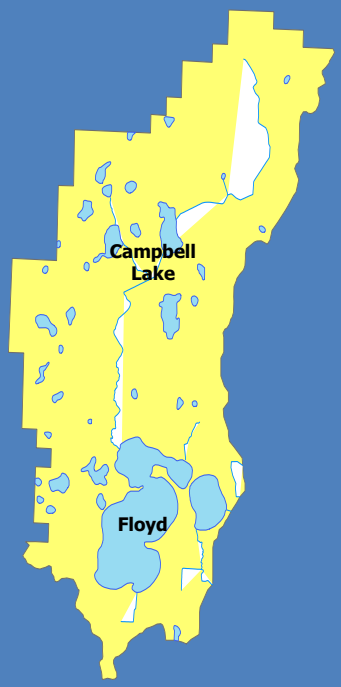
The Floyds Water Quality 2009

Pelican River Watershed District

"Protecting Our Lakes"

Floyd - Campbell Lake Water Quality Management Area:

In terms of water quality Floyd lake (Big Floyd) ranks very high among District Lakes. Most of the time it's water is clear, with moderate phosphorus and algae concentrations, with good game fish populations and moderate plant growth. On the other hand, from a water quality perspective, North Floyd is a significantly damaged lake, suffering poor clarity, high phosphorus and severe algae blooms as a result of heavy loads of phosphorus and sediment entering from Campbell Creek. It also experiences occasional late-summer episodes of internal loading of phosphorus from enriched bottom sediments. Little Floyd is also a direct victim of the Campbell Creek nutrient source because dissolved nutrients and phosphorus-enriched algae flow from North Floyd to Little Floyd.



The District understands that Floyd lakes' water problems are primarily the result of high nutrient and sediment loads from Campbell Creek and its tributaries which drain nutrient-rich wetlands and farm lands through the highly erodible soils of the lower Campbell Creek watershed.

A somewhat lesser problem has to do with upstream practices of dense residential development accompanied by poor shoreline practices, including the removal of natural vegetation, the failure of retaining walls and excessive impervious surfaces (including turf grasses). There is some suspicion that groundwater flows, especially as they relate to individual sewage treatment systems may also be in play.

The District implements strict shoreline impact zone regulations. All alterations to the shoreline requires a permit reviewed by the District Administrator. The District values and encourages the use of native plant shoreline buffer strips to aid in reducing and filtering runoff into adjacent lakes.

The Districts main goal for the Floyds is to prevent further degradation of Big Floyd, and to improve the condition of North and Little Floyd by using these measures:

1. Implement Best Management Practices (BMPs) to reduce peak flows from the Campbell Creek system.
2. Implement BMPs to stabilize Campbell Creek stream banks and other sources of sediment carried to North Floyd.
3. Implement agricultural BMPs in other areas draining to North Floyd and Little Floyd.
4. Monitor and mitigate, if necessary, groundwater migrations involving individual sewage treatment and or those from the county landfill.

PELICAN RIVER WATERSHED DISTRICT

211 Holmes Street West
Wells-Fargo Bank Building, Suite 201
PO Box 1043
Detroit Lakes, MN 56502

Phone: (218) 846-0436 Fax: (218) 846-0778
www.prwd.org

The PRWD Monitoring Program

The PRWD monitoring program is focused on lakes and streams. Measurements on some District lakes are taken monthly during the growing season, others on a biweekly basis. Data collected on lakes include samples tested for phosphorus, ortho-phosphorus, chlorophyll-a and readings of clarity. Conductivity, pH, temperature and dissolved oxygen observations are made at one-meter intervals from the surface to the lake's bottom.

Baseline data has been collected on District lakes since 1995. Starting in 2005 more lakes were sampled, but lakes for which water quality is well understood have been sampled less frequently. More volunteers have been recruited to assist in the District's monitoring, and there is coordination with Becker County COLA's monitoring efforts.

Program Costs

The District's monitoring program derives from the need to understand and address water quality problems for lakes. About $25,000 is expended each year for staff and student intern wages, chemical analysis, equipment and transportation costs

Few District lakes exhibit limitations for swimming or boating as defined by the Minnesota Pollution Control Agency, and only one, Lake St. Clair has been designated as "Impaired". Nevertheless, the District holds its lakes to higher standards. Lake specific goals call for water quality improvements, or at least protection on all lakes. Such goals are to be accomplished by implementing Best Management Practices (BMPs) such as shoreline protection, stormwater runoff controls, or other means.

A routine component of the District's monitoring program involves surveys of shoreline conditions around District lakes. The object is to provide current data on shoreline conditions and to assist in the District's rule-enforcement efforts. Shoreline surveys are repeated for main district lakes on a 5-year schedule.

Stream observations and sampling are conducted on a monthly to biweekly basis, depending on the season and the site. Protocols for storm-event sampling are also in place. Samples are analyzed for phosphorus and sediments. Gage readings provide important information on stream flow which determine patterns of nutrient and sediment inputs to lakes.

