

PELICAN RIVER

watershed district



50

1966-2016

Protecting Water Quality

2016 ANNUAL REPORT

Pelican River Watershed District

This Annual Report provides background information on the District's programs, activities and finances for 2016. The District continued its mission with activities in data collection, installation of best management practices to reduce pollutants, water management regulations and permits, lake management planning, education and outreach, ditch management and general operations administration .

In June, the District was pleased to learn that they would receive funding in the amount of \$1.5 million from the BWSR Targeted Clean Water Funds Grant for the Rice Lake nutrient reduction project. The District will have three years to complete this project. Work was completed in the fall of 2016 on the Drainage Ditch Inventory Grant.

Invasive species continue to be a focus of the District. In May, Curly-leaf pondweed was chemically treated for the first time, rather than continue to use the harvester to remove the plant from area lakes. The treatments were counted as a success. The chemical treatment of Flowering Rush also continued, however, due to reduced plant populations, there were less treatment sights in 2016. Zebra Mussels were confirmed in Detroit Lake and Sallie in August and September respectively. The District continues to consider possible management options in regard to these mussels. Administrator, Tera Guetter, served as Chairperson on the Minnesota Department of Natural Resources (MN DNR) Advisory Committee addressing invasive plants and animals issues. She also serves on the University of MN Aquatic Research Center Advisory Committee and grant selection committee.

Scientists are noting 2016 as the warmest on record, and locally there was evidence of this as Detroit Lake experienced 254 days of open water, the longest in recorded history. There were several large rain events in July and area lake levels rose significantly and remained high until freeze up in December.

The Revised Management Plan, which includes all avenues of the District's work and spans a ten year period, continued to be developed in 2016 and should be complete in early 2017.

This 2016 Annual Report is submitted to the Board of Water and Soil Resources, the Commissioner of the Department of Natural Resources, and the Director of the Division of Waters. Copies are available on line and in the District office.

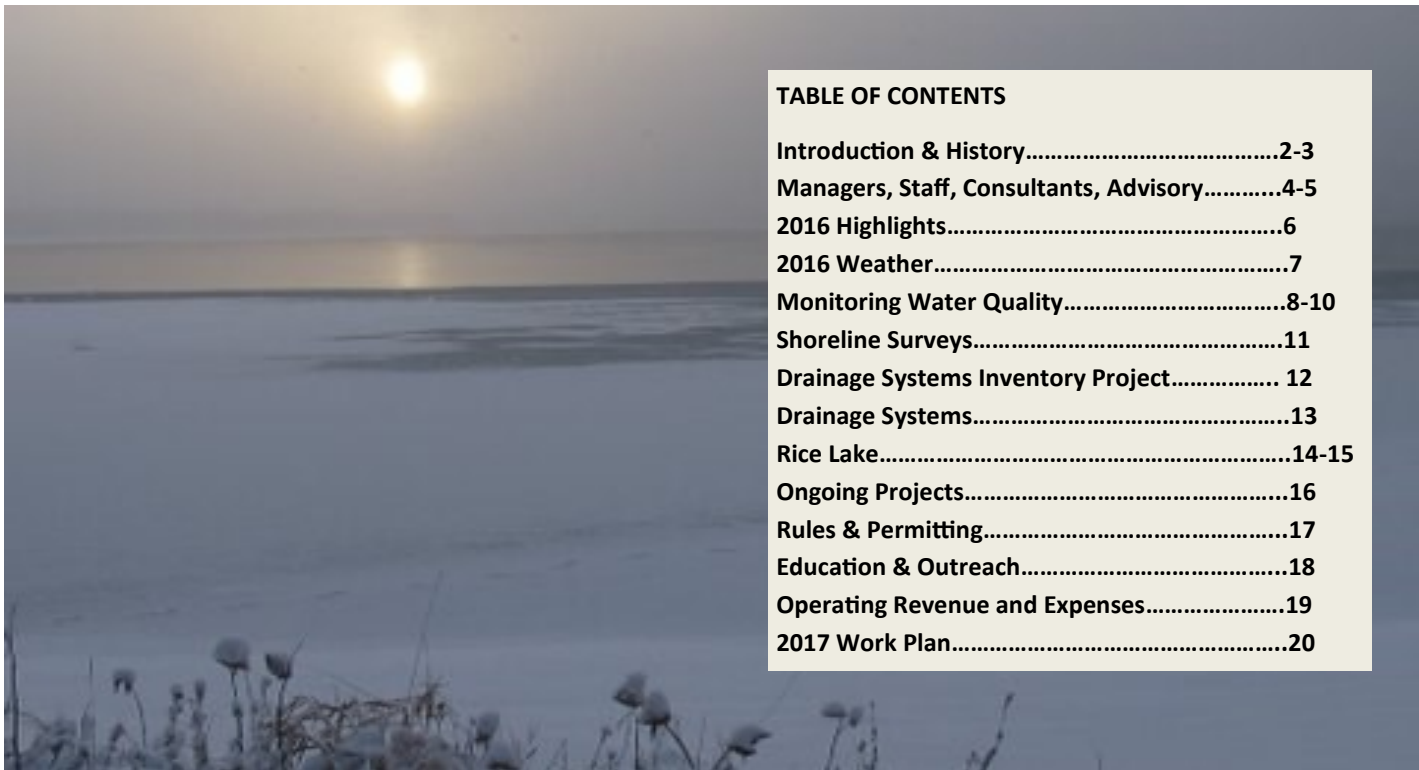


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Celebrating 50 years of Water Quality

In 1965, both the Melissa and Sallie Improvement Association and the Lake Detroiters, advocated for a governmental unit that would be able to address lake problems. Dr. Tom Rogstad, President of Lake Detroiters, led a delegation to St. Paul to seek enabling legislation that would make it possible to create a local government unit for the purposes of “finding causes and solutions for lake eutrophication problems”. They learned that a watershed district created under the auspices of the State’s 1955 Watershed Act, would serve the purpose if that Act was slightly amended to allow lakes and the lands that drained to them, to be defined as a watershed. The necessary amendments were enacted, and the PRWD was the first watershed district to organize under the amended law.

In September, 1965, a copy of a petition asking for the creation of the Pelican River Watershed District was filed with the Minnesota Water Resources Board. The petitioners, seeking to slow down the eutrophication of the lakes, were the Becker County Commissioners. After public meetings and discussion where local officials and the business community offered strong support, the petition was amended slightly and submitted by both the Becker and Otter Tail County Commissioners.

The proposed boundaries of the District were reviewed in detail and modified by the Director of the Division of Waters. This process was based on existing maps and detailed field surveys in the fall of 1965 and winter of 1966.

On March 30, 1966 the Water Resources Board held a hearing at the Becker County Courthouse. The Director’s report was presented and oral testimony on it and other matters was heard. At the May 27th meeting of the Water Resources Board, the Pelican River Watershed District, as previously defined and delimited by the Director, was ordered. The order specifically noted that addressing pollution would be central to the District’s mission. It also noted that navigation, soil erosion, and fish and wildlife enhancements would be District purposes.



Approximately 150 guests attended the celebration.

The official order also appointed Thomas Rogstad, DeWitt Clason, John Given, Clem Hagerty, and Donald Eugene Johnson to one-year terms as managers of the new District.

To mark the occasion of the 50th Anniversary of the District, current board members Curt Noyes and David Brainard, former Administrator Dick Hecock, and Office Coordinator Brenda Moses, began planning early in the year. A 50 year historical booklet was printed and memorabilia was ordered. An Open House was planned and held on August 10th, 2016 at the Detroit Lakes Pavilion. Local vendors and agencies set up information booths, representatives from local government agencies spoke and recognized the accomplishments of the PRWD, and pork sandwiches and refreshments were served. The guests included Becker County Commissioners, Detroit Lakes City Council members, area lake association representatives, former board members and staff, as well as other local people who wanted to help us celebrate this milestone.



Current President, Dennis Kral speaking at the 50th Anniversary celebration

The first board of directors of the newly-formed Pelican River Watershed District was organized Monday, June 13, at a meeting in the Graystone Manor in Detroit Lakes.

Directors, reading left to right, are: Clem Hagerty; Donald E. Johnson, treasurer; Dr. T. A. Rogstad, president; J. N. (Jack) Given, secretary, and DeWitt Clason. All are from Detroit Lakes.

The men were named to one-year terms by the Minnesota State Water Resources Board,

according to George Loughland of Golden Valley, chairman of the state board.

According to legal description, the general purpose of the watershed district is to “conserve and make provident use of waters and other natural resources, to reduce the pollution of the waters of the Pelican River Chain of lakes, to slow down the eutrophication of the lakes.”

“To regulate the water levels in the Pelican River Chain of Lakes, to enhance their rec-

reational facilities, and to protect and improve the scenic beauty thereof.

“To improve the needed drainage, to provide needed soil and water conservation practices on the land; and for other purposes as found in the Minnesota Watershed Act, pursuant to the provisions of Minnesota Laws of 1955, Chapter 799, as amended.”

The area involved in the district is about 131 square miles in both Becker county and Otter Tail county.

