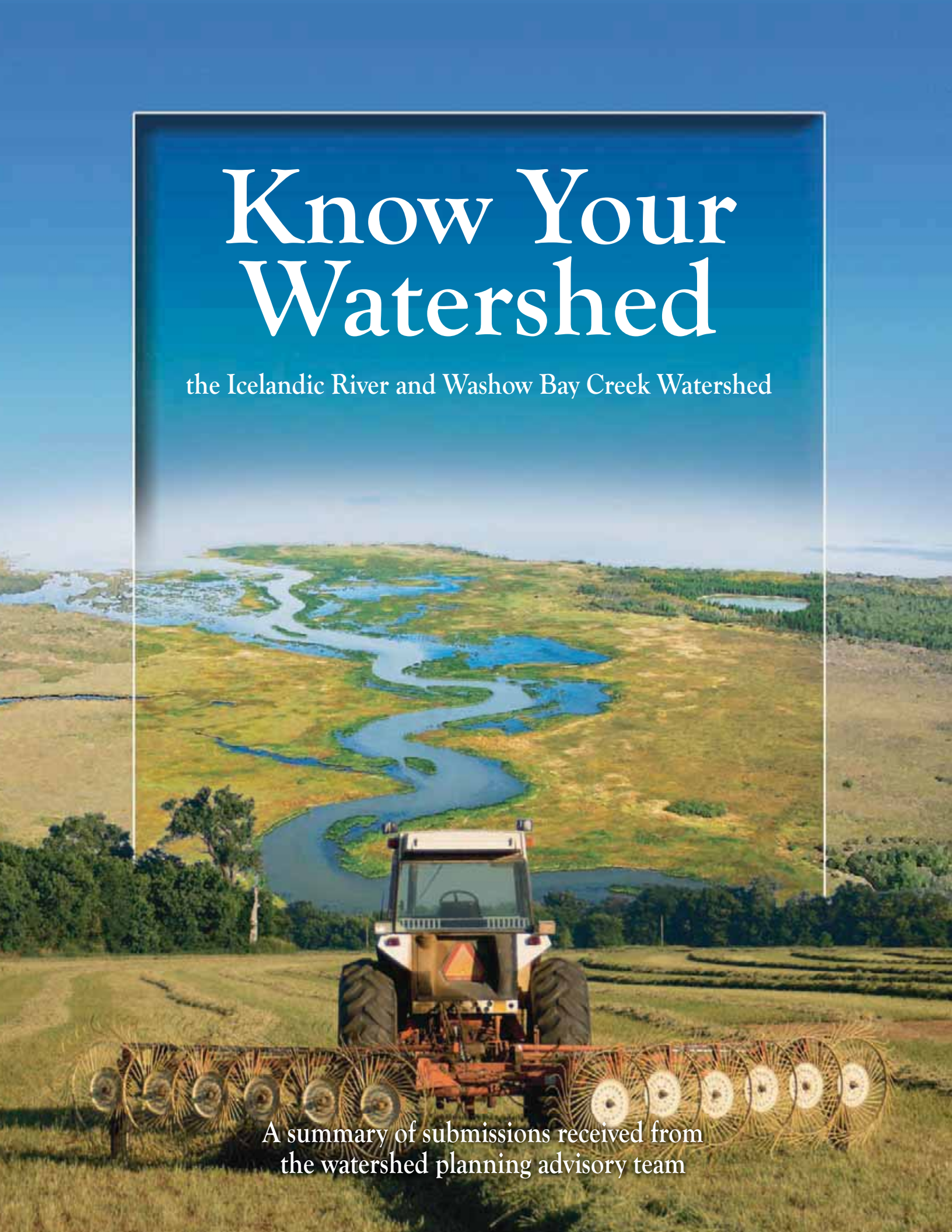


Know Your Watershed

the Icelandic River and Washow Bay Creek Watershed

A summary of submissions received from
the watershed planning advisory team

Integrated Watershed Management Planning

In January 2006 the Province of Manitoba proclaimed the *Water Protection Act,* which provides a mandate to develop and implement an Integrated Watershed Management Plan (IWMP) for watersheds across Manitoba.

Integrated watershed management planning is a community-based method of identifying watershed issues and creating a plan to protect watershed resources. The goal of this process is to put together a plan which ensures what we do in the watershed is environmentally, socially and economically sustainable. An IWMP will act as a roadmap for our community to reach those goals, and will help watershed stakeholders, like the East Interlake Conservation District (EICD) and the Province of Manitoba to offer relevant and effective programs that build healthy watersheds. This report is a summary of all submissions received from technical members of the watershed planning advisory team, and is intended for general readership. This report is a starting point, and is meant to encourage discussion and questions about the state and health of the Icelandic River and Washow Bay watershed. Please see the back cover of this report for contact information and opportunities for comment.

The East Interlake Conservation District

The East Interlake Conservation District (EICD) was officially formed in August of 2005 and became the seventeenth conservation district in Manitoba. The purpose of the EICD is to address soil and water management issues using a cooperative, long-term, planned approach within defined watersheds. The district is comprised of four major watersheds and is governed by four sub-districts.

EICD priorities include water quality, surface water management, watershed planning, soil and riparian health and education to ensure that responsible choices are made about land and water management. The EICD Board partners with different government agencies, including Manitoba Water Stewardship and Manitoba Infrastructure and Transportation to provide effective and relevant programming.

One of the initial steps in conducting an integrated watershed management plan is the designation of a Water Planning Authority (WPA) for each watershed entering into the planning process. The EICD has been designated by the Province as the WPA for the Icelandic River and Washow Bay Creek watershed.

The Icelandic River/Washow Bay Creek (IRWBC) watershed is one of the four watersheds within EICD boundaries. The IRWBC is located on the west side of the south basin of Lake Winnipeg. The watershed covers an area of approximately 2,640 km^2 and drains in an easterly direction towards Lake Winnipeg. Municipal land area contained within the watershed includes the municipalities of Armstrong, Bifrost, Eriksdale, Fisher and Gimli. Rural communities include the Town of Arborg and the Village of Riverton. The main industries and land use within the district include agriculture, tourism, industry, and mining of aggregate and peat.

The planning process

The watershed planning process is community driven and requires support, opinions and knowledge of the residents of the watershed, as well as technical information from provincial and federal government agents. Resident members and government representatives will form a Water Planning Advisory Team (WPAT) that will debate the issues and provide expertise to the water planning authority for consideration in the plan.

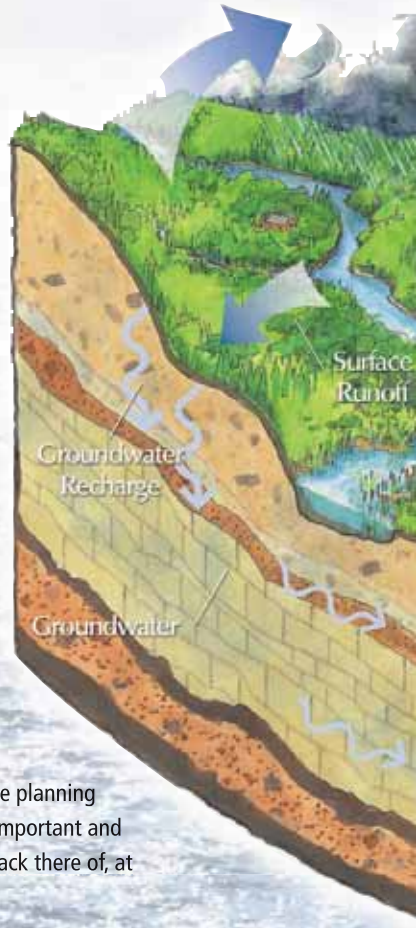
To develop a plan that meets the requirements of the Water Protection Act, the planning process will include the creation of the following documents:

State of the Watershed report

This report is a binder of all technical information submitted from WPAT team members. This information will be used to evaluate issues, identify data gaps and review the existing conditions of the watershed. This report, is a summary of all submissions received for the State of the Watershed report and is intended for general readership, and in some cases, technical submissions were modified to relay technical information in non-technical language. All technical submissions can be reviewed on the EICD web site at www.eicd.ca. A watershed report card will also be made available to evaluate watershed health indicators at a glance.

Source Water Protection Plan

The purpose of a source water protection plan is to coordinate actions in a way that maximizes the protection of public health and the safeguarding of source water quality and quantity over time. The source water protection plan will identify and assess threats to domestic drinking water supplies throughout the watershed, then recommend protective measures.



A Management Plan

The plan must identify issues relating to the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources in the watershed, it must contain objectives, policies and recommendations and it must link water management and land use planning and identify ways to implement the plan.

This document is a summary of the technical submissions received for the State of the Watershed Report. This report summarizes all data received by the EICD from WPAT team members over the last year; however, there are still data gaps. Please recognize that we have a long way to go before we can adequately characterize all aspects of this watershed, and that the planning process will help to guide our efforts in the future. Your input is important and we encourage you to comment on the following information, or lack there of, at upcoming public meetings.

What is a watershed?

At the most basic level, a watershed is a geographic area where any drop of rain will drain to a single body of water, such as a lake or river. A watershed can be as small as a basin that drains to a tiny creek, or as large as the Lake Winnipeg watershed. The key concept of the term 'watershed' is that water resource issues such as water quality, drainage and habitat for fish and wildlife are closely linked together within watersheds. What happens upstream affects what happens downstream.

