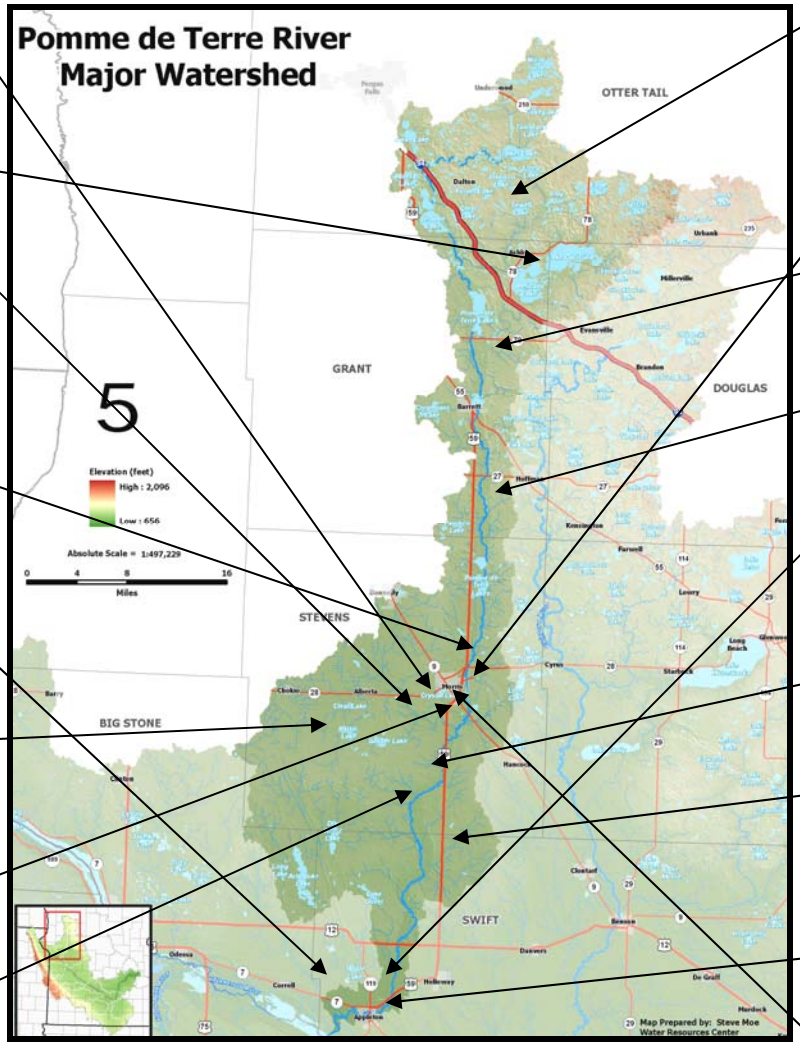
POMME DE TERRE RIVER WATERSHED

Located in western Minnesota in the upper Minnesota River Basin, the Pomme de Terre Watershed drains approximately 905 square miles or 559,966 acres and is largely rural with crop cultivation as the major land use. As the most northern watershed in the Minnesota River Basin, the Pomme de Terre Watershed has about 115 named lakes and about 750 miles of streams. Tributaries of the Pomme de Terre River include Artichoke, Dry Wood, Muddy and Pelican creeks. Named for the prairie turnip (a potato-like food of the Dakota known as Indian Breadroot, *psoralea esculenta*), the Pomme de Terre is French for "potato." Starting out in southern Otter Trail County the Pomme de Terre begins as a cool and clear stream tumbling out of the Stalker and Long lakes. On its upper portions, the Pomme de Terre meanders through cattail and reed canary grass marshes. The Pomme de Terre River drops an average of 3.5 feet per mile before out-letting into Marsh Lake below Appleton.


Pomme de Terre River at Highway 12



1. Pomme de Terre Clean Water Partnership
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The Pomme de Terre begins in the high country of Minnesota's famed lake region. Its origins are in lakes and ponds of the rugged glacial moraines; it begins as a distinct stream tumbling cool and clear from Stalker and Long lakes in southern Otter Tail County. Bordered by wooded hills and grassy meadows, the Pomme de Terre River has no major outlets. – Thomas F. Waters, The Streams and Rivers of MN

POMME DE TERRE RIVER WATERSHED

Stevens Soil and Water Conservation District works with partners on the local, state and federal level to improve water quality in the watershed through the use of conservation practices, education and public involvement. The University of MN Morris has expanded their environmental-theme mission by offering an environment major in 2009. One of most important educational outreach tools has been Bob Hartkopf's *Cry of the Marsh* film about the loss of wetlands.

