

Water quality changes following nutrient loading reduction and biomanipulation in a large shallow subtropical lake, Lake Griffin, Florida, or ...

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September 9, 2015
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LAKE GRIFFIN - BACK FROM THE DEAD?



Lake Griffin - late 1990s

Orlando Sentinel - 8/26/01

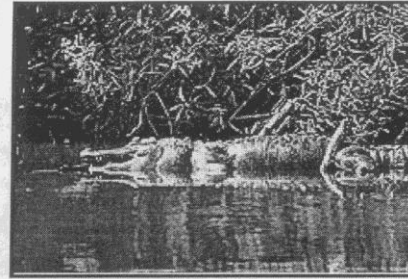
SPECIAL REPORT
Toxic algae in our lakes

Menace lurks hidden in lakes

A study reveals how risky it
may be to go into the water

Killed by Cy? A
gator lies dead
in Lake Griffin.
Scientists think
the killer may be
a tiny organism
nicknamed 'Cy.'

TOM BENITEZ/THE
ORLANDO
SENTINEL



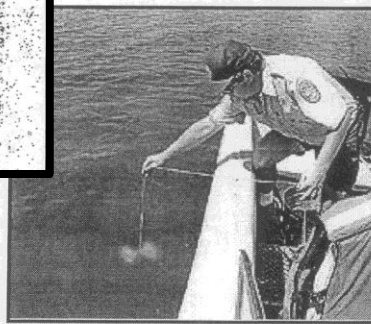
Do lakes hold a killer algae?

Robert Sargent Jr. and Ramsey Campbell
of The Sentinel Staff

entinel on July 22, 1999.

water in Lake
Griffin for
visibility

TOM BENITEZ/THE
ORLANDO
SENTINEL



Test confirms bacteria will poison lake

Ramsey Campbell
of The Sentinel Staff

Published in The Orlando Sentinel on July 23, 1999.



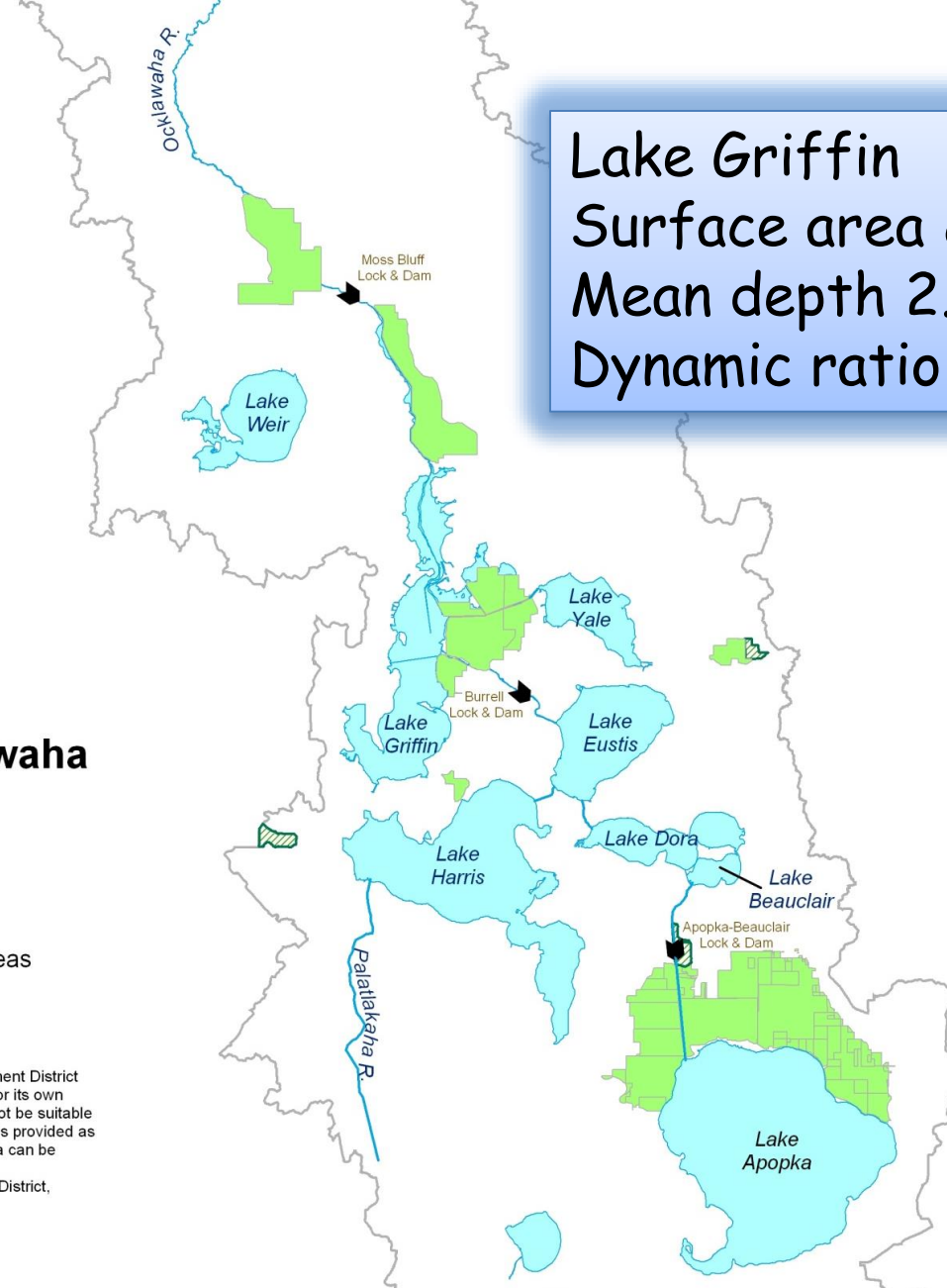
St. Johns River
Water Management District

Lake Griffin
Surface area 8,900 ac
Mean depth 2.2 m
Dynamic ratio 2.7

Upper Ocklawaha River Basin

-  Dam
-  Muck Farms
-  Restoration Areas
-  Lakes

The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting:
St. Johns River Water Management District,
Geographic Information Systems,
Program Management,
P.O. Box 1429, Palatka, Florida
32178-1429. Tel: (386) 329-4176.



Lake Griffin restoration program

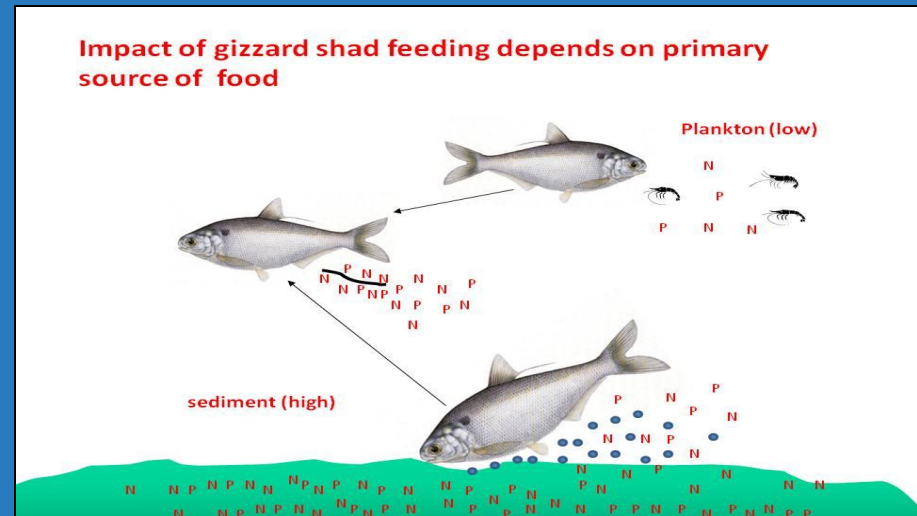
- Wetland restoration to reduce phosphorus load and restore habitat
- About 5,000 acres of former farmlands