Watershed boundaries for surface drainage are determined by topography. Since runoff water on the ground's surface flows by gravity, a watershed boundary may be a ridge or the top of a hill, where a raindrop falling on one side will flow towards one river, and a raindrop on the other side will flow towards a different lake or river. By contrast, the boundaries for groundwater aquifers may not be determined by topography alone The concept of "groundwatershed" is more complex and far more difficult to map. However, it generally refers to the area that contributes to a particular aquifer or water-bearing zone with an aquifer complex.

Surface waters are defined as above-ground water sources, including lakes, streams, rivers and wetlands. Groundwater is water that has percolated into the ground and occupies the spaces between soil particles or rock cracks and fissures. Both sources are vulnerable to contamination from industrial, agricultural or municipal sources.

Physical Geography

The geography of a region plays an important role in the water cycle. Topography and relief affect the flow of surface runoff; soil type determines the rate of infiltration into the groundwater system, erosion/sedimentation, and land use; and geology determines what happens to the groundwater and how the groundwater and surface water systems interact.

Topography

The topography of the IRWBC watershed is such that the highest point is in the west, with the land generally sloping toward Lake Winnipeg in the east. The land is flat to rolling. The major topographic features are the presence of Lake Manitoba to the West, and Lake Winnipeg to the North and East.

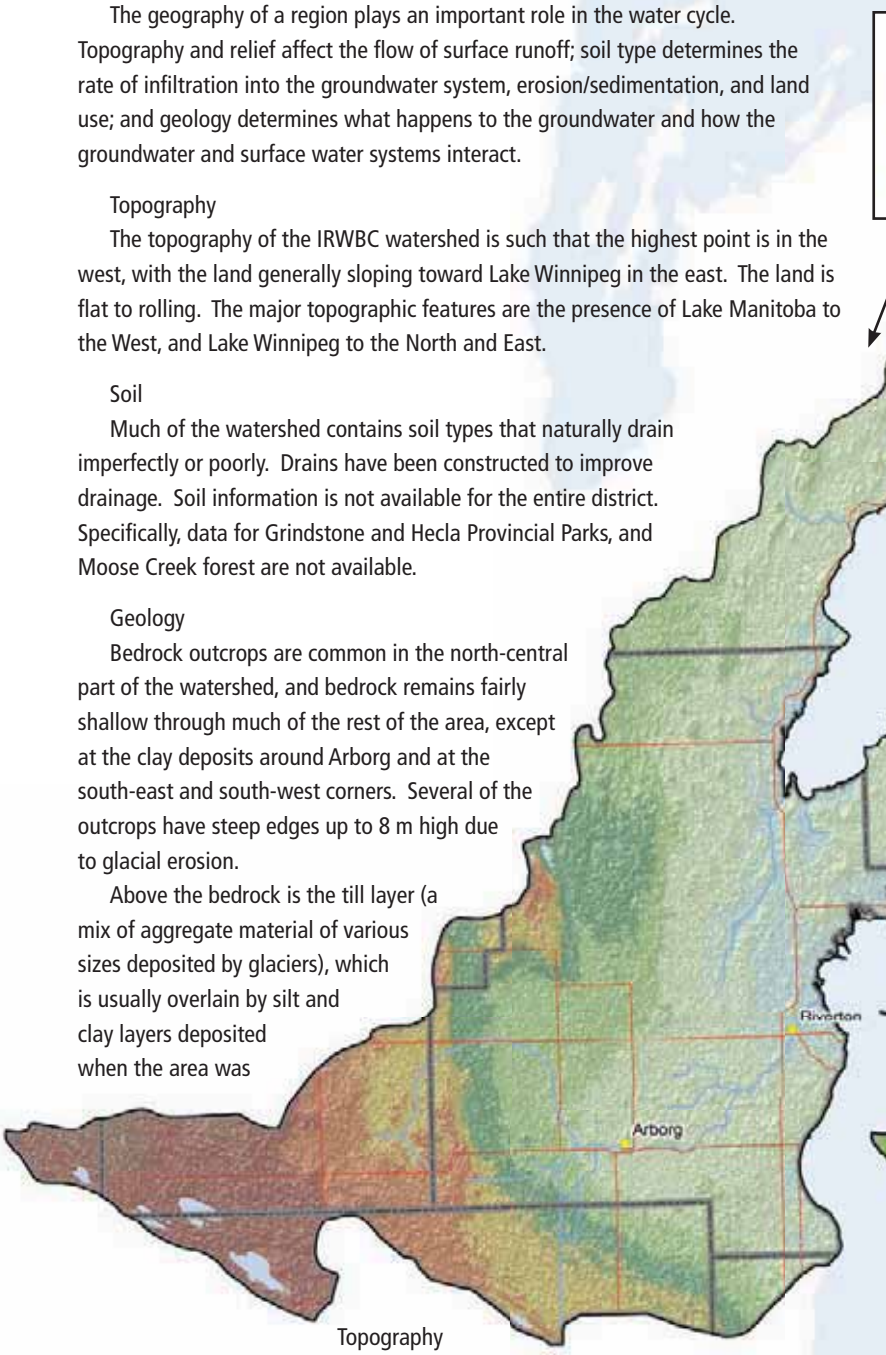
Soil

Much of the watershed contains soil types that naturally drain imperfectly or poorly. Drains have been constructed to improve drainage. Soil information is not available for the entire district. Specifically, data for Grindstone and Hecla Provincial Parks, and Moose Creek forest are not available.

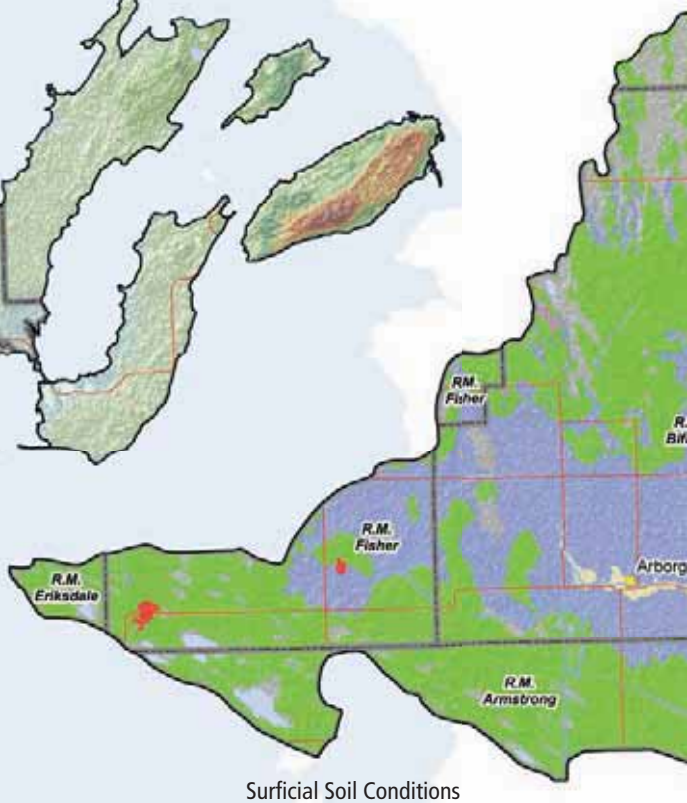
Geology

Bedrock outcrops are common in the north-central part of the watershed, and bedrock remains fairly shallow through much of the rest of the area, except at the clay deposits around Arborg and at the south-east and south-west corners. Several of the outcrops have steep edges up to 8 m high due to glacial erosion.

Above the bedrock is the till layer (a mix of aggregate material of various sizes deposited by glaciers), which is usually overlain by silt and clay layers deposited when the area was



