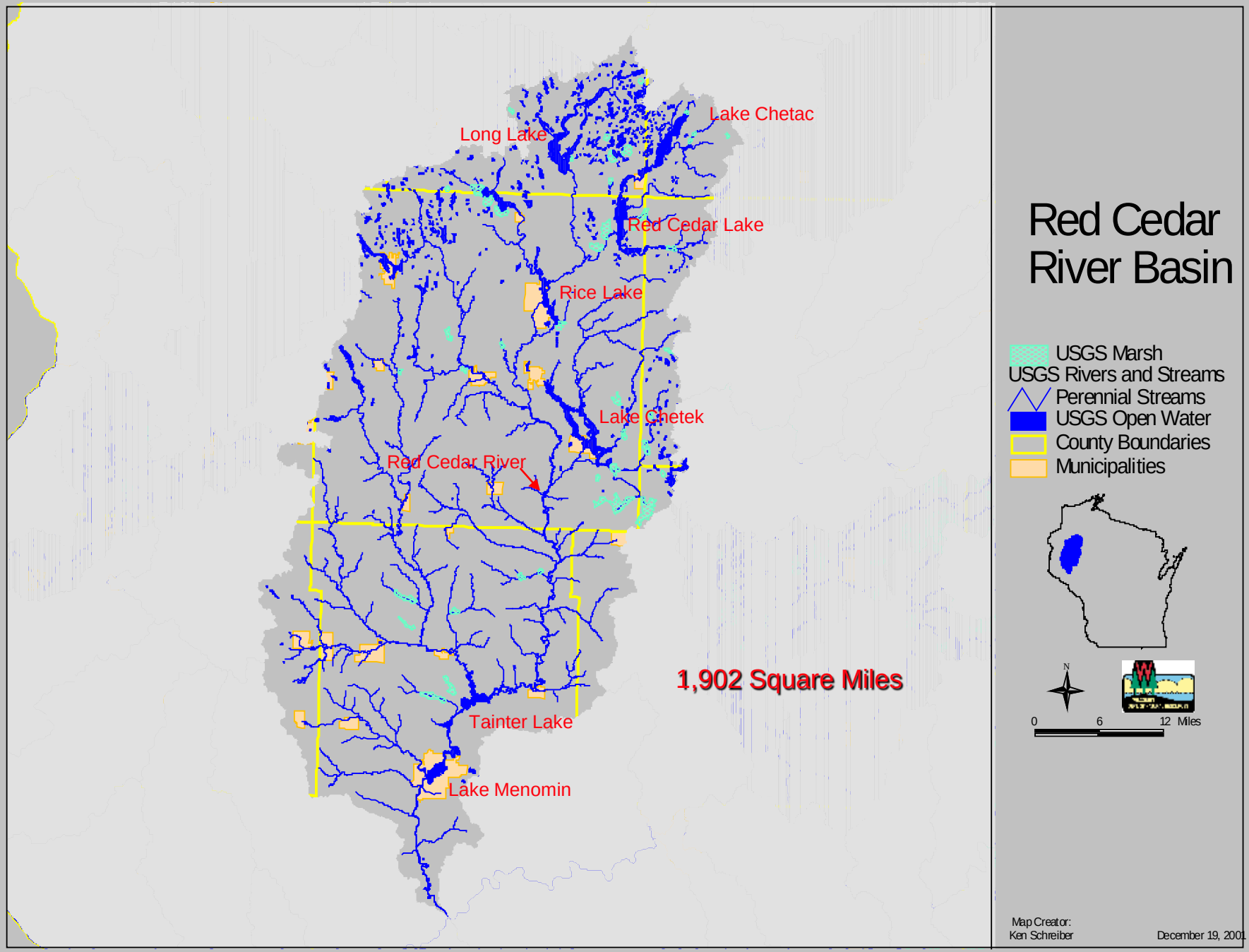
Wisconsin
Department of Natural Resources

Red Cedar River Water Quality

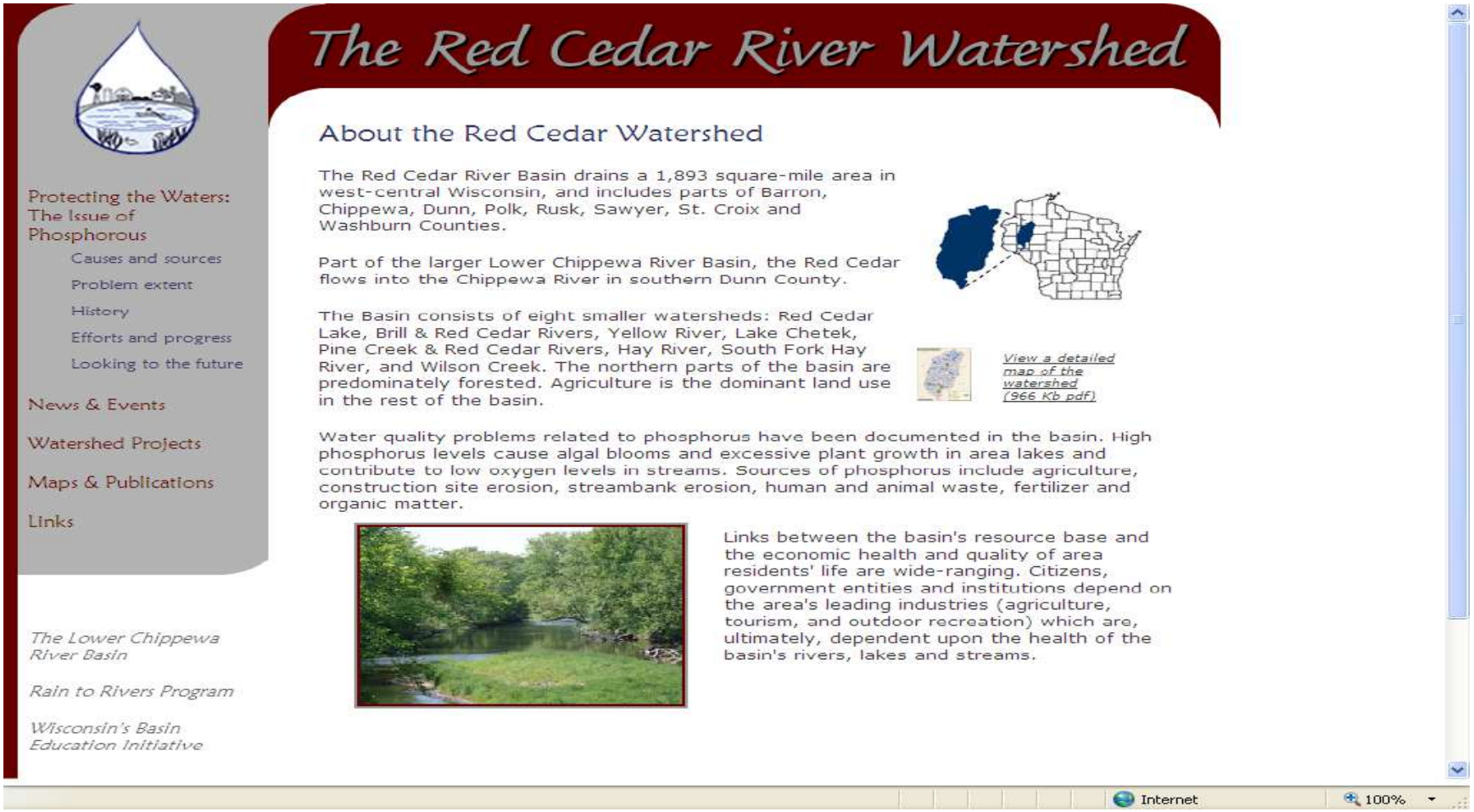
Recent developments
Where we stand
Possible futures

Paul La Liberte


Lake Chetac
Long Lake
Red Cedar Lake
Rice Lake
Lake Chetek
Red Cedar River
1,902 Square Miles
Tainter Lake
Lake Menomin
Red Cedar River Basin
USGS Marsh
USGS Rivers and Streams
Perennial Streams
USGS Open Water
County Boundaries
Municipalities
N
0
6
12 Miles
Map Creator:
Ken Schreiber
December 19, 2001

