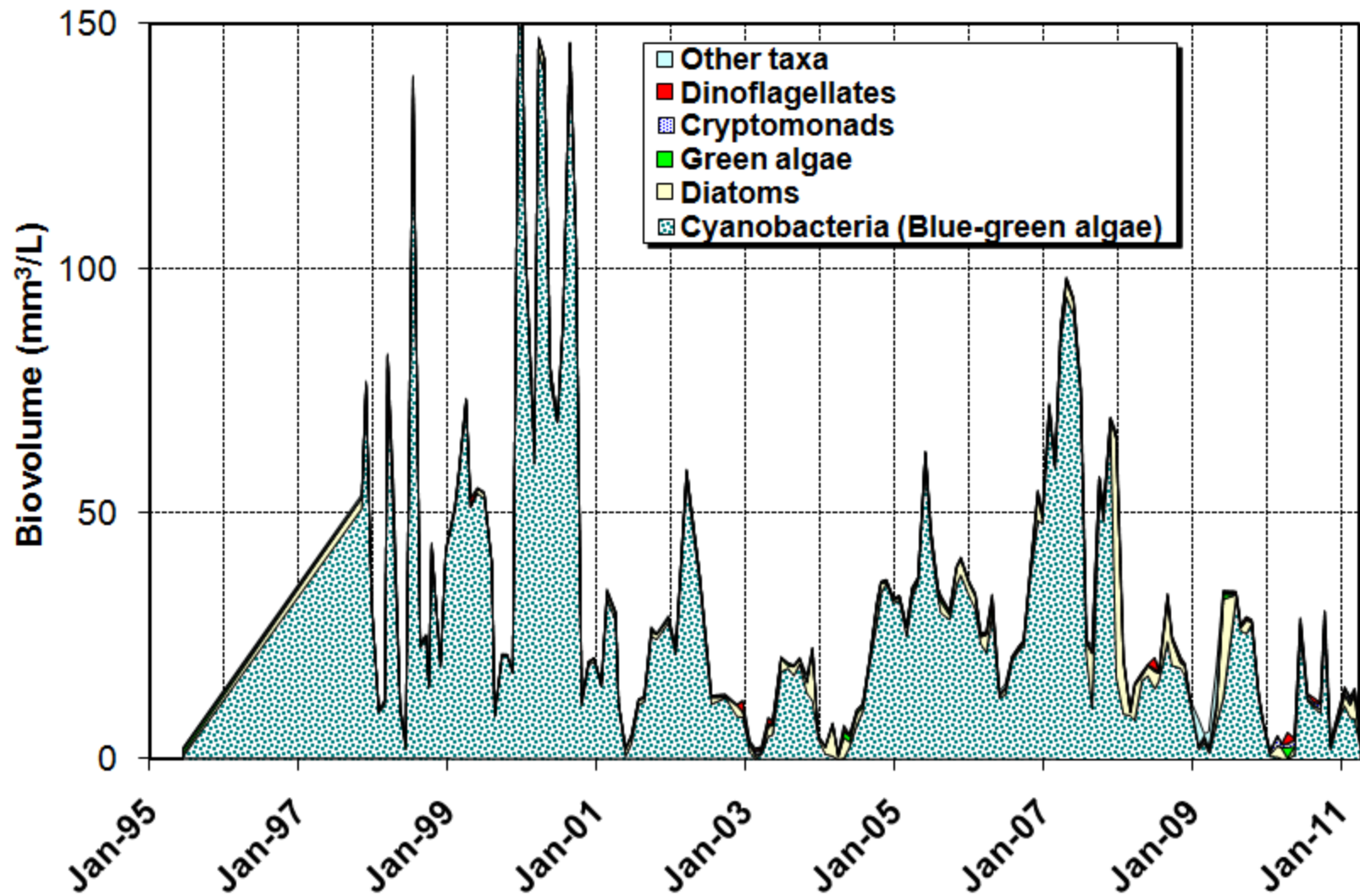
# **Lake Griffin estimated annual external total phosphorus loads, and concentrations of TP and chlorophyll-a**