4.10.2002 11:09

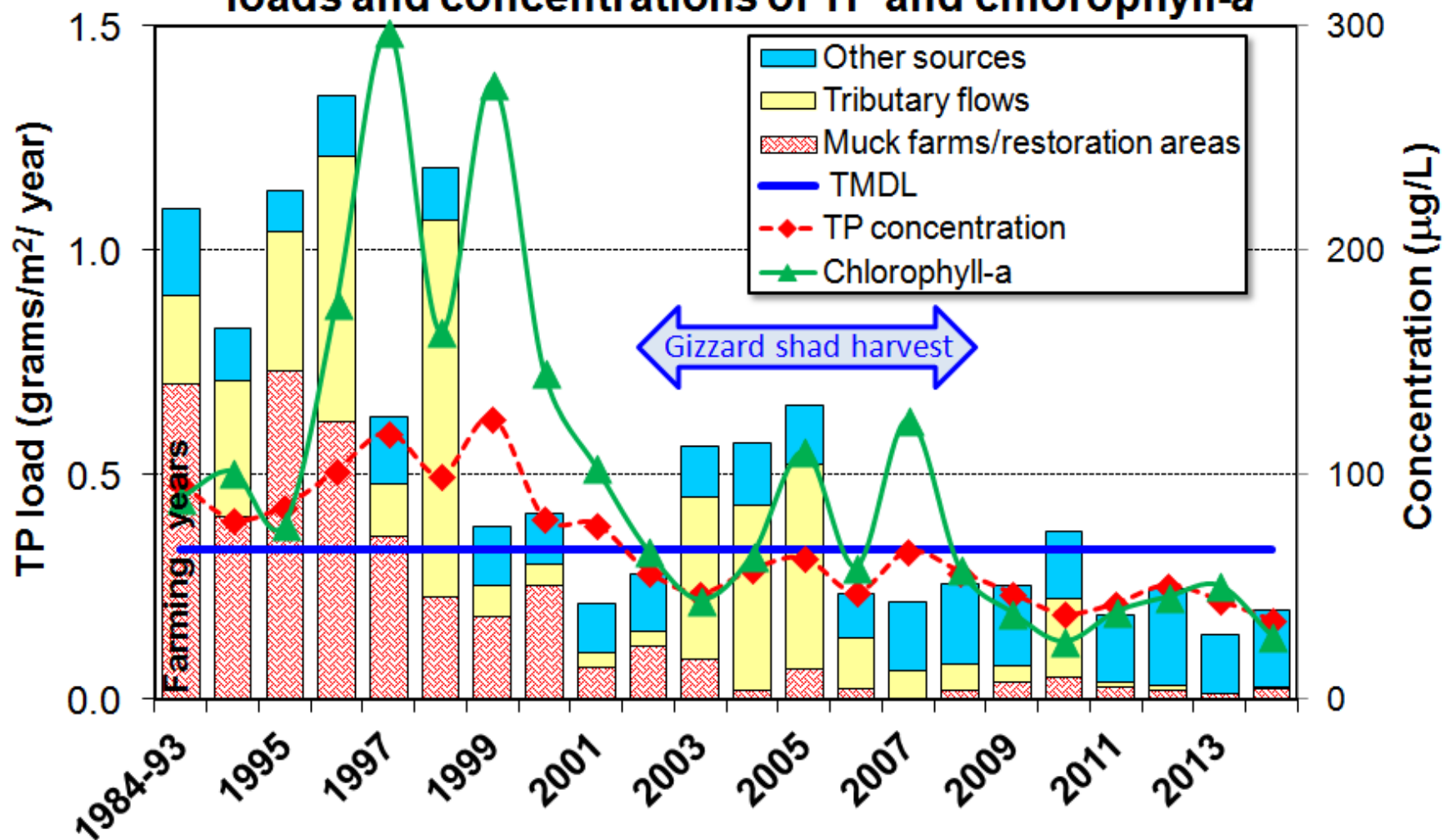
Removal of Gizzard Shad from Lake Griffin

- Reduce recycling of P caused by bottom feeding
- Reduce turbidity caused by bottom feeding disturbance
- Remove P in fish bodies
- Increase cropping of algae by zooplankton

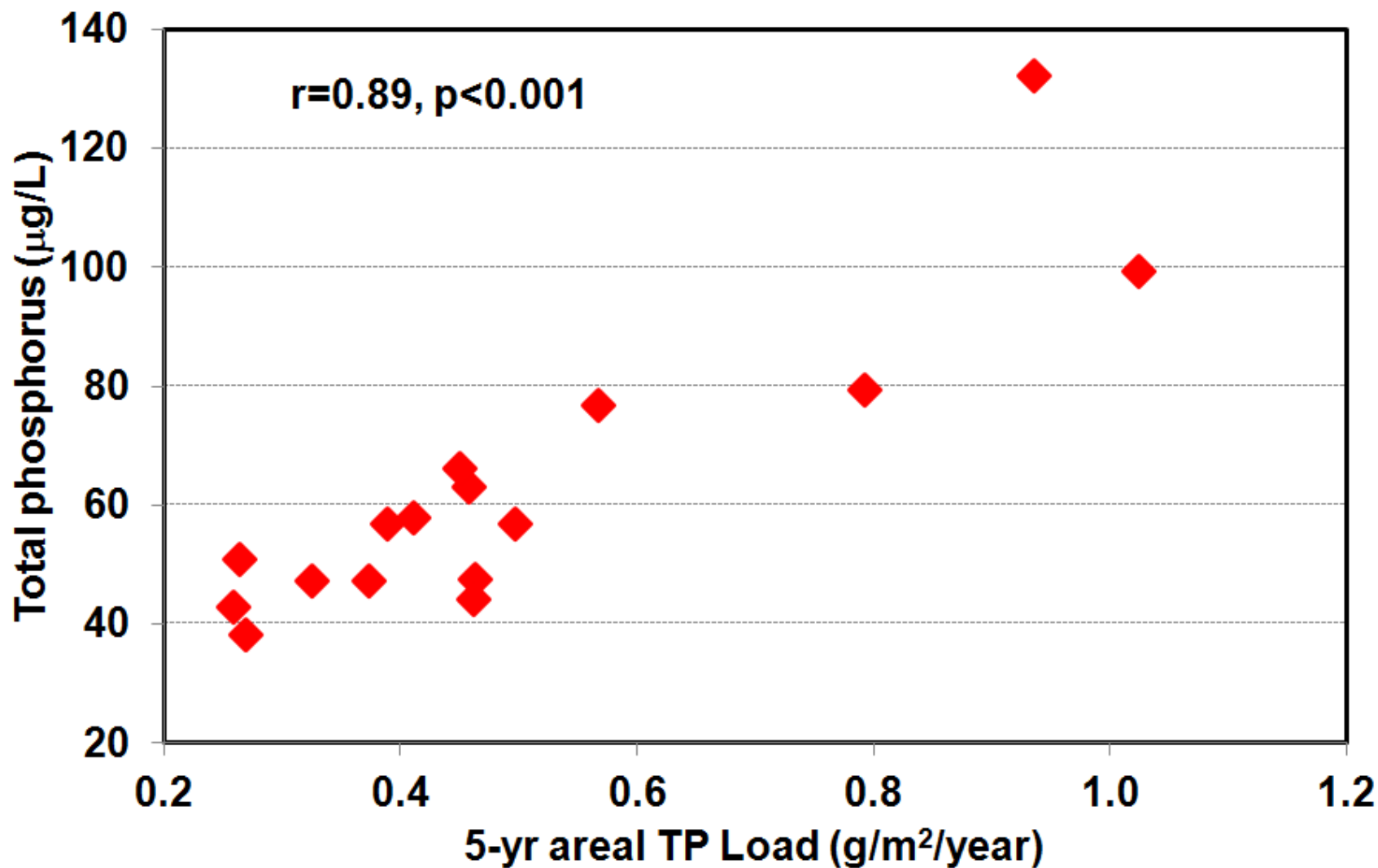


Year	Direct P Removal (g/m ² / yr)	P Excretion Prevented (g/m ² / yr)
2002	0.129	
2003	0.041	0.078
2004		
2005	0.030	0.135
2006	0.021	
2007	0.035	0.086
2008	0.009	0.208