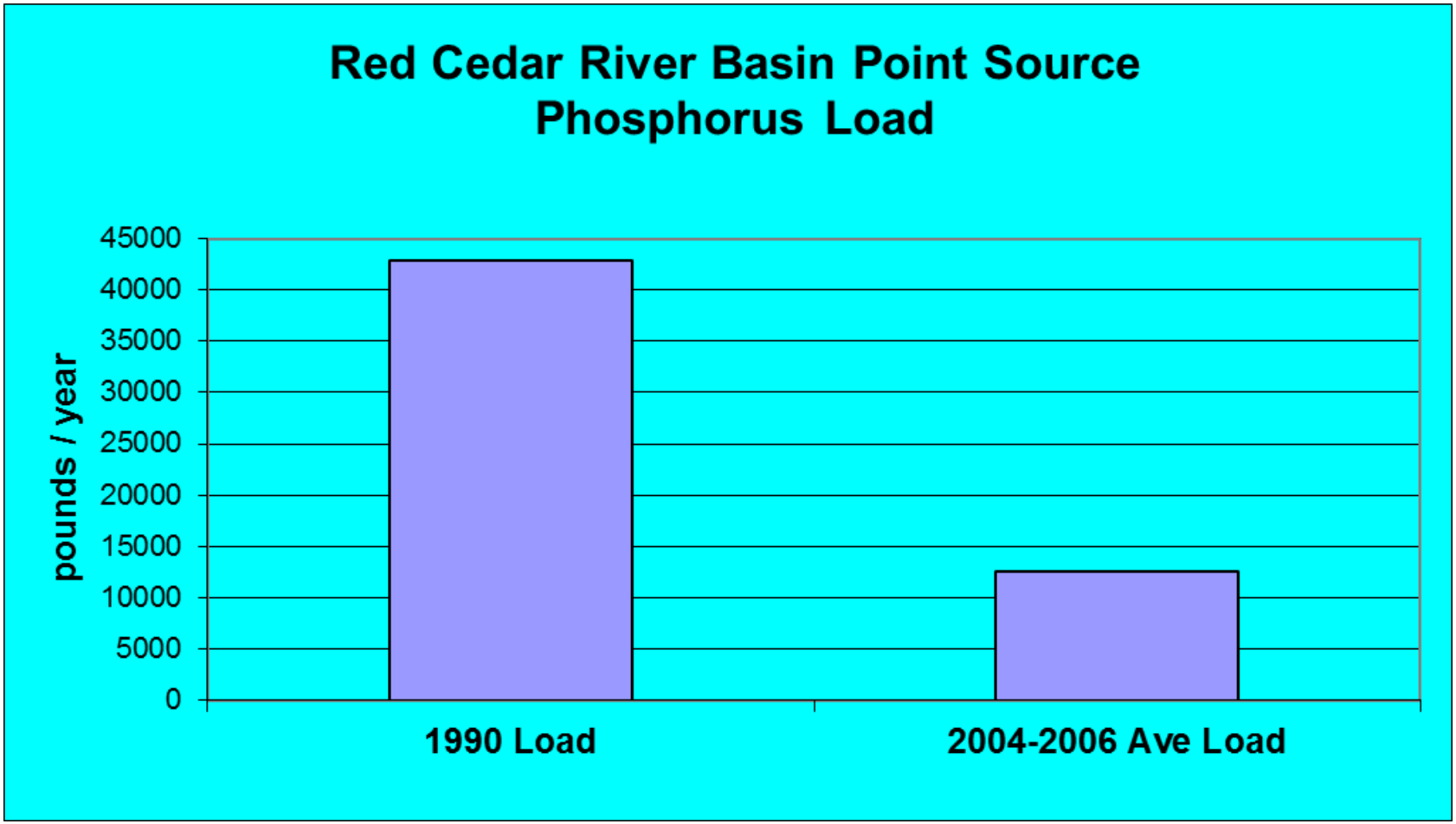
Red Cedar River Website

http://basineducation.uwex.edu/lowerchip/redcedar/index.html



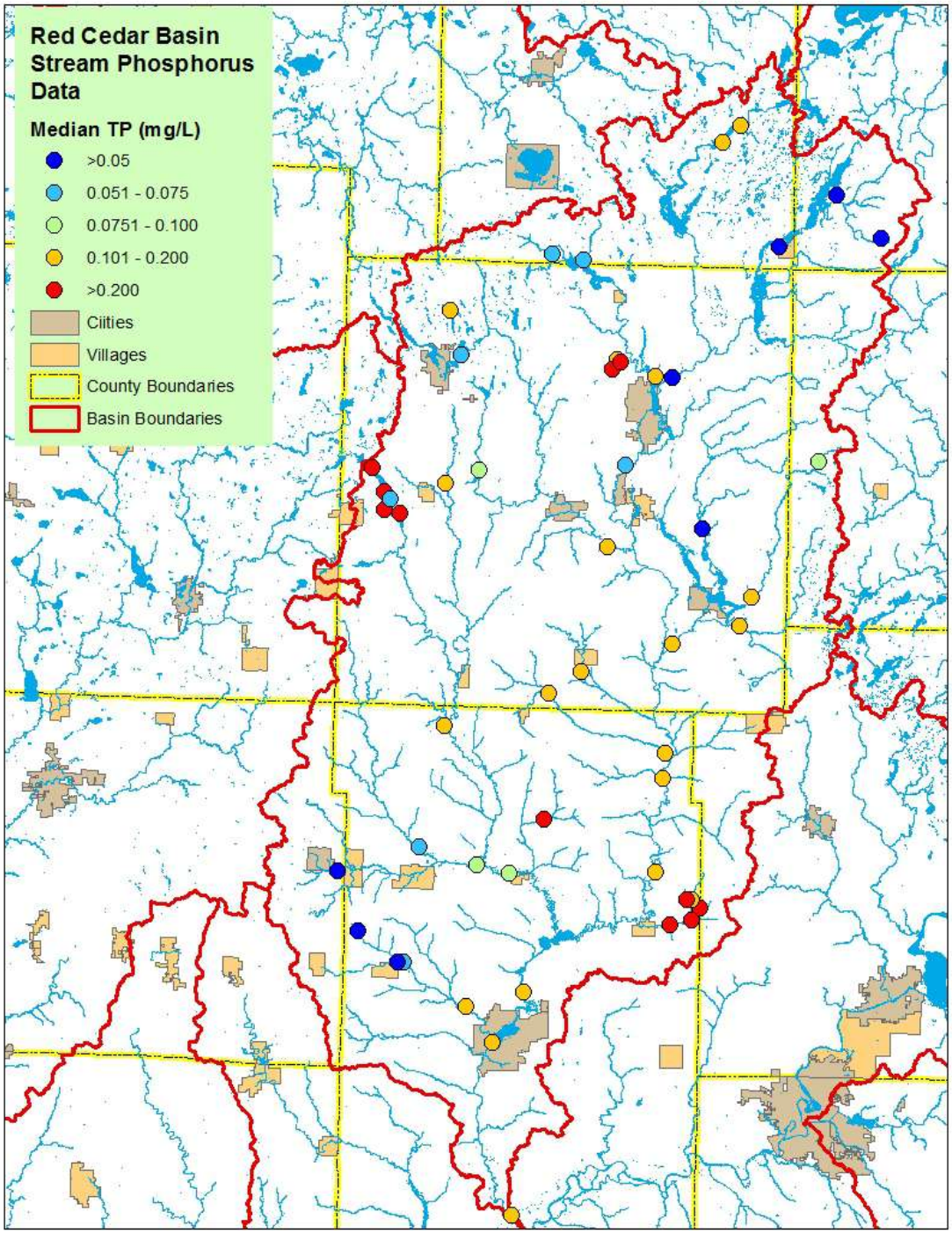
Phosphorus regulation history in WI

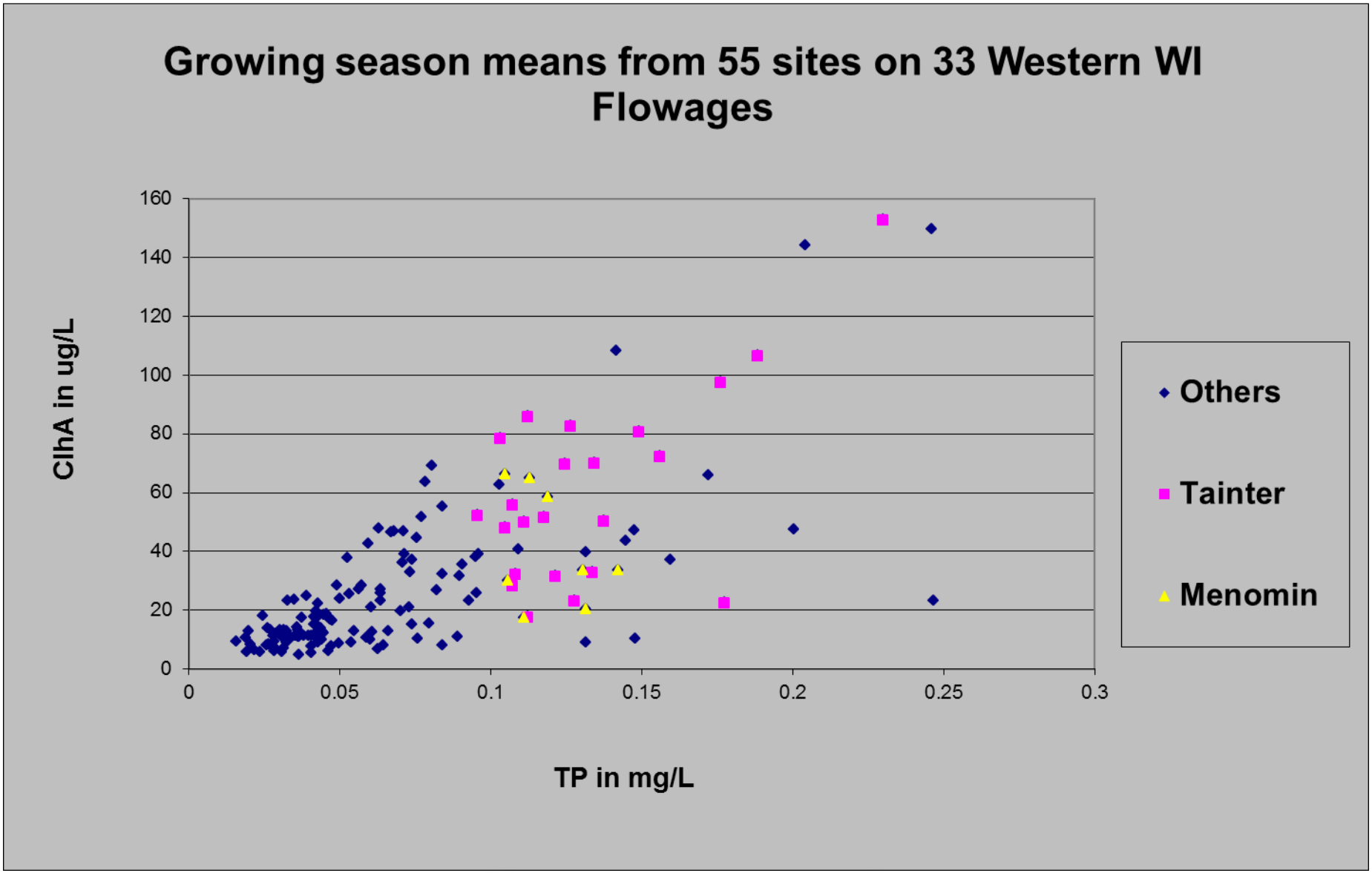
- 1970s Restriction in laundry detergent, Priority Watersheds start, wastewater treatment plant on Lake Michigan regulated
- 1992 Regulation of larger wastewater treatment plants statewide
- 1996 Lakes and streams in Red Cedar listed as impaired waters with EPA
- 1997 Stormwater permit program established
- 2002 minimum nonpoint performance standards established
- 2005 Tainter and Menomin Lakes posted with algal toxin signs
- 2008 – Professional nutrient management for turf areas over 5 acres
- April 2010 - Restriction on sales of phosphorus in lawn fertilizer in effect
- July 2010 – Restriction on phosphorus in dish detergent in effect
- December 2010 – Revisions to nonpoint performance standards NR151, Establishment of statewide phosphorus standards for waterbodies
- September 2012 – EPA approves TMDL for Tainter and Menomin Lakes