Results from nutrient and sediment samples are provided by RMB Environmental Laboratories. Together with other monitoring data, lake and stream conditions are described and summarized by District staff. Trends are identified, as are any special problems on specific lakes or stream segments. Results of these data are reported to state and federal agencies. The District's website contains records of lake levels, water quality data and interpretations, ice-in and ice-out information, climate data, stream flows and loading, and other information. See www.PRWD.org

Describing and Summarizing Water Quality

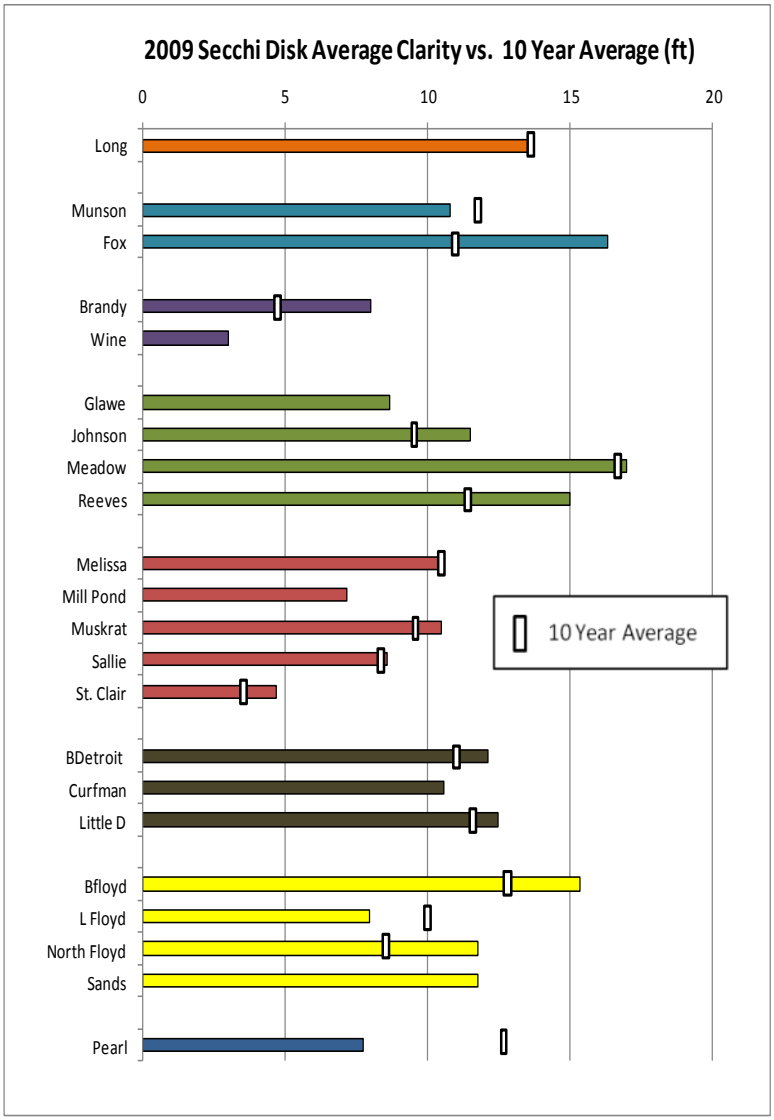
In 2009, the District made slight modifications in its approach to summarizing water quality data for lakes. Previously the three main indicators, clarity, total phosphorus and chlorophyll-a results were indexed in order to characterize a lake's water quality, and to facilitate trend analysis and comparisons among lakes. This index, called the Trophic Status Index (TSI), assumes that there is a high degree of correlation among the three indicator variables, and it is common to use the resultant scaled variables interchangeably or to average them. However, District data shows that the three variables are not always closely related, and that averaging the three disguises some important differences. Henceforth in characterizing lake water quality, the District will look at the variables independently. The District's monitoring program derives from the need to understand and address water quality problems for lakes.

2009 Water Quality Overview

2009 - Lake Water Quality

2009 was an outstanding water quality year — nearly all lakes with a substantial monitoring history showed near– or better-than record conditions. This is the second year in a row that results have been very good. Once again weather conditions are believed to have helped. The spring ice-out date April 23rd, came a few days later than the long-term average, and summer high temperatures were noticeably below the long-term average. Both of these are conditions which help to curtail nuisance algae blooms.

Adding to the favorable conditions, the incidence of runoff events capable of carrying large amounts of nutrients to the lakes were somewhat below average and most of those occurred outside the growing season. The graph indicates that all but three lakes (Pearl, Munson and Little Floyd) exhibited better-than-average clarity. Phosphorus and chlorophyll-a measures generally showed similar better-than-average patterns.



