

# High Rock Lake Long-term trends in DO and pH

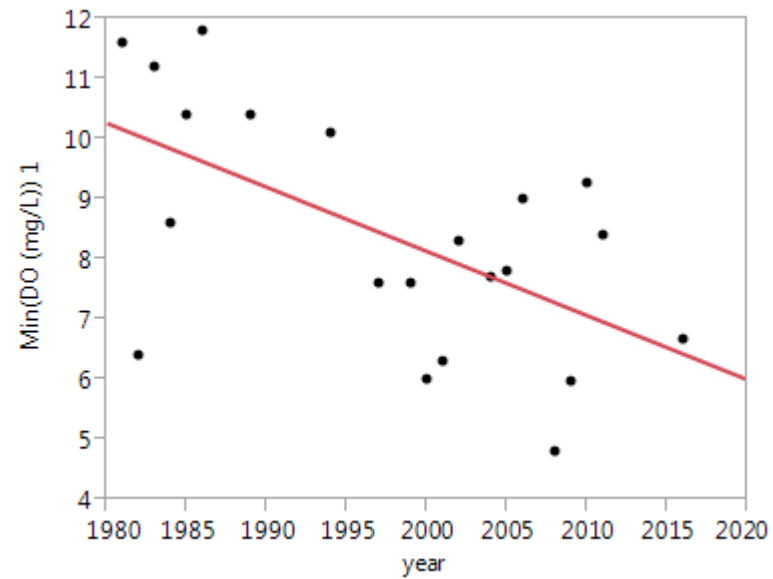
Marcelo Ardón

North Carolina State University

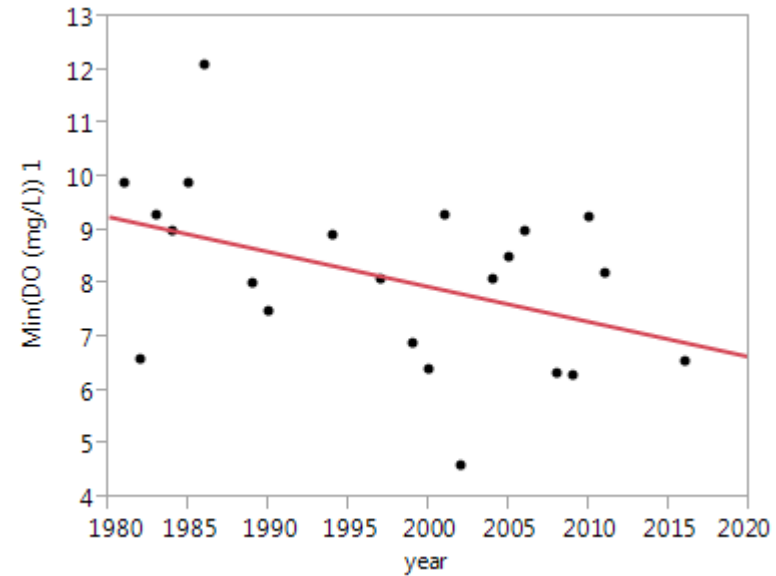
# DO patterns

- Photic zone less than 2 meters
- Looked at annual averages

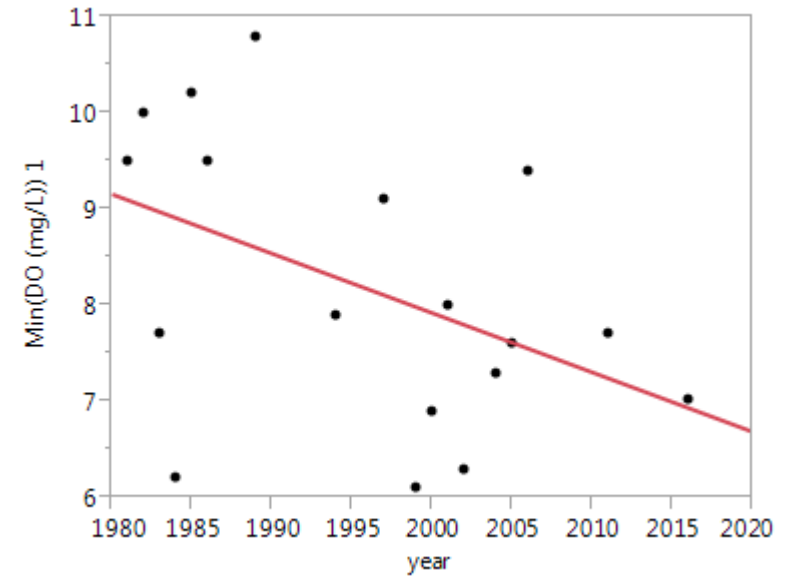
- Minimum DO 1980-2016  
YAD152A
- Significant decline
- $R^2 = 0.31$
- $P < 0.005$
- No pattern in mean DO



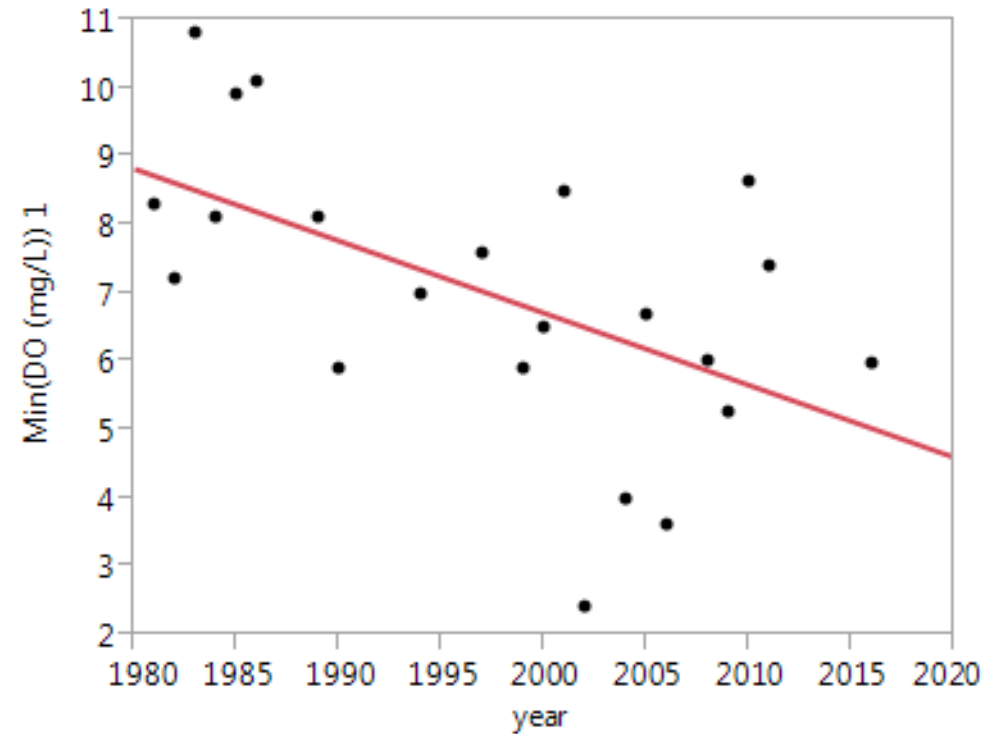
- Minimum DO YAD152C
- $R^2 = 0.18$
- $P < 0.05$
- No pattern in mean DO



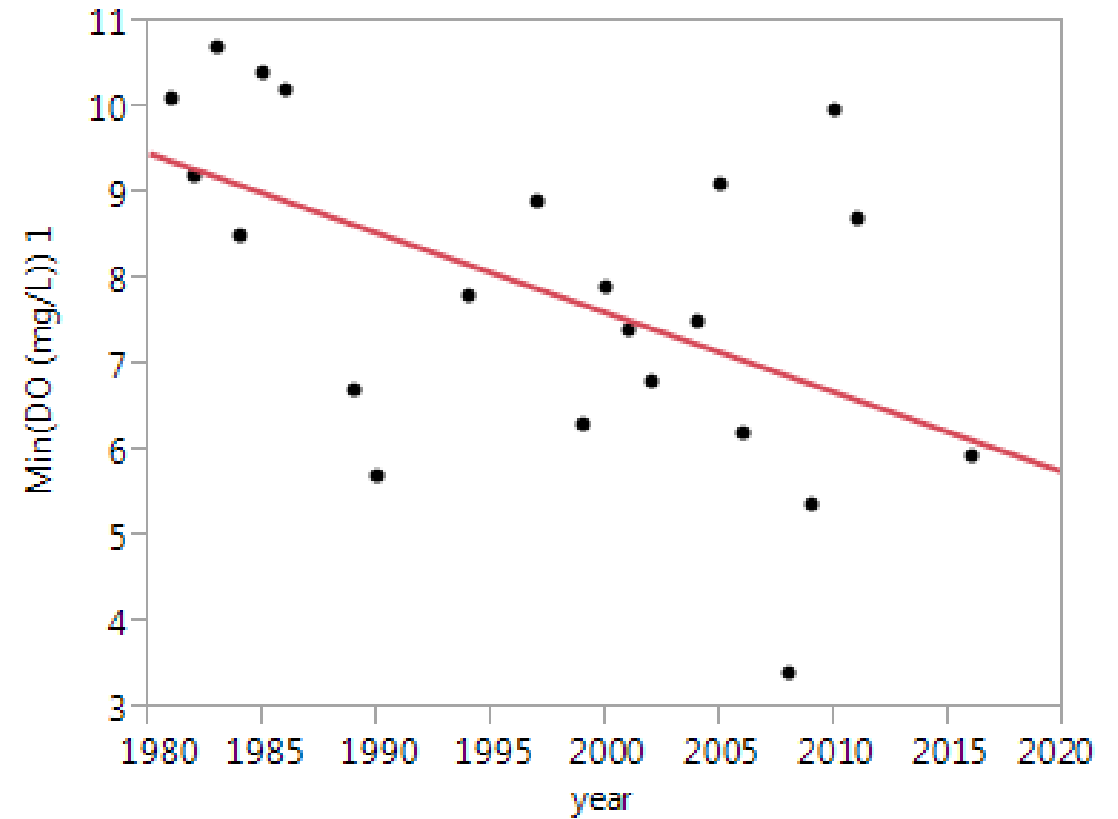
- Minimum DO YAD156A
- $R^2 = 0.15$
- $P=0.058$
- No pattern in mean DO