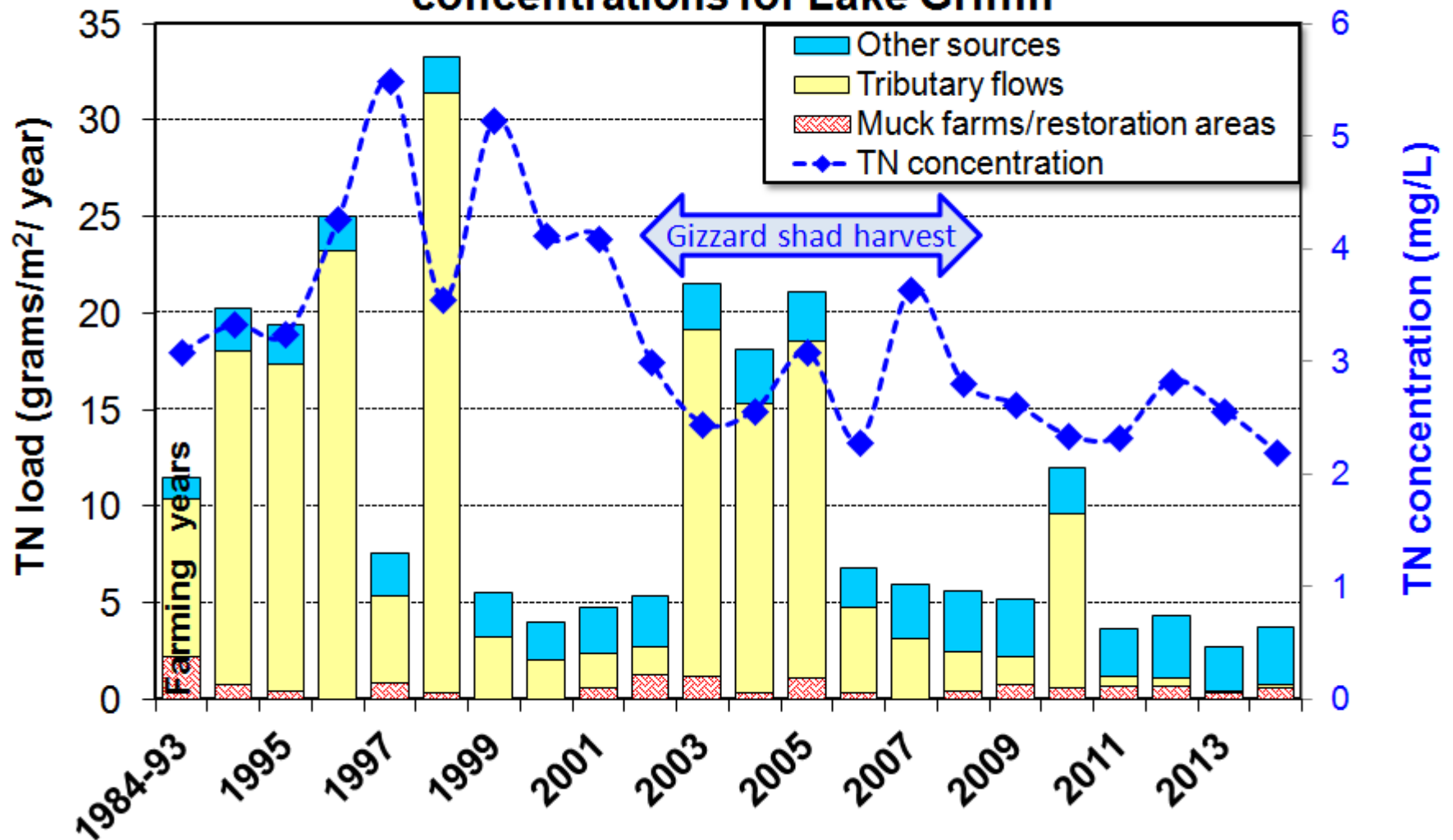
Lake Griffin estimated annual external total phosphorus loads and concentrations of TP and chlorophyll-a



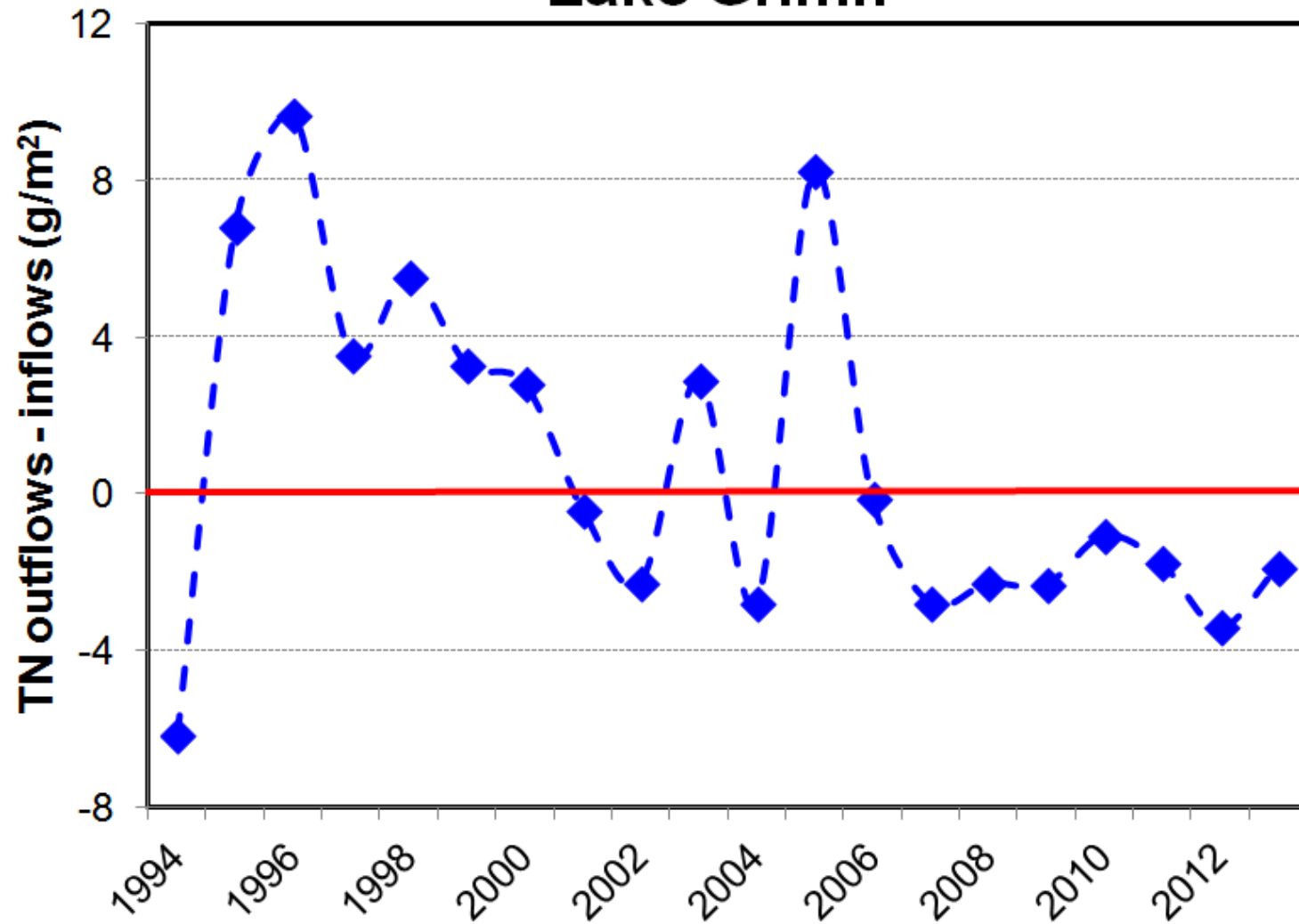
Lake Griffin average annual total phosphorus concentration vs. 5-yr external TP load, 1994-2013