Red Cedar River Basin Point Source
Phosphorus Load
pounds / year
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1990 Load
2004-2006 Ave Load


9 12 06

Phosphorus Criteria

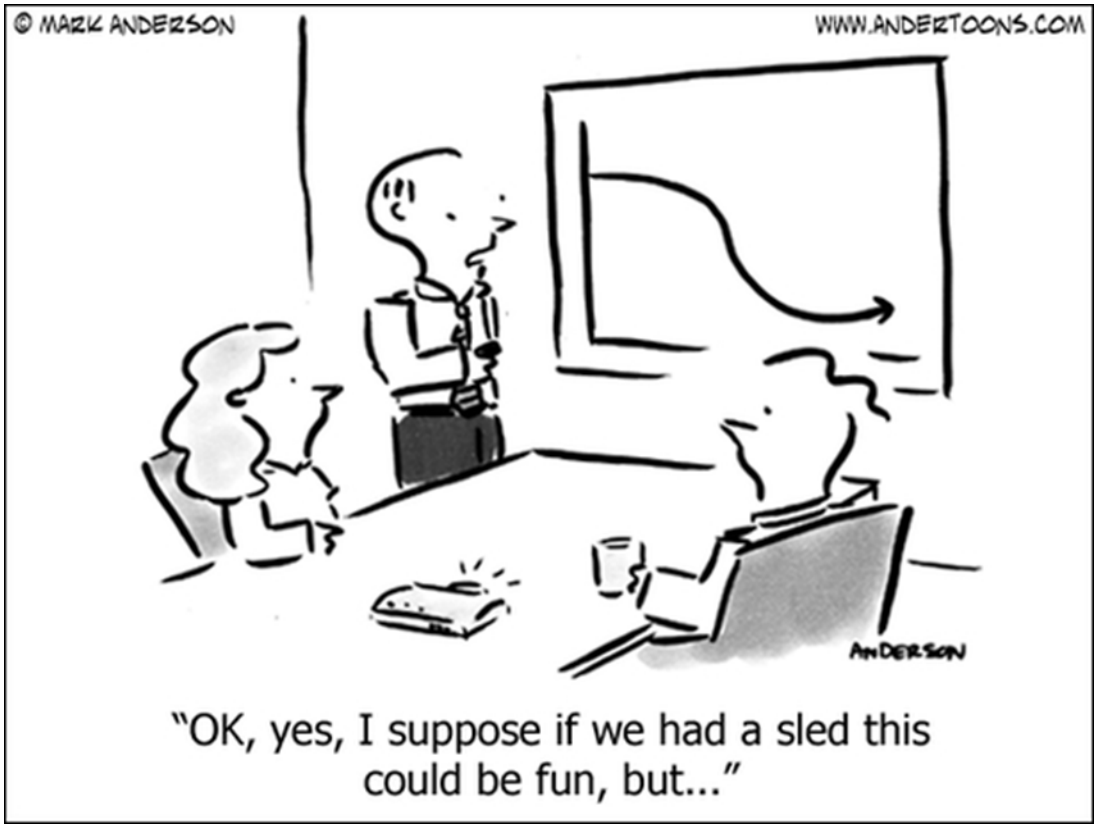

Red Cedar Basin
Stream Phosphorus
Data
Median TP (mg/L)
>0.05
0.051 - 0.075
0.0751 - 0.100
0.101 - 0.200
>0.200
Cities
Villages
County Boundaries
Basin Boundaries


Growing season means from 55 sites on 33 Western WI Flowages
ChlA in ug/L
160
140
120
100
80
60
40
20
0
0
0.05
0.1
0.15
0.2
0.25
0.3
TP in mg/L
Others
Tainter
Menomin

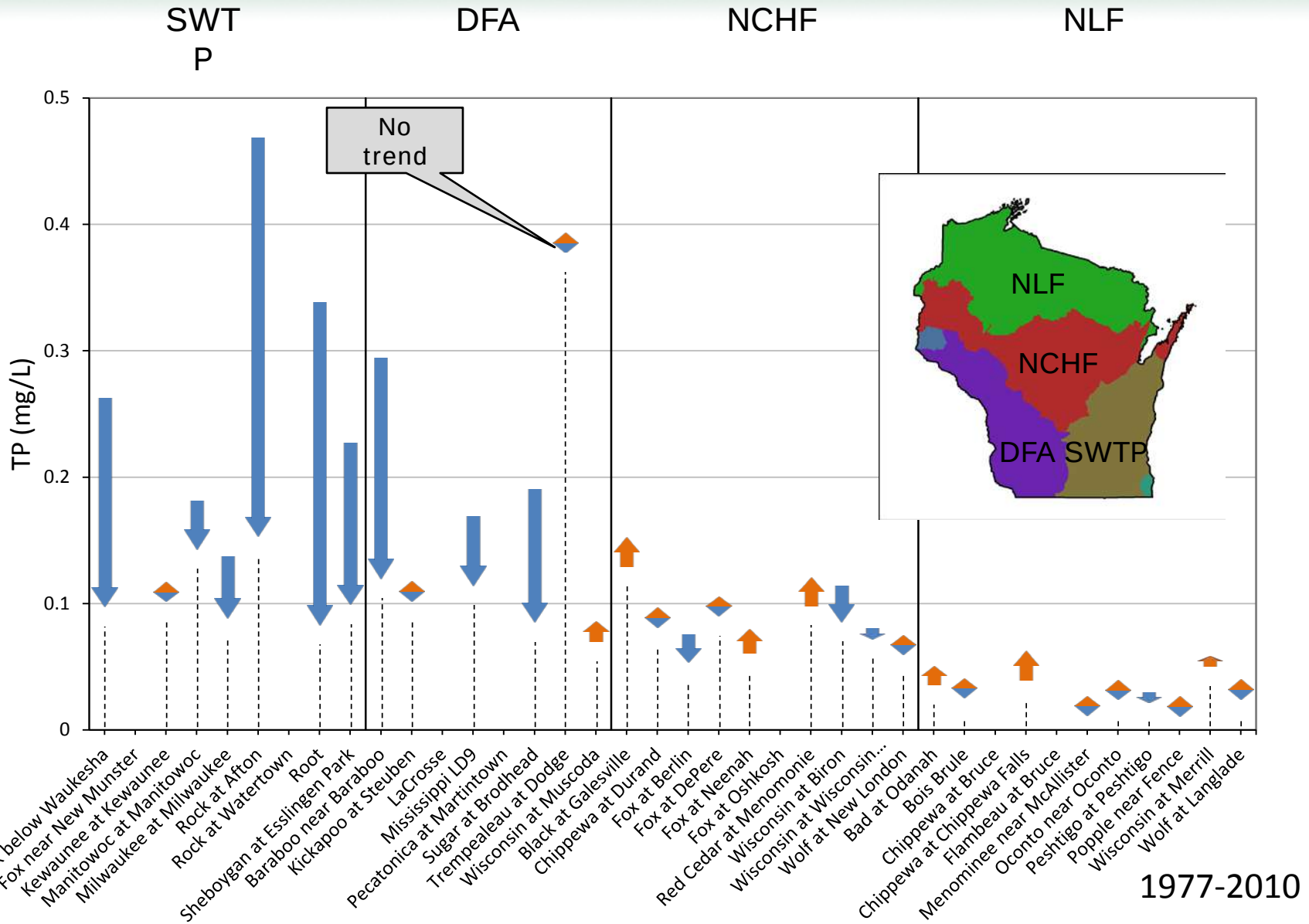
TMDL goal for 65% reduction phosphorus means

Tainter Lake	Current	TMDL Goals
Total phosphorus (mg/L)	150	59
Chlorophyll-a (mg/L)	87	25
Secchi depth (m)	0.8	1.6
Percent time >30mg/L Chl-a	92	28
Lake Menomin		
Total phosphorus (mg/L)	108	57
Chlorophyll-a (mg/L)	40	25
Secchi depth (m)	1.3	2.0
Percent time >30mg/L Chl-a	54	28