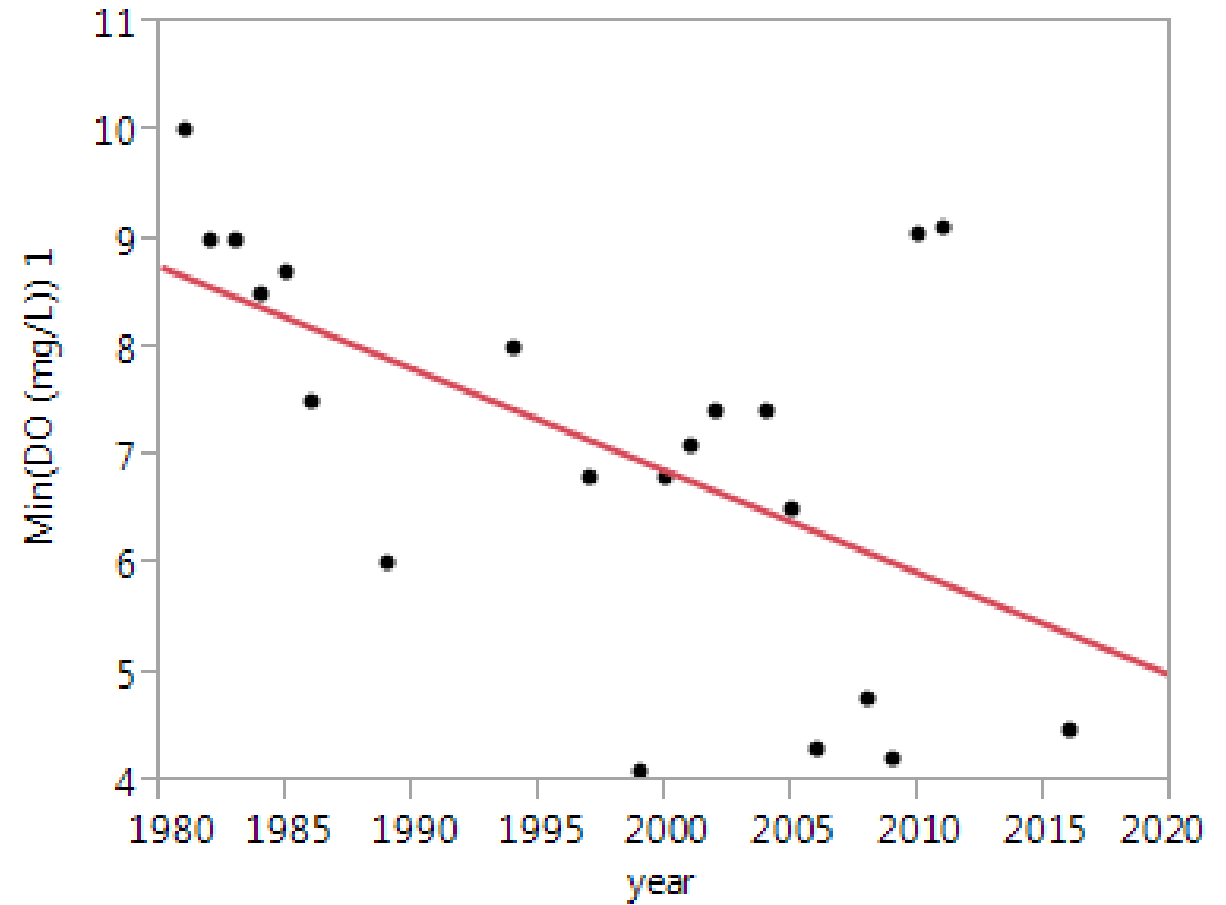
- Minimum DO YAD169A
- $R^2 = 0.26$
- $p < 0.008$
- No pattern in mean DO