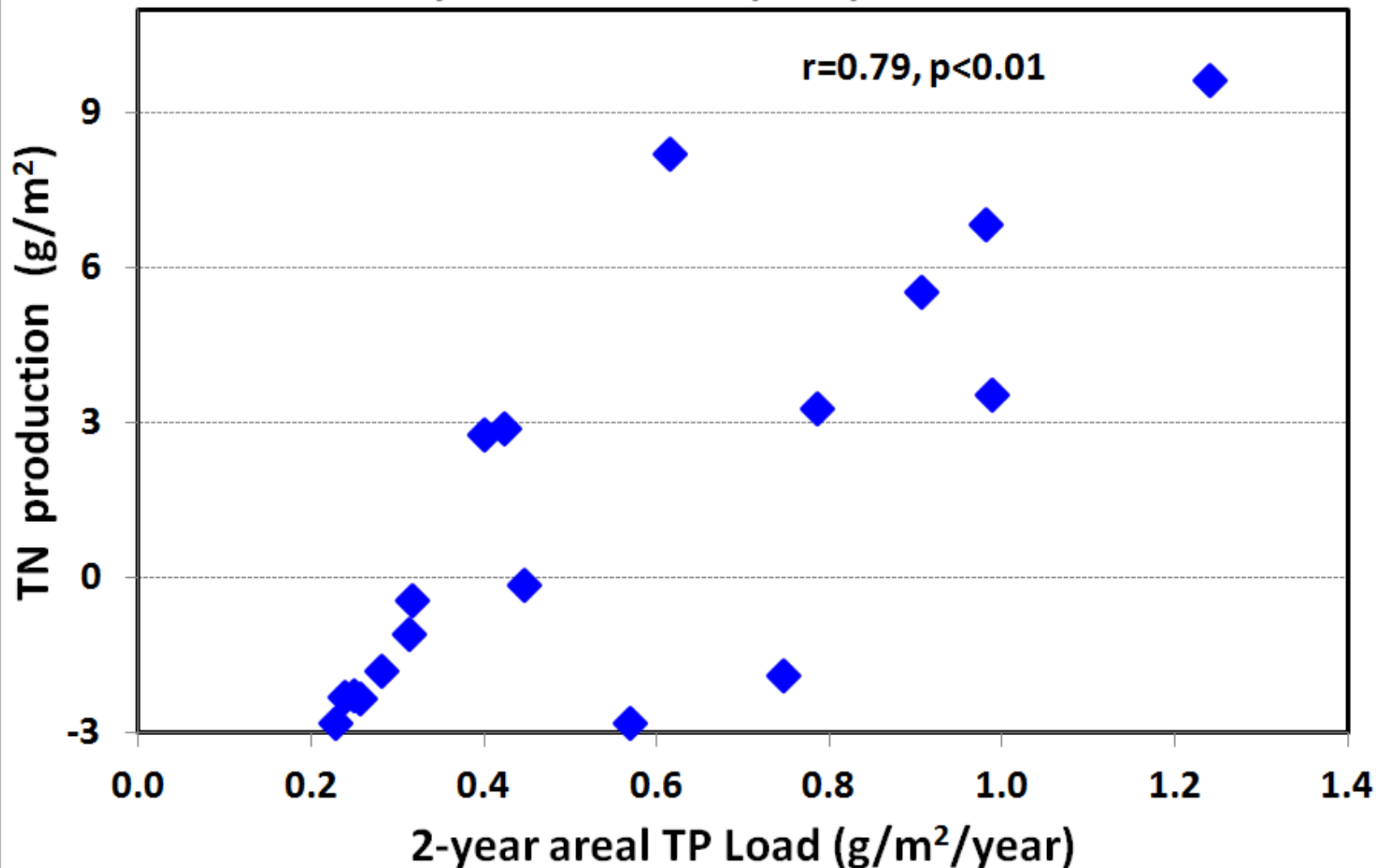
Estimated annual external total nitrogen loads and concentrations for Lake Griffin



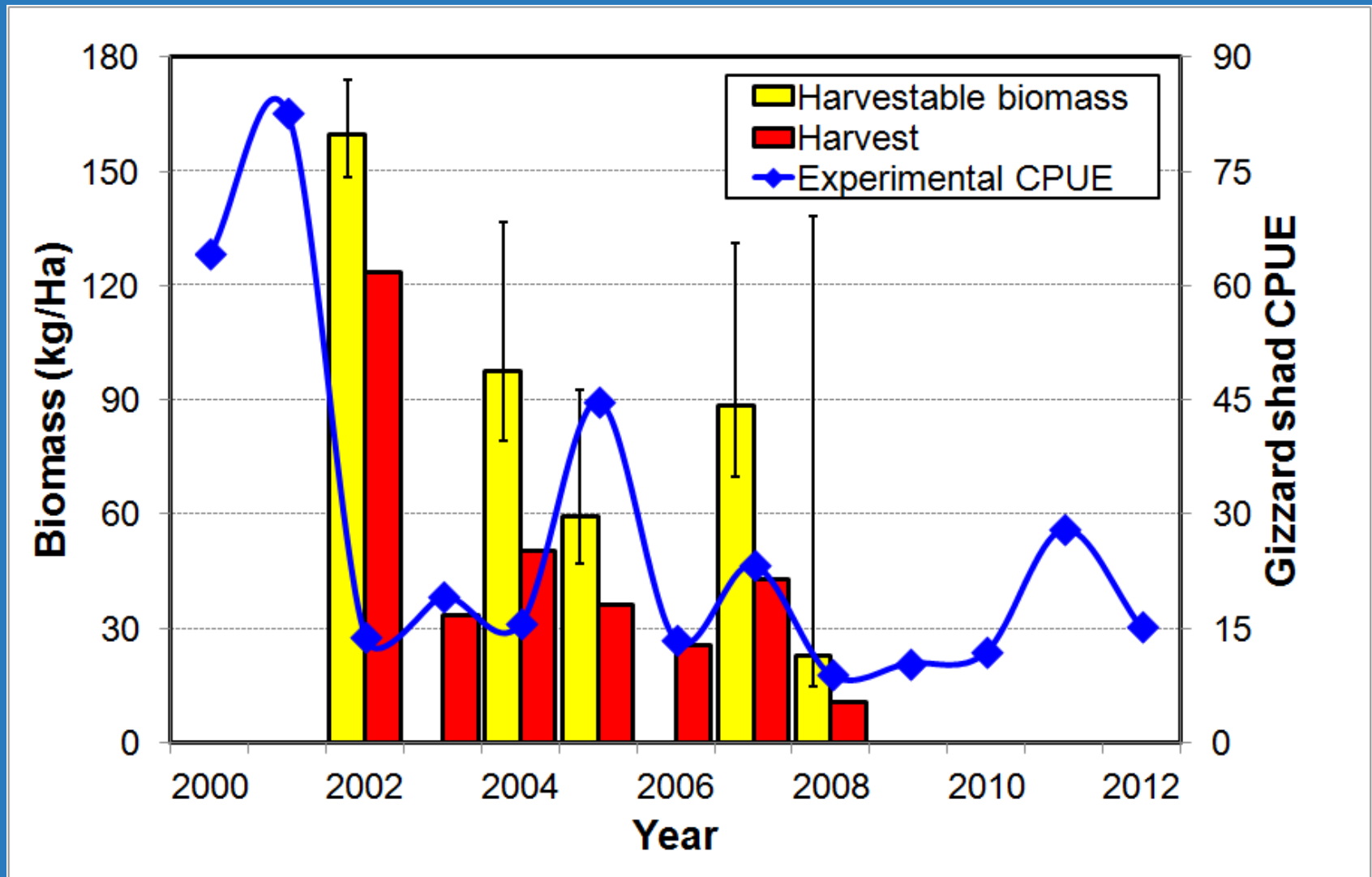
Total nitrogen outflows – inflows for Lake Griffin