Board of Managers

The Board of Managers holds their regular meetings on the third Thursday of the month at 6:15 p.m. at the Wells Fargo Bank Building, second floor conference room located at 211 Holmes St. West, Detroit Lakes, MN. All meetings are open to the public. The Becker County Board of Commissioners appoint the managers to 3-year terms.

2016 Managers	E-mail Address	Subwatershed	Service From	Term Expires
Dennis Kral, President	dskral@arvig.net	Big Floyd	1988	2019
Rick Michaelson, Treasurer	modern@arvig.net	Sallie	2013	2019
Janice Haggart, Manager	Janice.haggart@ndsu.edu	Muskrat	2005	2019
Orrin Okeson, Vice-President	okesonov@q.com	Campbell	1988	2018
David Brainard, Secretary		Long	1999	2018
Ginny Imholte, Manager	imholtegl@gmail.com	Big Detroit	1991	2017
Curt Noyes, Manager	Noyes.curtis@yahoo.com	Long	2015	2017



BWSR Board Conservationist, Brett Arne, center, presents a plaque on the occasion of the District's 50th anniversary celebration in August 2016. Staff and managers from left to right: Brent Alcott, Orrin Okeson, Curt Noyes, Ginny Imholte, Arne, Dennis Kral, Janice Haggart, Rick Michealson, Tera Guetter, and Brenda Moses. Not pictured: David Brainard

Marlon Mackowick, District Engineer	Wenck Associates	3303 Fiechtner Dr., Suite 100 Fargo, ND 58103	Ph: (701) 297-9600 mmackowick@wenck.com
Todd Shoemaker, District Engineer	Wenck Associates	1802 Wooddale dr., Suite 100 Woodbury, MN 55125	PH: (651) 294-4585 tshoemaker@wenck.com
Karen Skoyles Attorney	Ramstad, Skoyles & Winter PA	114 West Holmes St. Detroit Lakes, MN 56501	PH: (218) 847-5653 skoyles@arvig.net
Tami Norgard Attorney	Vogel Law Firm	218 NP Ave. No. Fargo, ND 58102	PH: (701) 237-6983 tnorgard@vogellaw.com

PRWD Staff

Tera Guetter, District Administrator

Tera joined the District in 1999 as the Assistant Administrator and has been in the Administrator position since 2000. She holds a degree in geology and has post-graduate training in hydrology, limnology and management. She was raised in Mahanomen County.

Brent Alcott, Assistant Administrator

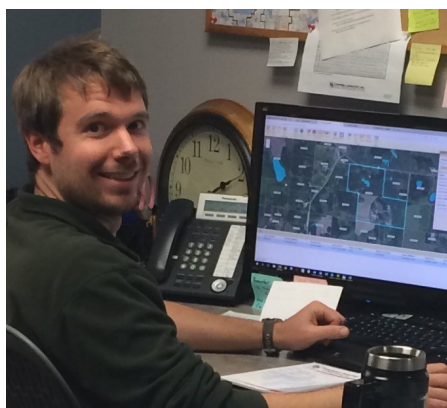
Brent joined the District staff in September 2014. He studied Biology at the University of MN Duluth. He is originally from the Big Lake, MN area.

Brenda Moses, Office Coordinator

Brenda is originally from the Wahpeton, ND area and attended NDSCS studying office management. She joined the PRWD staff in February 2013 shortly after relocating to Detroit Lakes.



Intern Kelsey Forward, and Administrator Tera Guetter, prepare a display for the 50th anniversary celebration.



Assistant Administrator Brent Alcott reviewing data at the office.



Office Coordinator Brenda Moses with 4th graders from Rossman Elementary during Water Festival presentations.

Seasonal Staff

Terry Anderson & Rob Kiihn conducted the Aquatic Roadside pick up program in 2016. They work from May—September picking up vegetation that property owners have picked up off their shores on Sallie, Melissa, Detroit and Curfman lakes.

Tyler Haaland-Zurn & John Kempe worked as student interns from May—August with focus on water quality monitoring.

Kelsey Forward, a graduate student, worked from May—August developing a data base for the Permit Program, as well as working on reports for the Revised Management Plan.

Advisory Committee

John Postovit, 20344 Co. Rd. 131, Detroit Lakes, MN 56501, (218) 847-1165

Rodger Hemphill, DNR Hydrologist, 14583 County Hwy 19, Detroit Lakes, MN 56501, (218) 846-8484

Peter Mead, Becker SWCD, 809 8th St. S. E., Detroit Lakes, MN 56501, (218) 846-7360

Brad Green, City of Detroit Lakes, 1023 Roosevelt Ave., Detroit Lakes, MN 56501 (218) 846-7145

Tim James, MPCA, 714 Lake Ave., Detroit Lakes, MN 56501, (218) 846-0749

John Okeson, County Commissioner, 13167 W. Lake Sallie Dr., Detroit Lakes, MN 56501, (218) 847-6244

Richard Hecock, 633 North Shore Dr., Detroit Lakes, MN 56501, (218) 847-6052

2016 Highlights

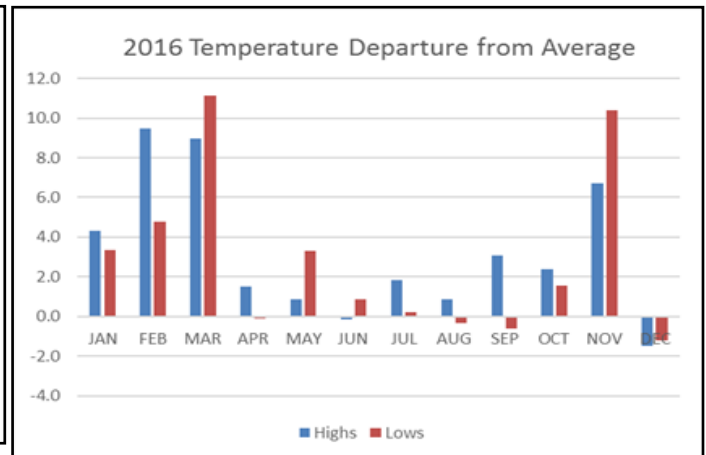
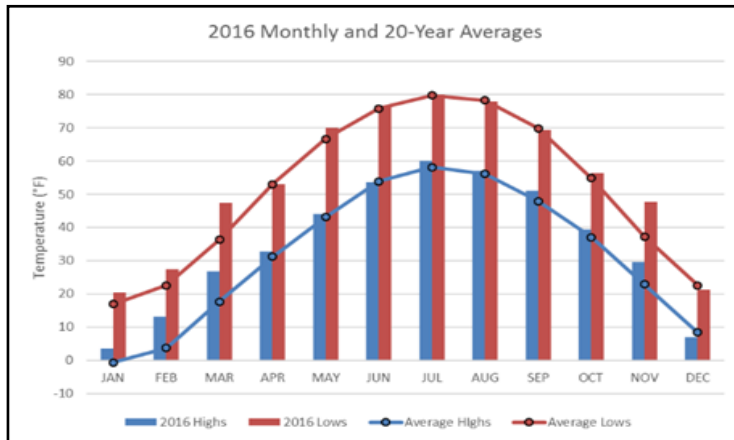
January	<ul style="list-style-type: none"> • Wenck Engineering retained to assist on the Revised Management Plan • Permit Applications and Fees updated • Guetter reappointed to MN DNR AIS Advisory Committee
February	<ul style="list-style-type: none"> • Alcott presents 2016 Lake & Stream Monitoring plan to Board of Mangers • Staff developing a booklet featuring the theme “Clean Water Starts with Me” • Staff applies for MN DNR AIS control Grant for Flowering Rush & Curly Leaf Pondweed.
March	<ul style="list-style-type: none"> • Staff submits interest proposal for BWSR Targeted Watershed Grant • District received the 2015 Flowering Rush Research Report from Mississippi State • Guetter testifies at Becker County public hearing involving ordinance revisions
April	<ul style="list-style-type: none"> • Guetter interviewed with the Clean Water Targeted Watershed Grant Committee. • District receives the City of Detroit Lakes draft of Shoreland Ordinance Revisions • Summer Intern, Kelsey Forward, hired to work on GIS database and permits
May	<ul style="list-style-type: none"> • As part of the Ottetail Basin WRAPS process, Guetter selected to participate in leadership training. • MN DOT & PRWD hold annual meeting to discuss upcoming projects. • John Kempe, Bemidji State University and Tyler Haaland-Zurn, U of M Duluth hired as student monitoring interns • District participates in City of Detroit Lakes Water Festival, Ike Fischer Farm Tour, and Becker COLA field trip as part of their education mission • First chemical treatment of Curly leaf pondweed administered on district lakes
June	<ul style="list-style-type: none"> • Rob Kiihn hired to assist with the Roadside pick up program • The District was notified by BWSR that they would be awarded grant for nutrient reduction on Rice Lake in the amount of \$1.5 million. • Flowering Rush delineated to determine chemical treatment areas for 2016 • Informational meeting held with Fox Lake residents
July	<ul style="list-style-type: none"> • Grant Agreement and Project Work Plan submitted to BWSR for Rice Lake Nutrient Reduction Project. • Staff speaks at Lake Association meetings and interns set up booth at the Becker County Fair • The first Flowering Rush treatment of the season is administered in district lakes..
August	<ul style="list-style-type: none"> • Alcott assisted the City of Detroit Lakes with a Clean Water Fund Grant application for stormwater improvement projects. • After high rain events it is determined that the BMPS on Campbell Creek are reducing nutrient inputs. • Guetter attended tour of Lake Koronis to view starry stonewort infestation. • District celebrates 50th anniversary at the Detroit Lakes Pavilion.
September	<ul style="list-style-type: none"> • Staff continues to work with City of DL on their Shoreland Ordinance update • Zebra mussel infestation documented in Detroit Lake. Guetter in touch with U of MN AIS Research to discuss options. District supports community meeting to discuss implications. • Flowering Rush plant surveys and core samples completed for the year.
October	<ul style="list-style-type: none"> • MPR News does feature story on District’s Flowering Rush research and success. • Guetter attends 2016 Aquatic Invaders Summit in St. Cloud, MN • Annika Merkens, DL High School Senior, shadows with District staff • Monitoring equipment collected and repaired and 2016 data is being reviewed.
November	<ul style="list-style-type: none"> • Alcott completes Ditch inspections for BWSR Drainage Grant and information sent to Becker SWCD to be rendered into AUTOCAD drawings. • District continues to battle beavers on ditch systems • Staff meets with City of DL staff and Becker SWCD Staff to review progress on Hwy 10 Overlook site in 2016 and review 2017 projects.
December	<ul style="list-style-type: none"> • Staff working with City of DL and Becker County to host a Contractor Training Seminar in February 2017. • Staff has developed a Cost Share Program for plants in raingardens and in shoreline projects. • Staff working with City of DL on Conservation Corps Grant to be used on projects in Detroit Lakes.