Topography

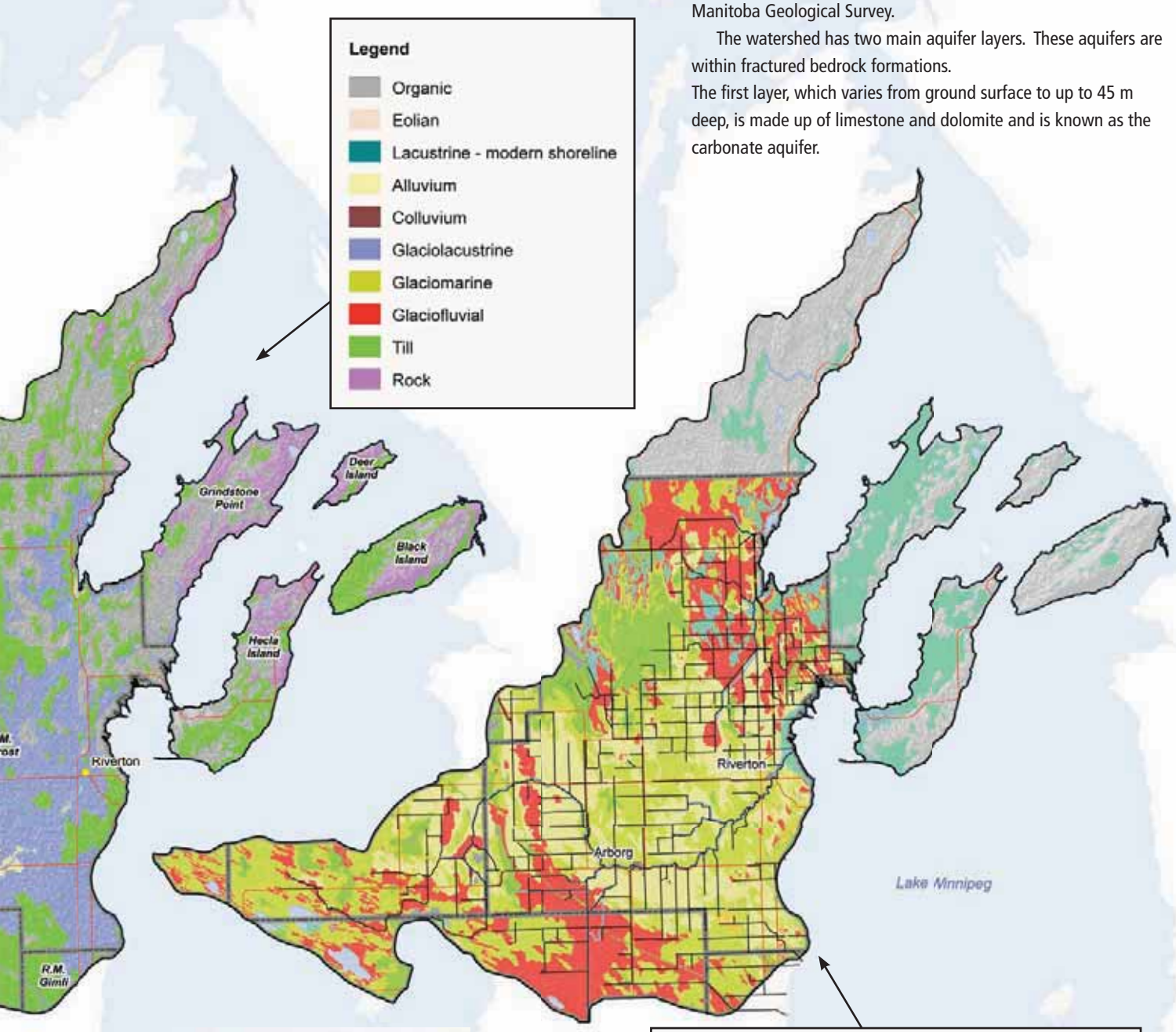


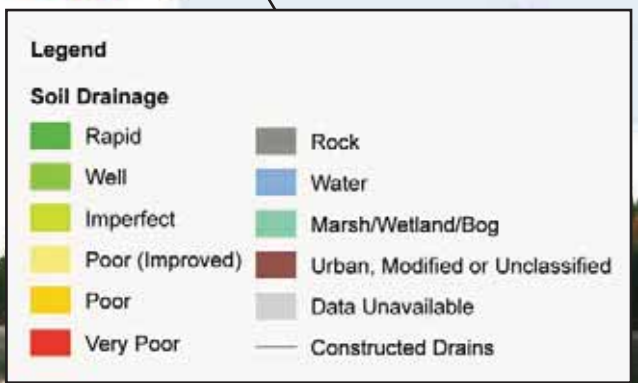
Surficial Soil Conditions

affected by moving glaciers and was part of a lake (glaciolacustrine). Geological information has been provided primarily from the Manitoba Geological Survey.

The watershed has two main aquifer layers. These aquifers are within fractured bedrock formations.

The first layer, which varies from ground surface to up to 45 m deep, is made up of limestone and dolomite and is known as the carbonate aquifer.





Climate

Climate is a description of a region's average long term weather patterns. It includes factors like temperature, precipitation, sunshine, and wind patterns.

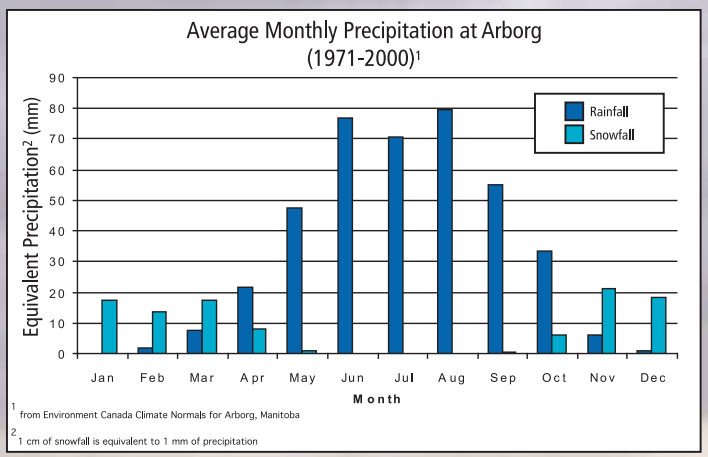
The IRWBC watershed is part of the Interlake Plain ecoregion, which is part of the Boreal Plains ecozone. The terms ecoregion and ecozone refer to large areas of land that share common characteristics in terms of climate, topography, and plant and animal species. This ecozone is relatively humid and has a mean annual temperature of around freezing. Winters are cold, and summers are warm but short. The mean annual precipitation is about 500mm, and the potential mean annual gross evaporation (i.e. evaporation from an open lake) is about 550mm.

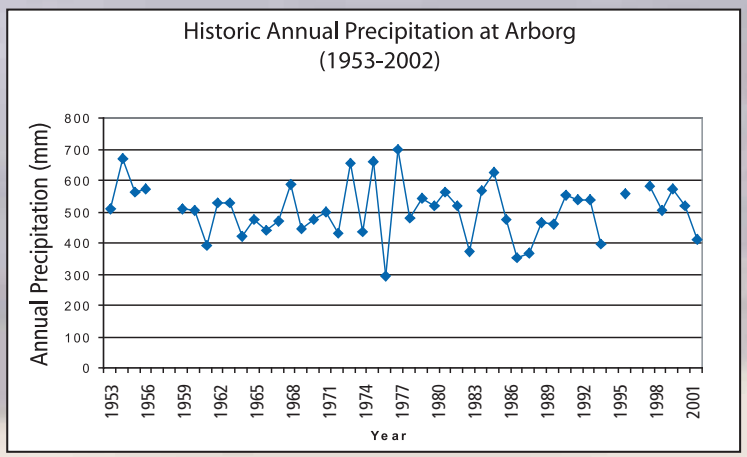
The main climate station in the IRWBC watershed is located at Arborg. Temperature data from the Arborg station is available from the early 1960's. Precipitation data is available from 1953.

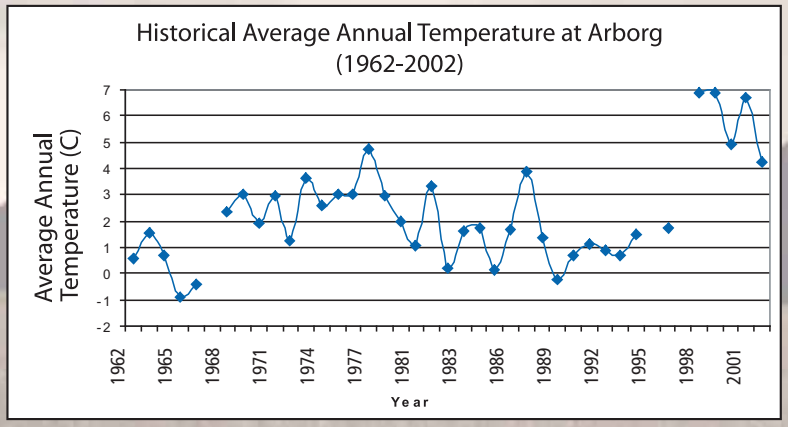
Monthly Climate Normals for Arborg

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Daily Average Temperature (°C)	-19.8	-15.4	-7.9	2.6	10.5	15.7	18.3	17.1	11	4.1	-6.3	-16.2	1.1
Average Precipitation (mm)	17.5	15.8	25.1	29.9	48.4	76.9	70.9	79.7	55.8	39.6	27.3	19.2	506.1

Norms for Arborg (1971-2000) from Environment Canada







Plants and Wildlife

The IRWBC watershed hosts a large variety of ecosystems, with mixed wood forests and bogs in the north; hardwood forest, marshes, and wet meadows near Lake Winnipeg; and small aspen woodlots and pastures in the south. The highest concentrations of moose are on Grindstone Point and along Fisher Bay, there is an important elk wintering area at the extreme west of the district, and the marshes at Washow Bay and Riverton are very important waterfowl staging areas.

There are four designated Wildlife Management Areas (WMAs) on crown lands of which all or part fall within the watershed: Moose Creek WMA (for ungulates birds, and furbearers), Lee Lake WMA (for Canada Geese), Washow Bay WMA (for waterfowl), and Rembrandt WMA (for white-tailed deer and ruffed grouse).