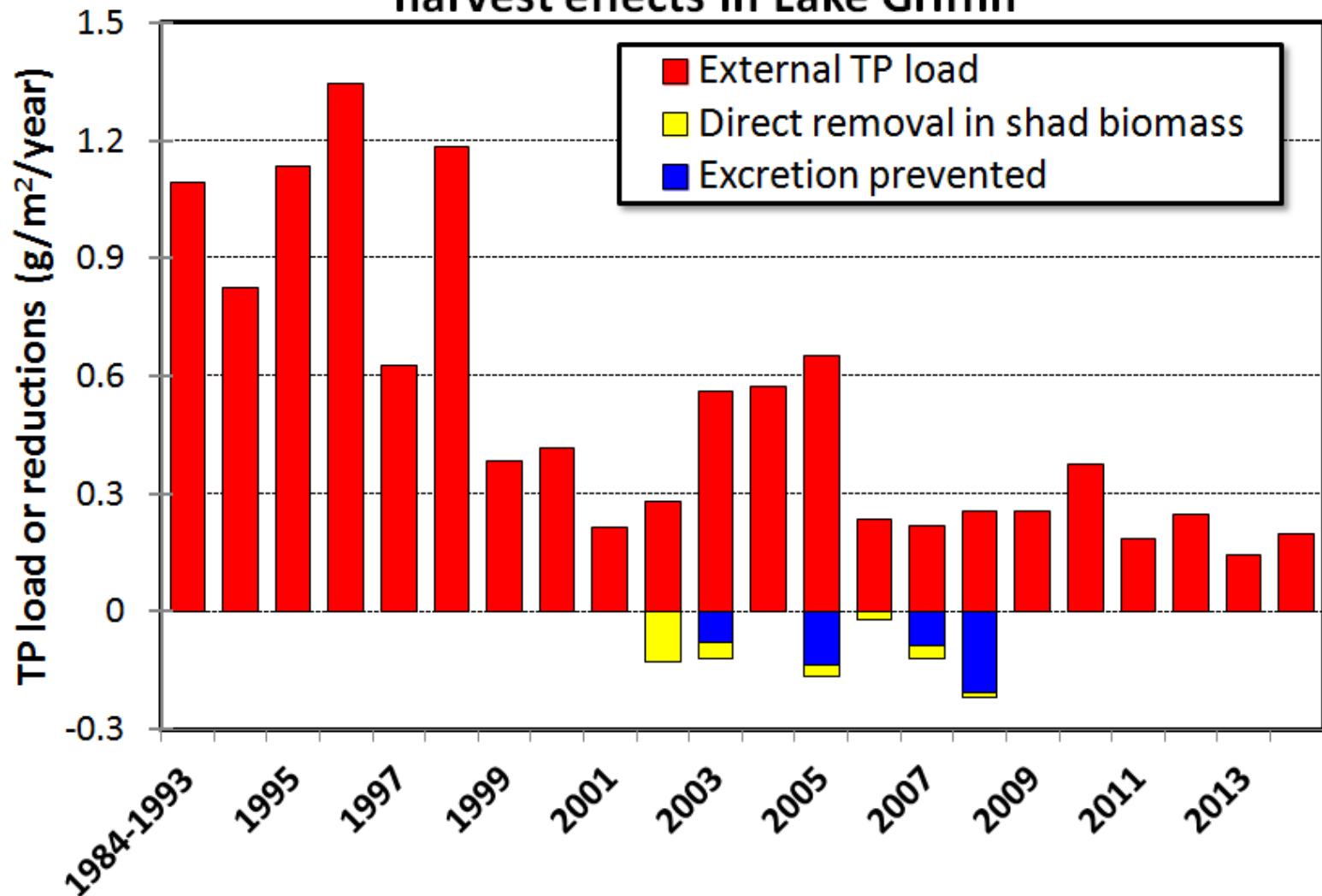
Lake Griffin anual net total nitrogen production vs. 2-year areal total phosphorus load