2016 Weather and Water Quality Influences

Weather patterns have a strong effect on local water resources. Precipitation has one of the strongest influences; creating storm water runoff that can deliver sediment and nutrients to the streams and lakes, resulting in decreased water clarity and increased algal growth. Higher precipitation amounts can also rapidly increase water levels in local lakes and streams causing shoreline and streambank erosions. Extended periods of warm air temperatures can increase lake water temperatures facilitating increased algal growth.

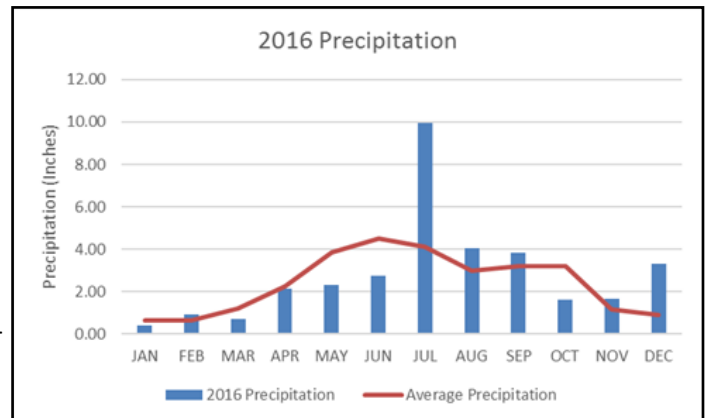
Temperature

2016 was the warmest year recorded, with average highs and lows both about 3 degrees above average (51 and 32 degrees). February and March were the warmest months of the year, both 9 degrees above the average high, 13 degrees and 27 degrees, respectively.



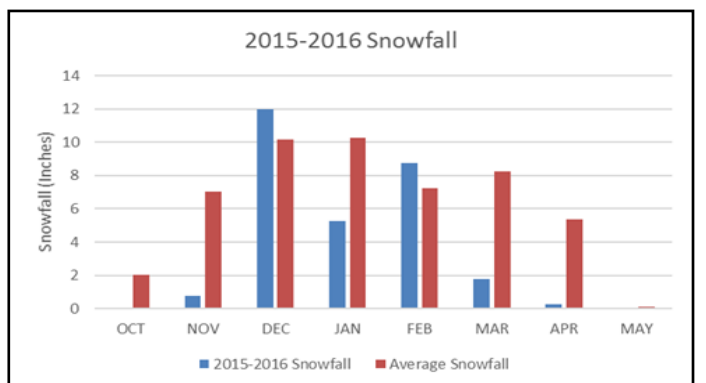
Precipitation

Prior to a near record setting amount of rainfall in July, the area had a relatively dry spring with a 4 inch rainfall deficit prior to the July rains. A significant rain event spanning several days, July 10-12, ended the rainfall deficit with 4.9 inches of rain recorded at the KDLM radio station. During the same storm event, PRWD rain monitoring equipment, located on Campbell Creek at Co Rd 149, measured 6.8 inches during the same time period. This shows the amount of variability of rainfall with less than 4 miles between the stations. The rainfall total in July was nearly 10 inches, 5.8 inches greater than the monthly average. The above average monthly rainfall trends continued through September. The most notable rain event, other than the July event mentioned earlier, occurred on the early morning of August 29. PRWD rain monitoring equipment observed a rain event that began at 12:02am and ended at 1:18am. Within that 1 hour and 20 minutes, 3.6 inches of rain was recorded at the PRWD Campbell Creek station.



Snowfall

Snowfall totals during the 2015-2016 winter season also added to the precipitation deficit observed in the early part of 2016, with only 28.75 inches of snow recorded, compared to the 50.5 inch average, with only 2 inches falling in March and April. The beginning for the 2016-2017 winter season began much different than the previous year, with a nearly record setting snowfall amount of 21.8 inches (10.2" average) in December 2016.

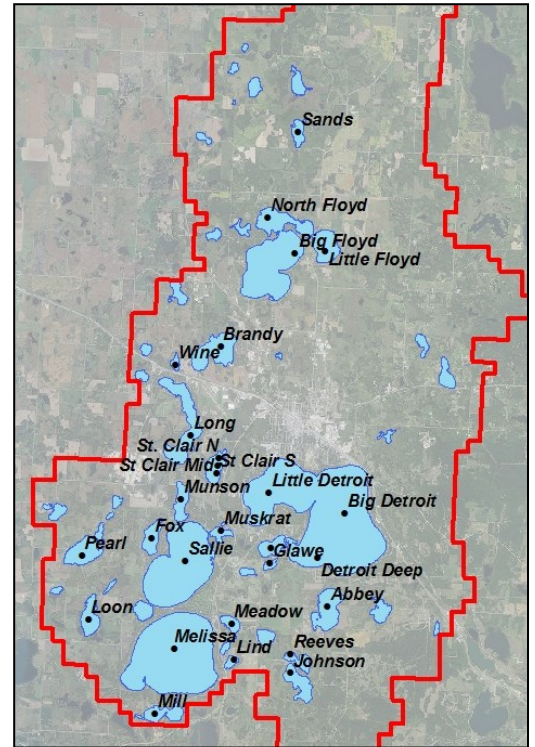


Monitoring Program

Water quality is the core component of the Pelican River Watershed District's mission, it relates to the creation of the District and ultimately to all decisions, activities and rules implemented by the District. Central to overseeing water quality is our monitoring program of all District lakes and streams.

District lakes have been prioritized based on economical and environmental value, as well as their phosphorous sensitivity. They are monitored on a rotating schedule, ensuring that all priority lakes are sampled a minimum of three years within a 10-year period. In 2016, 19 stream sites were routinely monitored for water quality, water levels, and stream base flow. Additional storm samples help capture information to better understand each stream system. Rating curves are created for several locations where chemistry data can be linked to stream flow to predict annual sediment and phosphorous loads. Rain gauges and contiguous water level logging equipment help to understand stream response to rain events and record high water conditions.

The District has all water samples analyzed by RMB Laboratories in Detroit Lakes. The table below shows the samples that were analyzed in 2016. The total cost of water testing was \$7,141.



2016 Samples	Total Phosphorous	Orthophosphate	Chlorophyll-a	Suspended Solids	Secchi Readings	Stream Gage Readings
Lake	76	76	76	-	76	-
Stream	115	115	-	60	-	203



Summer Interns

Two college interns are hired each year to assist with the monitoring program.

Tyler Haaland-Zurn, a geology student from the University of Minnesota Duluth, and John Kempe, studying biology at Bemidji State University, joined the PRWD staff for the 2016 season.

In addition to collecting water samples and other data on 18 lakes and stream sites, the interns conducted shoreline surveys on Floyd and Little Floyd Lakes and assisted with the Flowering rush research project by taking hundreds of core samples and measuring Flowering rush stem densities.