1. Pomme de Terre Clean Water Partnership

Efforts to study and improve water quality in the Pomme de Terre Watershed have been ongoing since the 1970s with the Pomme de Terre River Association taking a lead role. Today, a project coordinator works out of the Stevens Soil and Water Conservation District office in Morris. The role of the coordinator is to complete the development of TMDL studies of the watershed for turbidity and fecal coliform, promote the enrollment of conservation practices and educate residents on water quality issues. Examples of this work includes a set of articles featured in the Morris *Sun Tribune* including topics like stream biology and water quality, hosting public information meetings and sponsoring a paddle on the Pomme de Terre River. Currently the Pomme de Terre Watershed is listed for fecal coliform bacteria and turbidity water quality impairments.

Pomme de Terre River at Appleton

2. Pomme de Terre Stakeholder Meeting

A diverse group of people volunteered to help develop the implementation plan for the Pomme de Terre River turbidity TMDL. Close to 50 people attended a November 13, 2009 watershed meeting that focused on a draft turbidity TMDL discussion undergoing the review and approval process. Part of the conversation during the meeting concentrated on load duration curves and data contained in the TMDL along with the upcoming implementation plan process. Pomme de Terre coordinator also gave an overview of the recently approved fecal coliform TMDL implementation plan and a U.S. EPA 319 grant covering practices to reduce bacteria levels in the river. The grant will cover funds for incentives and cost share to utilize livestock exclusion fencing, rotational grazing, plus buffer strips for cattle pastures, between waterways and manured fields and feedlot runoff control.

Cattle in the Pomme de Terre River

3. Fecal Coliform TMDL Study

From Muddy Creek to Marsh Lake, this stretch of the Pomme de Terre River has been listed as impaired for fecal coliform bacteria. Samples were collected at the Appleton monitoring site from October 5, 1983 to September 27, 1993 with 23 of them exceeding the water quality standard of 200 colonies for 100 milligrams of water. The Pomme de Terre Association Advisory Committee determined additional information was needed to make a sound assessment of the watershed. As a result, the project focused to better characterize fecal coliform bacteria levels, identify the probable sources, and estimate the reduction required to meet the TMDL water quality standards. Three goals were developed: (1). Analysis the data that put the Pomme de Terre River on the impaired waters list; (2). the effects of Muddy Creek on the lower Pomme de Terre Watershed will be analyzed; and (3). To develop and initiate an implementation plan to attain and maintain water quality standards of fecal coliform bacteria in the river.

Livestock Stream Exclusion

4. Pomme de Terre River fecal coliform TMDL implementation plan

In 1994, the Pomme de Terre River from Muddy Creek to Marsh Lake was listed impaired for aquatic recreation as a result of high levels of fecal coliform bacteria. A strong positive correlation between precipitation and fecal coliform bacteria concentration was shown by supporting TMDL data. According to the TMDL, the river's water quality failed to meet state standards primarily during rain events, pointing to weather-driven sources. Stakeholder meetings were held in February, March and April of 2008 to develop an implementation plan along with a facilitated visioning session to determine priority issues and desired outcomes.


Native Prairie Restoration

As a result, a fecal coliform bacteria stakeholder group of 20 people formed and priority management measures were determined: (1). Riparian buffers – between manured fields and waterways or grazed pasture and waterways along with cropfield sites that have a documented history of manure application, (2). On-site sewer systems, (3). Manure management, (4). Pasture management – install livestock exclusion fencing to keep livestock out waterways and incentive payments for landowners to enroll pasture acres into prescribed rotational grazing plans, and (5). Urban stormwater management.

5. Pomme de Terre River Paddle

The Pomme de Terre Watershed Project along with Clean Up the River Environment (CURE) hosted a paddle on this prairie river to bring attention to the resource and highlight its current condition. A group of 30 paddlers took off from Larson's Landing for a total of five miles to the Appleton City Park. On this stretch of the Pomme de Terre River the paddlers experienced both open and wooded sections along with signs of agricultural and rural development. At the end of the paddle, everyone enjoyed a series of rock weirs built by the DNR after the removal of low-head dam.