- YAD169B
- $R^2 = 0.23$
- $P = 0.01$
- No pattern in mean DO

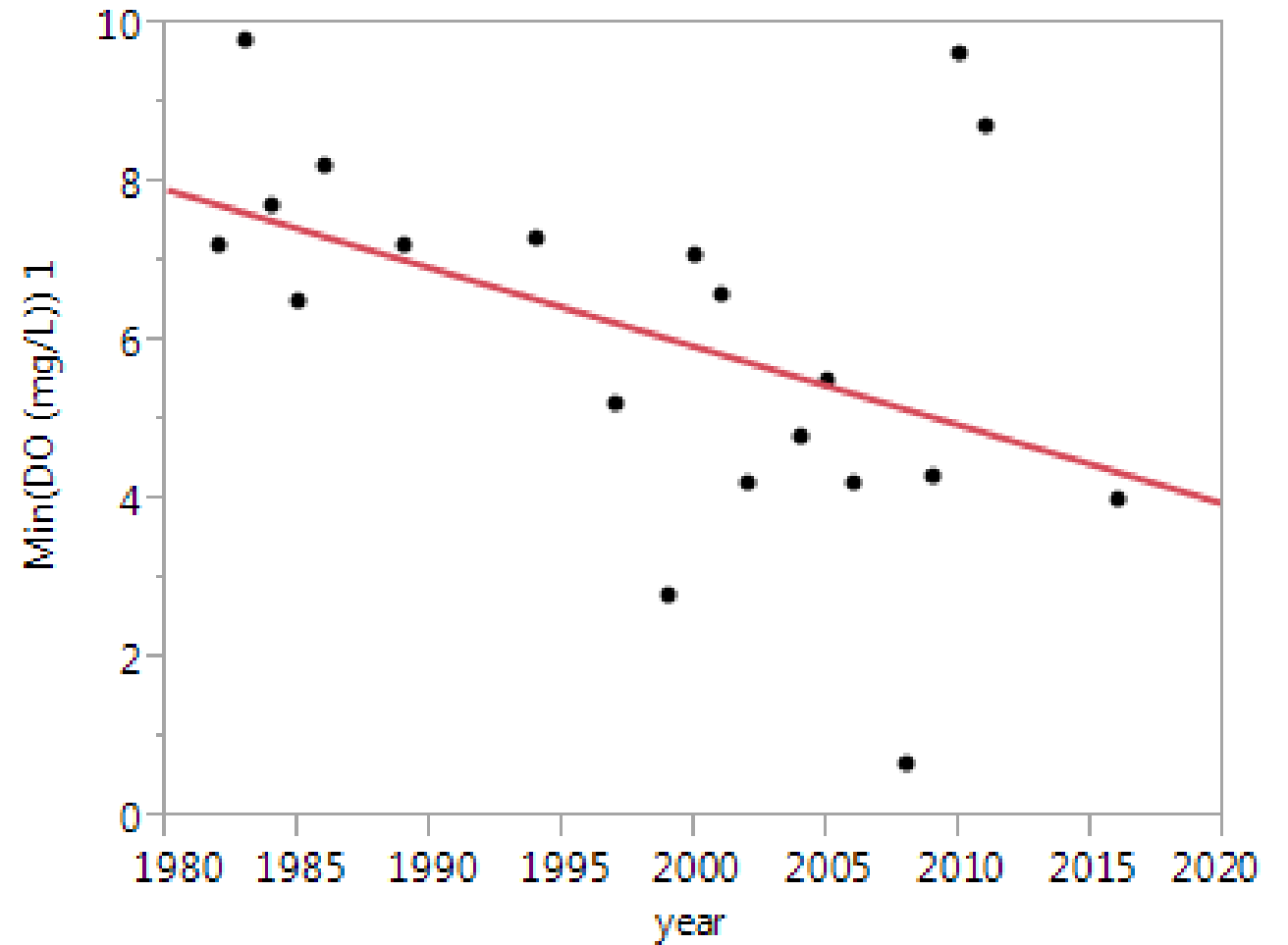


- YAD169E
- $R^2 = 0.27$
- $P = 0.008$
- No pattern in mean DO

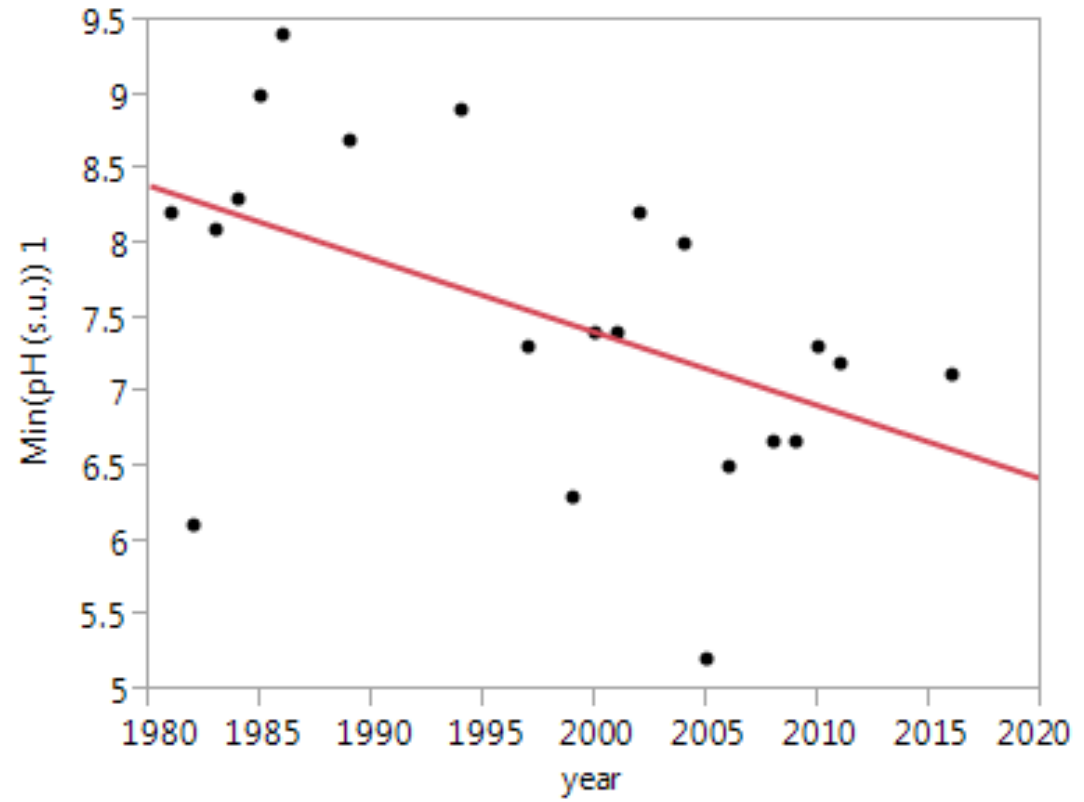




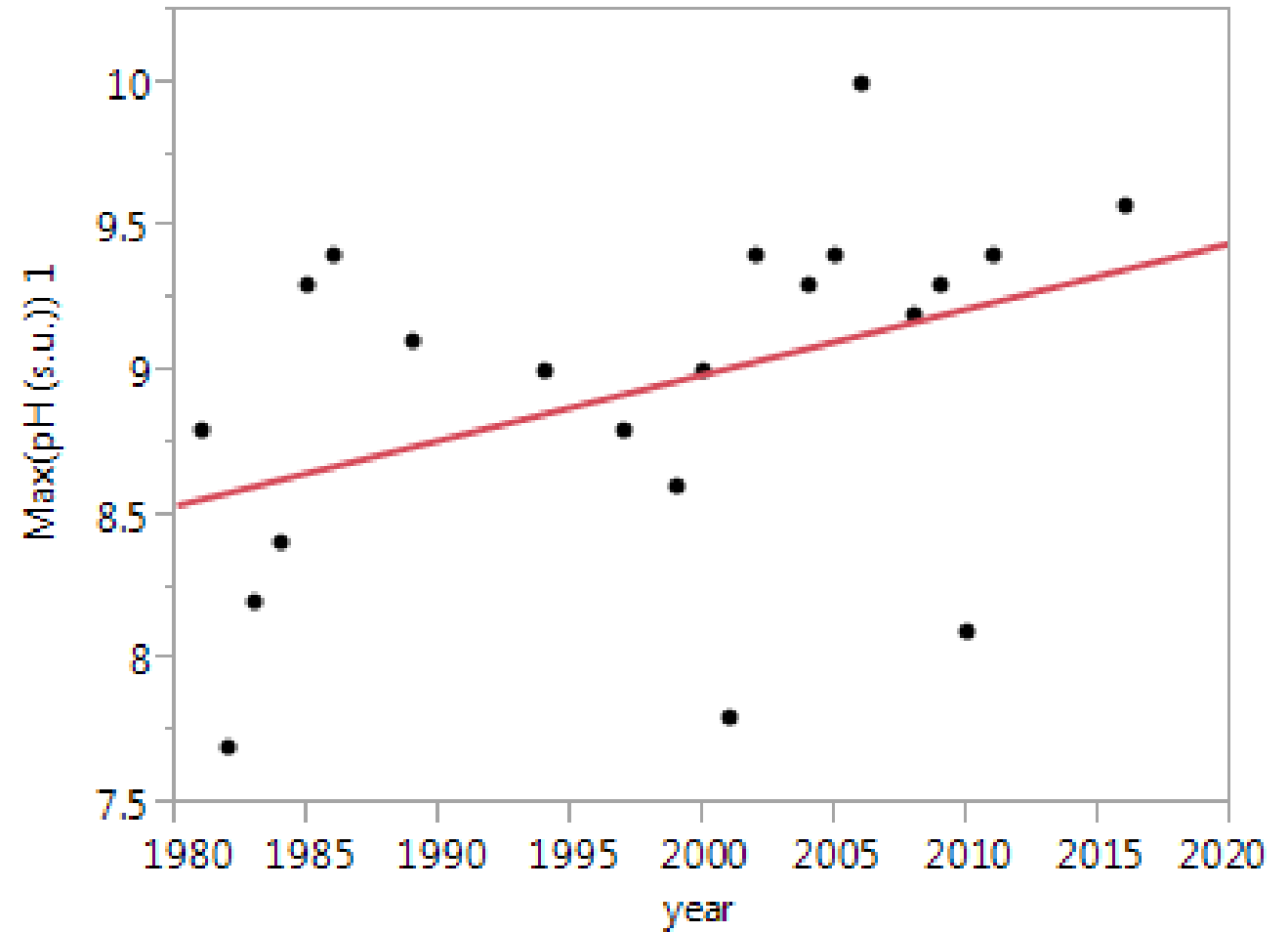
- YAD169F
- $R^2 = 0.15$
- $P = 0.04$
- No pattern in mean DO



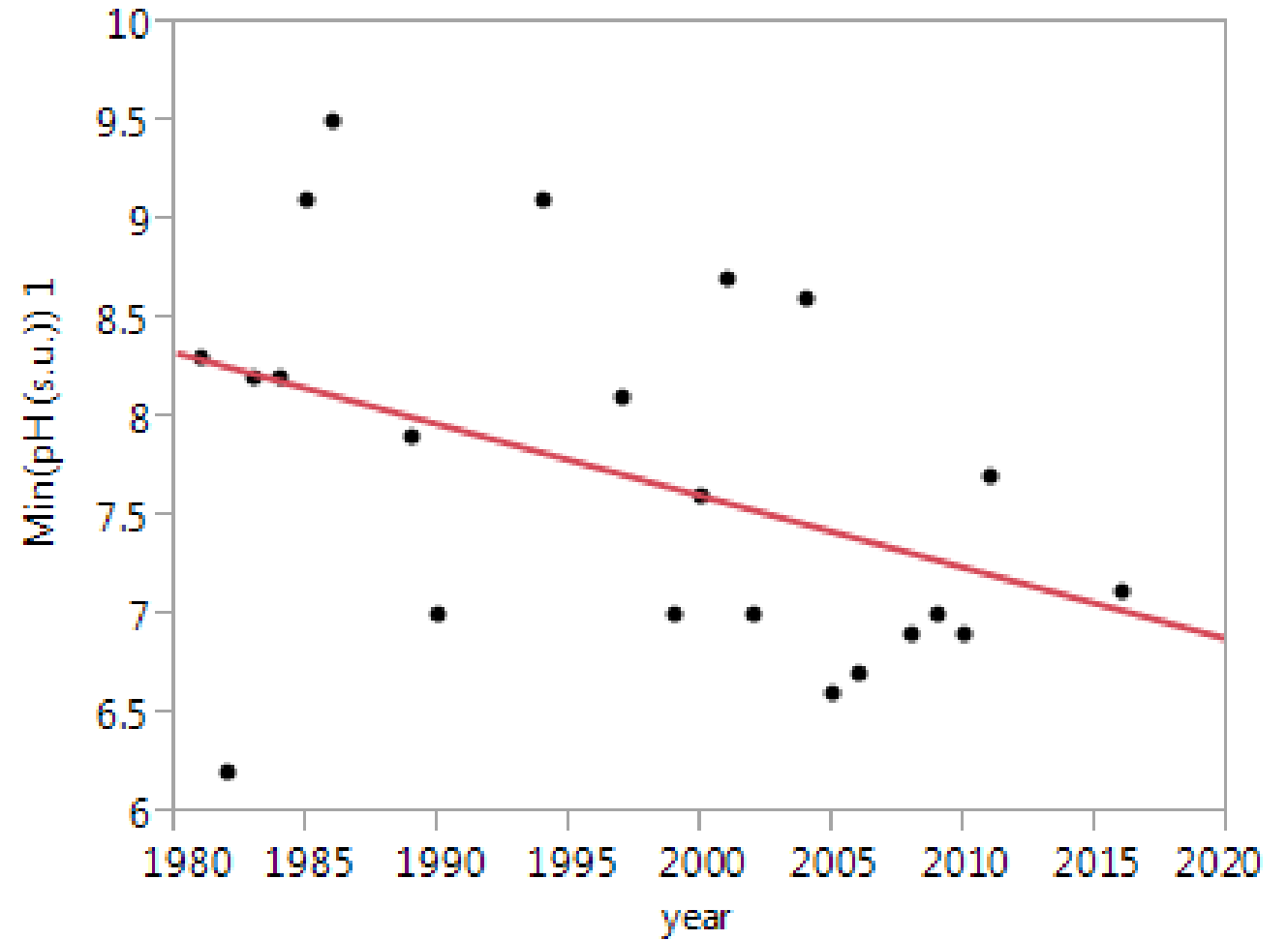
- Minimum pH YAD152A
- $R^2 = 0.21$
- $P = 0.01$