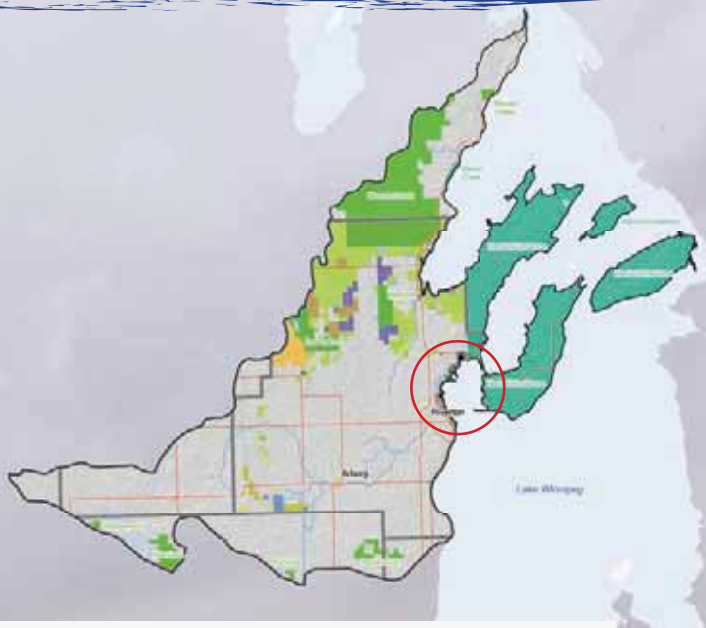
Riparian zones (i.e. the vegetated areas around rivers and lakes) are another important area for plant and animal populations. Within a watershed, the ecosystems on land and the ecosystems in water are connected, and the riparian zones provide that transitional habitat. These connections include the food chain, nutrient cycling, biodiversity, and the water cycle. Birds use these areas for nesting and wildlife uses it as a corridor to travel between habitats. Forests, grasslands, wetlands, and bank areas all play a vital role in lake and river health. The health and ability of an eco-system to deal with environmental stress is affected by its size, amount, species diversity, relative location and connection to other ecosystems, and surrounding land uses.

The Manitoba Conservation Data Centre (CDC) collects plant and animal data for the entire province of Manitoba. It develops lists of species found in Manitoba, and then assigns a conservation ranking to indicate how common or vulnerable that particular species is within the province.

The IRWBC watershed is home to some unique plant species. The following plants within the watershed are classified by the Manitoba CDC as "very rare" or "rare":

Very Rare
- Eleocharis engelmannii (Engelmann's Spike-rush)
- Stipa richardsonii (Richardson Needle Grass)

Rare
- Platanthera lacera (Fringed Orchid)
- Calopogon pulchellus (Swamp-pink)
- Carex tetanica (Rigid Sedge)
- Pyrola rotundifolia (Round-leaved Pyrola)
- Cypripedium arietinum (Ram's Head Lady's-slipper)
- Carex projecta (Necklace Sedge)



The Charadrius melodus (Piping Plover) is "very rare" in the province of Manitoba, and is a nationally endangered species. Riverton Sandy Bar peninsula provides breeding and nesting grounds for this shorebird. In recent years high lake levels and disturbance from All Terrain Vehicles have had an adverse impact on this critical habitat.

Surface Water Quantity (Hydrology)

The IRWBC watershed is part of the Western Lake Winnipeg drainage basin, which in turn is part of the Hudson's Bay watershed.

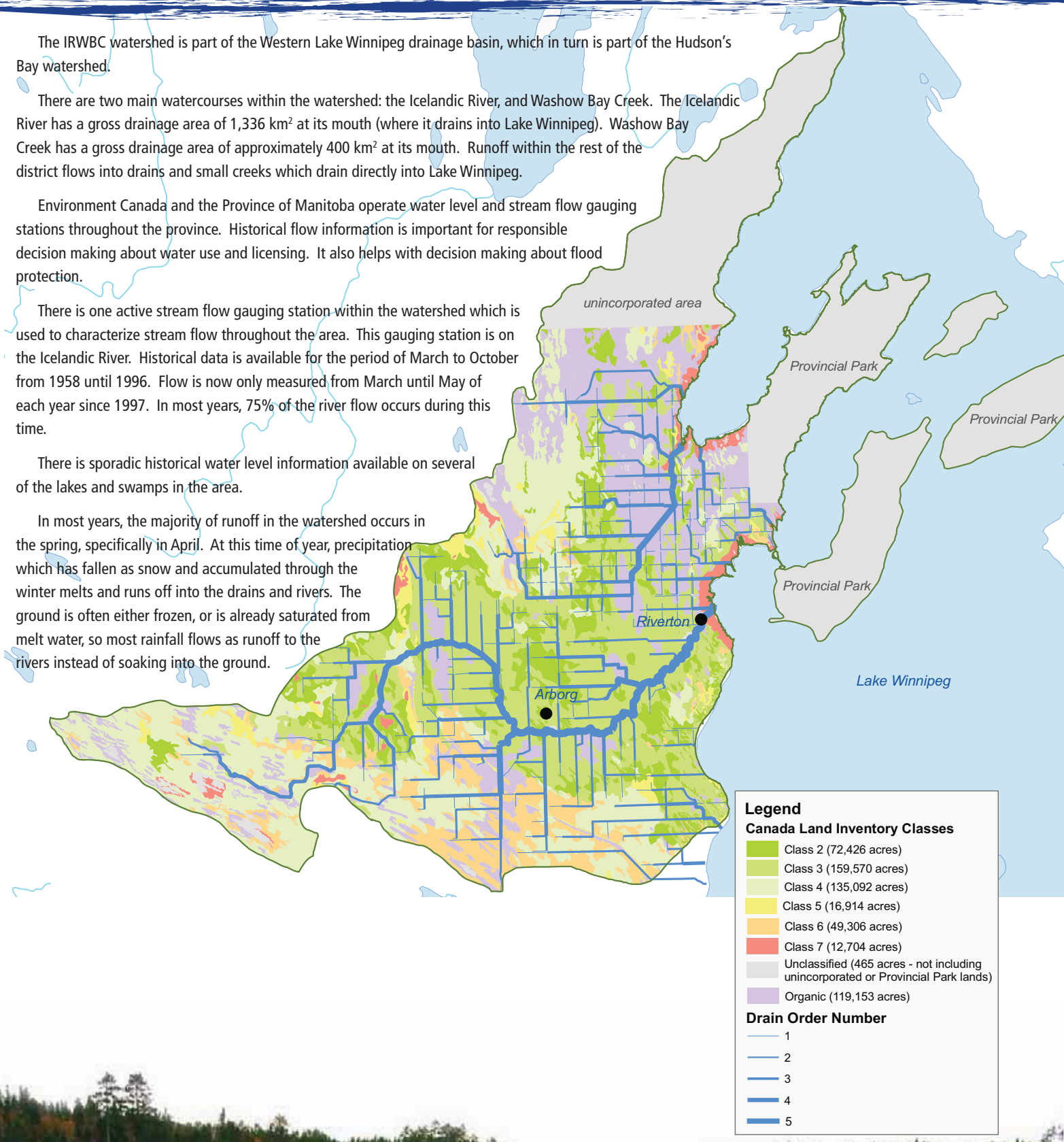
There are two main watercourses within the watershed: the Icelandic River, and Washow Bay Creek. The Icelandic River has a gross drainage area of 1,336 km^2 at its mouth (where it drains into Lake Winnipeg). Washow Bay Creek has a gross drainage area of approximately 400 km^2 at its mouth. Runoff within the rest of the district flows into drains and small creeks which drain directly into Lake Winnipeg.

Environment Canada and the Province of Manitoba operate water level and stream flow gauging stations throughout the province. Historical flow information is important for responsible decision making about water use and licensing. It also helps with decision making about flood protection.

There is one active stream flow gauging station within the watershed which is used to characterize stream flow throughout the area. This gauging station is on the Icelandic River. Historical data is available for the period of March to October from 1958 until 1996. Flow is now only measured from March until May of each year since 1997. In most years, 75% of the river flow occurs during this time.

There is sporadic historical water level information available on several of the lakes and swamps in the area.

In most years, the majority of runoff in the watershed occurs in the spring, specifically in April. At this time of year, precipitation which has fallen as snow and accumulated through the winter melts and runs off into the drains and rivers. The ground is often either frozen, or is already saturated from melt water, so most rainfall flows as runoff to the rivers instead of soaking into the ground.



The Agricultural Drainage Network

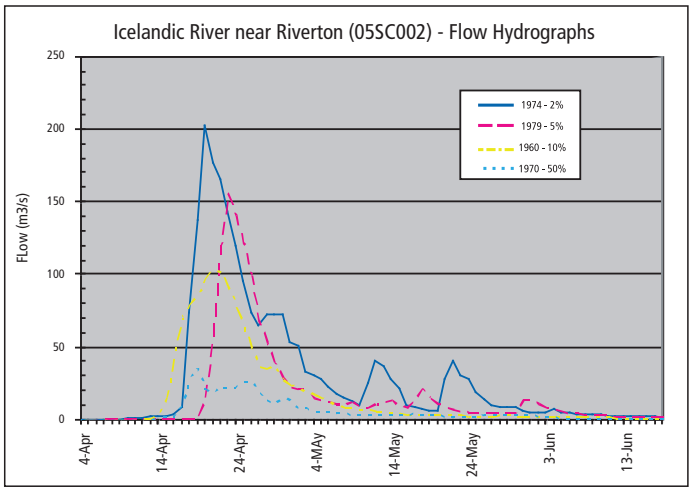
The agricultural drainage network is designed to remove excess rainfall from cropland during the growing season and is based on the productive capability of the soil and on technical, economic, and environmental factors. Drainage, and the lack of resources dedicated to the maintenance and reconstruction of existing works, has long been an issue throughout agricultural areas. Required drainage system capacity has been increasing due to an increase in the amount of land used for crop production, greater planting levels in specialty crops, improved on-farm infrastructure and urban development into agricultural areas. A general increase in farm size and landowners' abilities to alter runoff has also aggravated the situation.