Paddling the Pomme de Terre River

6. Organization Spotlight - Pomme de Terre River Association

Formed as a joint powers board, the Pomme de Terre River Association has been working to improve water quality in the watershed since 1981. This Association is dedicated to engaging local people to become informed and active in cleaning up the Pomme de Terre River along with being committed to making the river a great resource for all to enjoy. County commissioners and SWCD supervisors from each of the counties – Otter Trail, Douglas, Grant, Stevens, Swift and Big Stone – make up the joint powers board. A study titled "Sedimentation Rates and Changing Water Quality Pomme de Terre River Watershed West Central Minnesota" was completed in 1985 by Dr. Van Alstine under a contract with the Association. Out of this study the Joyce Foundation and Minnesota Environment Education Board developed curriculum materials for elementary school classrooms. The Association completed a diagnostic study of the watershed and held four public input meetings. Today, the Pomme de Terre River Association continues to work on improving water quality in the watershed.


Environmental Education

7. Pomme de Terre River Watershed Project

In 2000, the Pomme de Terre River Association Joint Powers Board began to use funds from the Minnesota Pollution Control Agency (MPCA) to study and assist in efforts to improve water quality in the watershed. A $50,000 grant compiled all of the studies that had been conducted in the watershed along with other activities. Part of the project involved educating and informing the public about the water quality issues through newsletters, bus tours, information booths at two community events, county public meetings, citizen monitoring picnic, presentations, Kids Groundwater Days and created the Appleton Outdoor Classroom on the Pomme de Terre River. Finally, the grant created a comprehensive report on the existing data and the accomplishments of the Association since the early 1980s.

Water Quality Monitoring

8. Crazy Kayak Race

Clean Up the River Environment (CURE) hosted a "Crazy Kayak Race on the Pomme de Terre River in conjunction with the City of Appleton's annual Applefest Celebration. Paddlers started at the top of the newly established rapids on the river and dash paddle (navigating the rocks) past several flags which they grabbed under the foot bridge to an access point further downstream. The goal of the race is to help people connect to the Pomme de Terre River as a valuable resource and embrace what it has to offer. Immediately after the kayak race, people participated in a rubber duck race on the river.

Paddling the rapids at Appleton

9. Shoreline Restoration

Stevens SWCD partnered with the Morris High School environmental science class on a joint restoration project at the Pomme de Terre Park. The local partnership planted a shoreline restoration in the area that had been the park's swimming hole. Students weeded the area and replaced the failed plants. Another benefit for water quality at the park was the reconstructed parking lot featuring a rain garden in the center to help reduce runoff from the pavement. Stevens SWCD shared information on the rain garden with the high school class.

Planting shoreline vegetation

10. Minnesota River Board Tour

County commissioners, government agency staff, citizens and others from across the basin traveled to Morris for a September 21, 2009 Minnesota River Board meeting and a tour of the Pomme de Terre Watershed. A presentation on the Pomme de Terre Watershed and project activities was given at the meeting to help set the stage for the bus tour going from Morris to the confluence with the Minnesota River at Marsh Lake and southwest of Appleton. Stops on the tour included the new Pomme de Terre scenic overlook at the University of Minnesota West Central Research and Outreach Center; the shoreline restoration project at the Pomme de Terre Park in Morris; phase II biological monitoring site on Drywood Creek, starting point of the DNR canoe trail; old mill dam site in Appleton and the Marsh Lake dam and Minnesota River confluence.

Pomme de Terre Interpretive Site

11. Stevens and Pope Conservation Day

Fifth grade students from all the Pope and Stevens schools came together at the Scandia Wood Environmental Learning Lab (SWELL) just east of Morris to learn about conservation and the environment. Over 200 students and teachers enjoyed the third year of this event featuring a variety of hands-on learning stations including Raptors, Mammals, In the Woods, Soils, Wetlands, Waterfowl, Prairie Wildlife, Water Quality, Mini Envirothon, Nature's Stockmarket, Scavenger Hunt and Orienteering. Presenters and sponsors of event included Stevens and Pope SWCDs, Stevens County Environmental Services, NRCS, U.S. Fish and Wildlife Service, Lawn & Driveway Service, Hancock Sportsmen Club, Stevens County Pheasants Forever, Prairie Country RC&D, Chippewa River Watershed Project, and University of Minnesota.