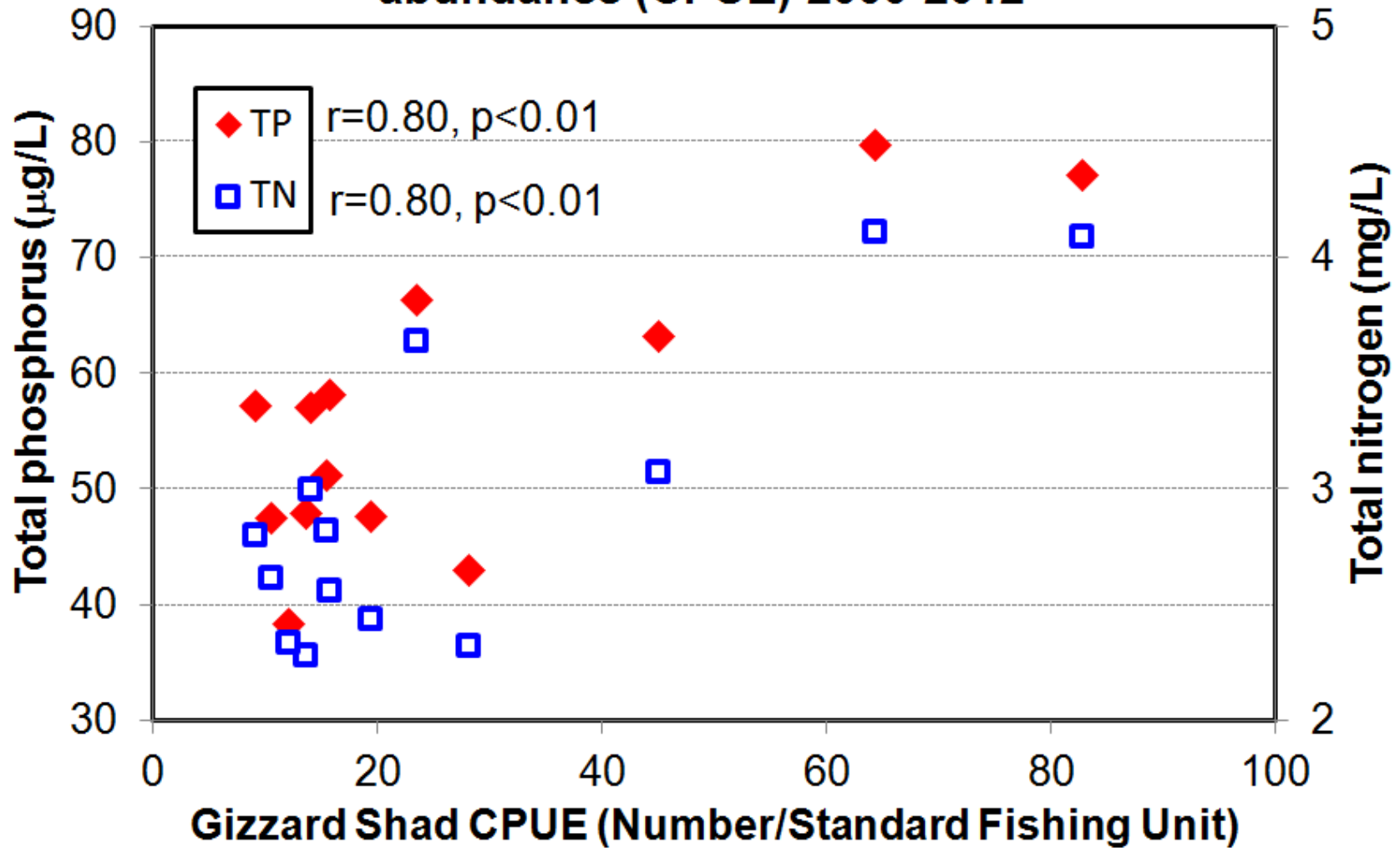
Lake Griffin gizzard shad



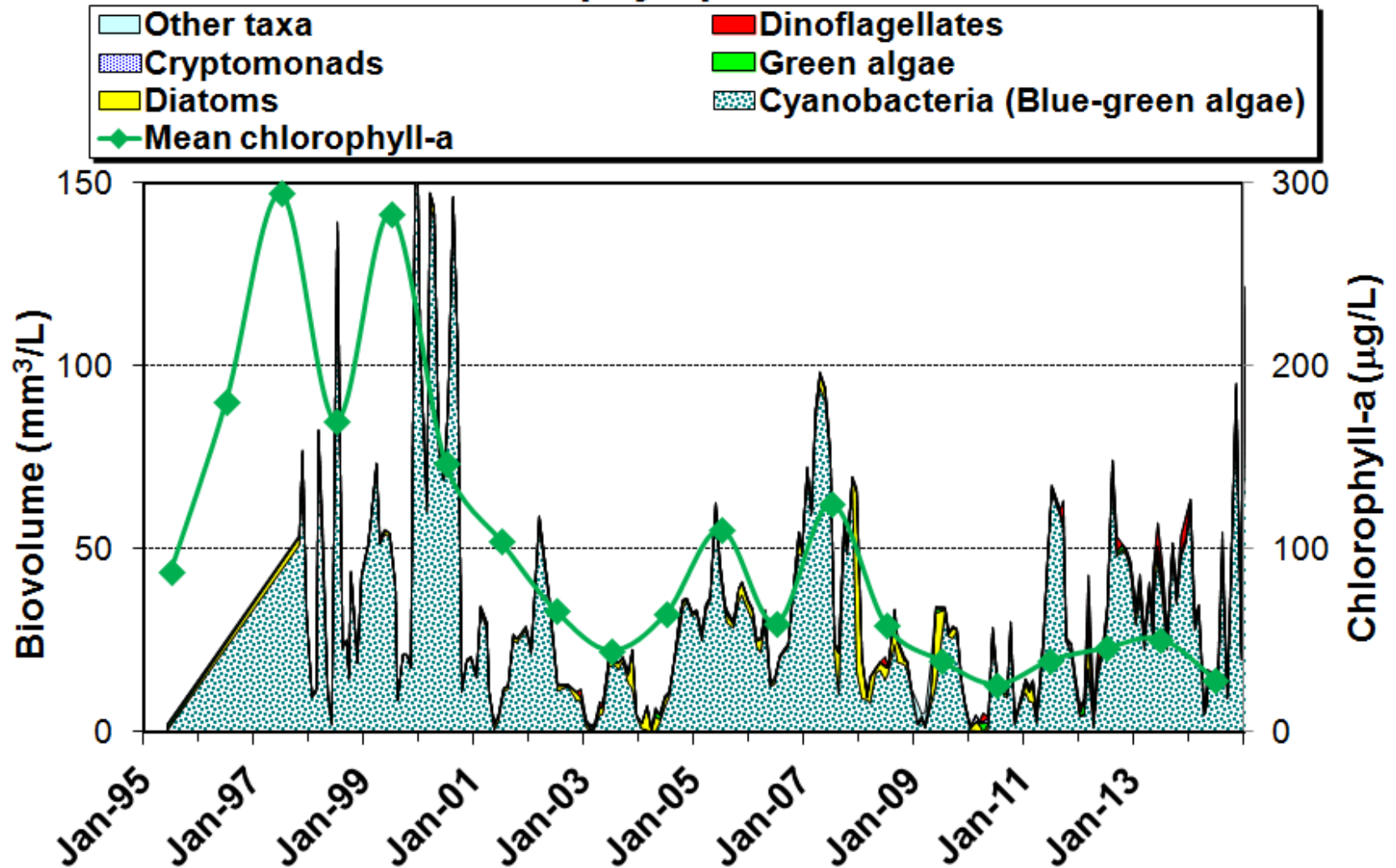
Comparison of TP external load with gizzard shad harvest effects in Lake Griffin



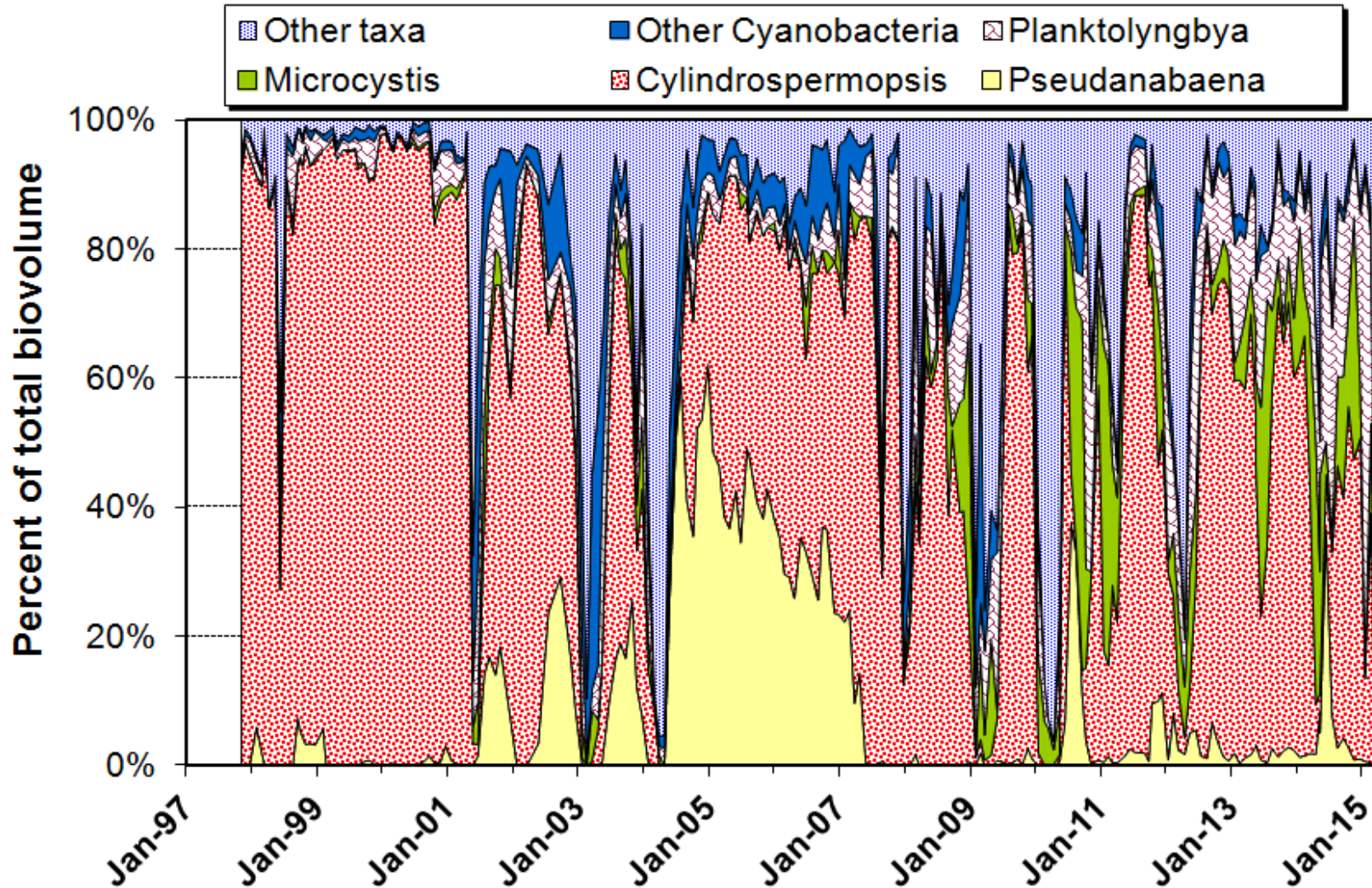
Lake Griffin average annual total phosphorus and total nitrogen concentrations vs. gizzard shad abundance (CPUE) 2000-2012