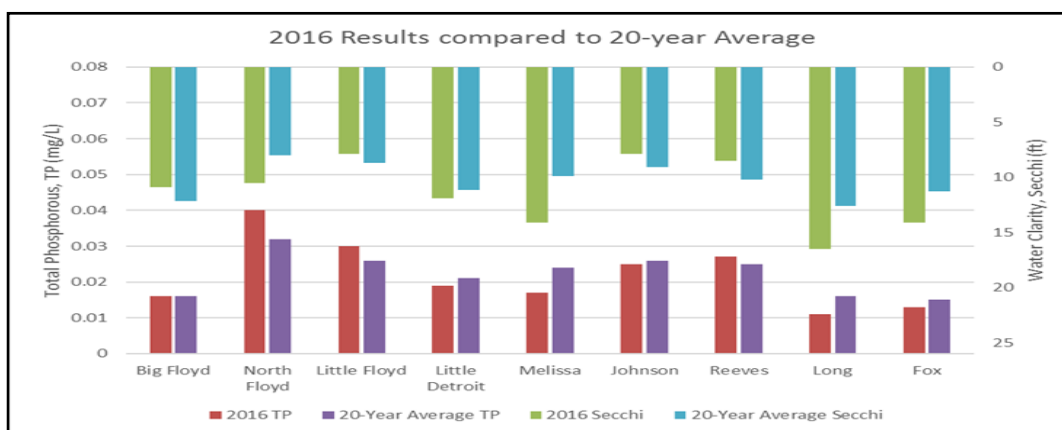
Tyler and John also assisted with the District's booth at the County fair and with the PRWD 50th Anniversary Celebration at the Pavilion.

Water Quality

Phosphorous is the primary nutrient of concern in lakes within the Pelican River Watershed District. Because high levels of phosphorous provide more nutrients for algal growth, it is important to closely monitor levels throughout the District. Development in urban and agricultural areas can cause this nutrient to enter lakes and rivers at increased rates. Storm water runoff from impervious surfaces that can flush grass clippings, pet waste, sediment, and fertilizers into storm drains and our lakes and rivers, negatively impact water quality due to the phosphorous they contain.

2016—A good year for water quality

Most District lakes experienced better than average water clarity due to little precipitation and runoff through mid-July, but experienced declines in water quality after the mid-July high rainfall event which flushed untreated storm water runoff into the lakes. Even with the late season water quality declines, the overall (May—September) water clarity and phosphorus averages for most lakes remained above average compared to the 20-year average, with the exception of Big Floyd, Little Floyd, Johnson, and Reeves lakes, which remained below their 20 year water clarity and phosphorus averages.



Overall Lake Conditions

A common method for classifying the overall condition of a lake is with the use of the Trophic Status Index (TSI). With this method, lakes are classified on a scale to increasing productivity (increasing algal growth, decreasing clarity). The results of the TSI analysis on the 2016 monitoring data show that PRWD lakes are predominantly mesotrophic (TSI 40-50), or moderately rich in nutrients. Some lakes are very near or just beyond the eutrophic threshold, or considered to be high in nutrients. The only exception is St. Clair Lake, which contains excessive nutrients and has been designated by the Minnesota Pollution Control Agency as an impaired lake.

2016 TSI Results	TSI (Phosphorous)	TSI (Clarity)	TSI (Chlorophyll)	TSI Average
Big Floyd	44.1	42.7	45.4	44.1
North Floyd	57.3	43.2	54.7	51.8
Little Floyd	53.2	47.3	52.3	50.9
Little Detroit	46.6	41.4	44.0	44.0
Melissa	45.0	39.0	41.0	41.7
Johnson	50.6	47.3	49.8	49.2
Reeves	51.7	46.3	51.8	49.9
Long	38.7	36.7	43.2	39.5
Fox	41.1	39.0	41.7	40.6
St. Clair	66.4	66.4	67.5	66.8

< 30	Oligotrophic; clear water; high DO throughout the year in the entire hypolimnion
30-40	Oligotrophic; clear water; possible periods of limited hypolimnetic anoxia (DO =0)
40-50	Moderately clear water; increasing chance of hypolimnetic anoxia in summer; fully supportive of all swimmable/aesthetic uses
50-60	Mildly eutrophic; decreased transparency; anoxic hypolimnion; macrophyte problems; warm-water fisheries only; supportive of all swimmable/aesthetic uses but "threatened"
60-70	Blue-green algae dominance; scums possible; extensive macrophyte problems
70-80	Heavy algal blooms possible throughout summer; dense macrophyte beds; hypereutrophic
> 80	Algal scums; summer fish kills; few macrophytes due to algal shading; rough fish dominance

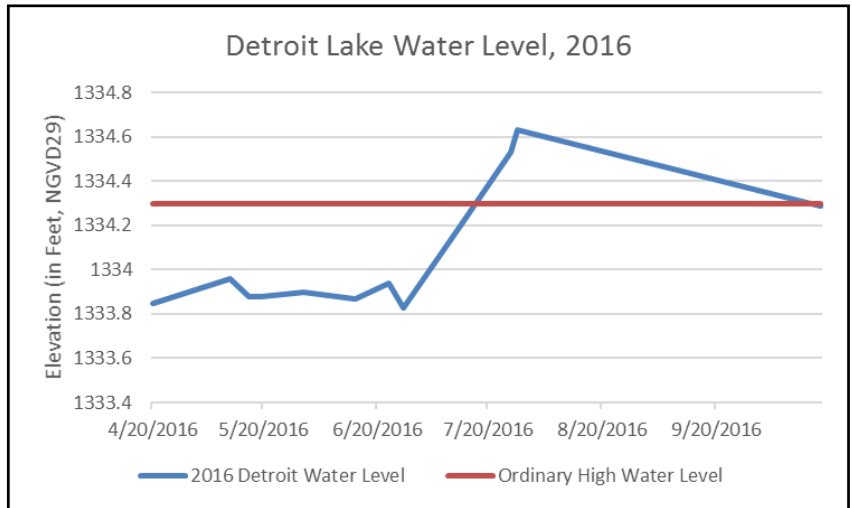
2016 Water Trends

The varying weather and precipitation patterns also impacted lake water levels in 2016.

Lake Level Fluctuations

Below average spring rains along with decreased snowfall levels leading into 2016, resulted in low springtime lake levels for District lakes. Detroit Lake was nearly one foot below the ordinary high water (OHW) level in May.

Low lake water levels continued into early July until rebounding nearly a foot after the heavy mid-July rains, reaching its maximum water level in 2016 at only .3 feet above the OHW level.

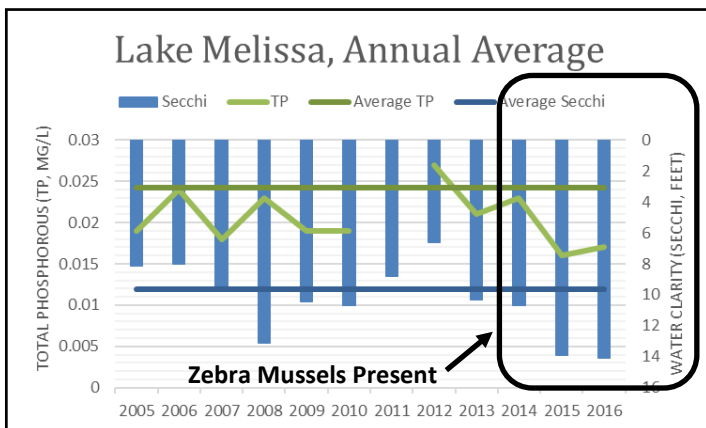


AIS Ecological Changes

In June 2014, Melissa became the first District lake to be placed on the Minnesota Department of Natural Resources infested waters listing for Zebra Mussels (ZM) with Detroit and Sallie lakes to follow in August of 2016. Alcott and the summer interns assisted the MN DNR with the investigation to determine the extent of the ZM infestations. The ZM infestations on both Detroit and Sallie were widespread as they were found on docks and lifts around the lakes. On Big Detroit, they were found along most of the southeast corner to the north side.

It is not known what the long term impact Zebra mussels will have on our area lakes, as little is known how they affect inland lakes. Most study work to date is on the Great Lakes system. We do know ZM's feed on certain types of plankton, which are also important food sources for fish and other aquatic species. The increased competition for plankton food, results in stripping the water column of good algae and artificially increases the lake water clarity, usually achieved by lowering phosphorus inputs. With clearer water, increased sunlight and phosphorus-fertile sediments will encourage denser aquatic plant growth in shallower areas as well as into water depths with previously little to no vegetation present. This phenomena also forces light sensitive fish, such as walleye, to move into different areas of the lake, changing the location and makeup of their aquatic habitat.

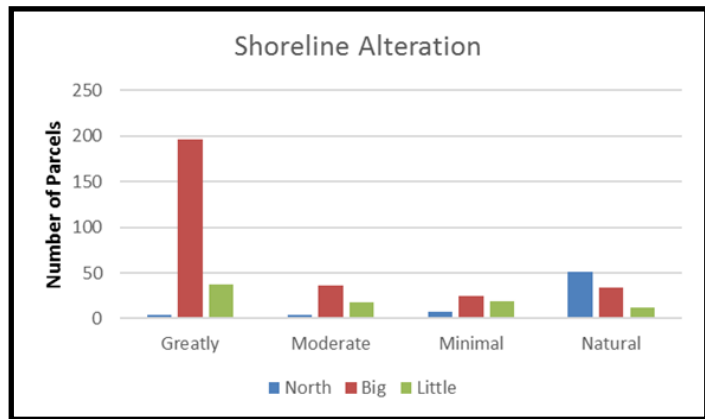
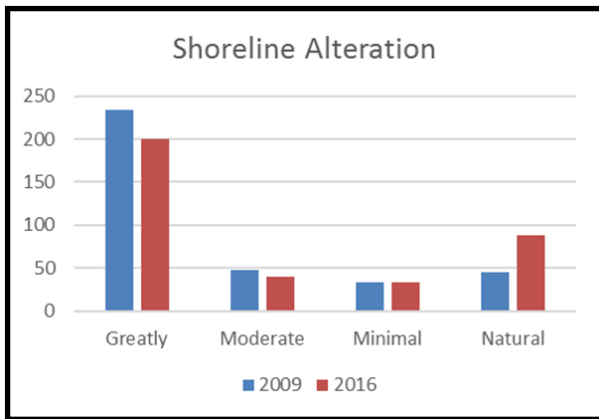
The effects of the zebra mussel filtering on Lake Melissa are beginning, with water clarity readings at nearly high records for both 2015 and 2016. The University of MN, Aquatic Invasive Species Research Center is currently studying the effects of ZM on the Lake Mille Lacs ecosystem and fisheries. The District will continue it's monitoring program and assessment.