12. Hattie and Page Lakes Project

Stevens County Environmental Services, Stevens SWCD and NRCS partnered together to conduct an inventory to identify critical erosion and pollutant sources for the watersheds of Hattie and Page lakes. The inventory identified ditches, field drain tile outlets, critical erosion sites, feedlots, septic systems and other pollutant sources. Once completed, the inventory was used to target financial assistance and voluntary labor to correct water quality problems.

13. Echoes of Cry of the Marsh

The University of Minnesota Morris, the Upper Minnesota River Watershed District and the U.S. Fish and Wildlife Service produced a one-hour documentary on the impact of the 1960s documentary "Cry of the Marsh" by Bob Hartkopf. As a young boy, Hartkopf wandered through a shallow wetland called Mud Lake next to his father's cropland. He used the wetland as a classroom by studying the plant and migration patterns of local waterfowl, inspiring him to become a high school science teacher. After his beloved Mud Lake and many other wetlands were drained for additional cropland, Hartkopf picked up a 16 millimeter camera in 1959 to document all the ditching work near his family farm. "Cry of the Marsh" came out of this filmmaking and released in 1970, winning a number of awards at festivals in New York, Washington D.C. and Berlin. Since the release of his film, Hartkopf has worked tirelessly to promote it, promote the benefits of conservation, of biodiversity and wetland restoration.

River Advocate – Bob Hartkopf

Bob grew up on a farm near Appleton where he explored the natural environment as a young child and read books by Aldo Leopold and Rachel Carson. One of his favorite places was a nearby marsh or wetland called Mud Lake. After graduating from college Bob went off to teach high school in Fargo, North Dakota and began to see the dramatic changes to the landscape on his family farm – the draining of wetlands, loss off tall grass and no more ducks and geese. The land was being transformed to grow more crops. Hartkopf felt the need to record what was happening. In 1959, he started to film the digging of ditches near his family home. Later Bob produced a 12 minute documentary called Cry of the Marsh in April of 1970, which coincided with the first Earth Day. Today, Bob Hartkopf continues to be an advocate for the protection and restoration of wetlands, rivers and other valuable waterbodies.

14. Stevens SWCD – Stream Barb Projects Two stream barb projects were completed on sensitive areas of the Pomme de Terre and Chippewa rivers with assistance by Stevens SWCD through planning and funding. Stream barbs are low rock structures installed on a meandering stream to protect the outside edge of the bank from washing away as water flows around a curve. The rock structures transfer the flow of the stream from the outside edge to the middle of stream, deepening the flow in that area and causes silt to fill in behind the barbs. The concentrated flow in the middle makes the stream become narrower and cuts down bank erosion.


Conservation Practices Tour

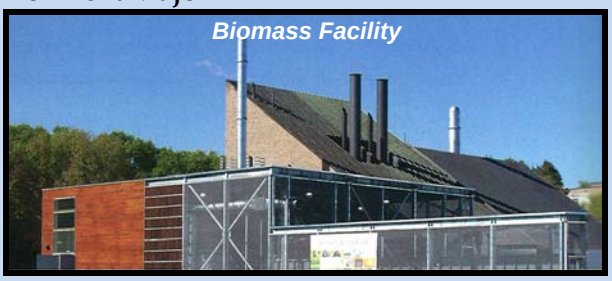
15. Stevens SWCD – Conservation Education
Stevens SWCD has made conservation education for both youth and adults an important focus with many of these efforts done in partnership with one or more other area SWCD offices. Most of the opportunities offered are outdoor, hands-on sessions for youth through the Water Fest, Conservation Day and Area II Envirothon, coordinated by Stevens SWCD for over 10 years. A partnership has been developed with Morris Area Schools through their Service America program to teach students of all ages about various environmental topics including nitrates, water testing, watersheds, and community tree planting while meeting the state graduation standards.


Conservation Day

16. Lake Christina
Located in the northern part of the Pomme de Terre Watershed, Lake Christina has been referred to as a 4,000 acre duck pasture. The abundance of waterfowl have made this a hunting Mecca since the beginning of the last century. Tens of thousands of ducks and hundreds of thousands of coots can be found on the lake when it is in good condition.