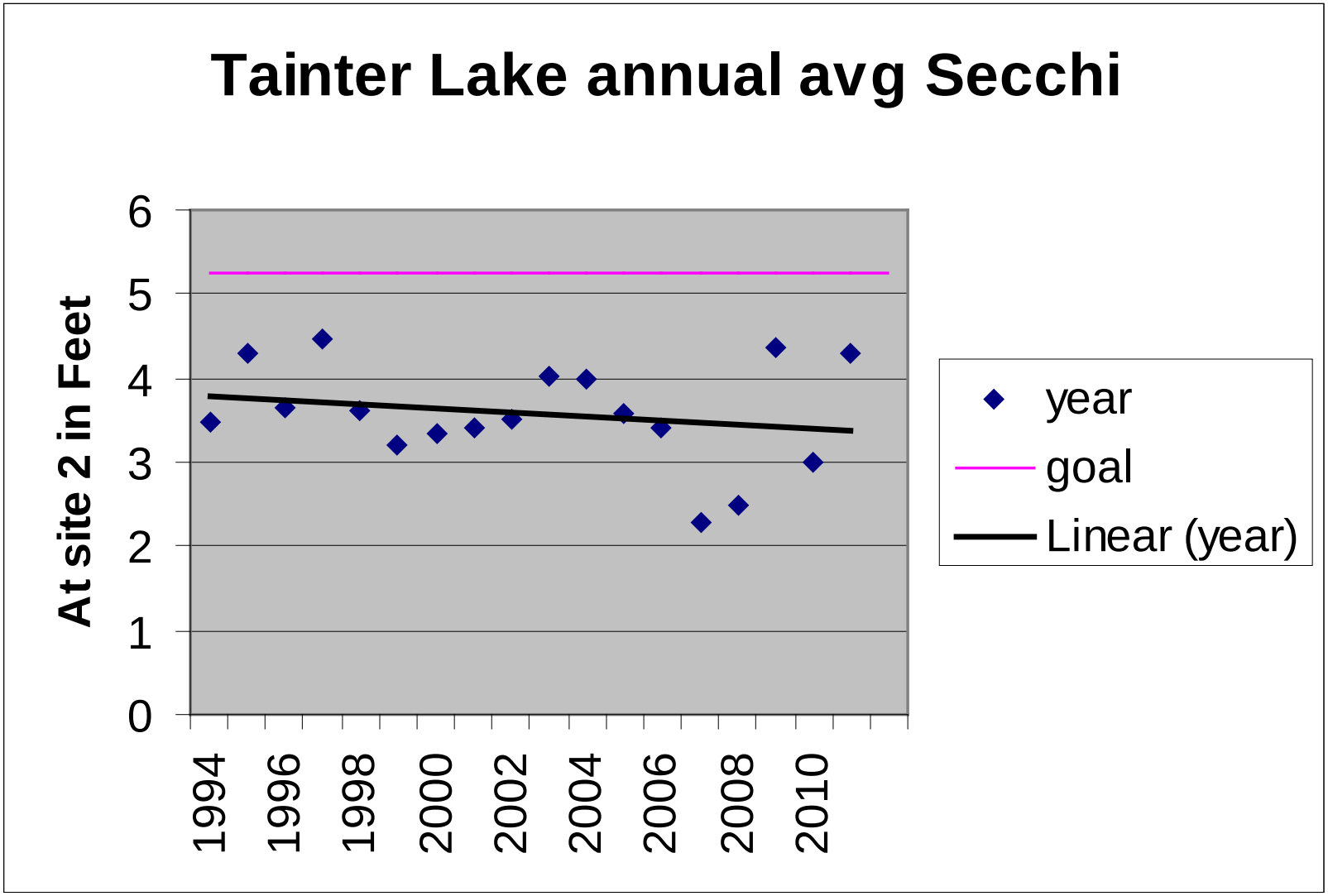
Trends to consider



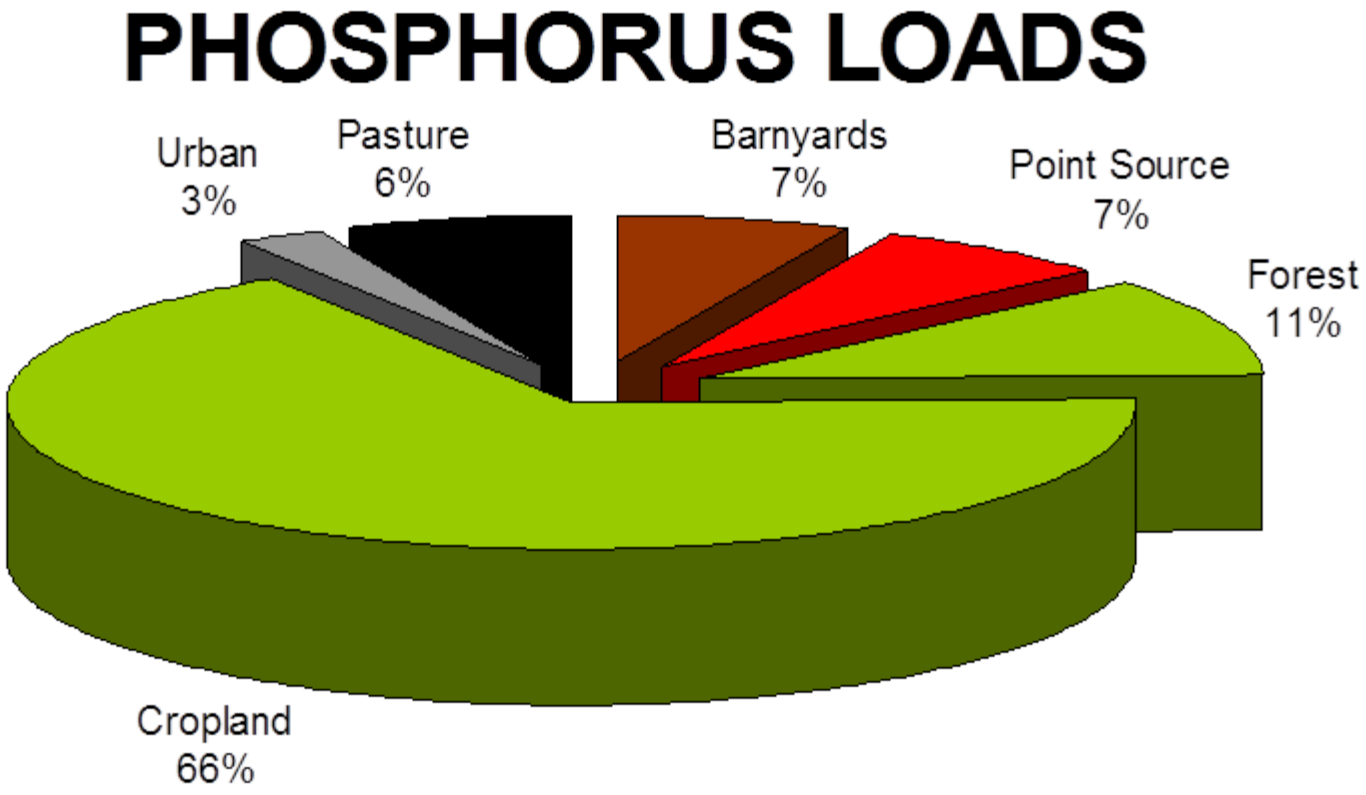
Total Phosphorus

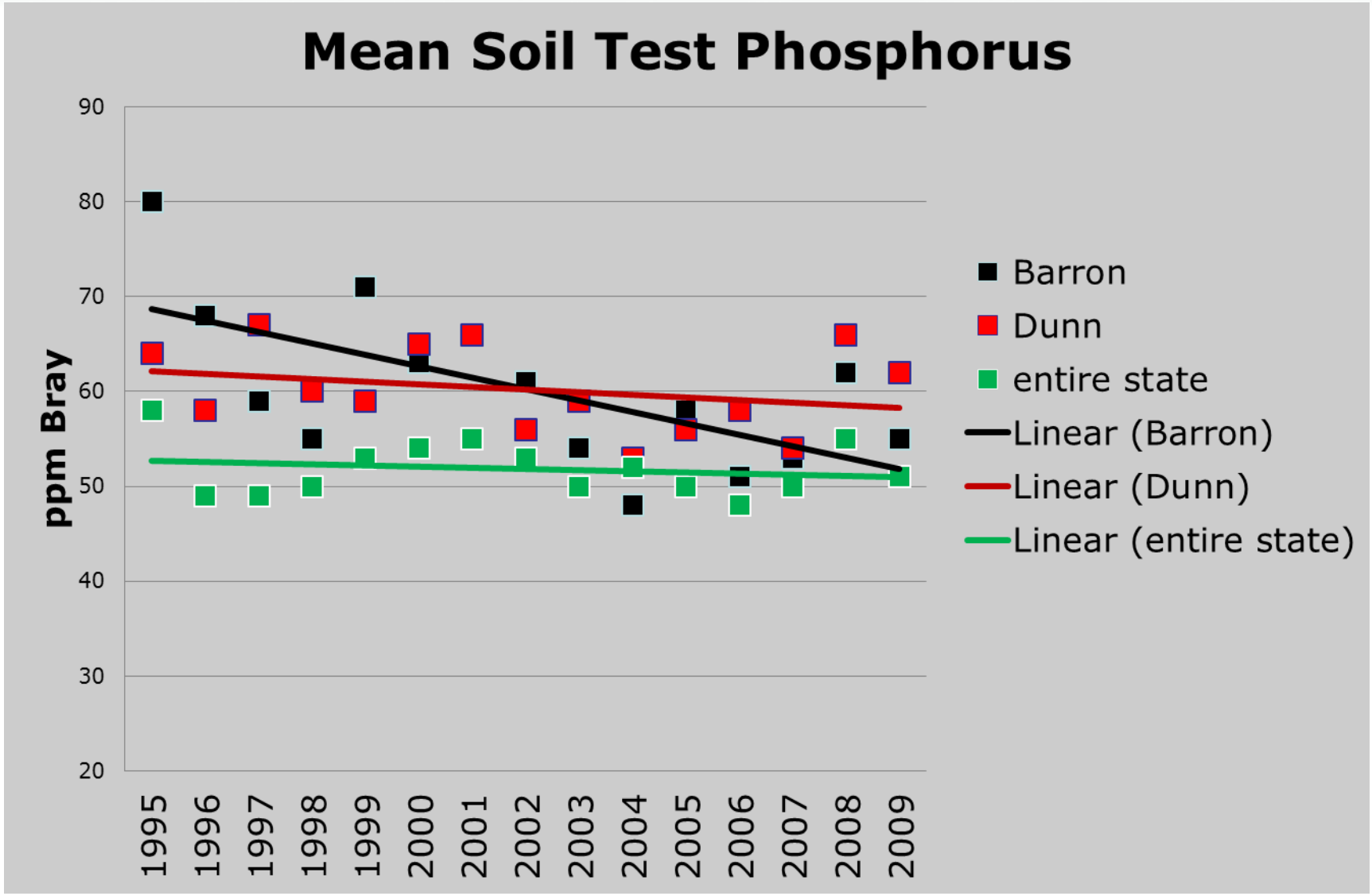


1977-2010


Tainter Lake annual avg Secchi
At site 2 in Feet
0
1
2
3
4
5
6
1994
1996
1998
2000
2002
2004
2006
2008
2010
year
goal
Linear (year)