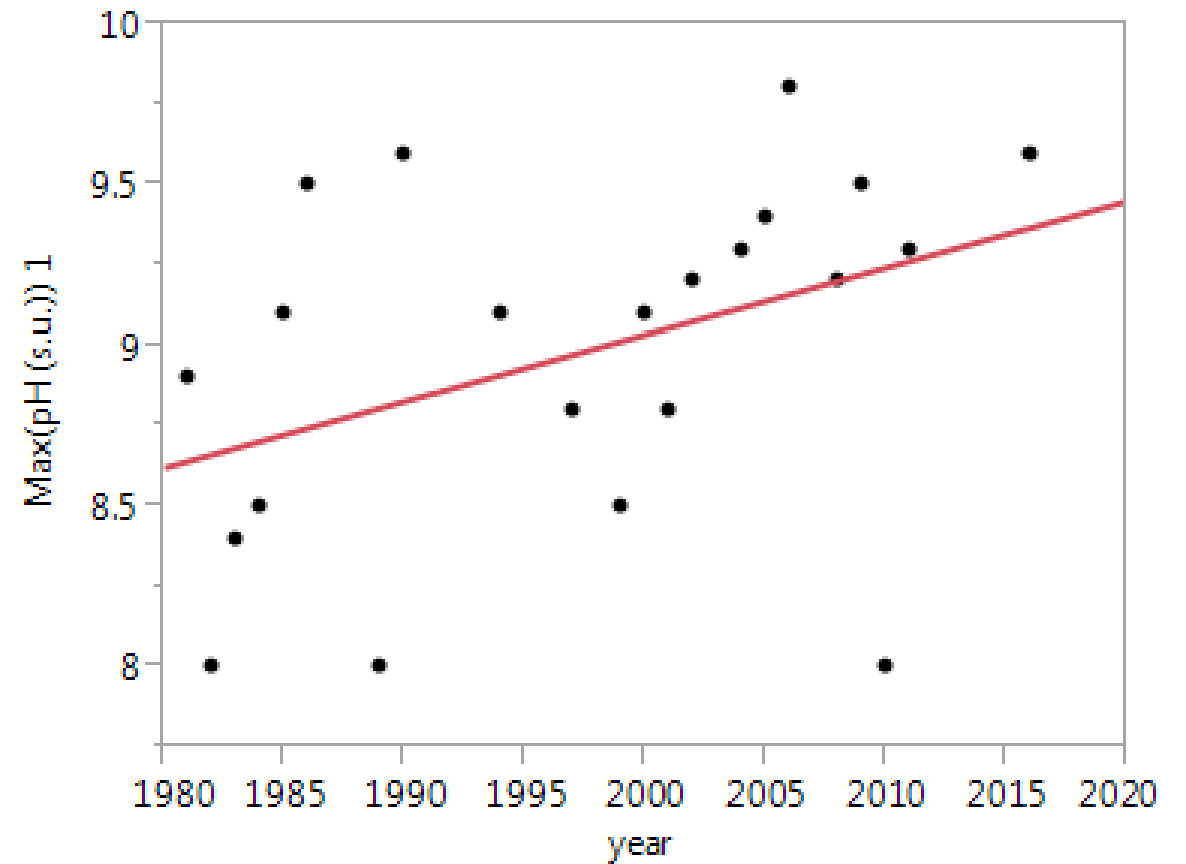
- YAD152A max pH
- $R^2 = 0.12$
- $P = 0.06$



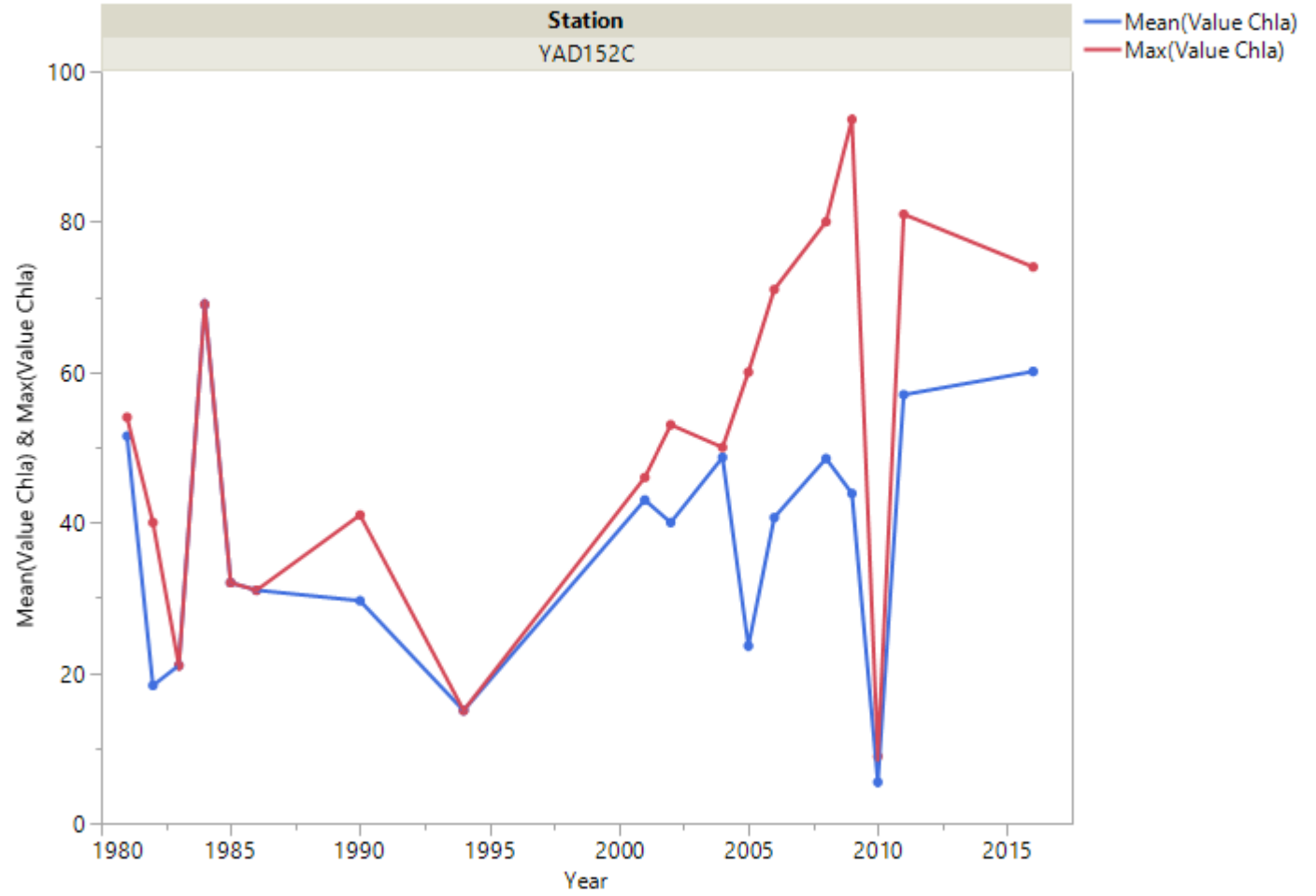
- Minimum pH YAD152C
- $R^2 = 0.14$
- $P = 0.04$