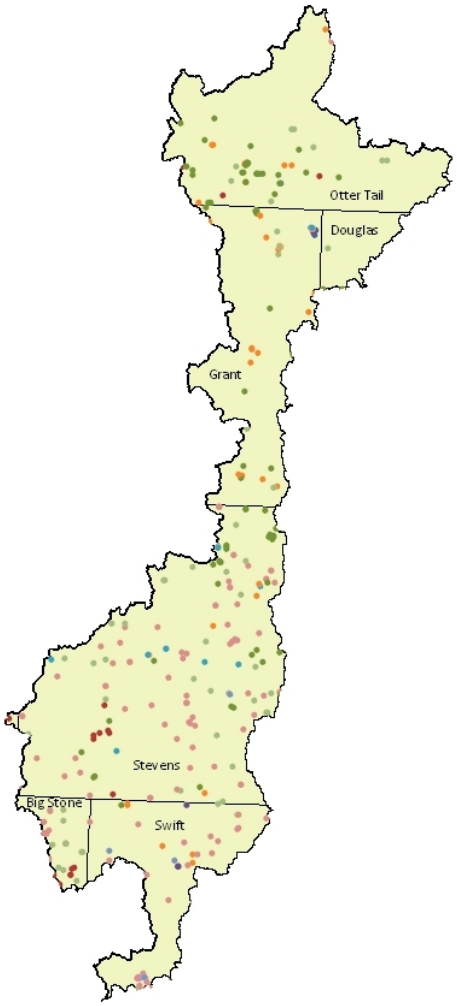
The Minnesota Department of Natural Resources, local lake association, Ducks Unlimited and other partners have used a number of different management methods to control invasive species of fish from getting into the lake including the use of the chemical Rotenone, fish barriers and water control structures. One proposed method for lake management is the use of a permanent pump structure to allow for periodic drawdowns of the water level.

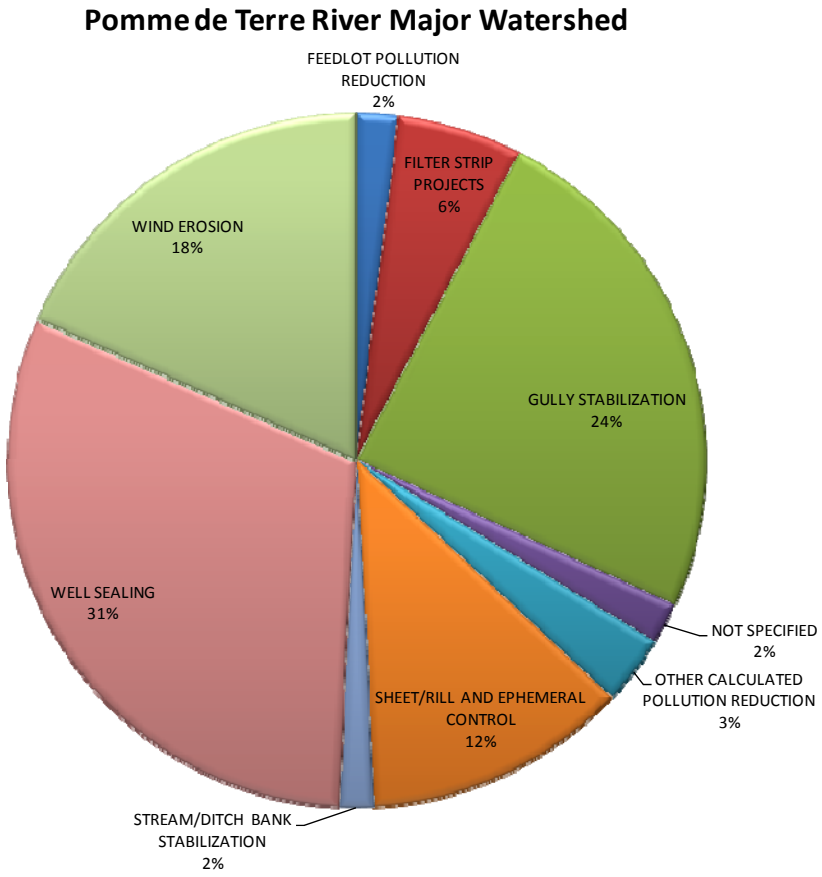
17. Project Spotlight - University of Minnesota Morris Environment Major


Biomass Facility

Over the years, the University of Minnesota Morris has moved towards a more sustainable and green campus with buses fueled by corn, dorms heated by a biomass furnace and serving food grown on nearby farms. After adding two new majors – environmental studies and environmental science – the previous year, Morris began to offer an environmental major in 2009. The fully developed green curriculum of this multidisciplinary degree offers classes ranging from microeconomics to a course called "Evolution of the Minnesota Prairie." These classes utilize the college's facilities by visiting the biomass heating and cooling plant to discuss biomass gasification, and work with small-scale gasifiers.