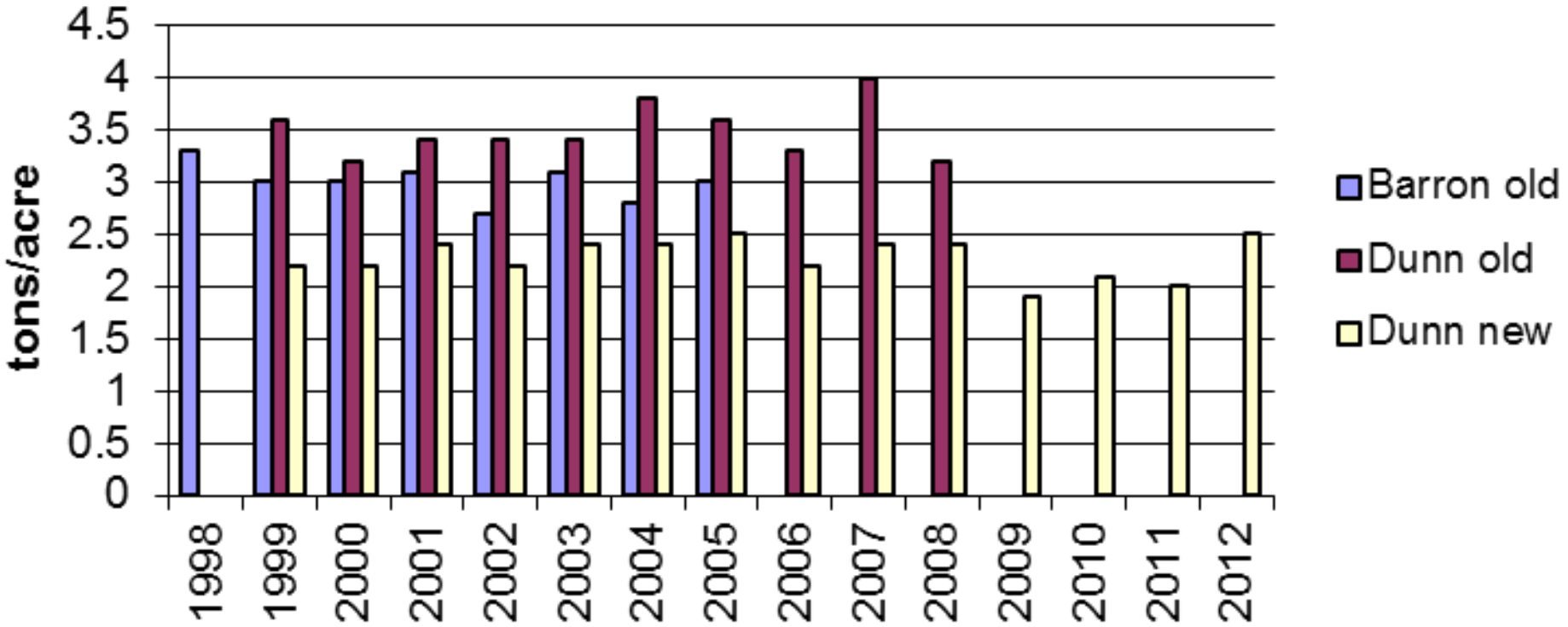
How do we reduce the phosphorus levels?