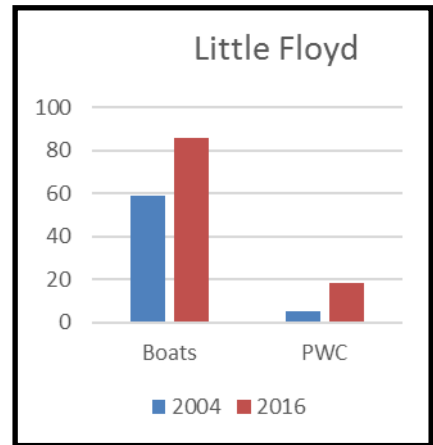
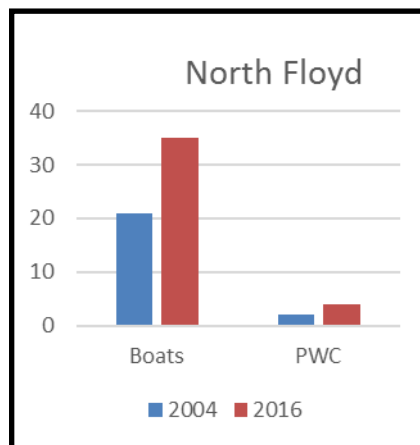
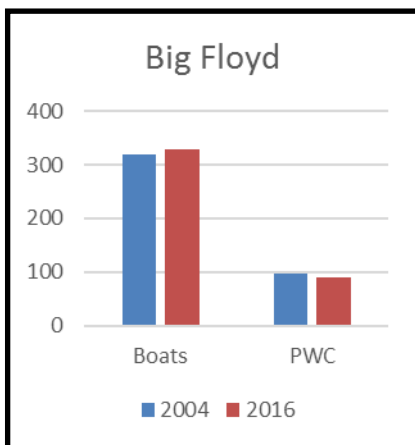
Shoreline Surveys

PRWD conducts periodic assessments of the land use, lake use, and level of shoreline alteration on lots on District Lakes. In 2016, District staff completed surveys of “Big” Floyd, “North” Floyd and “Little” Floyd. Each parcel was documented for shoreline alterations, the use of the Shore Impact Zone (SIZ), and the amount/type of waterfront equipment. The amount of altered shoreline was documented into four categories, Natural Condition, Minimally Altered, Moderately Altered, and Greatly Altered.

In 2016, “North” Floyd parcels were observed having altered shorelines (minimal, moderate, or greatly) at 24% of the sites, compared to “Big” Floyd at 88% and Little Floyd at 86% altered shorelines. The previous survey, completed in 2009, did not separate the lakes into two separate waterbodies. To compare the change over time, the results from the 2016 survey on “Big” and “Little” Floyd were combined as they were in 2009. The amount of greatly altered shoreline declined by 34 parcels between 2009 and 2016. On the other side, natural shorelines increased by 43 parcels. Moderately and Minimally altered shorelines remain very similar. The significance of this may vary due to the high level of interpretation of shoreline alteration. Protocols should be established to ensure a more consistent interpretation of the shoreline conditions.



Monitoring and documenting the type and quantity of waterfront equipment is the method that was used to observe the change in lake use over time. The information in the graph to the right shows the type of equipment that was observed per parcel on Floyd and Little Floyd. By comparing the quantity and type of equipment, assumptions can be made as to lakeshore owners use. It is apparent that Little Floyd and Big Floyd are more heavily used, with 90% of the parcels having docks. There is a positive correlation with the level of shoreline alteration and the amount of equipment per parcel. The amount of water boats and personal water craft were compared to the 2004 survey. The 2009 survey was not used in this comparison because the survey was done in late October when many of the boat had already been removed from the lake. The results of the comparison are shown below.





Drainage System Inventory Project

CLEAN WATER LAND & LEGACY AMENDMENT

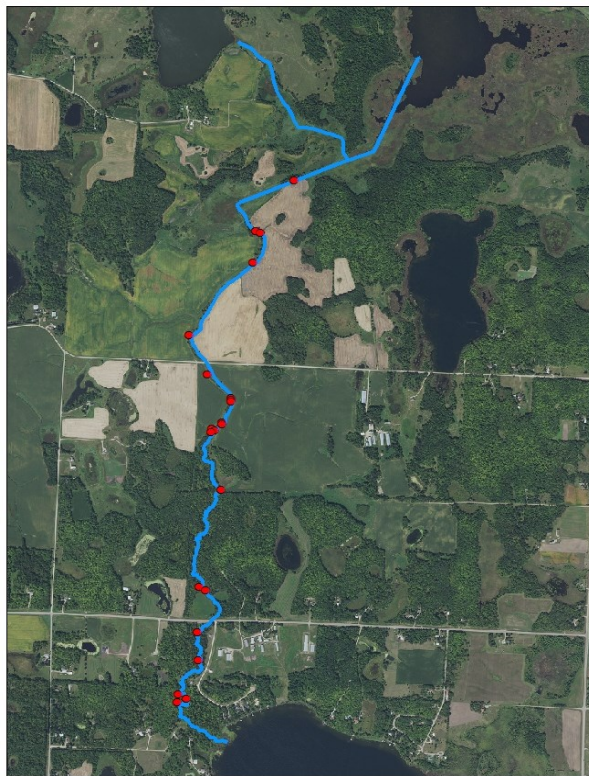
During the 2015 and 2016 seasons, the District conducted an extensive inventory of the four public drainage ditches within its jurisdiction—Becker County Ditches 11, 12, 13, and 14.

Funded by a Clean Water Land & Legacy Grant, the project aim was to develop a GIS based inventory of the current ditch conditions, including culvert elevations and locations, buffer width, areas of erosion, and adjacent land use.

The inventory results will help the District and the Becker Soil and Water Conservation District to target and prioritize areas for future best management practices and restoration.



Area for Potential Restoration and Resource Protection Efforts



PELICAN RIVER
watershed district

Ditches 11&12, also known as Campbell Creek, located north of Floyd lake, had a few areas along the ditch system with “improvement potential” for sediment and phosphorous reductions (see map), mainly along Ditch 12, in the downstream wooded area where severe streambank erosion was noted in multiple areas. There was only one potential location in the cultivated area for improvements as this area had extensive installations of best management practices completed in 2011 and 2012. The report also noted various beaver activity that had caused localized flooding and vegetation loss in certain areas.

On Ditch 13 and 14 there were no “improvement potential” areas identified, only beaver dams or debris were noted which are addressed through the drainage system maintenance. Most of Ditches 13 & 14 run through wetland areas or through the City of Detroit Lakes urban area.

The inventory results were sent to landowners with “improvement potential”. The District received positive landowner feedback indicating a high interest in working with the District and Becker Soil and Water Conservation District to implement improvements on their lands. Over the next year, PRWD staff will assist with prioritizing and applying for grant funding to help with the restorations.