Drains are classified in terms of order. Drains in this watershed range in size from 1st order to 5th order – the higher the number being the largest size of drain. Municipalities, towns and villages typically maintain 1st and 2nd order drains, whereas the Province of Manitoba typically construct and maintain 3rd to 5th order drains, however, all property in, and all rights to the use, diversion or control of all water in the province in vested in the Crown in right of Manitoba. All drainage works (other than those owned by the Province) in the province are subject to the jurisdiction of the Water Rights Act.

Agricultural Capability

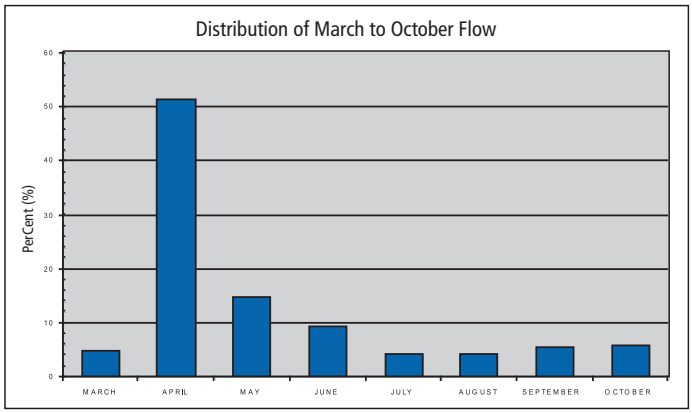
The Canada Land Inventory (CLI) soil capability classification for agriculture may be used as an indicator of the agricultural potential capability within the watershed. This classification system was developed in 1965 and subdivides the mineral soils into seven classes according to their potentialities and limitations for agricultural use.

Soil Classes 1 to 3 represent the prime agricultural land capable of sustained production of common cultivated crops, Class 4 is considered marginal for sustained cultivation, Class 5 is considered capable of perennial forages and improvement is feasible, however this class is primarily pasture and hay, Class 6 is capable of producing native forages and pasture but improvement is not feasible, while Class 7 soils are considered unsuitable for dryland agriculture and incapable for use. The majority of land in the Icelandic River and Washow Bay watershed is classified as Class 3, followed by Class 4, then Class 2.



Frequency of Flood Flows for the Icelandic River (05SC002)

Flood Frequency	Annual Peak Discharge (m3/s)	Annual Runoff Volume (dam3)	Unit Runoff (dam3/km2/year))
1%	245.6	238,200	192.6
2%	201.2	195,300	157.9
5%	147.4	144,400	116.8
!0%	110.3	109,800	88.8
50%	35.9	40,310	32.6
80%	15.7	20,220	16.3
90%	9.9	13,950	11.3



Surface Water Quality

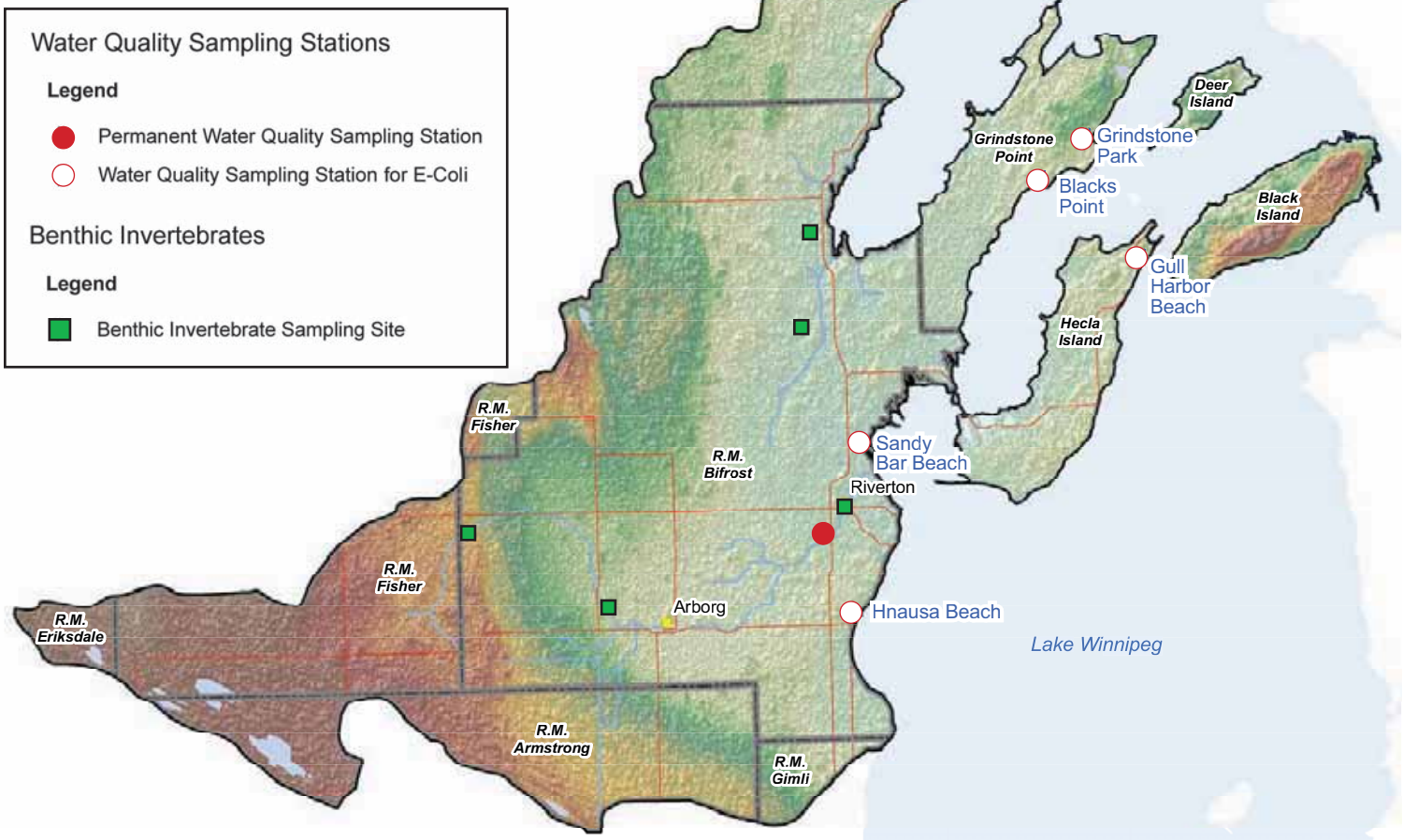
Recreational water quality within the IRWBC watershed along the shores of Lake Winnipeg is generally excellent, making it an excellent location for swimming and water-skiing. The water quality in the Icelandic River is generally classified as fair to good.

One water quality concern for people using the water, whether as drinking water or for recreational use, is microbial pathogens. Most waterborne pathogens of concern in the prairies come from the gut of warm-blooded animals and are most often introduced into a water source through fecal contamination. This contamination may be from a variety of sources such as livestock (e.g. runoff from pastures into drains), agriculture (e.g. runoff after manure application) human waste (e.g. septic tanks too close to the water source, insufficiently treated wastewater discharged into a river), or natural sources (e.g. beavers, ducks, deer). The indicator species used to test for contamination *Escherichia coli,* or E. coli.

Research has shown that less than 10 percent of the E. coli at Lake Winnipeg beaches is from human sources, with the remaining contribution from birds and other animals.

What can I do to help protect water quality?

- Maintain natural vegetation to create a buffer along drains and waterways
- Maintain wetlands
- Avoid using fertilizer close to waterways
- Use phosphate-free soaps and detergents
- Properly operate and maintain septic systems



There are five beaches in the EICD which are regularly sampled for *E-coli*: Blackpoint Beach, Grindstone Park Beach, Gull Harbour Beach, Sandy Bar Beach, and Hnausa Provincial Park Beach. These beaches all generally have excellent recreational water quality during calm weather. However, all but Blackpoint Beach show high *E-coli* counts during poor weather, when the winds are high and the water levels rising. At these times, bacteria in the beach sand are washed into the swimming areas. More than 90% of the *E-coli* at Lake Winnipeg beaches are from birds and animals.

One of the most important water quality issues in the province of Manitoba is nutrient loading. Nutrient loading (excess Nitrogen and Phosphorus) into rivers can cause eutrophication, which is an overload of algae and other aquatic plants. This can lead to low levels of oxygen in the water, changes in fish habitat, problems at water treatment facilities, taste and odour problems with treated water, decreased recreational possibilities, and, in the case of blue-green algae, even be toxic.

Historically, the Icelandic River has had low oxygen levels from February to April. Studies in 1995 and 1996 showed high nutrient loading in the spring during the melt, but this decreased by summer to result in fair to good water quality. However, with the exception of one site, none of the measurements taken in a new study in 2006 within the Icelandic River and associated drains met Manitoba Water Quality Objectives for the protection of aquatic life. They had low levels of oxygen and high pH during the bimonthly sampling, in May, July, and October.

Until 2006, water quality in the IRWBC watershed was only monitored as part of short term studies or in response to environmental emergencies. A long term water quality monitoring station was established on the Icelandic River by Manitoba Stewardship's Water Quality Section in 2006. Water will be tested 4 times a year for a wide variety of variables including: E-coli, nutrients (i.e. phosphorus and nitrogen), metals, pesticides, and total suspended solids (TSS).