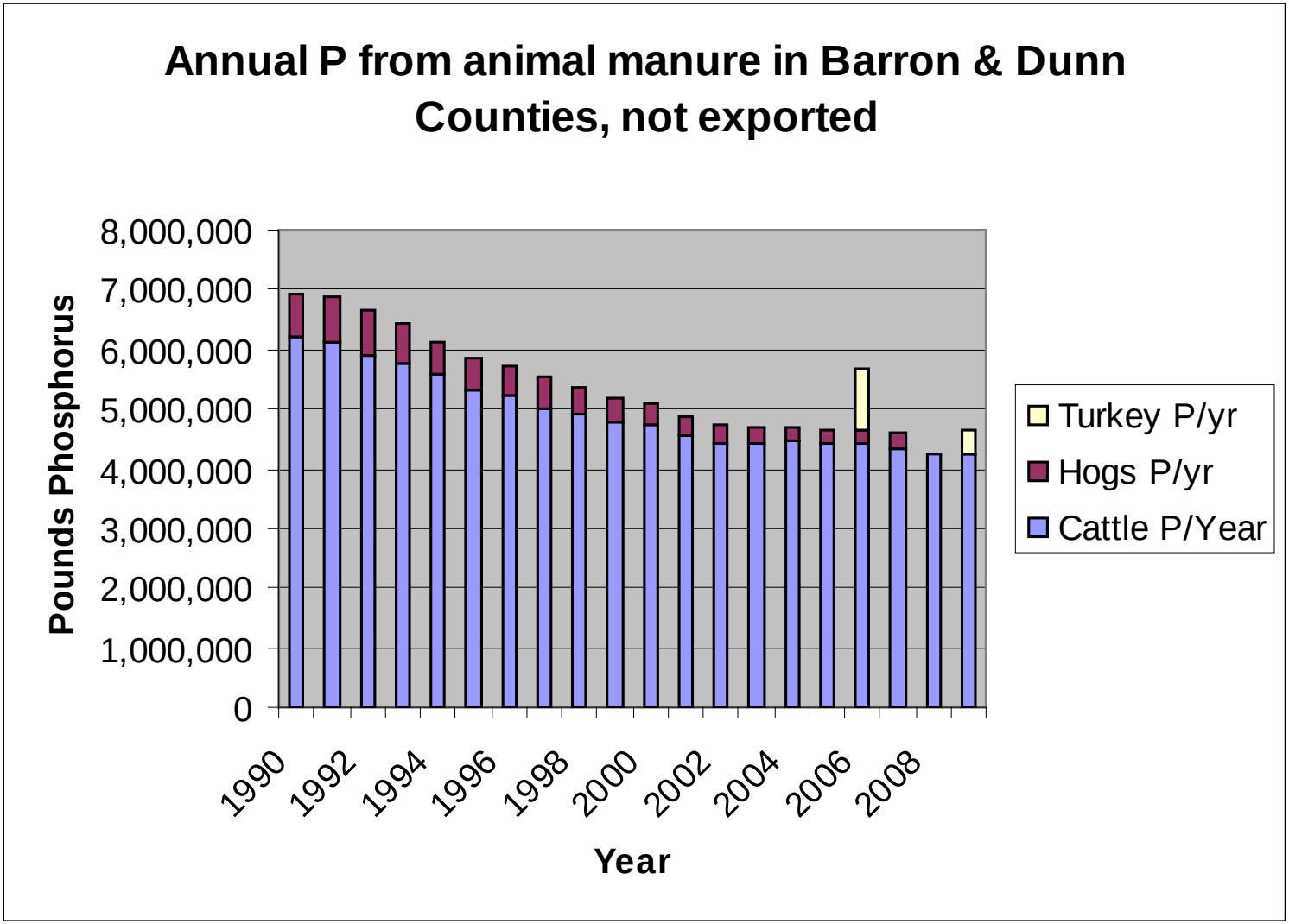




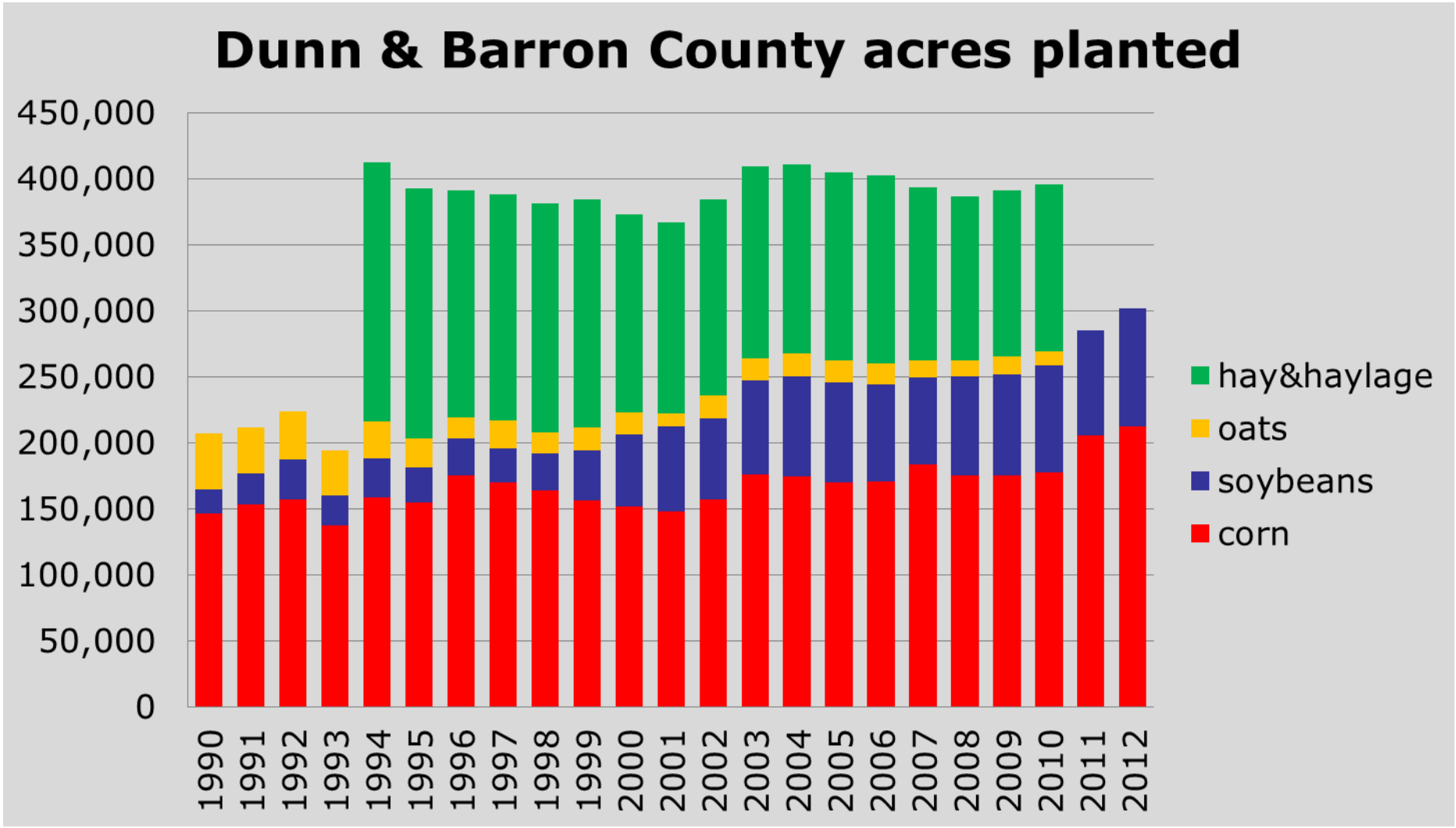
http://uwlab.soils.wisc.edu/soilsummary/database/

County average soil loss from transect surveys

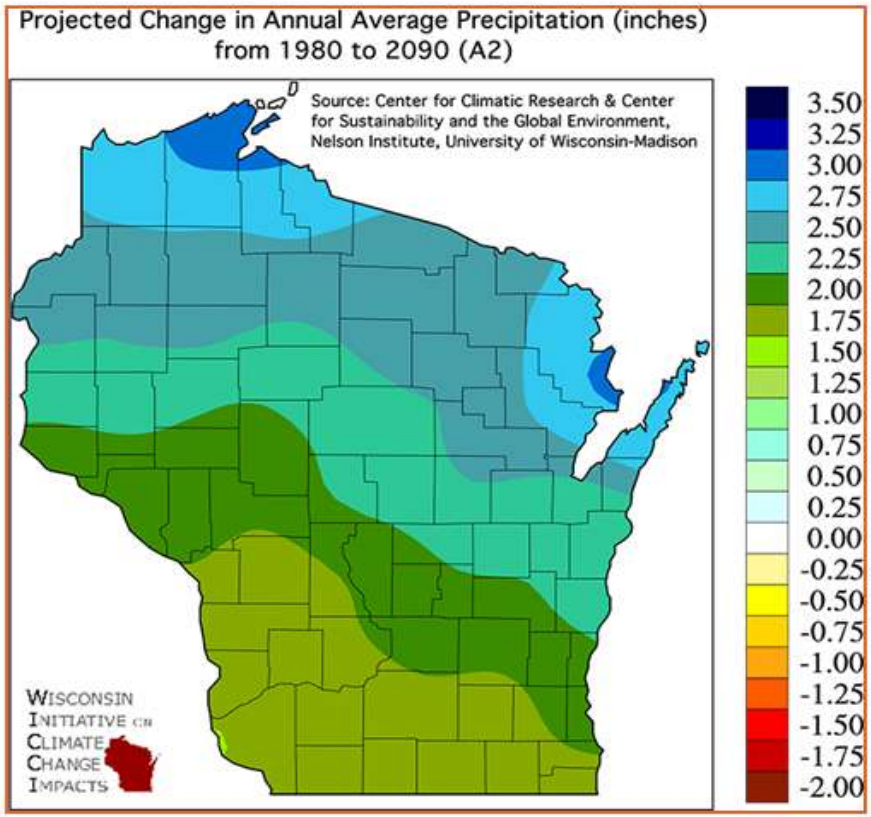


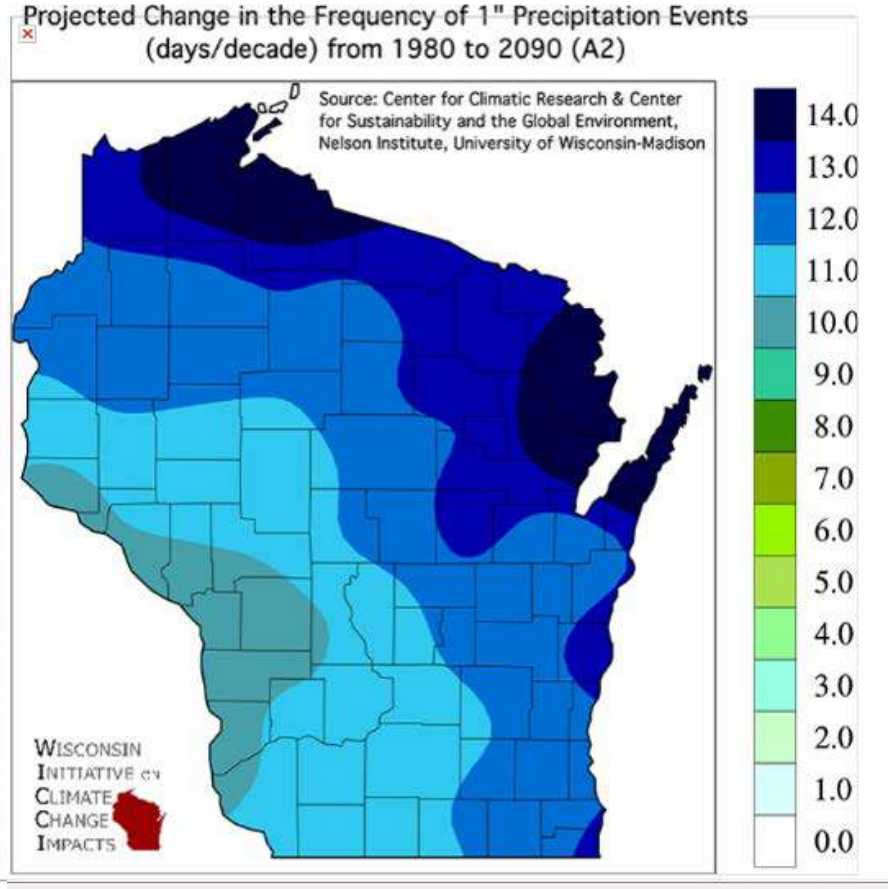


http://www.nass.usda.gov/Data_and_Statistics/index.asp).



http://www.nass.usda.gov/QuickStats/Create_County_Indv.jsp


Projected Change in Annual Average Precipitation (inches)
from 1980 to 2090 (A2)
Source: Center for Climatic Research & Center for Sustainability and the Global Environment, Nelson Institute, University of Wisconsin-Madison
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
WISCONSIN INITIATIVE ON CLIMATE CHANGE IMPACTS


Projected Change in the Frequency of 1" Precipitation Events
(days/decade) from 1980 to 2090 (A2)
Source: Center for Climatic Research & Center for Sustainability and the Global Environment, Nelson Institute, University of Wisconsin-Madison
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
WISCONSIN INITIATIVE ON CLIMATE CHANGE IMPACTS

So where does this leave us?

HOW?

- More row crops
- Climate change
- Permit programs continue
- Dunn Co shoreline setbacks
- Barron Co soil tests
- Tillage change
- Less manure
- Biofuel technology