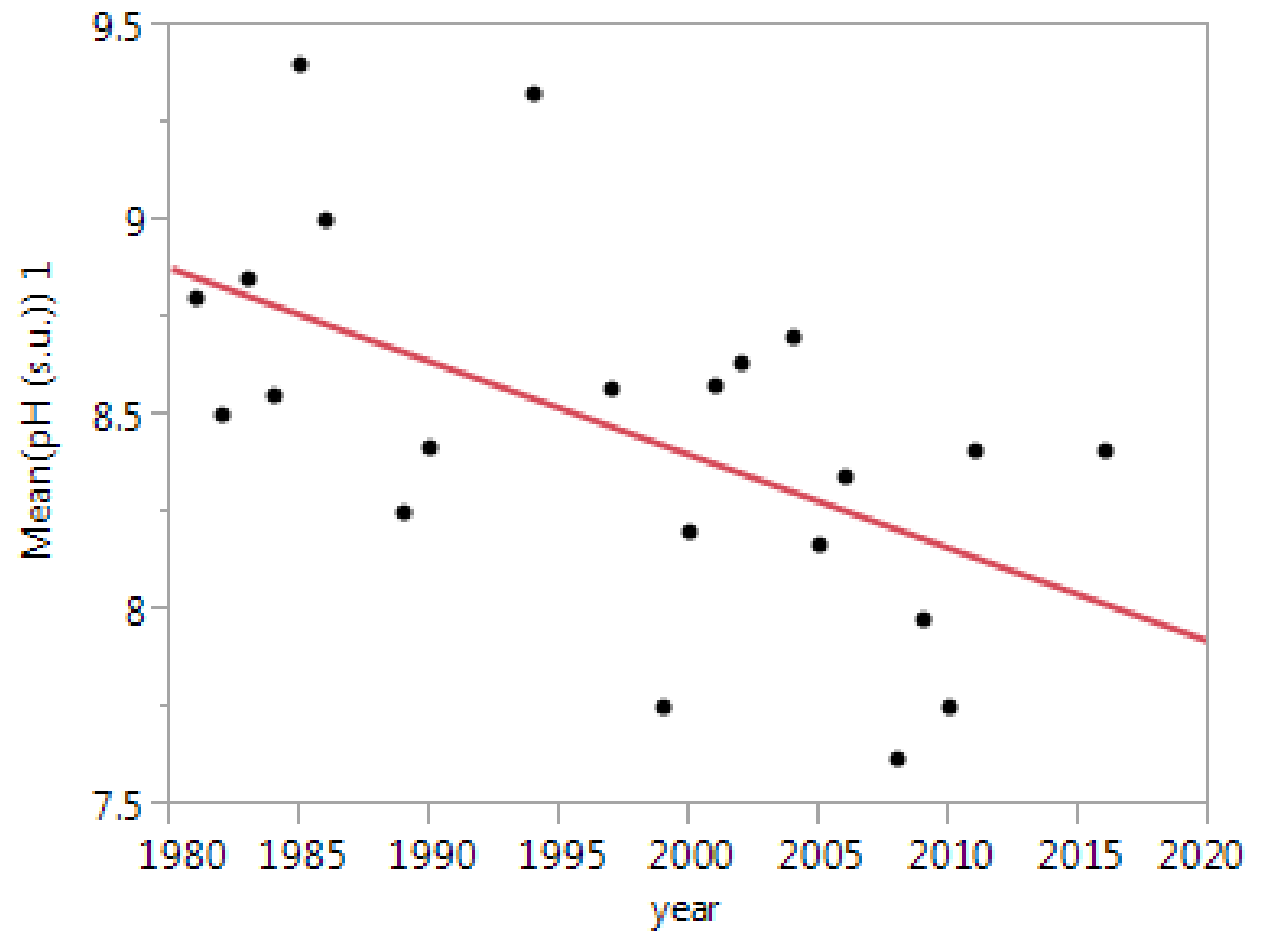
- YAD152C max pH
- $R^2=0.12$
- $P=0.056$



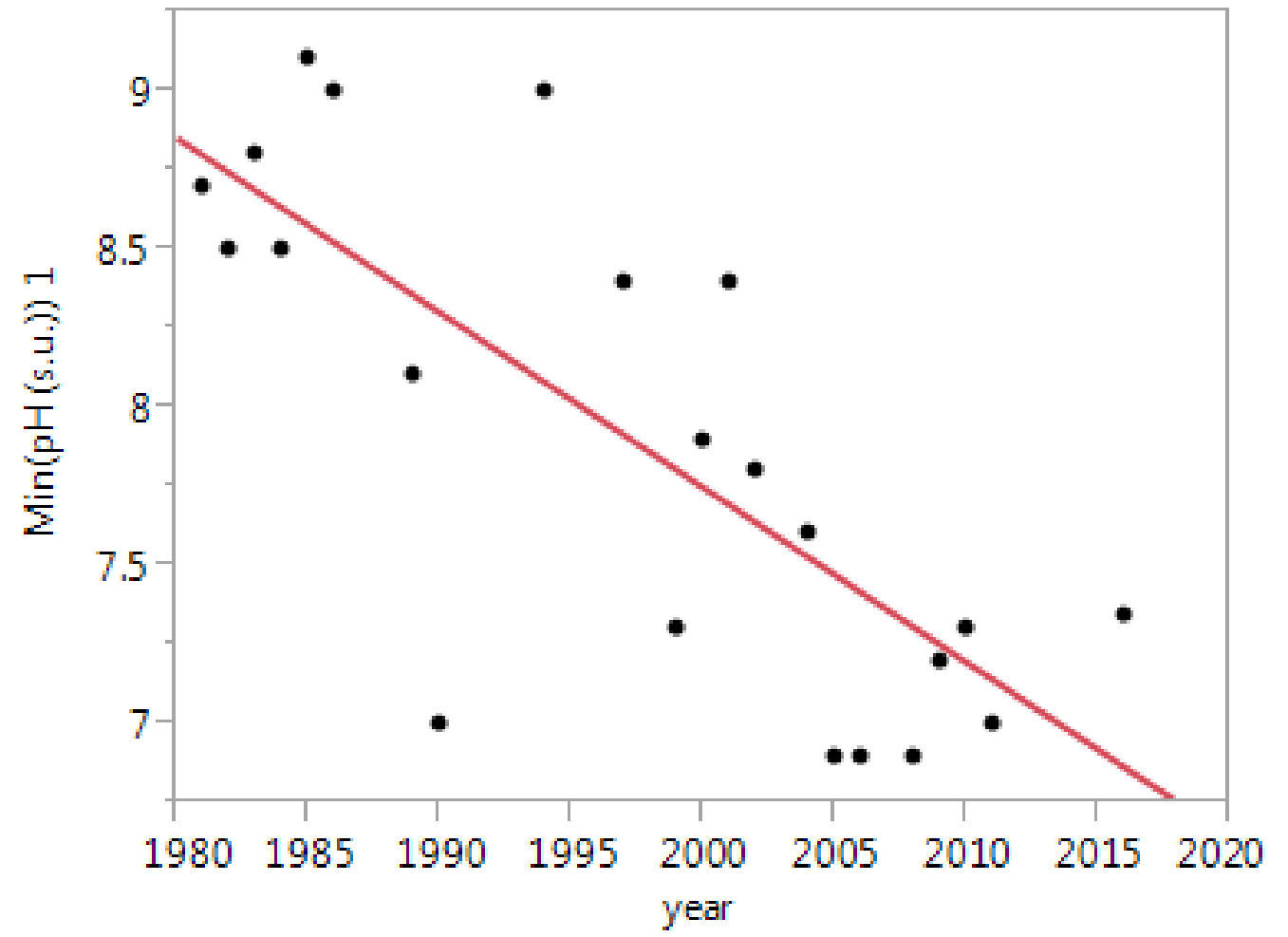
Mean(Value Chla) & Max(Value Chla) vs. Year