Drainage Systems

Becker County Ditches 11,12,13, 14

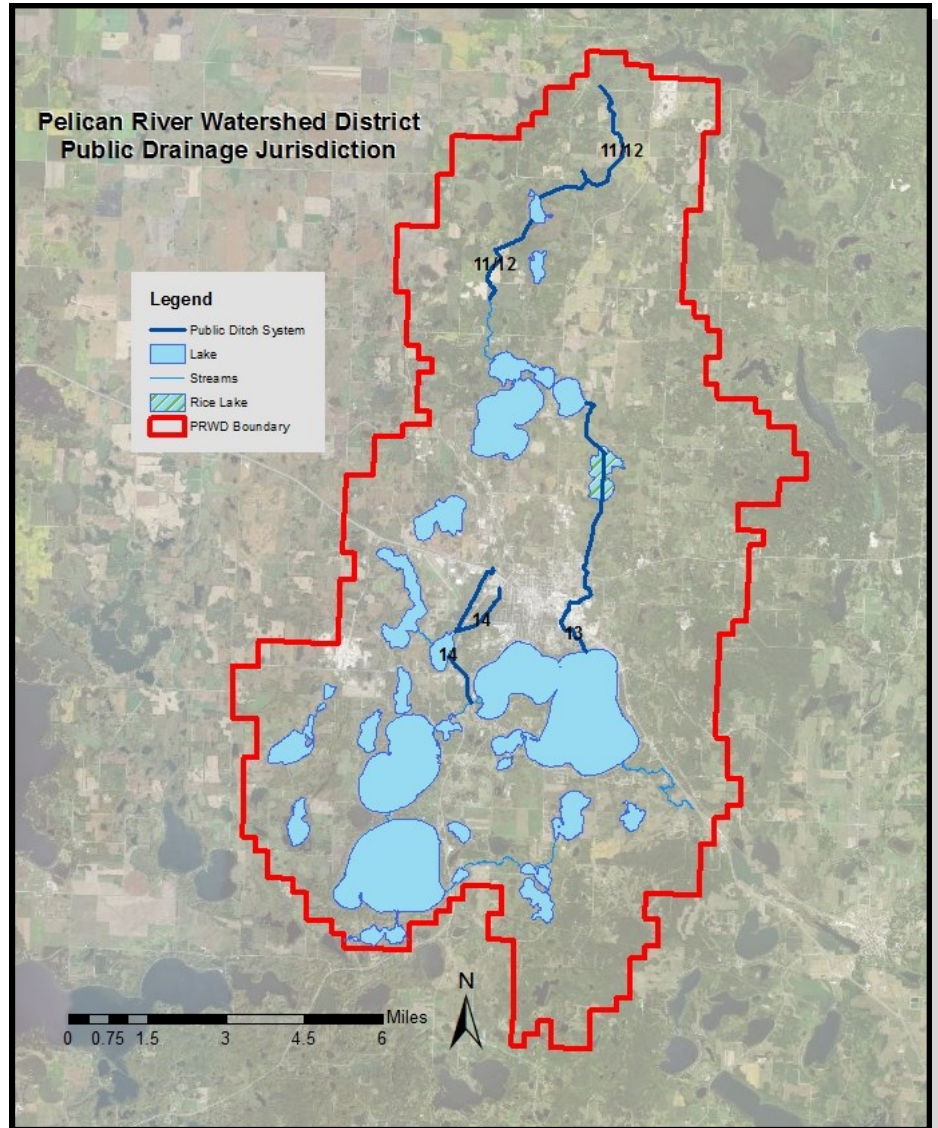
The District has statutory responsibility for the management of public ditch systems that were constructed in the early 1900's.

As the Ditch Authority for Ditch 11/12 (Campbell Creek), Ditch 13 (Pelican River), and Ditch 14 (St. Clair Creek), the District is responsible to maintain them, including the trapping of beaver, removal of beaver dams, and drainage blockages.

The District inspects the systems on an annual basis. The District is also responsible for submitting buffer compliance reports to the Board of Soil and Water Resources. These ditches are also monitored for water quality and ditch condition.

In 2016, beaver dams continued to be a recurring problem on Ditch 11 and 12. This problem extended into areas along Ditch 13 (Pelican River) located within the Rice Lake Wetland and in the City of Detroit Lakes. Ditch 14 was virtually problem free throughout 2016.

The total cost for maintenance on the four ditches was \$1825.13



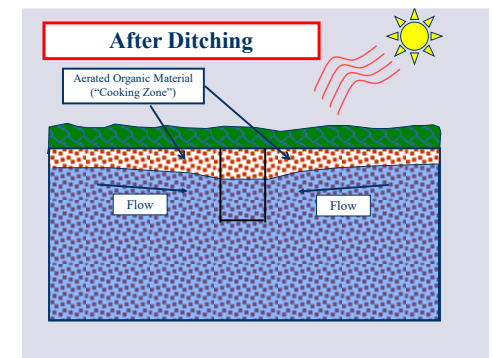
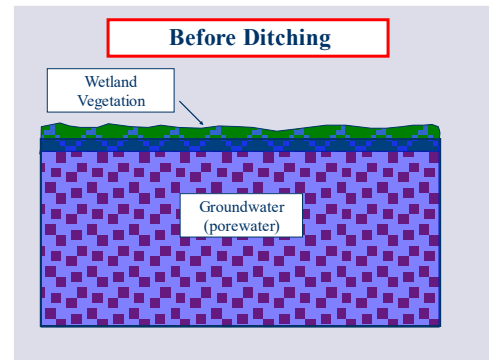


Rice Lake Wetland Nutrient Reduction Project

Over the past 15 years, sediment and nutrient management practices have been installed in the sub-watershed area of Detroit Lake, including over 25 agricultural structures in the Campbell Creek area north of Floyd Lake, as well as over 12 regional storm water ponds within the City of Detroit Lakes. The Rice Lake Wetland area is another major nutrient source remaining to be addressed for the long term health of Detroit Lake and downstream Sallie and Melissa lakes.

In 2016, the District was awarded \$1.5 Million by the Minnesota Board of Soil & Water Resources from the Clean Water Land & Legacy Amendment to construct targeted nutrient reduction practices to reduce the annual phosphorus loading from Rice Lake Wetland to Detroit Lake by 50% annually (3,000 lbs/year).

We usually view wetlands as nutrient sponges, but when this natural system is artificially changed or disrupted, this functionality may be lost. In the early 1900's, Rice Lake Wetland was ditched, causing significant changes to its hydrology and natural function. Based upon research and study findings, the "organic peat material layer" in the ditched Rice Lake wetland has functionally changed, and is releasing high loads of phosphorus after summertime rainfall events. By raising the water level and keeping the peat layer wet, phosphorus will remain trapped in the organic material, reducing the summer phosphorus "pulsing" episodes. This will help restore hydrology closer to "before ditching" wetland functionality.



Detroit Lake Watershed Water Quality Goals

Non-Degradation:

In Lake Phosphorus (P) < 40 ppb

Long Term-2025:

In Lake Phosphorus (P) 20-30 ppb

Stream Goals:

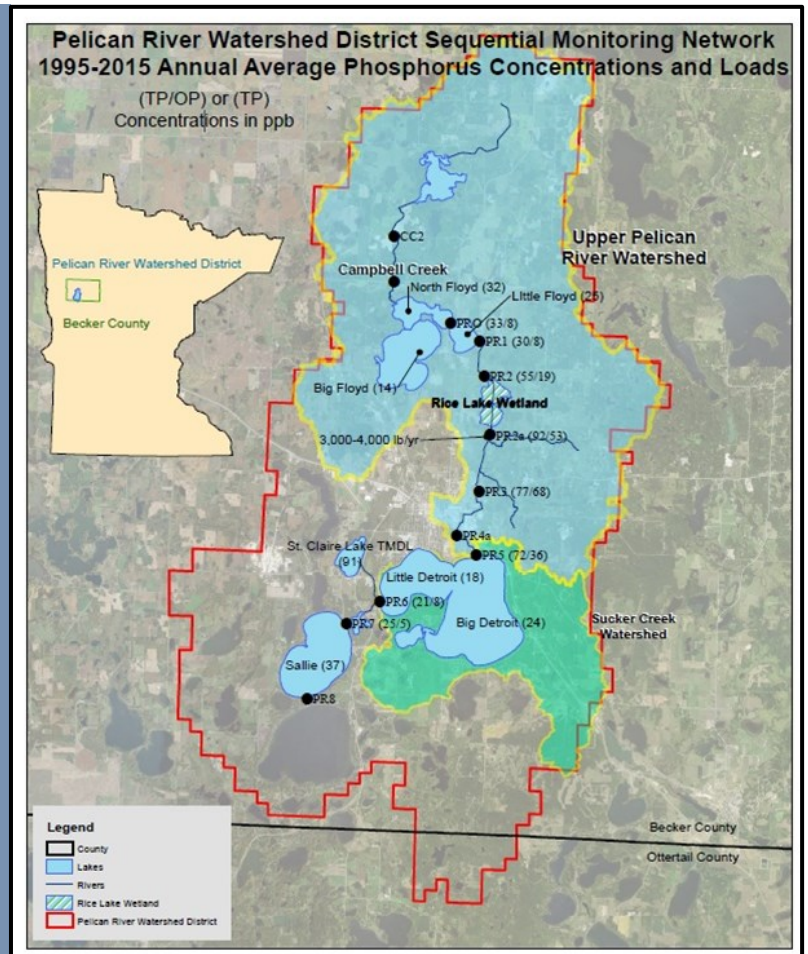
Reduce Total P to 50ppb

Dissolved P to 30 ppb

- ◆ Reduce phosphorus loads by 50% from the Rice Lake Wetland;
- ◆ Reduce City of Detroit Lakes sediment and nutrient-rich storm water runoff in targeted areas;
- ◆ Reduce sediment and nutrients by 50% from agricultural runoff and streambank erosion in Campbell Creek area;

Identifying the phosphorus sources

Through watershed land use reviews, research, and years of monitoring data; the highest sources of phosphorus loading to Detroit Lake are from the upstream drained Rice Lake Wetland and untreated urban storm water runoff.



Rice Lake Wetland Nutrient Reduction Project

Wildlife Benefits

In addition to the water quality benefits, the wetland restoration project will provide enhanced wildlife and waterfowl habitat improvements for the MN DNR Frank Waterfowl Management Area located within the project area.