Phosphorus regulation of point sources in Red Cedar Basin

- paul.laliberte@wi.gov

Objective One is Blue Water not Green Water

- Balanced point source – nonpoint source approach

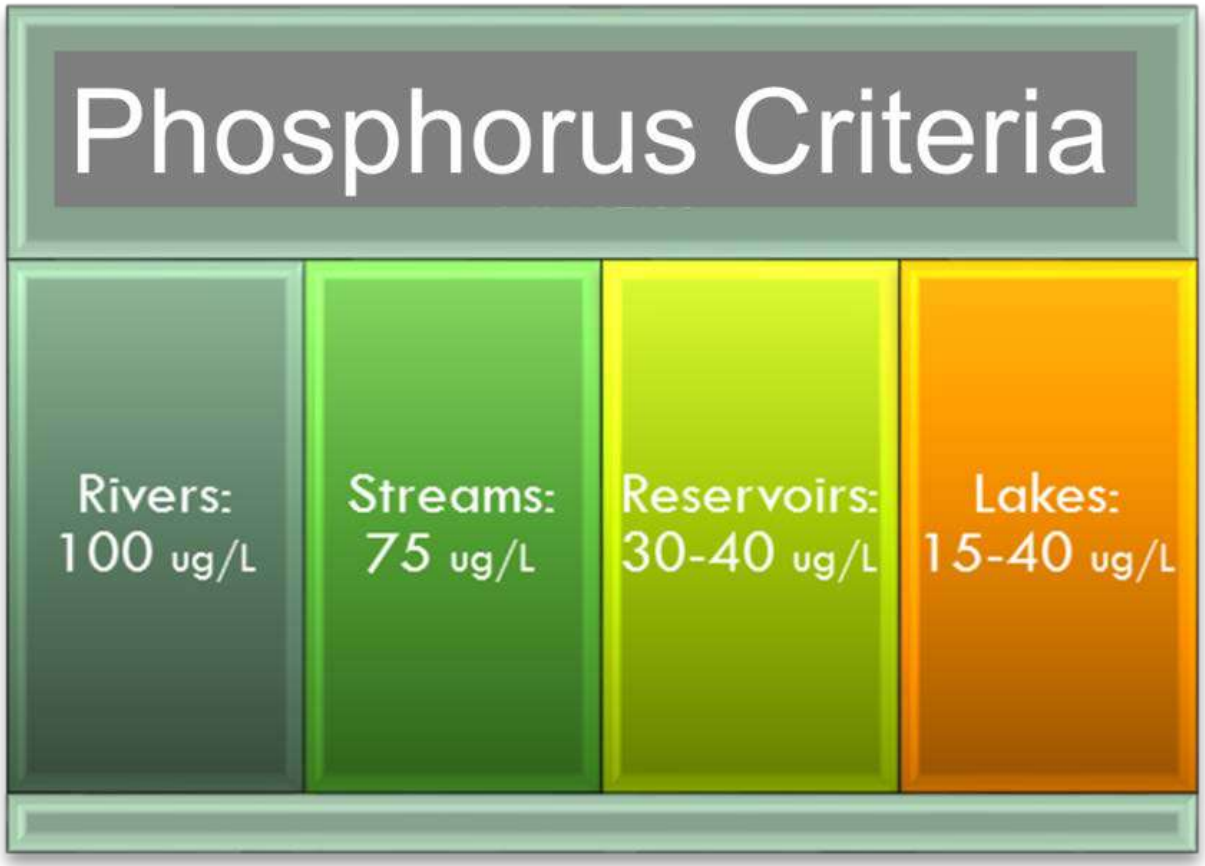
Objective Two is implementation in a least cost and fair way.

- Reasonable compliance schedules and implementation options
  - Must be consistent with Clean Water Act

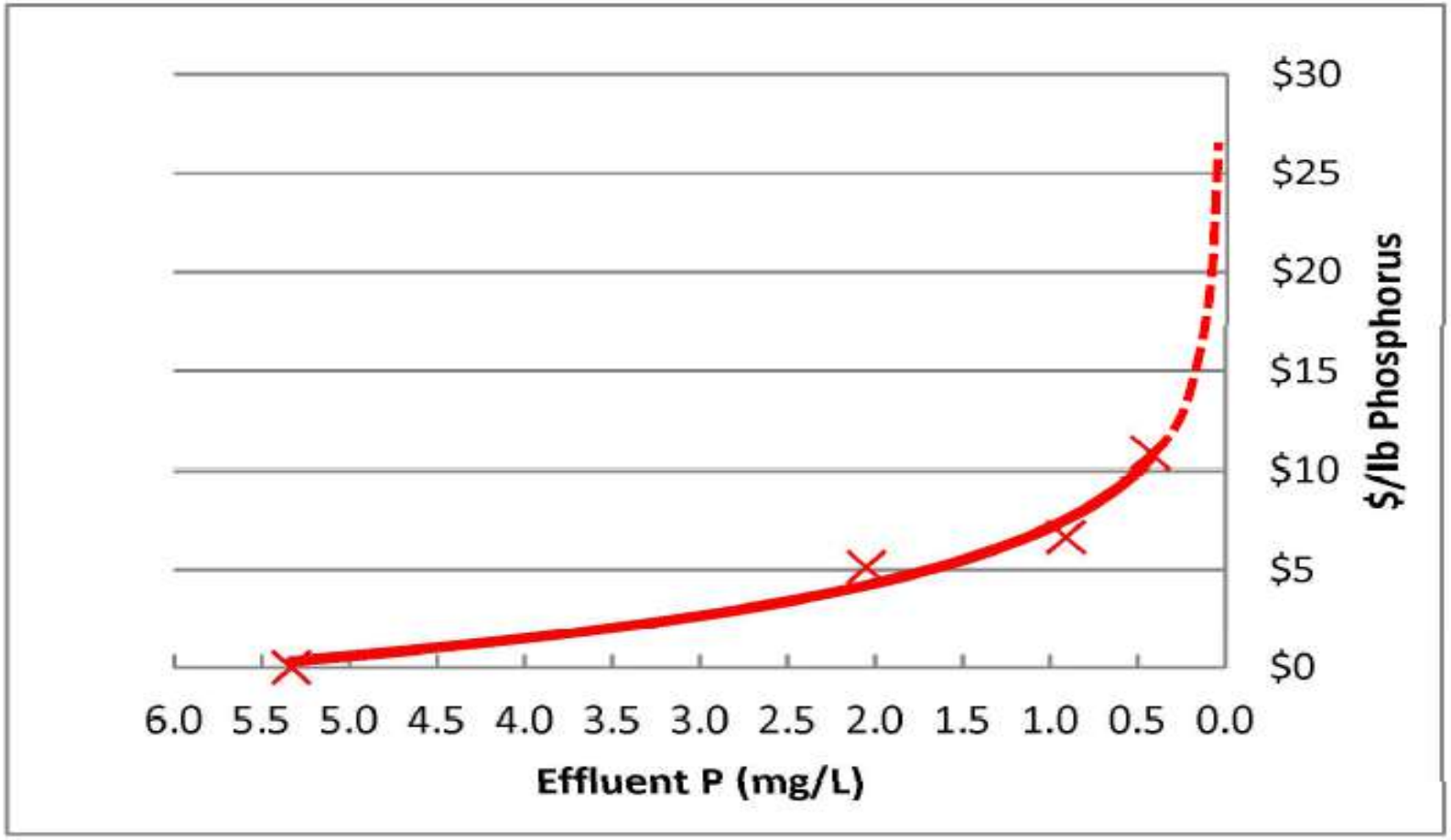
Red Cedar Dischargers

Almena	Seasonal
Boyceville	Continuous
Chetek	Continuous
Colfax	Seasonal
Crystal Lake SD	Seasonal
Cumberland	Continuous
Dallas	Continuous
Glenwood City	Continuous
Jennie O Turkey Store	Continuous
Lakeland SD #1	Continuous
Prairie Farm	Continuous
Rice Lake	Continuous
Ridgeland	Seasonal
Saputo Cheese-Almena	Continuous
Turtle Lake	Seasonal
Wheeler	Seasonal

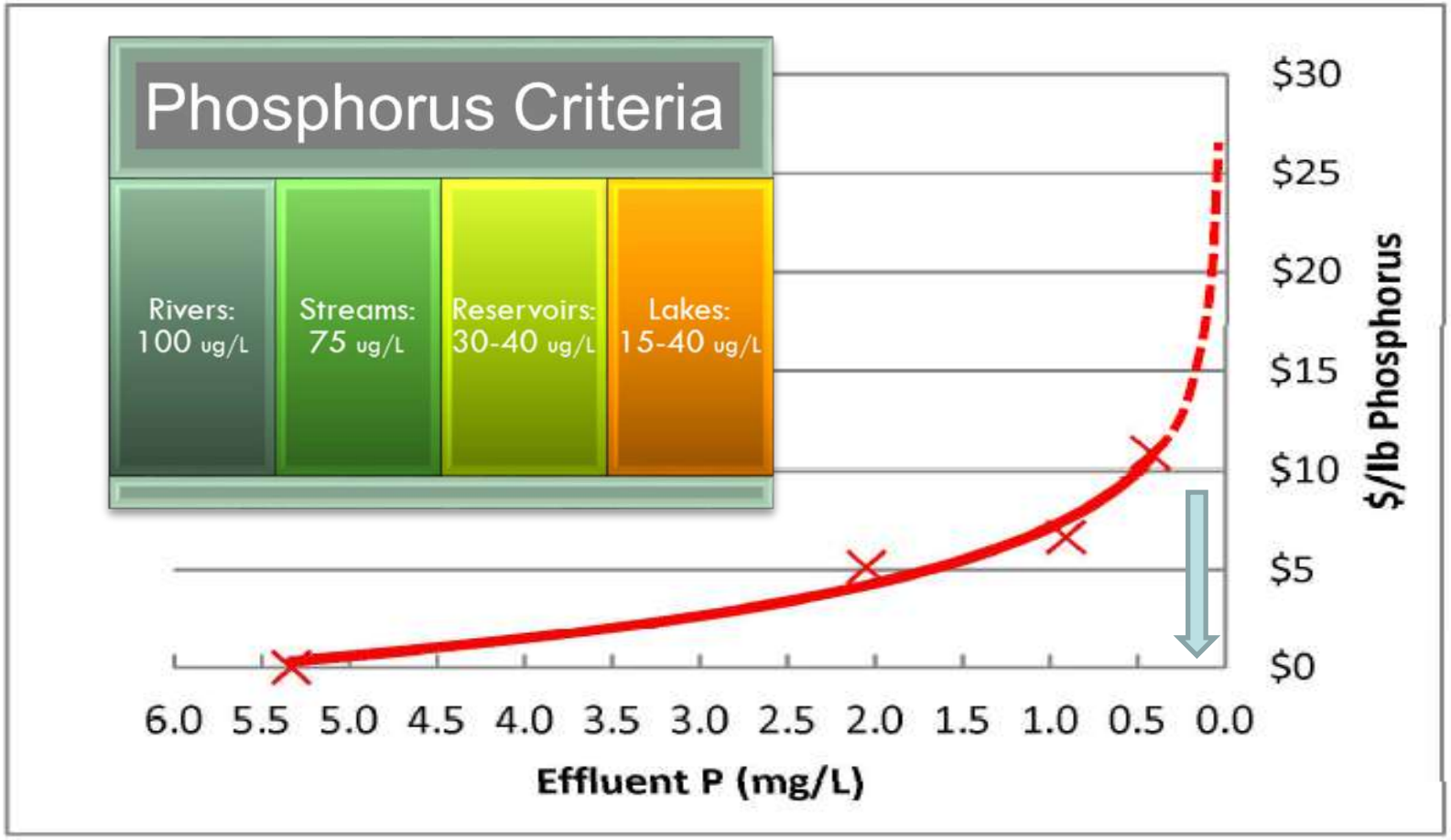
- Technology based limits


Phosphorus Criteria
Rivers:
100 ug/L
Streams:
75 ug/L
Reservoirs:
30-40 ug/L
Lakes:
15-40 ug/L