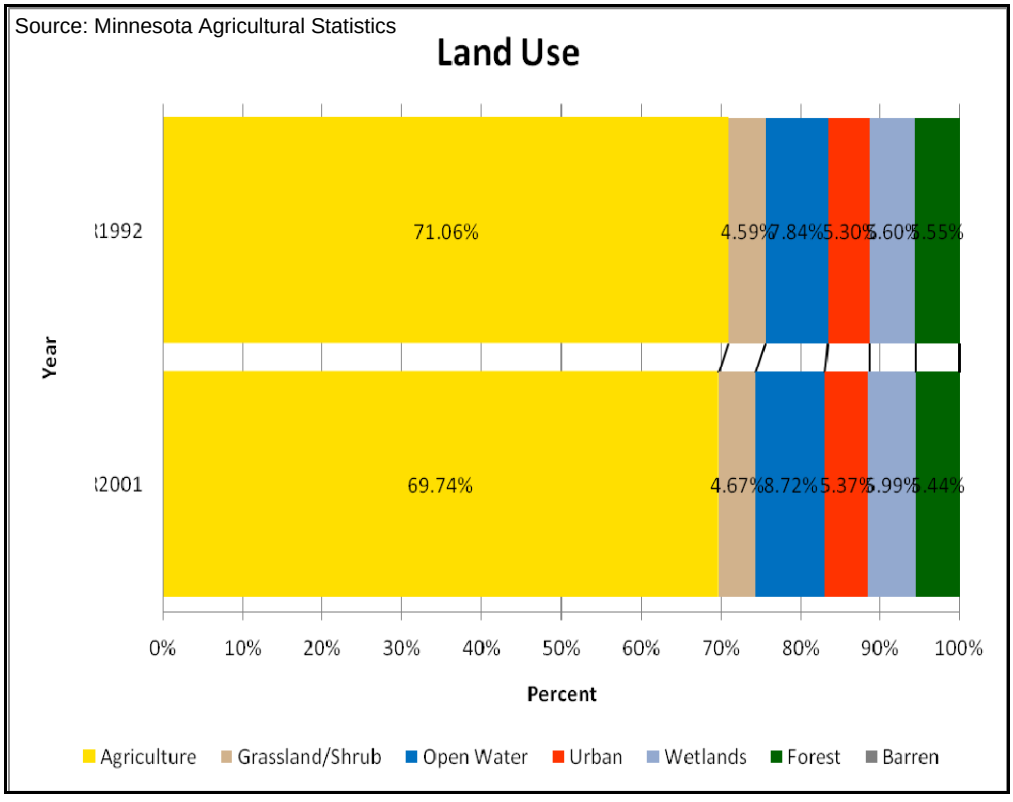
Pomme de Terre River Watershed Conservation Practices and Land Use





Conservation Practices

One of the first efforts to improve water quality in 1981 came with the formation of the Pomme de Terre River Association. The map above and the pie chart to the right illustrates conservation practices in the Pomme de Terre River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Pomme de Terre River Watershed but not recorded in either LARS or eLINK.



Pomme de Terre River Watershed Pollution Reduction

Water Quality Monitoring

Over the last few decades there has been some effort to measure water quality including the collection of fecal coliform bacteria samples. Monitoring near the outlet of the Pomme de Terre River didn't began until 2007 when the Minnesota Pollution Control Agency set up a station for collecting samples and measuring flow at Appleton. As a result there isn't enough data to develop a trend line for water quality measurements in the Pomme de Terre Watershed. The quality of water in this watershed is impacted by the number of lakes, extensive groundwater flow into the river and limited drainage network. The Pomme de Terre River Watershed can be compared to the upper Chippewa River Watershed.