- YAD169A mean pH
- $R^2 = 0.28$
- $P < 0.006$

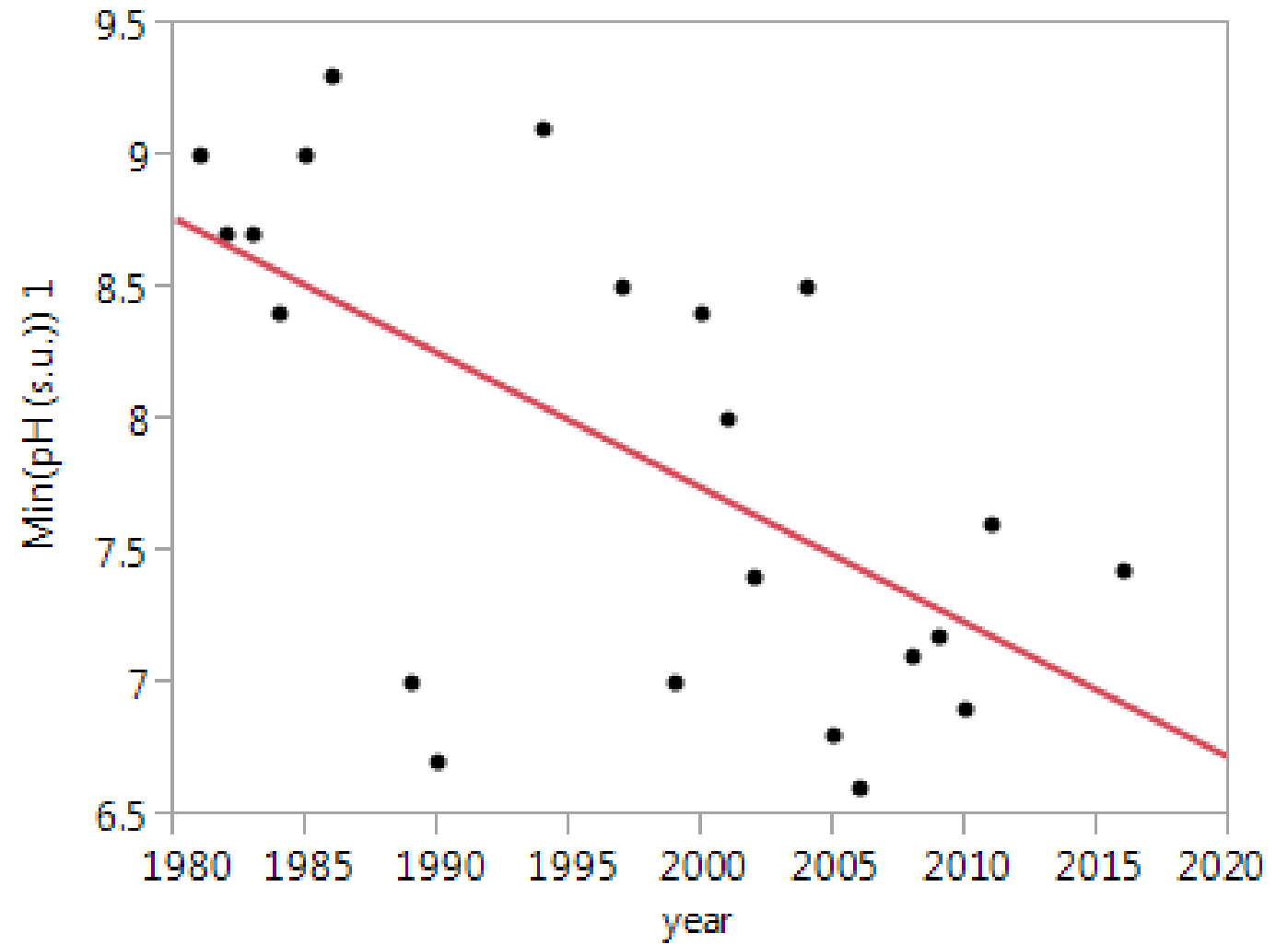


- Minimum pH YAD169A
- $R^2 = 0.56$
- $P < 0.001$

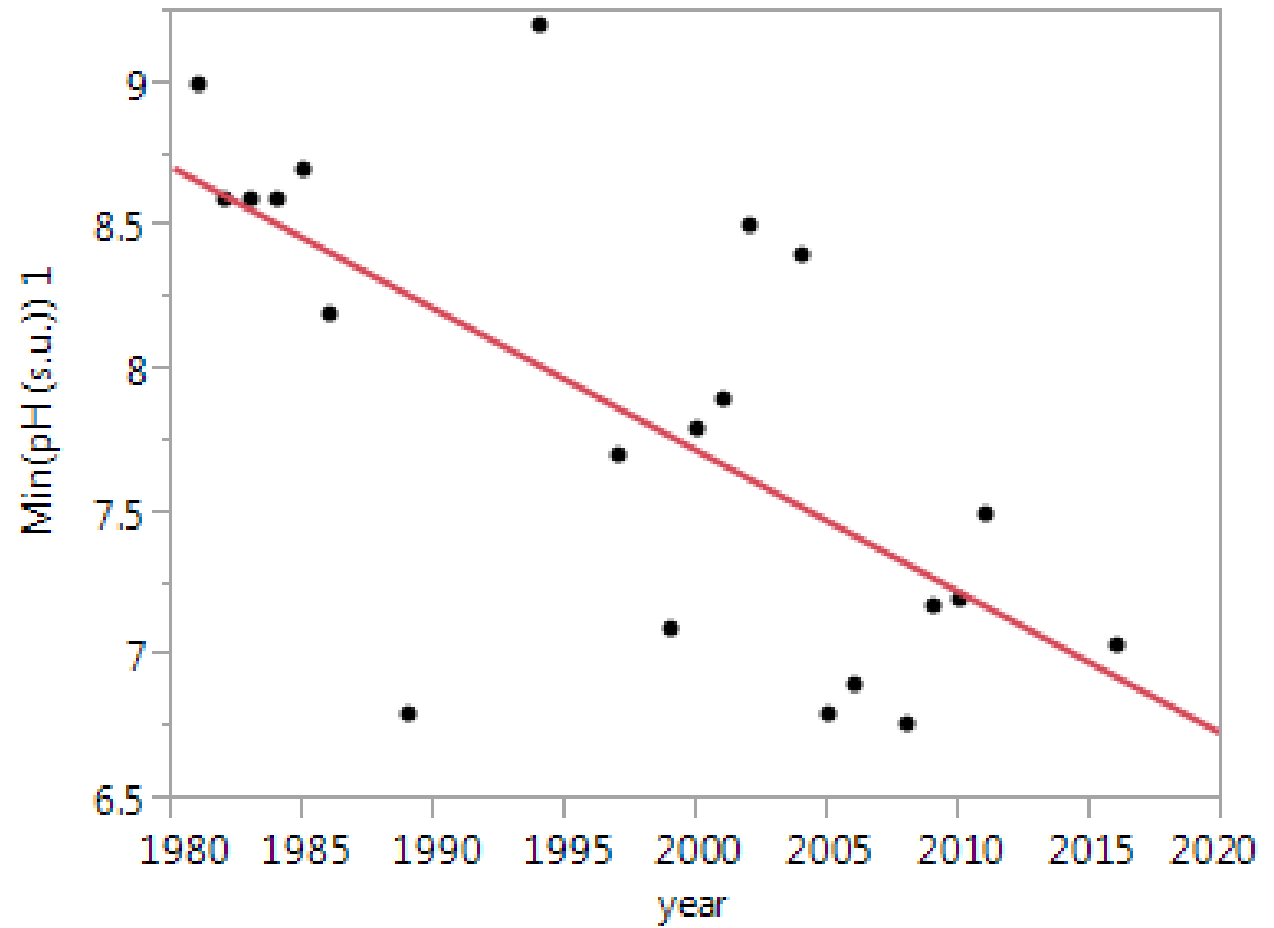




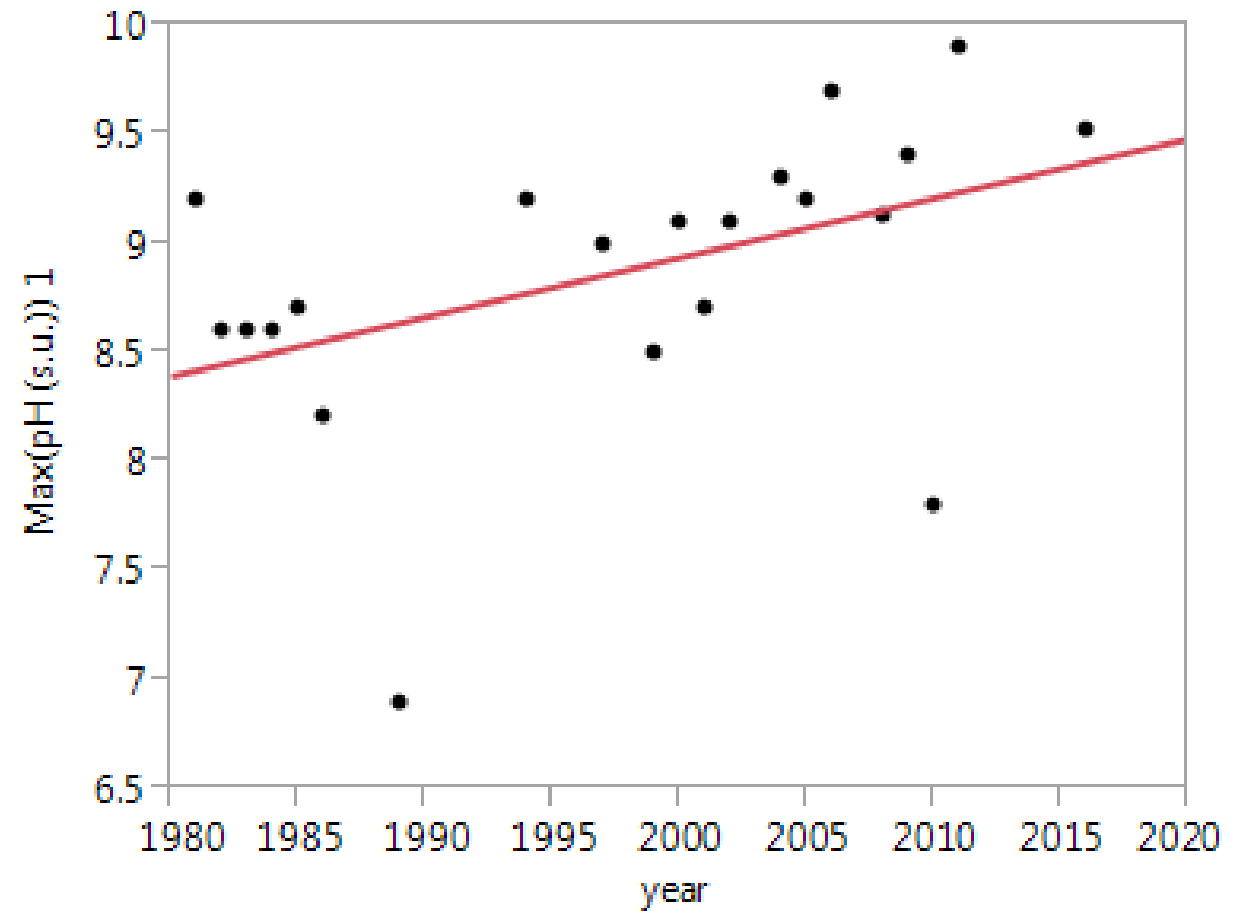
- Minimum pH YAD169B
- $R^2 = 0.34$
- $P = 0.002$