Phosphorus Treatment Costs

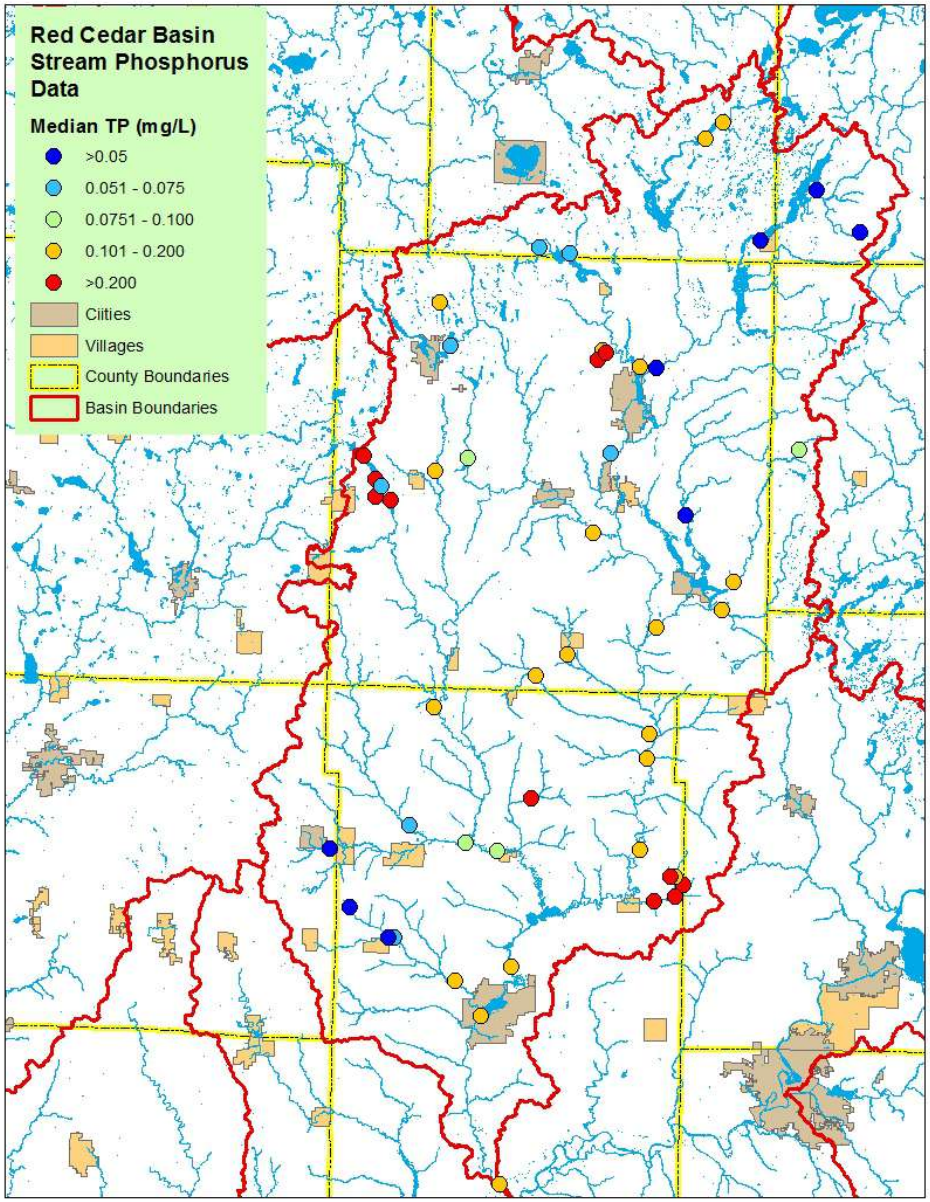


Phosphorus Treatment Costs



Treatment Plant limits based on 2010 phosphorus rule

- Local stream conditions or
- TMDL Limits



Compliance Tools

- Extended Compliance Schedules
- Add treatment
- Water Quality Trading
- Adaptive Management
- Variances

Compliance schedule

- New Permits include a phosphorus effluent limit
- Compliance schedule possible for up to 9 years to allow for significant construction
- Alternatives to treatment must be identified by year 3 of 5 year permit.
- Must optimize phosphorus treatment while planning

Discharger chooses alternative

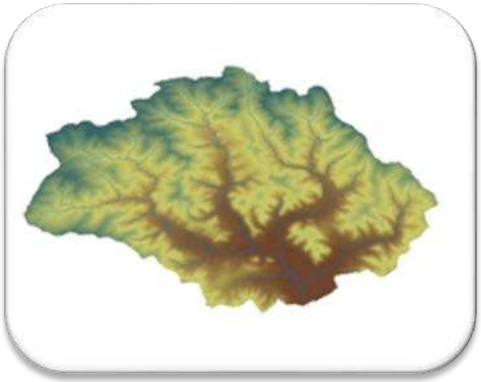
- Treatment
  - required completion 2 to 4 years into the second term
- Water Quality Trading
  - Permit revised to reflect proposed trade with expected implementation in 2 years
- Adaptive Management
  - Permit limit becomes 0.6 mg/l plus….

Trading

- Compliance offsets the phosphorus discharged

Adaptive Management

- Compliance is in the watershed



Both also can provide benefits such as flood retention and habitat improvement.

Water Quality Trading

- Exchange of pollutant reduction credits.
- A buyer with a high phosphorus control cost can purchase phosphorus reduction from a willing seller.
- Can be much more cost effective but must result in a net reduction of phosphorus.

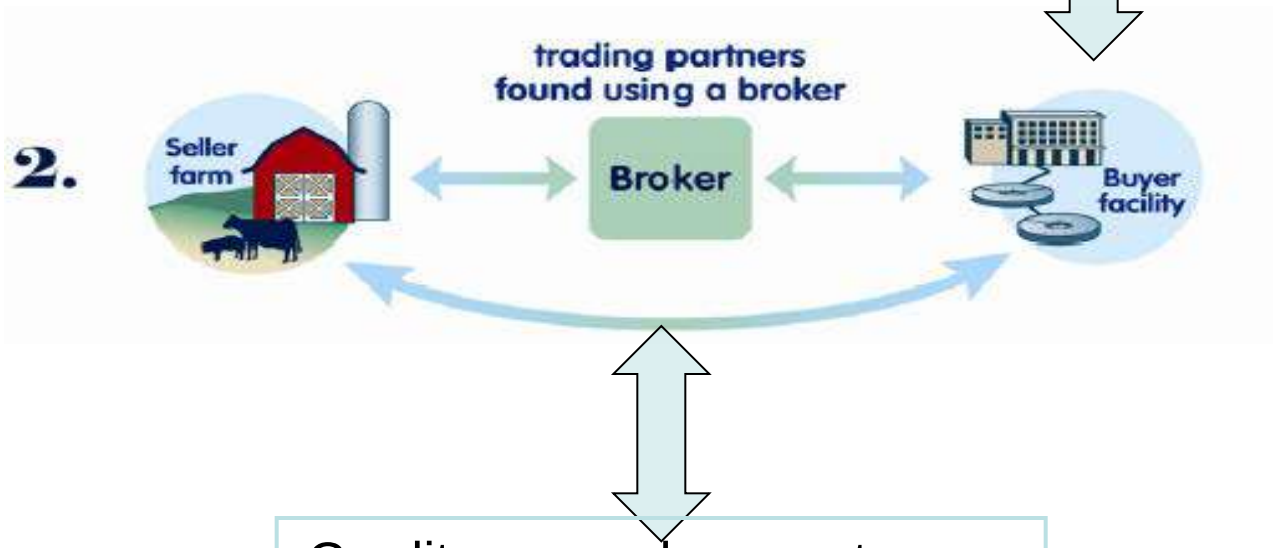
Trade Ratio

- Uncertainty
  - Based on effectiveness and ease of verification of the management practices employed.
- Delivery (distance between generator and user)

Credits must be generated before they are used

Trade Administration

DNR enforces permit



Credit user and generator use a contract.

Adaptive Management Eligibility Requirements

- **Nonpoint sources exceed 50%**
- **Minimum treatment = 0.5 mg/L**
- **Receiving water exceeding water quality criteria**
- **Agree to perform monitoring**

Adaptive Management Expectations

- Develop and implement a plan for watershed improvement
- Goal is attainment of the stream standard
- Up to three permit terms (10 to 15 years)

$ Economic Variance $

- Other options not affordable
- "Widespread social and economic impact"
- Utility cost 2% of Median Household Income
- EPA Approval Required

For more information…

Phosphorus Rule Implementation including Water Quality Trading and Adaptive Management
http://dnr.wi.gov/topic/surfacewater/adaptivemanagement.htmlWater

TMDL Implementation
http://dnr.wi.gov/news/input/guidance.html

Economic variances
http://water.epa.gov/scitech/swguidance/standards/economics/

Red Cedar Water Quality information
http://naturalresources.uwex.edu/redcedar/

Tainter Lake TMDL