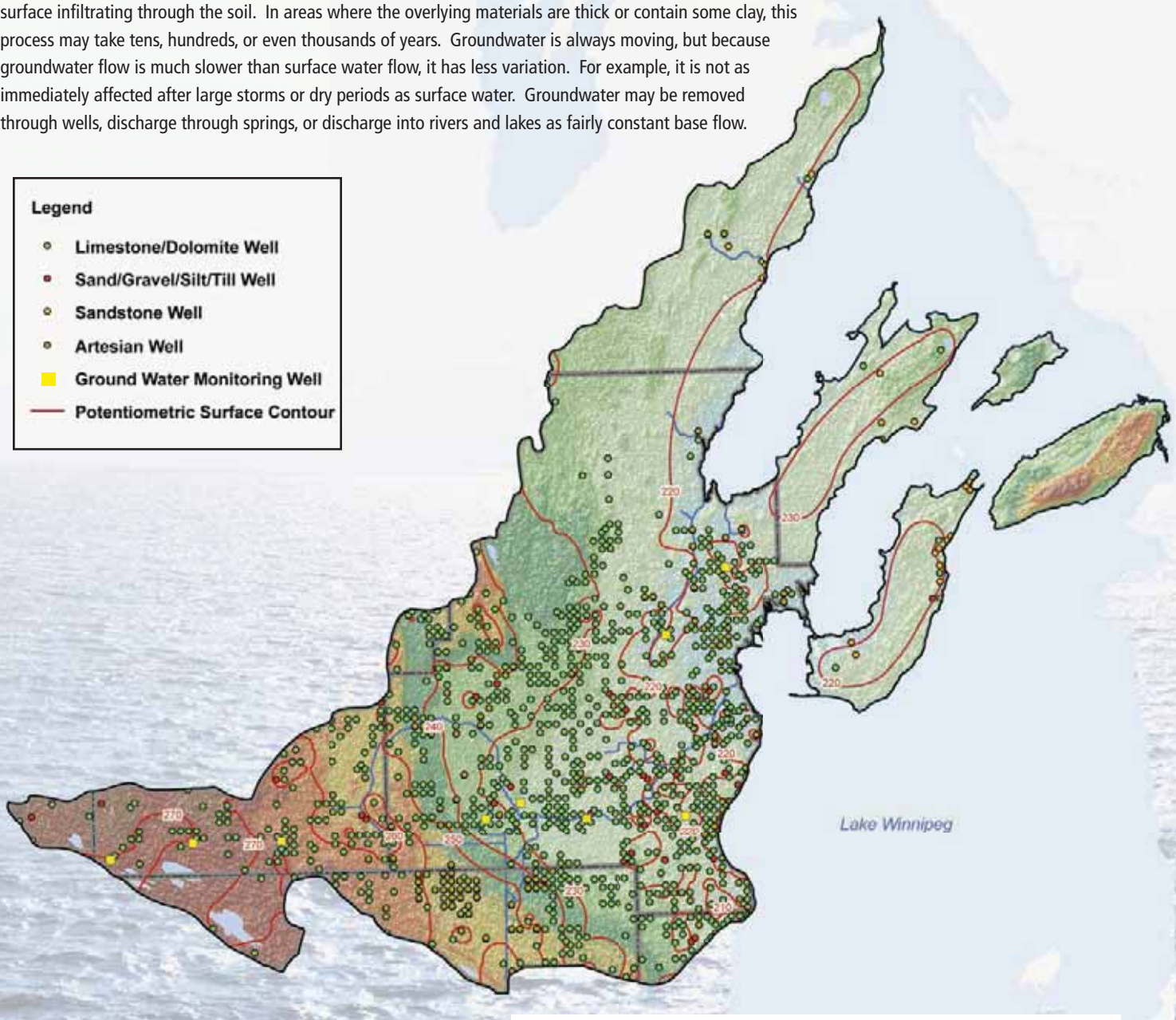
Benthic Macroinvertebrates

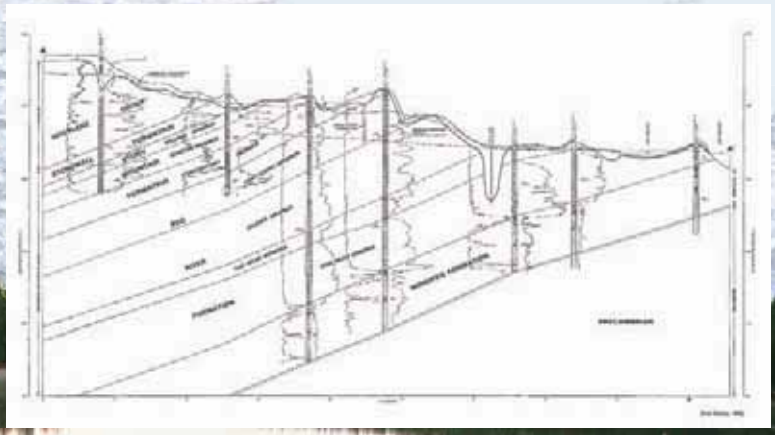
The term "freshwater benthic macroinvertebrates" describes aquatic creatures which are greater than 0.5mm long and have no backbones, such as crayfish, clams, snails, and mayfly nymphs. They are an important part of the aquatic eco-system and play a major role in the food chain in and of themselves, but are mainly studied because they are good water quality indicators. Different species have different tolerance levels to pollution, so the presence or absence of specific species, and how this changes over time, is a good indicator of a river's health.

In 2006, the East Interlake Conservation District commissioned a study to develop standard protocols for a long term monitoring program of benthic macroinvertebrates. Seven sites were chosen for the long term program. As this program has only collected one year of data to date, it is not yet possible to comment on any trends.

Groundwater

Groundwater is the water flowing in the ground below the water table. It is recharged by water from the surface infiltrating through the soil. In areas where the overlying materials are thick or contain some clay, this process may take tens, hundreds, or even thousands of years. Groundwater is always moving, but because groundwater flow is much slower than surface water flow, it has less variation. For example, it is not as immediately affected after large storms or dry periods as surface water. Groundwater may be removed through wells, discharge through springs, or discharge into rivers and lakes as fairly constant base flow.



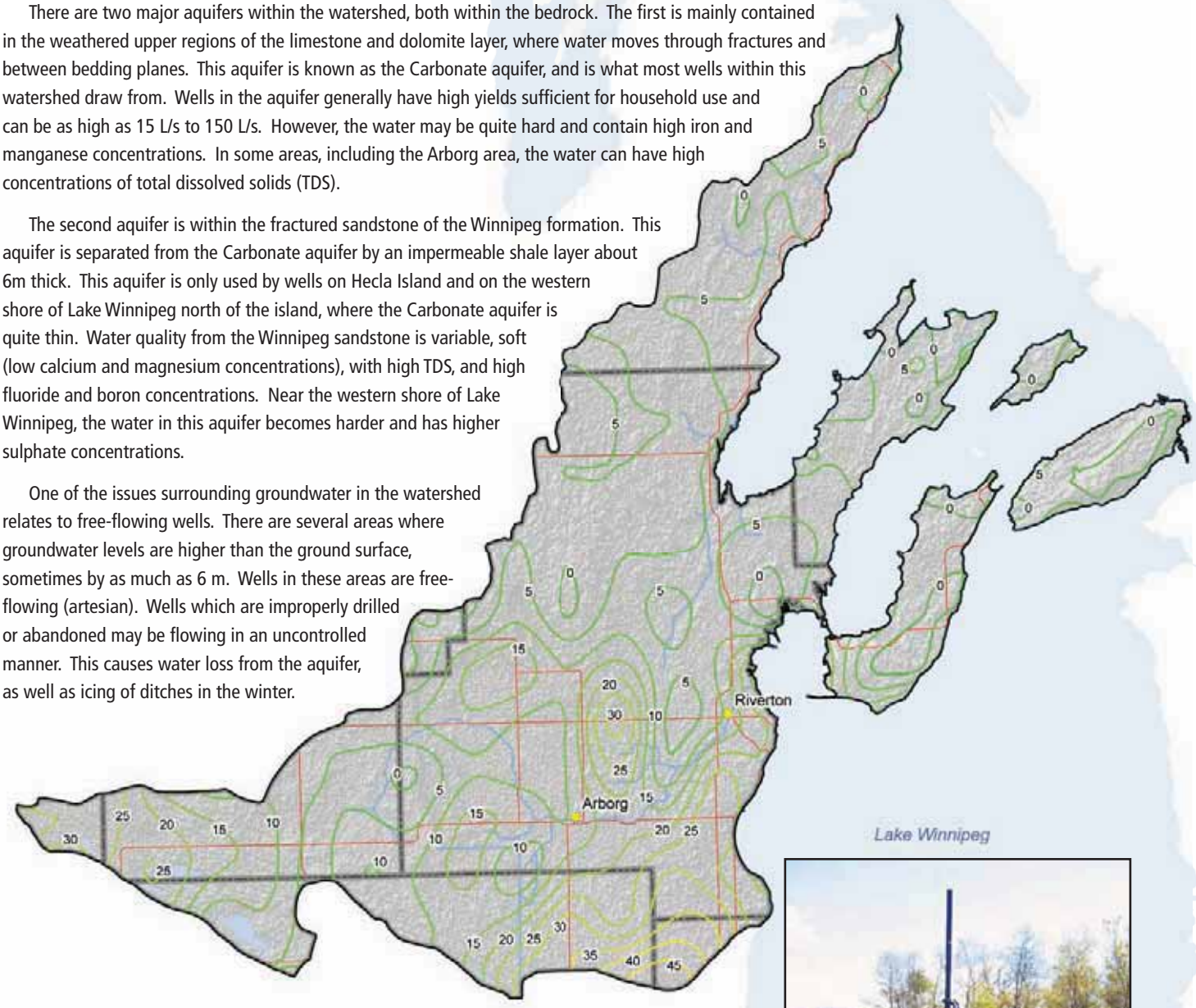


Groundwater is monitored by the Groundwater Management Section of Manitoba Water Stewardship. They operate 9 groundwater level monitoring wells within the IRWBC watershed, most of which have records dating back to the mid-1960s. There is one water quality monitoring well which was installed in 2000. There have also been several point-in-time studies of groundwater within the EICD which involved sampling of additional wells.