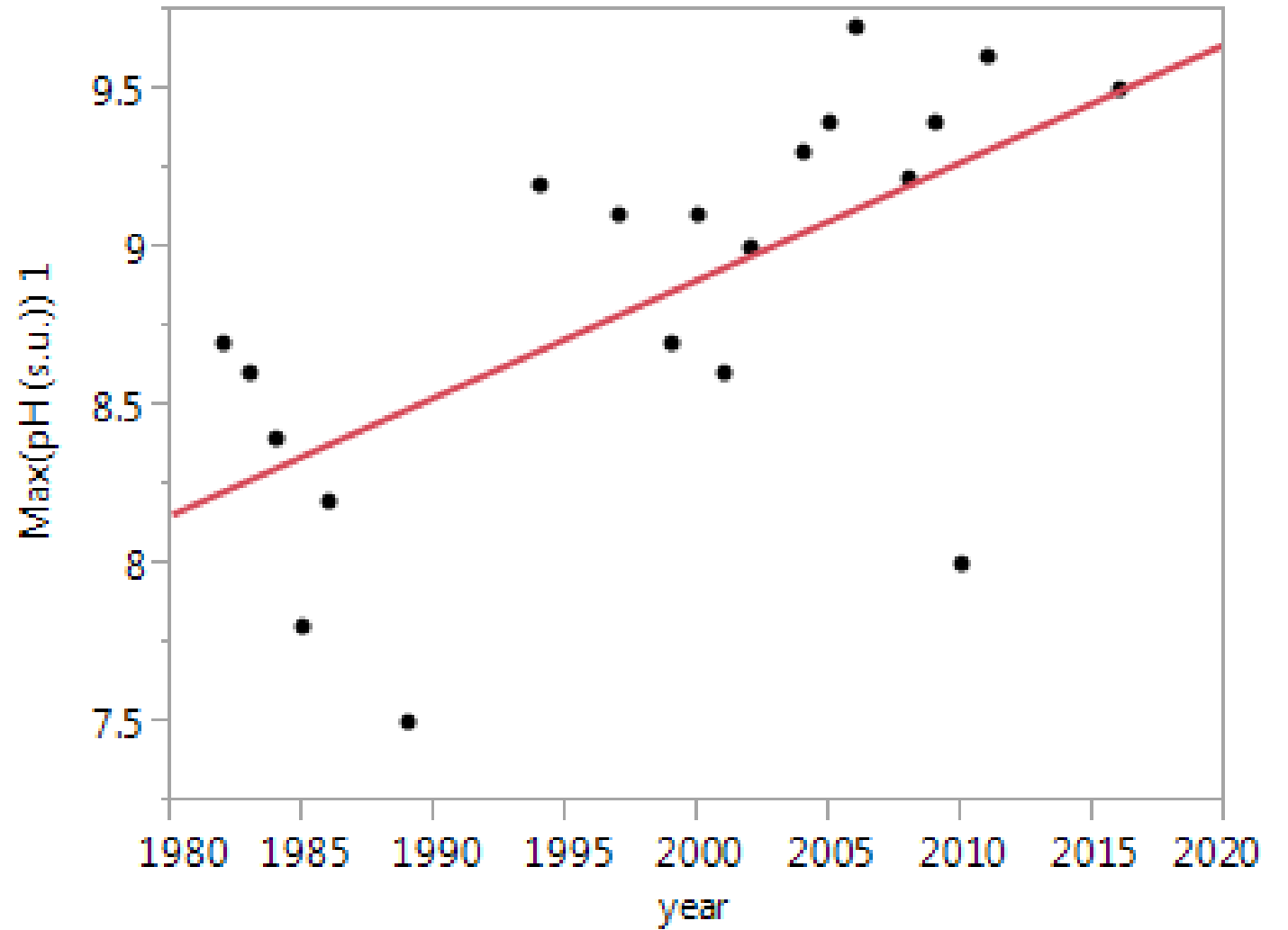
- YAD169E min pH
- $R^2 = 0.42$
- $P < 0.008$



- Max pH YAD169E
- $R^2 = 0.15$
- $P < 0.05$



- Max pH YAD169F
- $R^2 = 0.36$
- $P = 0.0028$



# Summary

Rank	Lake	Mean NCTSI	N
141	HIGH ROCK LAKE	3.43	347

- HRL is a eutrophic reservoir

Tetra Tech 2015 NSTEMPS report

Those lakes that did not meet all of the eutrophication-related standards are: Graham-Mebane Reservoir, High Point Lake, Jordan Lake, Stoney Creek Reservoir, Lake Mackintosh, Pittsboro Lake, Lake Rhodhiss, Cedar Cliff Lake, Lake Sequoyah, Falls of the Neuse Reservoir, High Rock Lake, Lake Lee, and Lake Twitty.

**Report to the Environmental Review  
Commission on the Status of Water  
Quality in Water Supply Reservoirs  
Sampled by the Division of Water Quality**

**April 2006**

- Long term patterns suggest conditions are getting worse



## THOUSANDS OF FISH DEAD AT HIGH ROCK LAKE

Submitted by Judi on October 27, 2009 - 9:01pm

High Rock Lake

By Julie Rose, WFAE, Charlotte Public Radio

State officials say the two events aren't directly linked. But they paint a picture of pollution problems that plague High Rock Lake on the Yadkin River. WFAE's Julie Rose reports:

The easiest way to find the cove where all the fish died on High Rock Lake is to look for the big birds circling over head. A big flock of them flies off as we walk to the water's edge.

They've done a pretty good job . . . nothing but slimy little fish skeletons left and still some white fish bellies floating in the water. A big fish covered in maggots makes us back away.

The small cove is surrounded by trailers and modest homes. Lori Propst has lived here for 10 years.

"It concerns me because my children swim out here and stuff and you know, seein' all them dead

Chl a Docu...pdf ^

## Yadkin River and High Rock Lake are polluted, experts say

John Hinton/Winston-Salem Journal Mar 23, 2013 (0)



f t e p

High Rock Lake is filled with toxic algae blooms fed by human and animal sewage, and storm-water runoff. And it would cost millions of dollars to control the problem, water-quality experts said Friday night.

The pollution in the lake, which is part of the Yadkin River, reflects the polluted lakes, rivers and streams across the state and nation, said JoAnn Burkholder, the director of the



NC Launches So  
North Carolina Set To Giv  
To Middle-Class Families  
Green Energy Tribune

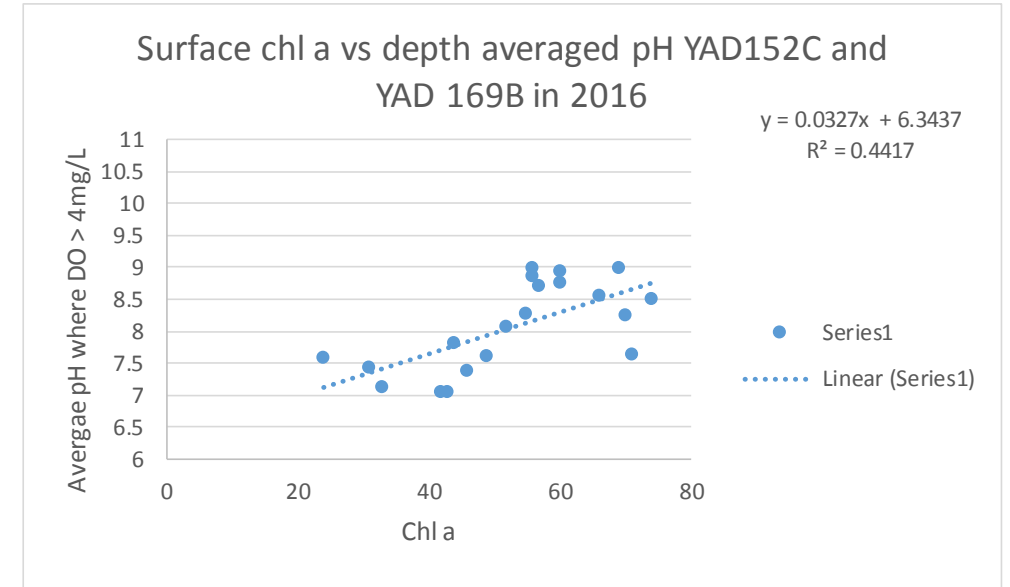
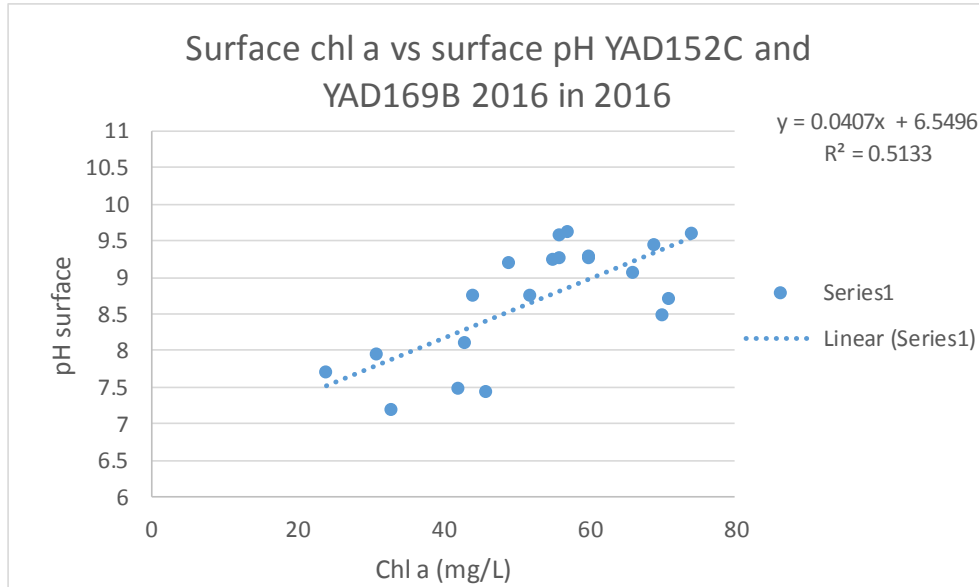
### Popular This Week

- 1 UNCC student from Kir made false report of m
- 2 Wake Forest Baptist au after erroneous lab res
- 3 Free boat rides and mc open marina
- 4 Waterfront in Winston- reopened Salem Lake
- 5 Driver from Winston-Si police officers in multio
- 6 Rain mixed with snow I Forsyth County
- 7 UNCC police chief exp