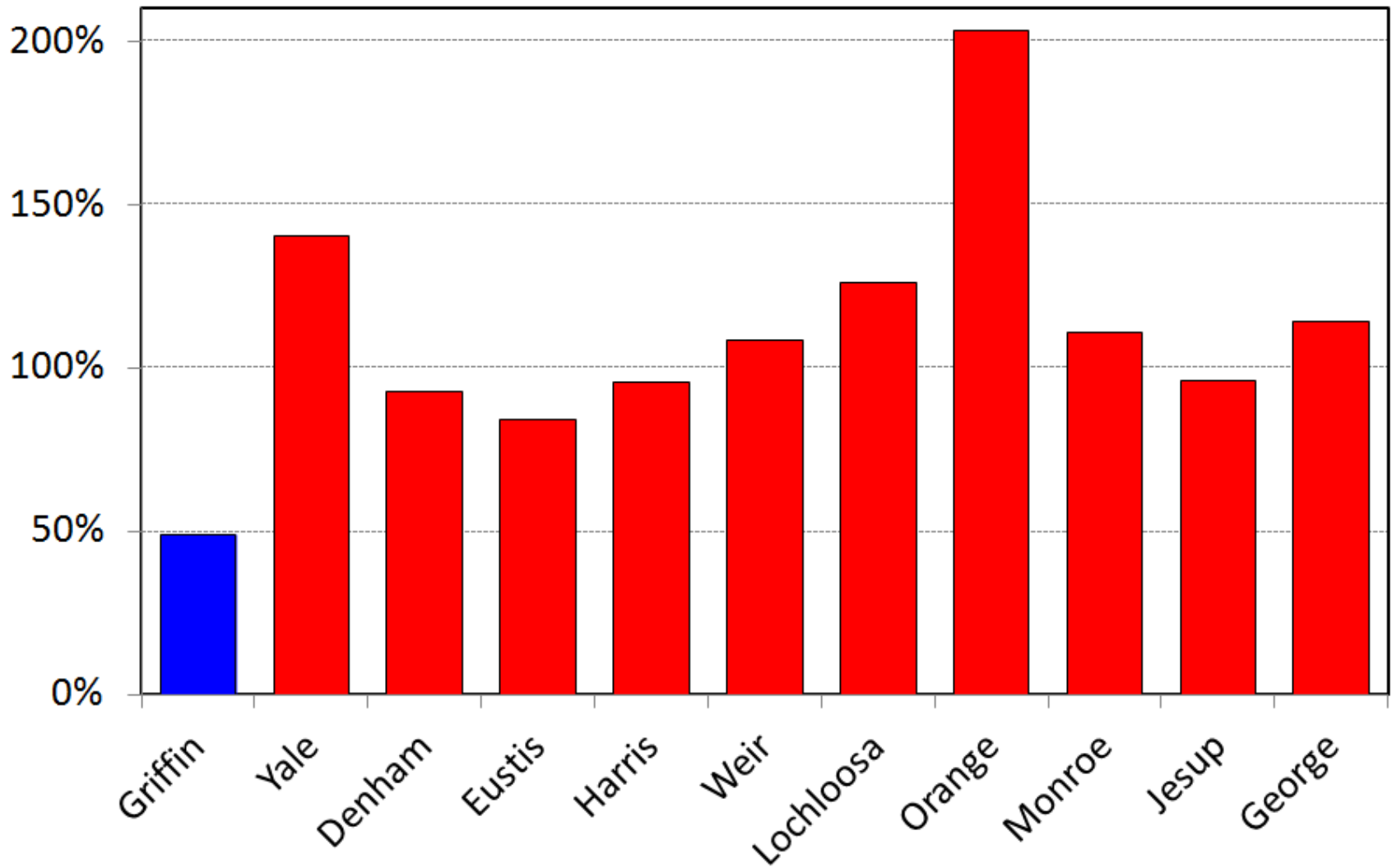
Lake Griffin phytoplankton biovolume



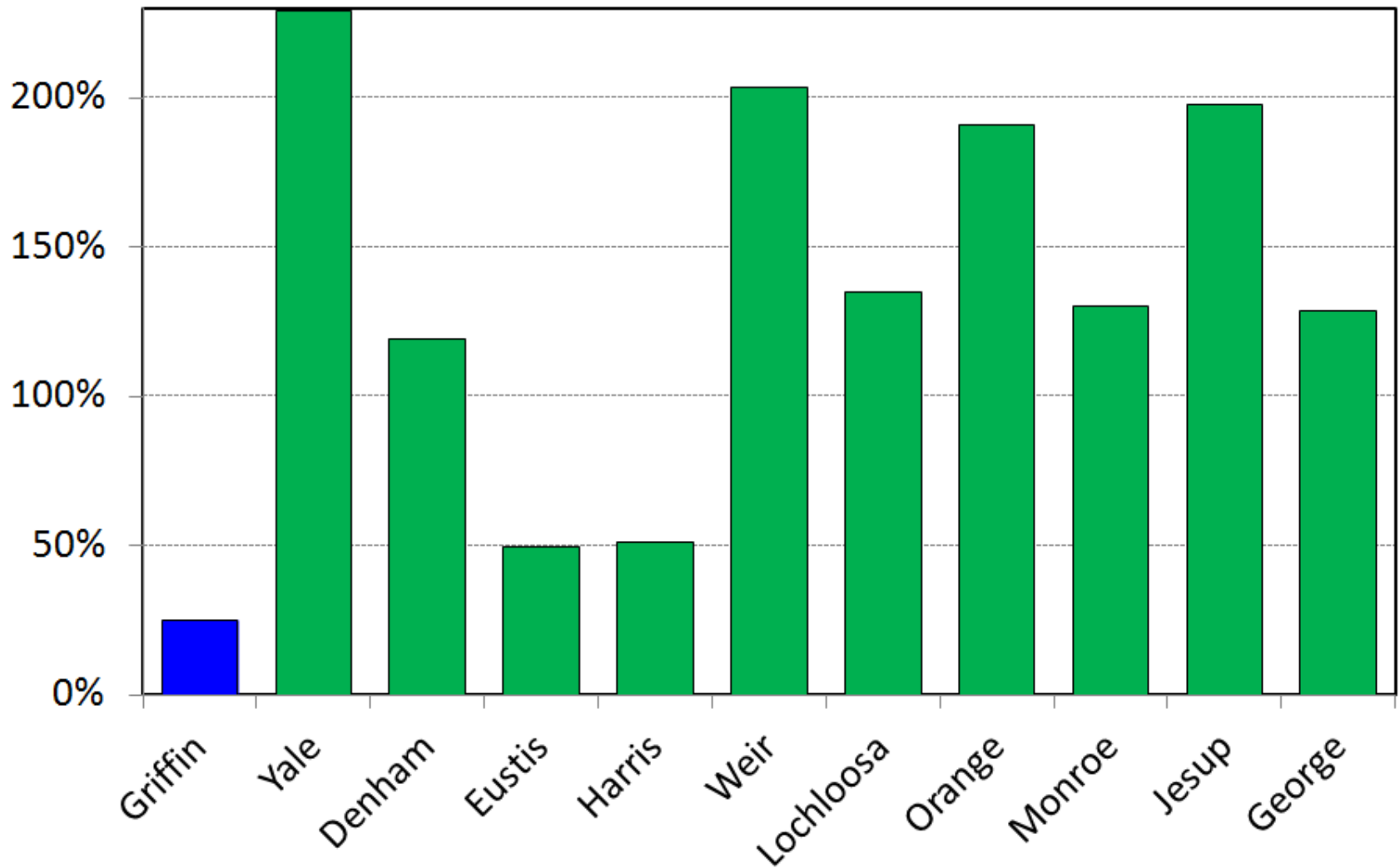
Lake Griffin phytoplankton percent composition



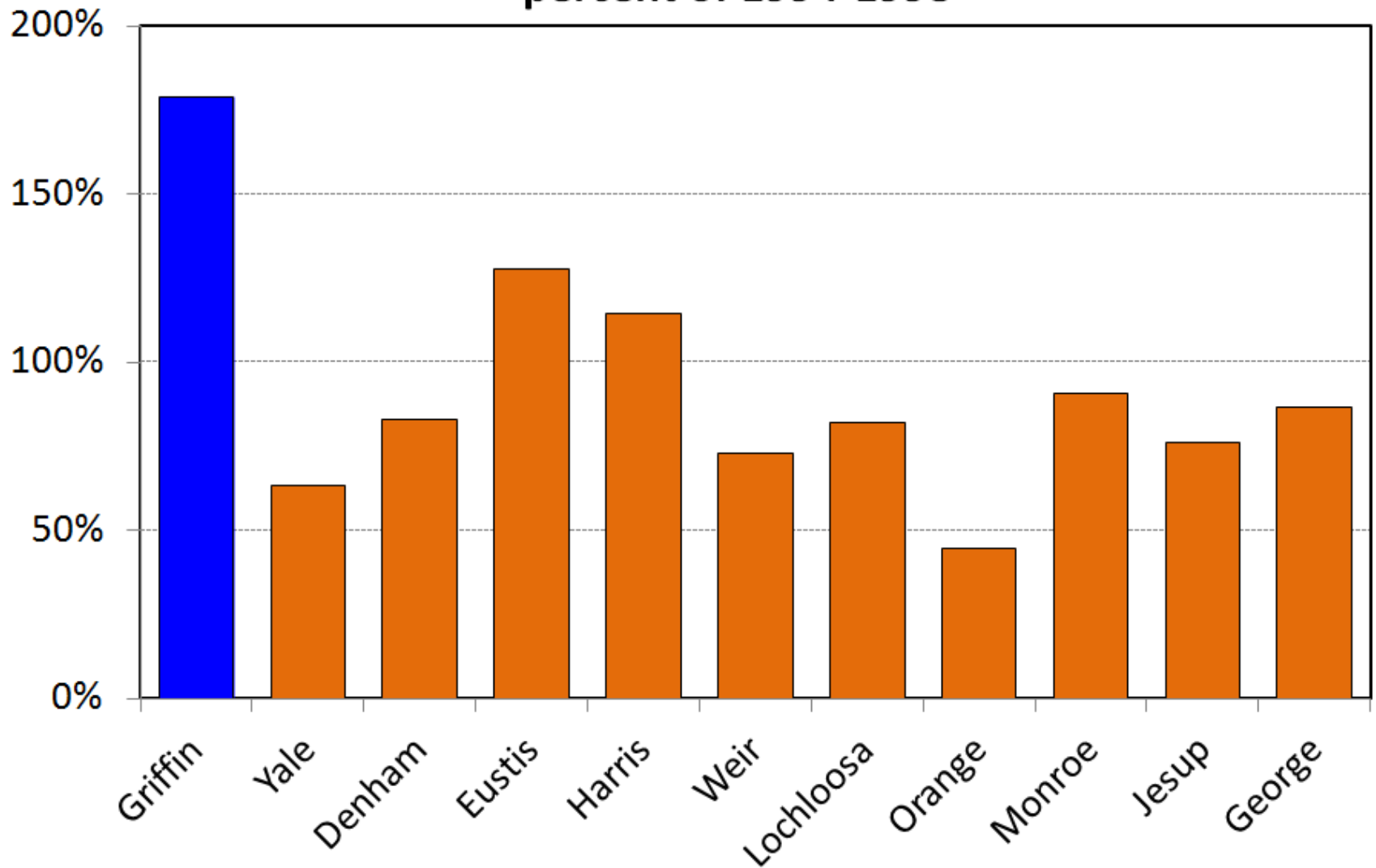
Mean 2008-2012 lake TP concentrations, percent of 1994-1998