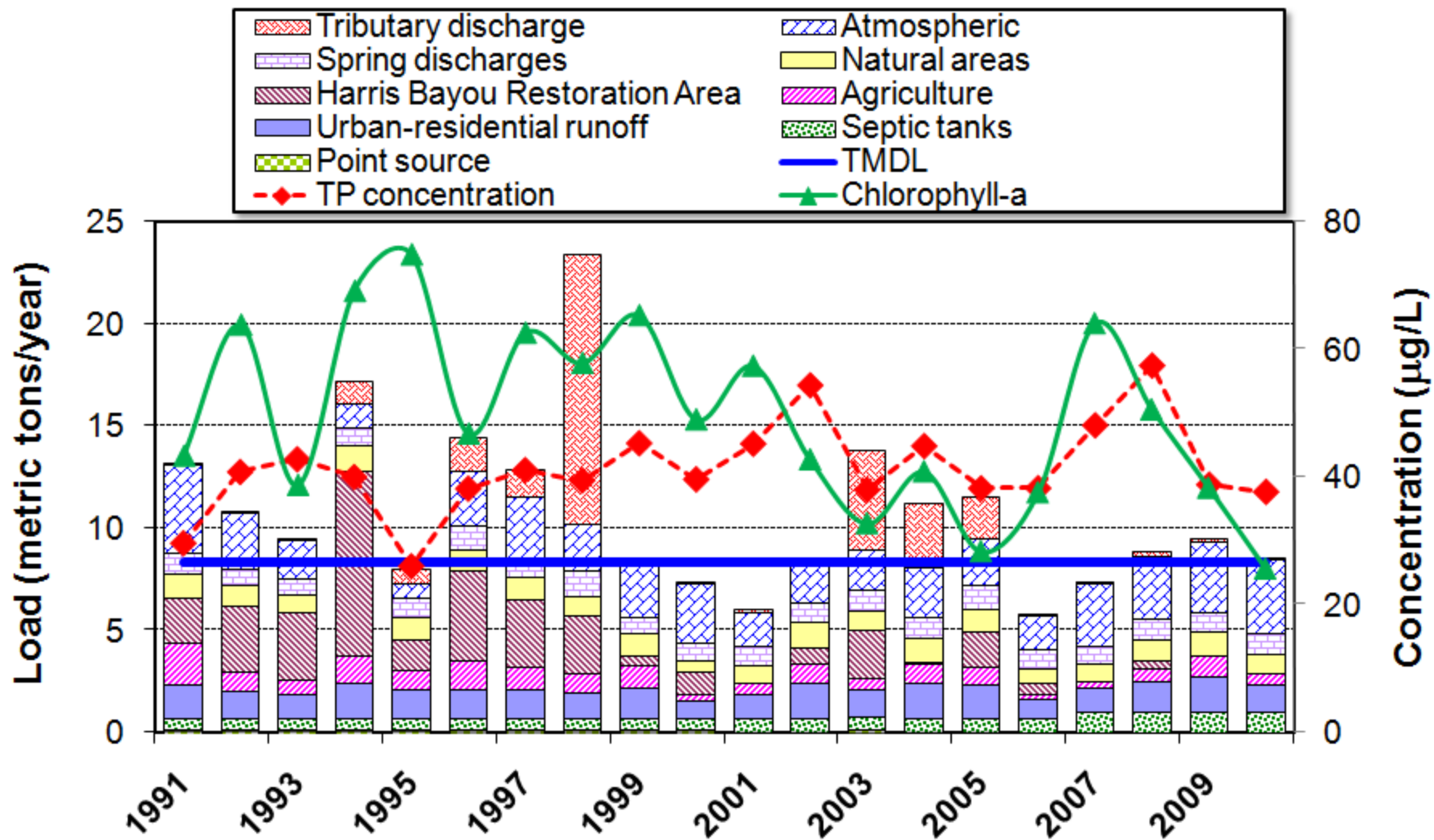
Lake Griffin Secchi depths



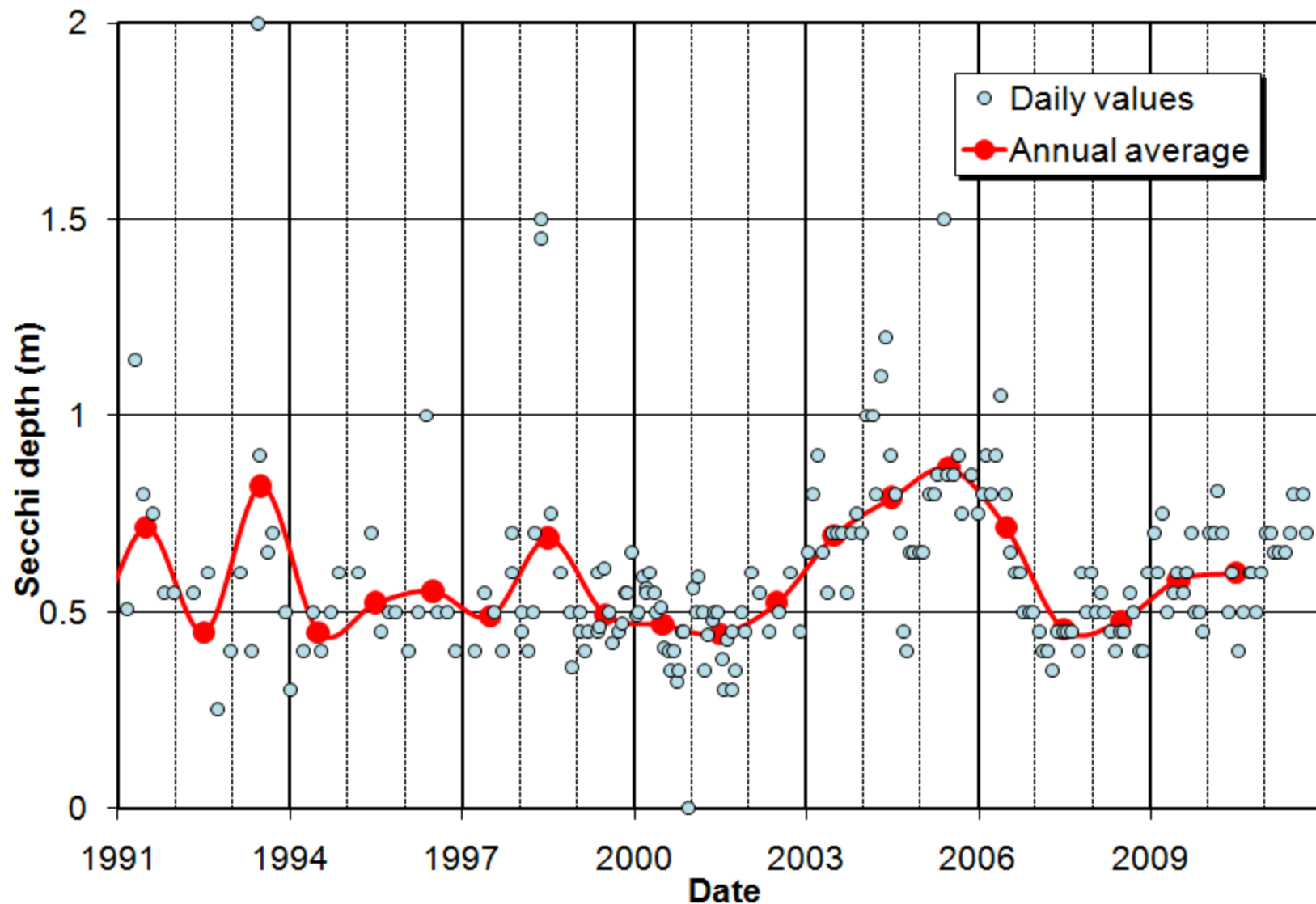
## Lake Griffin phytoplankton biovolume



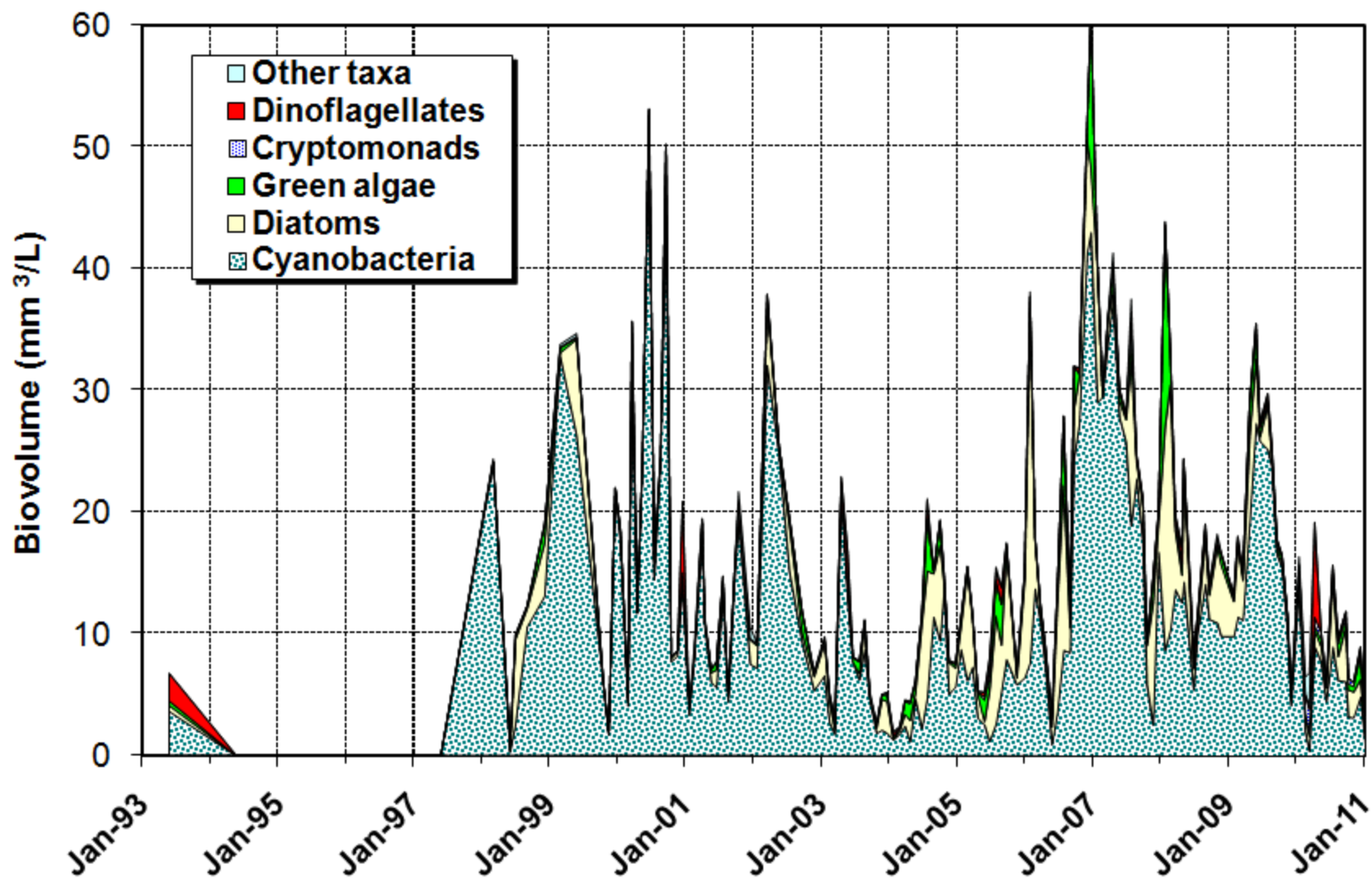
# **Lake Harris estimated annual external total phosphorus loads, and concentrations of TP and chlorophyll-a**



## Lake Harris Center water quality data - Secchi depth



## Lake Harris phytoplankton biovolume



# Changes to UORB water quality stations, October 2011

- Ambient stations deleted:
  - Lake Carlton
  - Lake Ola
  - Lake Dora east pool (will continue center lake)
  - Dora Canal
  - Dead River
  - Helena Run
  - Hicks Ditch
  - Pine Meadows south
  - Little Lake Harris???