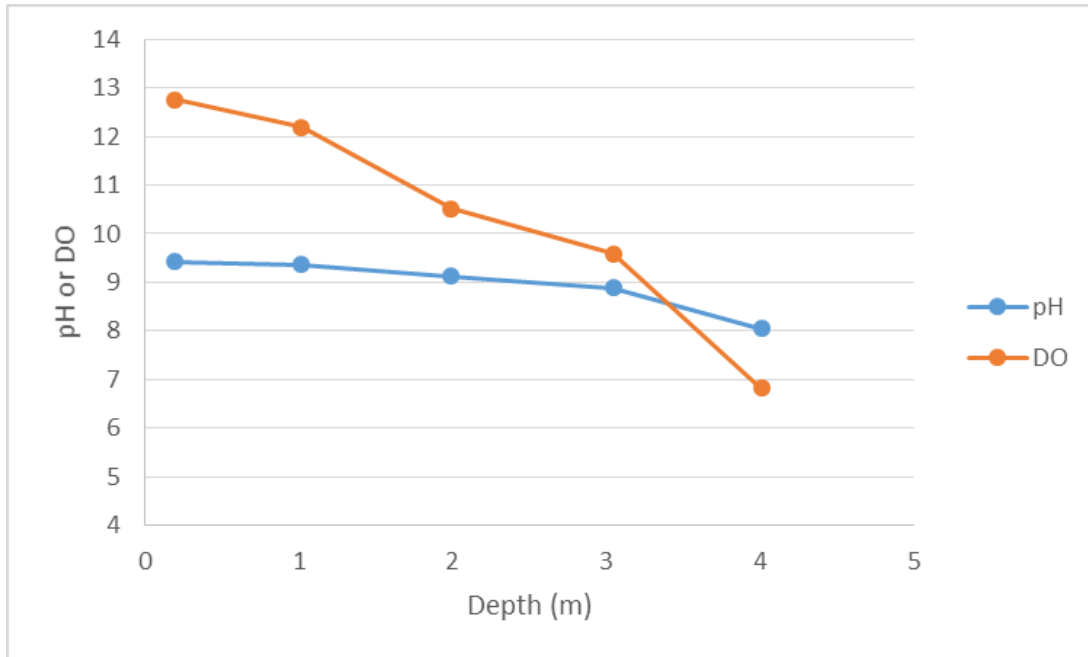
dock ^ Petter Chl a Docu...pdf ^

[http://www.journalnow.com/news/local/yadkin-river-and-high-rock-lake-are-polluted-experts-say/article\\_3ebb3ea2-9367-11e2-9aa1-0019bb30f31a.html](http://www.journalnow.com/news/local/yadkin-river-and-high-rock-lake-are-polluted-experts-say/article_3ebb3ea2-9367-11e2-9aa1-0019bb30f31a.html)

# pH vs Chl a with and without depth averaging



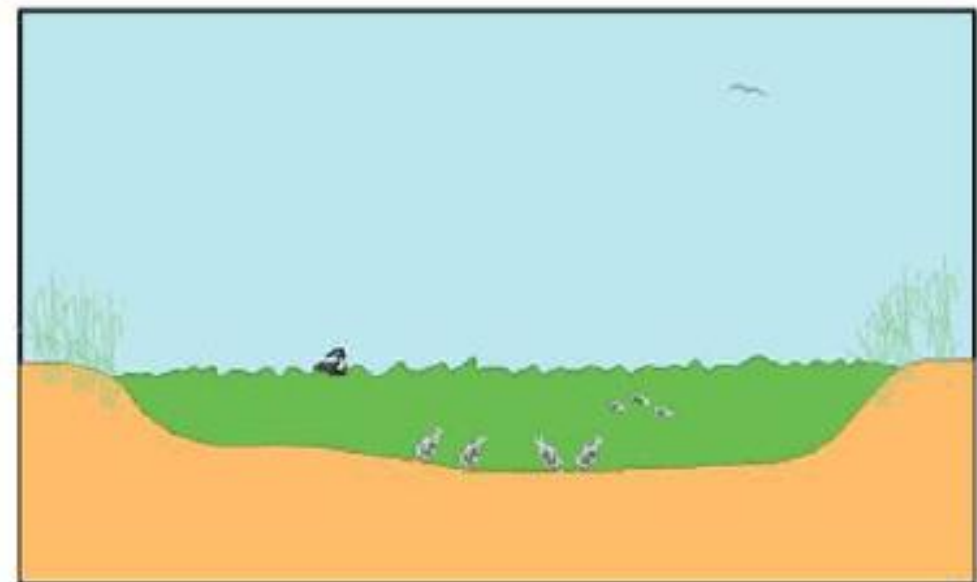
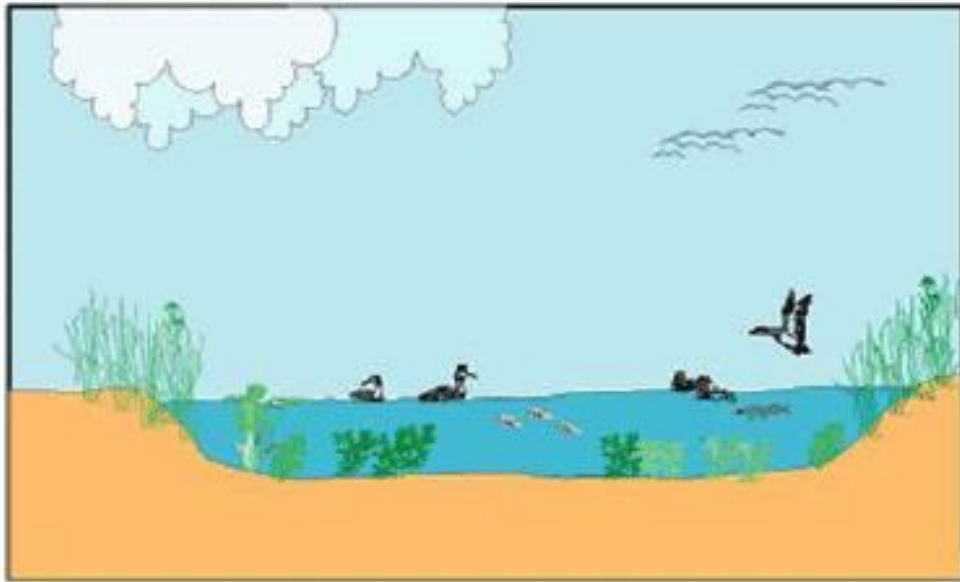
# YAD169B Aug 31, 2016



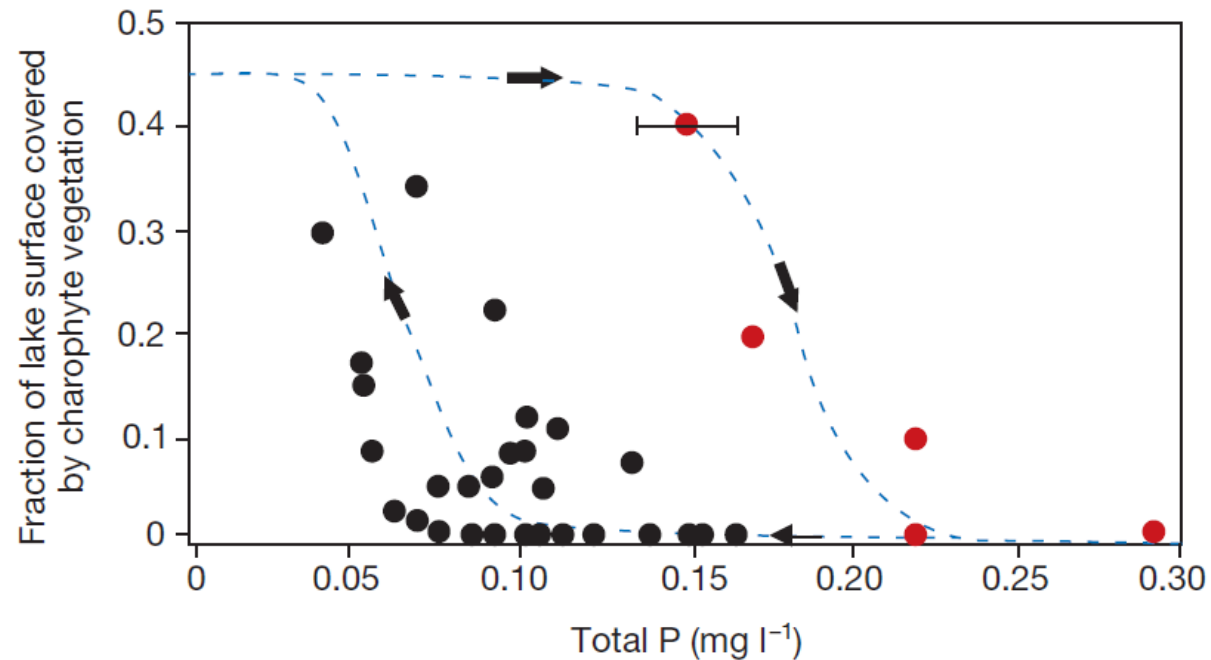
- Average pH = 8.97
- Average pH from [H] = 8.62



# Alternative stable states in lakes and reservoirs



# Hysteresis makes it hard to recover lake/reservoir water quality



**Figure 4** Hysteresis in the response of charophyte vegetation in the shallow Lake Veluwe to increase and subsequent decrease of the phosphorus concentration. Red dots represent years of the forward switch in the late 1960s and early 1970s. Black dots show the effect of gradual reduction of the nutrient loading leading eventually to the backward switch in the 1990s. From ref. 59.