There are two major aquifers within the watershed, both within the bedrock. The first is mainly contained in the weathered upper regions of the limestone and dolomite layer, where water moves through fractures and between bedding planes. This aquifer is known as the Carbonate aquifer, and is what most wells within this watershed draw from. Wells in the aquifer generally have high yields sufficient for household use and can be as high as 15 L/s to 150 L/s. However, the water may be quite hard and contain high iron and manganese concentrations. In some areas, including the Arborg area, the water can have high concentrations of total dissolved solids (TDS).

The second aquifer is within the fractured sandstone of the Winnipeg formation. This aquifer is separated from the Carbonate aquifer by an impermeable shale layer about 6m thick. This aquifer is only used by wells on Hecla Island and on the western shore of Lake Winnipeg north of the island, where the Carbonate aquifer is quite thin. Water quality from the Winnipeg sandstone is variable, soft (low calcium and magnesium concentrations), with high TDS, and high fluoride and boron concentrations. Near the western shore of Lake Winnipeg, the water in this aquifer becomes harder and has higher sulphate concentrations.

One of the issues surrounding groundwater in the watershed relates to free-flowing wells. There are several areas where groundwater levels are higher than the ground surface, sometimes by as much as 6 m. Wells in these areas are free-flowing (artesian). Wells which are improperly drilled or abandoned may be flowing in an uncontrolled manner. This causes water loss from the aquifer, as well as icing of ditches in the winter.



Another potential concern is areas where the groundwater table is close to the ground surface. If the overlying materials are very permeable, meaning that water easily flows through it, the underlying aquifer may be vulnerable to contamination from local land activities.

Water Use & Waste Water Discharge

There are two public water supply systems within the IRWBC watershed, both of which use groundwater from the carbonate rock aquifer and both of which are Class 1 Treatment and Distribution facilities under the Water and Wastewater Facility Operators Certificate Program. Before treatment, the groundwater is very hard and has high iron content. After treatment, water from the Arborg plant meets the physical, chemical, and bacteriological requirements in the "Guidelines for Canadian Drinking Water Quality". Water from the Hecla plant meets all biological and physical guidelines as well as all chemical guidelines with the exception of iron.

Source Water Protection and Monitoring

There are no agricultural, livestock, or industrial activities near the wells in the public systems which could lead to contamination and the system maintains a chlorine residual to prevent contamination in the distribution system. The water from both public water supply systems is regularly tested in accordance with the Drinking Water Safety Act of Manitoba, which came into effect in March of 2007. Samples are taken daily from the water treatment plants to measure the chlorine residual, and biweekly from the source water, the treatment plant, and the distribution system for a bacteriological analysis.

The town of Arborg has two water wells which supply approximately 1,000 residents year-round. The storage reservoirs have a capacity of 2,046 m^3, and the plant supplies an average of 10,450 m^3 of water per month. There are also approximately 50 private wells in the area.

Treatment Process

Pre-Chlorination → **Filtration** → **Storage** → **Post-Chlorination** → **Distribution**

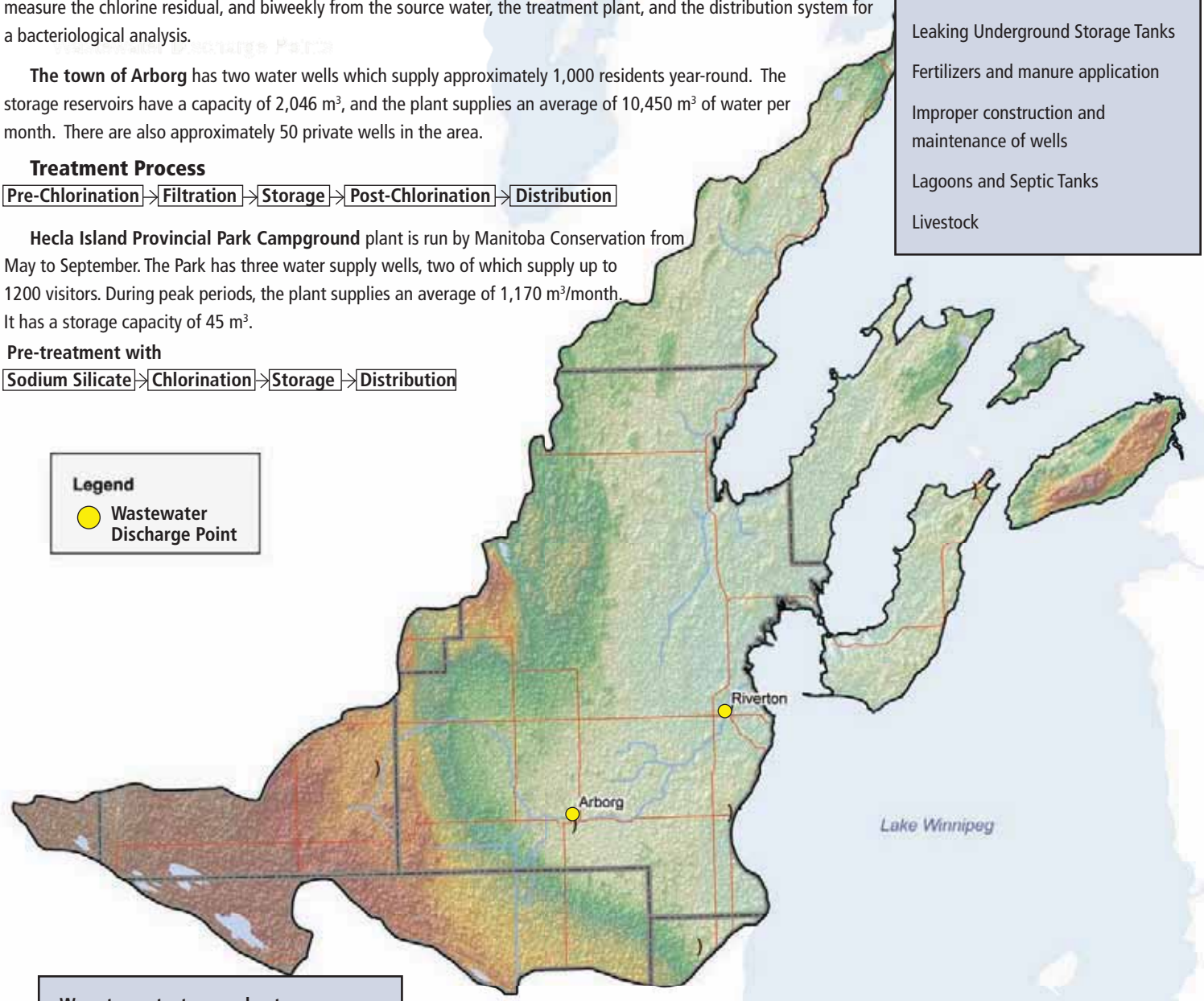
Hecla Island Provincial Park Campground plant is run by Manitoba Conservation from May to September. The Park has three water supply wells, two of which supply up to 1200 visitors. During peak periods, the plant supplies an average of 1,170 m^3/month. It has a storage capacity of 45 m^3.