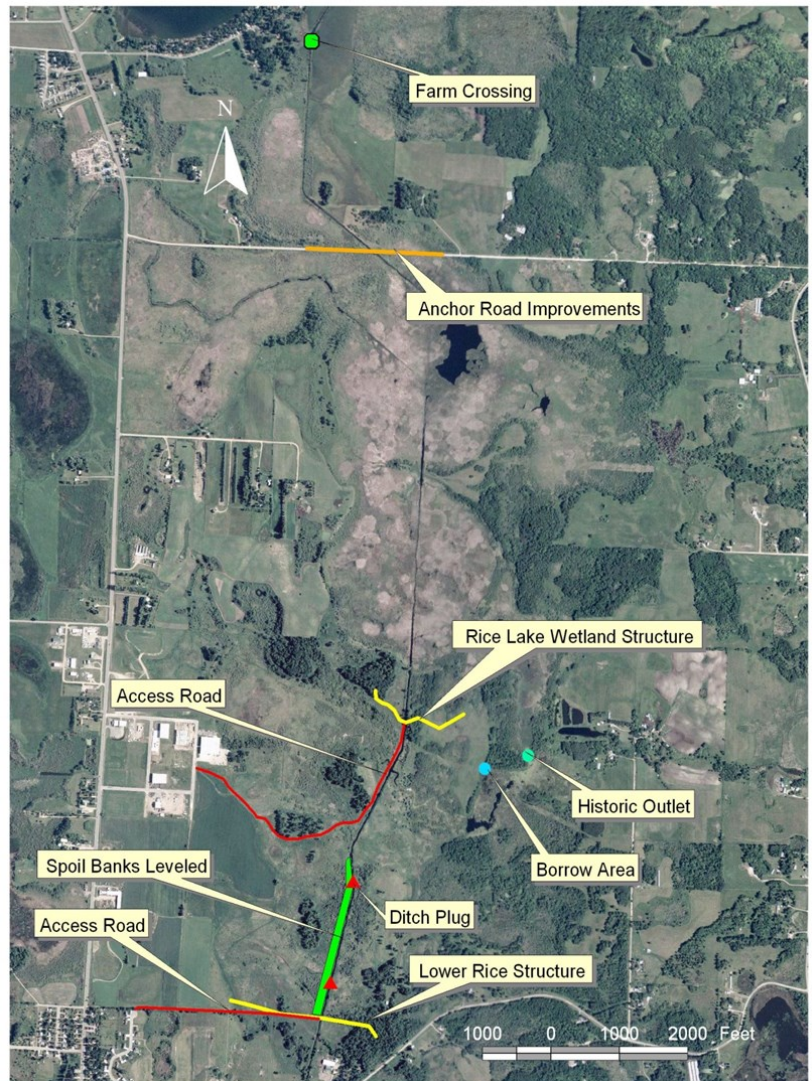
Project Construction

The construction project includes two water control structures, historical outlet meandering, structure access and Anchor road improvements.

The project is funded using State of MN Clean Water Land and Legacy Funds and local District funds.

The Natural Resource Conservation Service, MN Pollution Control Agency, U of MN Agricultural Research Center, MN Dept of Natural Resources, and the MN Board of Soil and Water Resources have also assisted financially and technically over the years with the diagnostic research, studies, and assessments; project and construction plans; flowage easements and land rights.

In 2016-17 final engineering and construction plans will be developed, with anticipated construction in Fall of 2017



Rice Lake Wetland Studies

U of MN , Agricultural Research Center: Ground water, In-Wetland Organic Soils, Drainage Flow, and Phosphorus Levels Research Projects: measured the amount of phosphorus in wetland organic peat layer, depth of the peat layer, and how varying water levels will cause the peat layer to release high phosphorus loads to the drainage ditch in the summertime to Detroit Lake. Phosphorus increases by 1.5 times from North to South

Natural Resource Conservation Service: Hydraulic Modeling, Soil borings within the Rice Lake Wetland. Developed **Implementation Plan** for Detroit Lake Watershed Area.

Ongoing Projects

Flowering Rush Management

2016 marked a major milestone in the District’s research on the control and management of Flowering Rush. This was the final year of research on the development to establish long-term treatment protocols to effectively maintain the plant at a low population density. The treatment protocols are based on a spring littoral point-intercept surveys of areas that are infested with the invasive plant. The presence, or absence, of Flowering Rush is recorded at each survey point to determine the number of annual treatments for each of the areas. The goal of the treatment protocol is to minimize the amount of treatment, and chemicals, that are needed to keep the plant at a low population density. The treatment protocols for each area are based on the criteria listed in the table below. Note the number of acres chemically treated based on the plant density.

	<5% Presence 0 Treatments	6-20% Presence 1 Treatment	>21% Presence 2 Treatments	Total Acres Treated	Total Cost of Treatment
2014	N/A	N/A	260	520	\$64,855.68
2015	4.1	120.4	135.4	391.2	\$53,392.49
2016	20.1	147.2	145.9*	439*	\$64,776.52

*Additional acres of 18.5 x 2 were added to previous year’s treatment sites.

Sediment core sampling, used to collect and quantify plant root rhizomes, determines the efficacy of the treatment methods. Treatment areas that received two annual treatments experienced a decrease in plant biomass, which is as expected and shown in previous research. Areas that had one annual treatment did not have any significant decrease but also did not have any increase. This showed that the treatment protocols could be used to reduce the amount of the plant with two treatment in areas that have high plant density while maintaining in areas that have low density. Areas with no, or extremely low, plant population will not be treated, but will be assessed each year to begin treatments if populations are above treatment thresholds.

Lake Sallie Flowering Rush and Bulrush Mixed Stands Pilot Treatment Project

The District and Mississippi State University continued a 3 –year pilot project studying the effects of chemically treating Flowering Rush infestations mixed with native Hardstem Bulrush plants. Bulrush is critical fisheries habitat and the invasive plant, Flowering rush is heavily invading the 60+ acre area on the east end of Lake Sallie. PRWD and MN DNR conducted stem counts from a 5-acre treatment area and a 5– acre reference area. The 2015 & 2016 treatment results concluded Flowering Rush populations were significantly reduced while the native Bulrush populations increased—showing no negative impacts from the treatments. Based upon these promising results, The District will request to expand the 5-acre treatment area to 30+ acres in 2017 and more in subsequent years.

Curly-leaf Pondweed (CLP) Management

Historically, the District has used mechanical harvesting equipment in June and early July to cut and collect the invasive plant, Curly-leaf Pondweed to prevent major plant “blow-ins” on beaches in July when CLP naturally senesces. In 2016, the District changed to using herbicides to treat CLP on Big & Little Detroit, Curfman, Muskrat, Sallie and Melissa lakes. Treatment was conducted in mid-May and focused on areas that were problematic in past years. Results from the herbicide treatment were positive, with very little CLP plant shoreline blow-ins in late June and early July, as in previous years. A total of 73.1 acres were treated on the lakes, with the majority of the acres on Big Detroit near the Holiday Inn area. Total cost of treatments were \$28,413.97. The District will continue to use herbicide treatments in 2017.

District Rules & Permitting

The overall goal of the District's permitting program is to ensure that land development is done responsibly and that water quality will be protected for future generations. The Current set of District's Water Management Rules were first approved in 2003 to help the District meet the Water Management Goals set by the Revised Management Plan. During the process of drafting the Water Management plan, it became apparent through community input meetings, that there was public support for the District to regulate land use to help meet the water quality goals. Rules were then written to avoid jurisdictional overlap where possible with the City of Detroit Lakes and Becker County Shoreland Ordinance.



Since the fees had not been raised since they were first adopted in 2003, they were often not in-line with actual costs to the District, especially on large sites requiring an engineer review. A new permit fee schedule was adopted in 2016 by the Board to better reflect the costs associated with reviewing applications and plans. For most lakeshore owners, which require a Shore Impact Zone alteration permit, there was only a slight change from \$75 to \$100. The bigger increase was for large and commercial projects requiring an engineered reviewed by the District engineer. These permit application costs were increased from \$175 to \$500-\$750, depending on the project size. PRWD collected \$11,300 in permit application fees while it spent \$21,059 on engineer reviews in 2016. Rules enforcement is not only costly, but it also requires a large amount of staff time for site visits and violation remedies.

In 2016, the total number of permits issued was 37% lower than in 2015, primarily due to less shoreline ice damage than from the previous year. Overall, 71% of the permits issued in 2016 were for alteration of land within the Shore Impact Zone, which includes activities such as rip-rap installation, beach sand additions, land grading (including ice damage repair), and vegetation alterations. Nearly 23% of the permits issued were for projects where impervious surface thresholds were met. Typically, these are large scale projects which require an Engineered Storm water Management Plan to show that the project design will meet the water management standards, and plans showing how soil erosion will be prevented and contained. Other permit projects were 3 subdivisions and 1 road/parking lot, both of which required engineered storm water management plans.



Example of work conducted without a permit and in violation with District Rules, Shoreland Ordinance Rules, and MN DNR Waters regulations.