Mean 2008-2012 lake chlorophyll-*a* concentrations, percent of 1994-1998

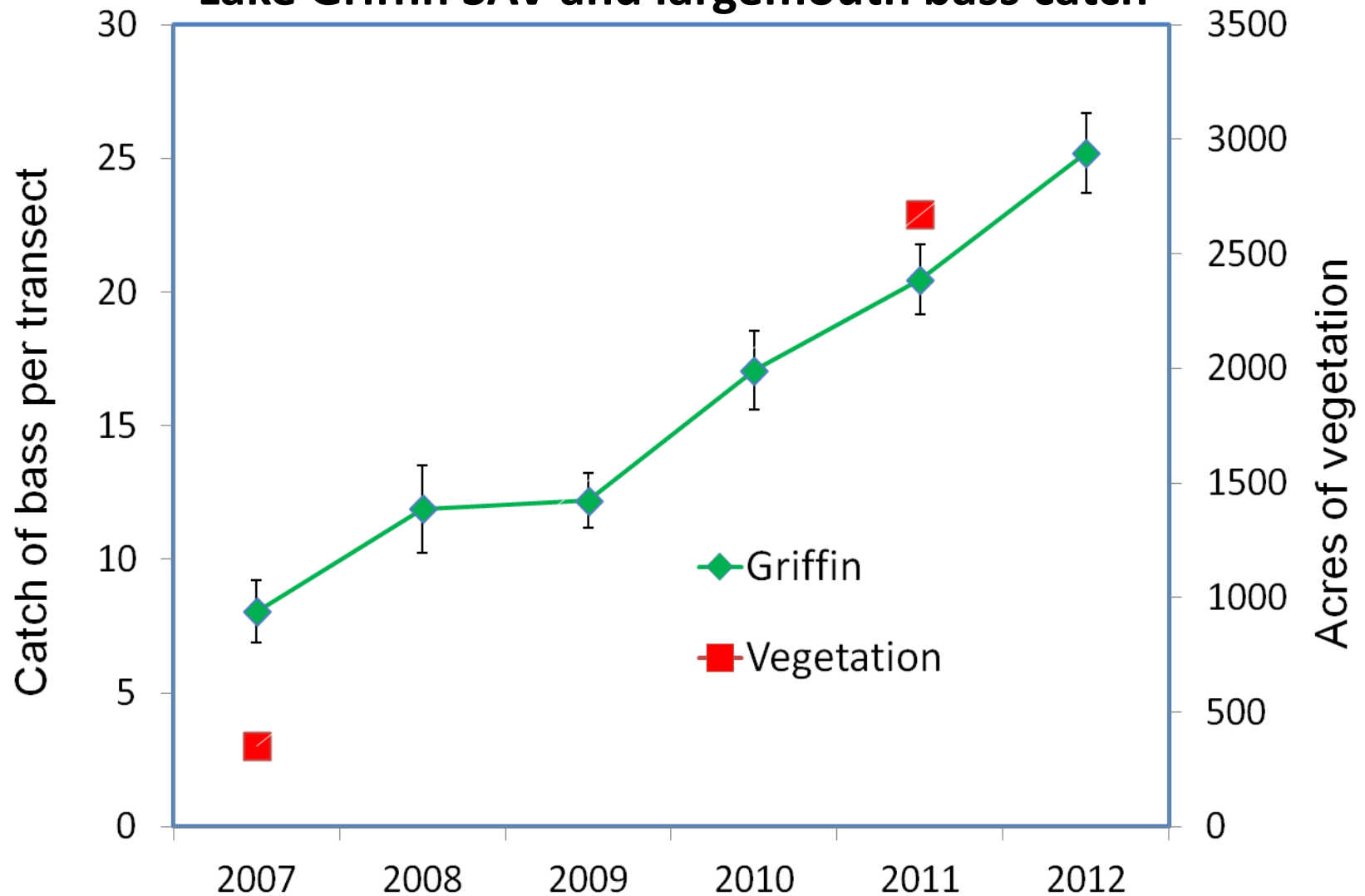


Mean 2008-2012 lake Secchi transparency, percent of 1994-1998



Florida Fish and Wildlife Conservation

Lake Griffin SAV and largemouth bass catch



North American Lake Management Society Technical Merit Award November 2014

SJRWMD Lake Griffin Nutrient Restoration project

the best paper published in *Lake and Reservoir Management* as determined by the editor and associate editors.

This year's technical merit awards are:

TECHNICAL MERIT AWARD FOR SUCCESSFUL PROJECTS

Lake Griffin Nutrient Restoration Project

Lake Griffin is a large (surface area about 38 km²), shallow (mean depth about 2 m) lake located in central Florida. Lake Griffin is the most downstream of the Ocklawaha Chain-of-Lakes, and discharges to the Ocklawaha River, which discharges further downstream into the

St. Johns River. Large floodplain wetland areas along the east shore of Lake Griffin were drained to develop truck farms beginning in the 1950s.

Lake Griffin has been hypereutrophic since at least the early 1980s, with total phosphorus (TP) and chlorophyll-*a* concentrations often exceeding 100 µg/L since that time. In the 1990s, Lake Griffin had persistent severe cyanobacterial blooms, dominated by *Cylindrospermopsis raciborskii*, which ranged up to 98 percent of total phytoplankton biovolume. Gizzard shad (*Dorosoma cepedianum* Le Sueur) dominated the fish biomass in Lake



Accepting the Lake Griffin award are (from left) Michael F. Coveney, Rolland S. Fulton III, and Victoria R. Hoge (all with SJRWMD), with Reed Green and Ann B. Shortelle.



Water quality changes following nutrient loading reduction and biomanipulation in a large shallow subtropical lake, Lake Griffin, Florida, USA

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St. Johns River
Water Management District

The Lake Griffin "team"

- SJRWMD Governing Board - Joe Hill
- SJRWMD Staff - Walt Godwin, Mike Coveney, Vickie Hoge, John Stenberg, Brian Sparks, Ed Lowe, John Richmond, Bob Naleway, Dale Smith, Robin Harrell, Dave Walker, Steve Miller, Brian Emanuel, R.H. Davis, Matt Cole, Tommy Burbage
- Contractors - Maynard Schaus, Olivia Thomas



Conclusion

The response of Lake Griffin indicates that the combination of external nutrient load reduction and biomanipulation can result in sustained improvements in water quality in shallow subtropical lakes



Lake Griffin - April 30, 2004

Any questions?



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