PRWD 2009 Lake and Stream Sampling			
Lakes Sampled	22		
Streams Sampled	17		
Shoreline Surveys	Pearl, Munson, Big Floyd, North Floyd and Little Floyd.		
Lake Secchi Readings	216		
Parameter	**Lake**	**Stream**	**Total**
Total Phosphorus	147	134	281
Ortho Phosphorus	114		114
Chlorophyll A	114		114
Suspended Solids		29	29
Gage Readings		341	341

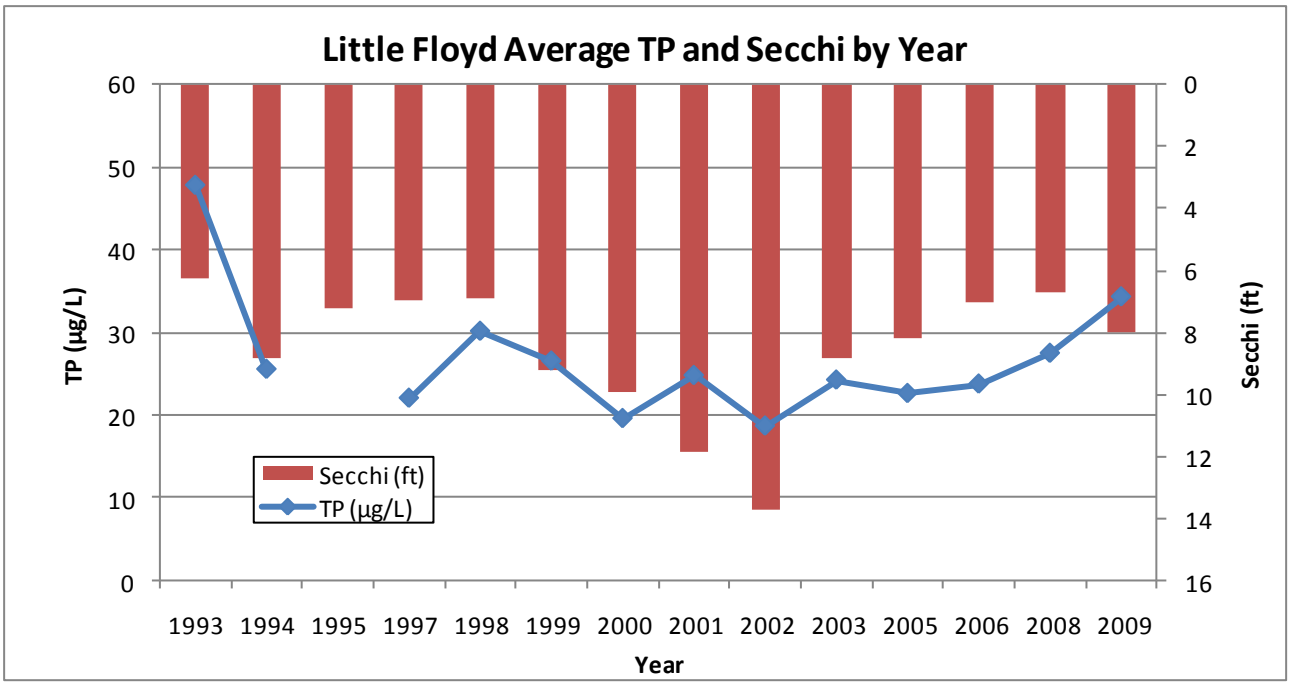
Thanks to 2009 Monitoring Volunteers

Curfman: Ed Welke
Big Floyd: Mark Geihl, Les Froiland
North Floyd: Mark Geihl, James McGough
Little Floyd: Arnold Hilde,
Big/Little Detroit: Dick Hecock
Fox: Sue Portilla
Long: Curt Noyes, Shirley Fihn
Pearl: Ryan Kalberer
Melissa: Clayton Jenson
Sallie: John McLaughlin

The Floyds Water Quality 2009

Over the past ten years or so the water quality of Big Floyd Lake has been roughly stationary. There are years that are better than others, but the District has been able to maintain its goal for Big Floyd of no further degradation. Big Floyd is one of the gems within the District for water quality.

North Floyd on the other hand has had consistently poor water quality, especially over the past few years. In-lake phosphorus levels far exceed District standards; instances and severity of summer algae blooms continue to rise. There is speculation that North Floyd is a source of phosphorus in itself. For decades upstream agricultural sources of nutrients have poured into North Floyd. Bottom sediments have become enriched with nutrients and under certain circumstances the sediments give off phosphorus into the water column. As many have witnessed during turn over, as the water mixes and comes into contact with sunlight, severe algae blooms occur.



Little Floyd appears to be declining in water quality recently as well; however, it may be a cyclical pattern as seen in the graph above. Current conditions are similar to conditions in the early 1990s when phosphorus levels were high and clarity was poor. North Floyd is a source of nutrients to Little Floyd, but there is no evidence of recent increases in nutrient exports from North Floyd to Little Floyd. Other possible sources of nutrients effecting Little Floyd may be related to high spring runoff from snowmelt, shoreline development, internal nutrient loading and septic systems.

This District is currently working with the Natural Resource Conservation Service to assess the current BMPs within the Campbell Creek watershed area. An inventory is being made and research is being conducted to further assess the needs for additional BMPs. This will most likely result in a greater focus on buffer strips along portions of Campbell Creek. Buffer strips help to filter out agricultural run off from adjacent fields. In the future more BMPs will need to be in place within the watershed area as well as possible in-lake treatments for North Floyd may be required to improve water quality.