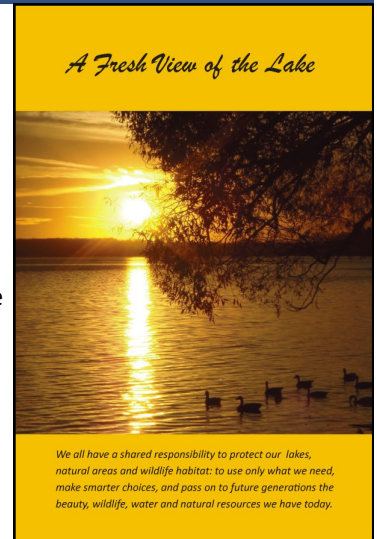
Shore Impact Zone Alteration	44
Impervious Surface Coverage	14
Subdivisions	3
Road/Parking Lot	1
2016 Permit Total	62

Education & Outreach

PRWD staff began 2016 designing a 16 page booklet suggesting ways that visitors and property owners alike could be more helpful than harmful to the lakes we all enjoy. After several weeks of compiling information, Moses forwarded to Becker County, City of Detroit Lakes, and the Lake Detroiters Association for their input and critiques. When the final draft was complete, 10,000 copies were printed with each organization contributing to printing costs and distribution of the booklet.

As in previous years, the PRWD staff spoke monthly on the local radio show, Hodge Podge, to discuss District projects and state wide events that effect our area. Manager, Dennis Kral, spoke the day of the 50th anniversary gathering in August to invite the community to the event and talk about our history and the direction of the District.

The District purchased a watershed model early in the year and Moses used it to demonstrate Watershed features at the Water Festival event hosted by the City of Detroit Lakes in April at the Fairgrounds. Over 400 fourth grade students attend this event each year.



A Fresh View of the Lake

We all have a shared responsibility to protect our lakes, natural areas and wildlife habitat: to use only what we need, make smarter choices, and pass on to future generations the beauty, wildlife, water and natural resources we have today.



In May, Moses also mentored a group of Rossman Elementary fourth grade students on Best Practices for stormwater management as well as serving as a tour guide on the Ike Fischer Farm tours for area fifth graders.

In the fall of the year, Annika Merkens, a senior at Detroit Lakes High School, mentored with District Staff. One of her assignments was to demonstrate with the watershed model to Rossman and Holy Rosary fourth graders.

In June, Alcott and summer interns, John Kempe and Tyler Haazland-Zurn, were guests of the Becker County COLA group and enjoyed a pontoon tour on Detroit Lake while explaining to COLA members why and how the District monitors water quality in area lakes.

Annika Merkens demonstrates how a watershed functions at Holy Rosary School.

Alcott also spoke at the annual Lake Detroiters Association meeting in June held at the Detroit Lakes Pavilion. We continue to work with various lake association groups to keep them informed of District activities and objectives. Their members are often helpful to us in accessing lakes and with monitoring functions. It is a partnership we value greatly as a district.

In August, the summer interns were given the opportunity to meet with local residents at our booth located in the Natural Resources Building at the Becker County Fair. They are able to inform the public about the District work with monitoring, permitting and invasive species efforts.

The District organized a meeting with Fox Lake residents when it was notified of a parcel of land that was for sale north of the lake. There is concern that the parcel could be developed in a way that would be harmful to the lake. Residents and PRWD staff and managers continue to weigh their options in the matter.



District Administrator, Tera Guetter, speaks to Fox Lake residents at a meeting held in June regarding the history of a parcel of land north of the lake.

Operating Revenue and Expenses

The District is funded through ad valorem tax levies within the boundaries of the watershed district. These funds, along with grants and special assessments, are used to fund projects and programs. The District does charge permit fees to support their permit program. Tax dollars are collected from watershed residents through its statutory authority according to MN Watershed Act (M.S. 103D).

Watershed Districts must have the following programs:

- ◇ General/Administrative: conducting the business of the District
- ◇ Regulations: administering the District's rules and permits
- ◇ Planning: administering the District's watershed Management plan and budgets
- ◇ Maintenance of Projects and District owned facilities
- ◇ Capital Projects
- ◇ Public Relations: administering the requirements of reporting to and notifying the public

The budget must be adopted and certified on or before September 15th. M.S. Chapter 103D.911 requires that the managers hold a public hearing before adopting a budget. The chart below is a complete budget profile for 2016 and 2017 along with the actual funds spent in 2016.

	2016 Budget	2016 Actual	2017 Budget
Revenue			
Levy	733,047	758,176	687,000
Grants & Other	(116,692)	842,237	(129,492)
Total Revenue	\$616,355	\$1,600,413	\$557,508
Expenses			
Capital Outlay	41,000	30,000	35,000
Community Relations	14,000	9,689	16,500
Loan Payment	33,000	33,000	33,000
Grant Match	22,000		50,000
Easement/Acquisition		3,239	
Ditch Expenses	4,550	1,700	6,390
Program Activities	152,800	92,913	215,520
Operating Expenses	80,530	60,723	81,330
Payroll	303,400	276,803	301,700
Contracted Services	158,160	85,473	101,600
Total Expenses	\$809,440	\$593,540	\$841,040

2017 Workplan

District Wide Goals	Ongoing Activities	2017 New Activities
Education <ul style="list-style-type: none"> • Publications, support of organizations, etc. • Recruit more volunteers • Upgrade Website • Awards/Demo Projects • Contractor Seminar 	<ul style="list-style-type: none"> • Tours for Managers and Citizen Advisors • Presentations for service groups, lake associations, classes, fair booth, water festival, City, County • Publish annual summaries, lake info sheets • Website/Facebook • Continuing education for managers and staff-workshops, conferences, Support of LA's and COLA • News articles/Monthly Hodge Podge radio 	<ul style="list-style-type: none"> • Collaborate with City of DL and Becker County—Shoreland, stormwater, trainings/seminars • Revitalize PRWD citizen Advisory Committee • Work/engage with organizations such as Becker COLA, Rotary, etc. • Create new suite of storm water management information • Present to more Community and Lake Association Groups
Date Collection (monitoring) <ul style="list-style-type: none"> • Maintain monitoring program • Upgrade monitoring equipment • Prepare lake-specific evaluations • Integrate monitoring and GIS • Citizen volunteers, agency coordination 	<ul style="list-style-type: none"> • Update & implement monitoring plan and data • Recruit additional monitoring volunteers • Employ two summer interns for lake/stream monitoring • Training/seminars/conferences/courses 	<ul style="list-style-type: none"> • Industrial Park-Monitoring for CW Grant/City • Shoreline surveys-Sallie, Melissa • 1 seasonal intern for stormwater practice inspection, database, RMP assistance
BMP's to Reduce Phosphorous and Sediment <ul style="list-style-type: none"> • Promote BMP's • Promote, acquire buffer zones 	(sell also Water Mgmt Reg & Educ.) Encourage vegetative buffer easements along riparian areas <ul style="list-style-type: none"> • Encourage other BMP's • Restore-the shore—Hwy 10 overlook maintenance 	<ul style="list-style-type: none"> • Assist MN DNR with buffer enforcement (waterways) • CW Grant Funding for West Lake Drive & Industrial Park improvements (stormwater innovations; buffers) - July • Raingarden in City of DL; Overlook Area • Cost Share Assistance for Shoreland Buffers • Develop GIS based database to BMPs • Review areas from Drainage inventory for potential projects
Water Mgmt Regulations (permitting) <ul style="list-style-type: none"> • Advocate regulations to promote water quality • Advocate rigorous and consistent enforcement of District and other rules • Coordinate with other units of government. 	Continuous rigorous and consistent enforcement of Rules <ul style="list-style-type: none"> • Practice oversight on County and City activities relating to water quality • Advocate for City, County and State water quality enhancement • Serve on inter-agency committees and panels • Update Website-Permit information/location links 	<ul style="list-style-type: none"> • Explore rule revision process with RMP Revised Management Plan (Wenck) • Ottertail Basin WRAPS • Permit Application Software—County BWSR grant; Work with county & city on streamlined permitting • City of DL Shoreland Ordinance Update
Lake Management Planning <ul style="list-style-type: none"> • Promote LMP concept; encourage adoptions of special protection zones 	<ul style="list-style-type: none"> • Continue to motivate and assist lake associations to become proactive in promoting planning • Encourage the adoption of special protection zones (see also Water Mgmt Reg) • Project 1B/1C Aquatic Vegetation Management • AIS prevention, rapid response, control 	<ul style="list-style-type: none"> • Manage AIS infestations • Encourage continued inspection program at public and private accesses
Septic System Management <ul style="list-style-type: none"> • Encourage septic BMP's and rigorous enforcement of regulations 	<ul style="list-style-type: none"> • Support BC Septic inspection program • Encourage cluster systems (Sallie/Melissa) • Promote alternative approaches 	<ul style="list-style-type: none"> • Work with City of DL—Wastewater treatment plant upgrade; assist w the grand funding opportunities
Ditch Management	Ensure proper ditch management (Beaver)	<ul style="list-style-type: none"> • Rice Lake Project Requirements • Buffer Compliance
General Administration <ul style="list-style-type: none"> • Project overview, grants, reports, budgets, payroll, etc. 	<ul style="list-style-type: none"> • Plan and manage finances; 2016 Audit • Office equipment updates • Annual Report 	<ul style="list-style-type: none"> • Office Equipment, computers, (laptop, reception) • MAWD strategic plan support