Pre-treatment with

Sodium Silicate → **Chlorination** → **Storage** → **Distribution**

Ways that groundwater can become contaminated

- Abandoned wells
- Sinkholes
- Leaking Underground Storage Tanks
- Fertilizers and manure application
- Improper construction and maintenance of wells
- Lagoons and Septic Tanks
- Livestock



Ways to protect groundwater

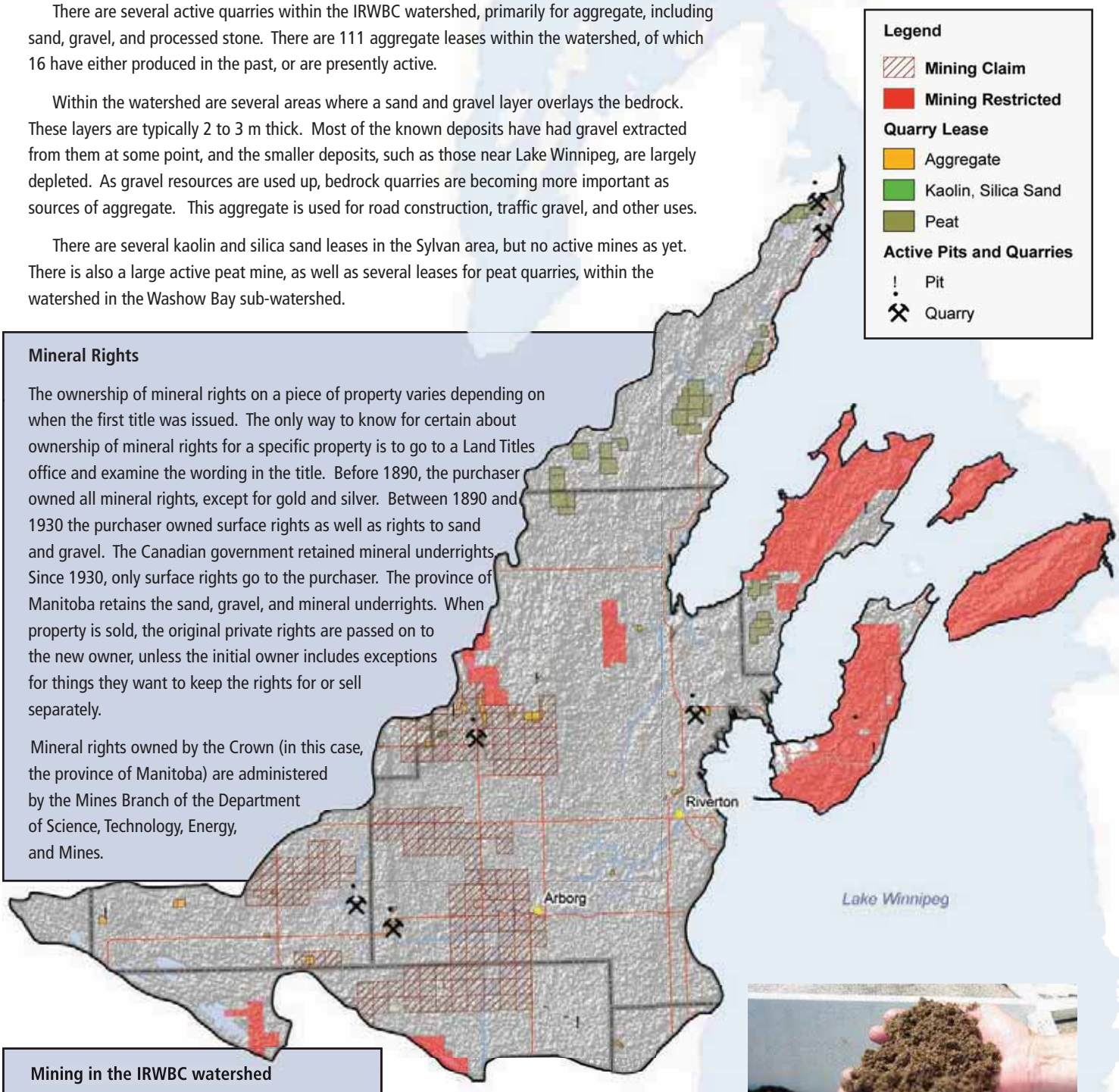
- Limit potentially contaminating activities near groundwater wells
- Properly seal abandoned wells
- Upgrade wells in pits
- Identify sinkholes and prevent contaminated water from draining to them

Mining

There are several active quarries within the IRWBC watershed, primarily for aggregate, including sand, gravel, and processed stone. There are 111 aggregate leases within the watershed, of which 16 have either produced in the past, or are presently active.

Within the watershed are several areas where a sand and gravel layer overlays the bedrock. These layers are typically 2 to 3 m thick. Most of the known deposits have had gravel extracted from them at some point, and the smaller deposits, such as those near Lake Winnipeg, are largely depleted. As gravel resources are used up, bedrock quarries are becoming more important as sources of aggregate. This aggregate is used for road construction, traffic gravel, and other uses.

There are several kaolin and silica sand leases in the Sylvan area, but no active mines as yet. There is also a large active peat mine, as well as several leases for peat quarries, within the watershed in the Washow Bay sub-watershed.



Mineral Rights

The ownership of mineral rights on a piece of property varies depending on when the first title was issued. The only way to know for certain about ownership of mineral rights for a specific property is to go to a Land Titles office and examine the wording in the title. Before 1890, the purchaser owned all mineral rights, except for gold and silver. Between 1890 and 1930 the purchaser owned surface rights as well as rights to sand and gravel. The Canadian government retained mineral underrights. Since 1930, only surface rights go to the purchaser. The province of Manitoba retains the sand, gravel, and mineral underrights. When property is sold, the original private rights are passed on to the new owner, unless the initial owner includes exceptions for things they want to keep the rights for or sell separately.

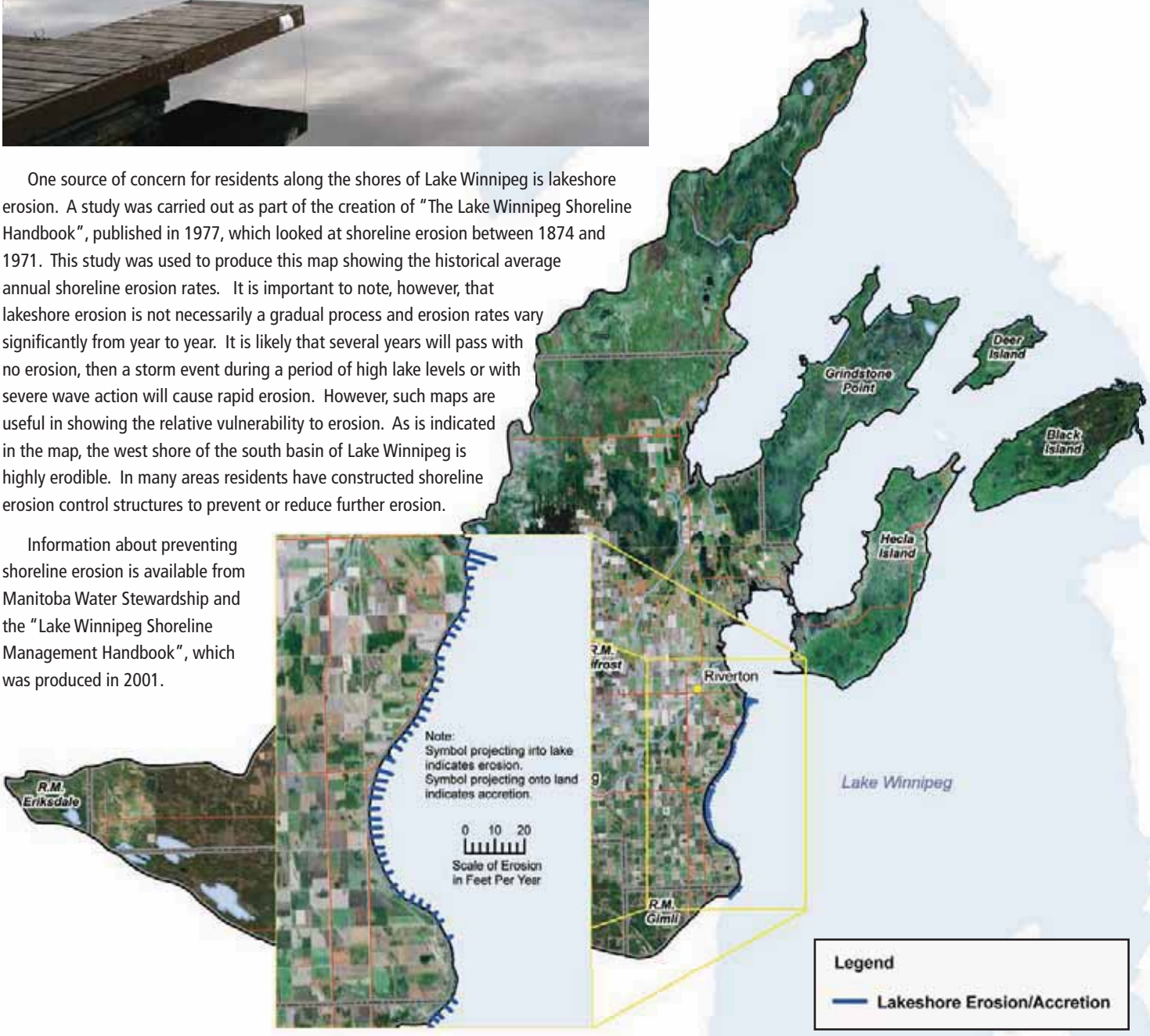
Mineral rights owned by the Crown (in this case, the province of Manitoba) are administered by the Mines Branch of the Department of Science, Technology, Energy, and Mines.

Mining in the IRWBC watershed

There are 9 active bedrock quarries within the watershed, and 7 active commercial gravel pits.

One source of concern for residents along the shores of Lake Winnipeg is lakeshore erosion. A study was carried out as part of the creation of "The Lake Winnipeg Shoreline Handbook", published in 1977, which looked at shoreline erosion between 1874 and 1971. This study was used to produce this map showing the historical average annual shoreline erosion rates. It is important to note, however, that lakeshore erosion is not necessarily a gradual process and erosion rates vary significantly from year to year. It is likely that several years will pass with no erosion, then a storm event during a period of high lake levels or with severe wave action will cause rapid erosion. However, such maps are useful in showing the relative vulnerability to erosion. As is indicated in the map, the west shore of the south basin of Lake Winnipeg is highly erodible. In many areas residents have constructed shoreline erosion control structures to prevent or reduce further erosion.

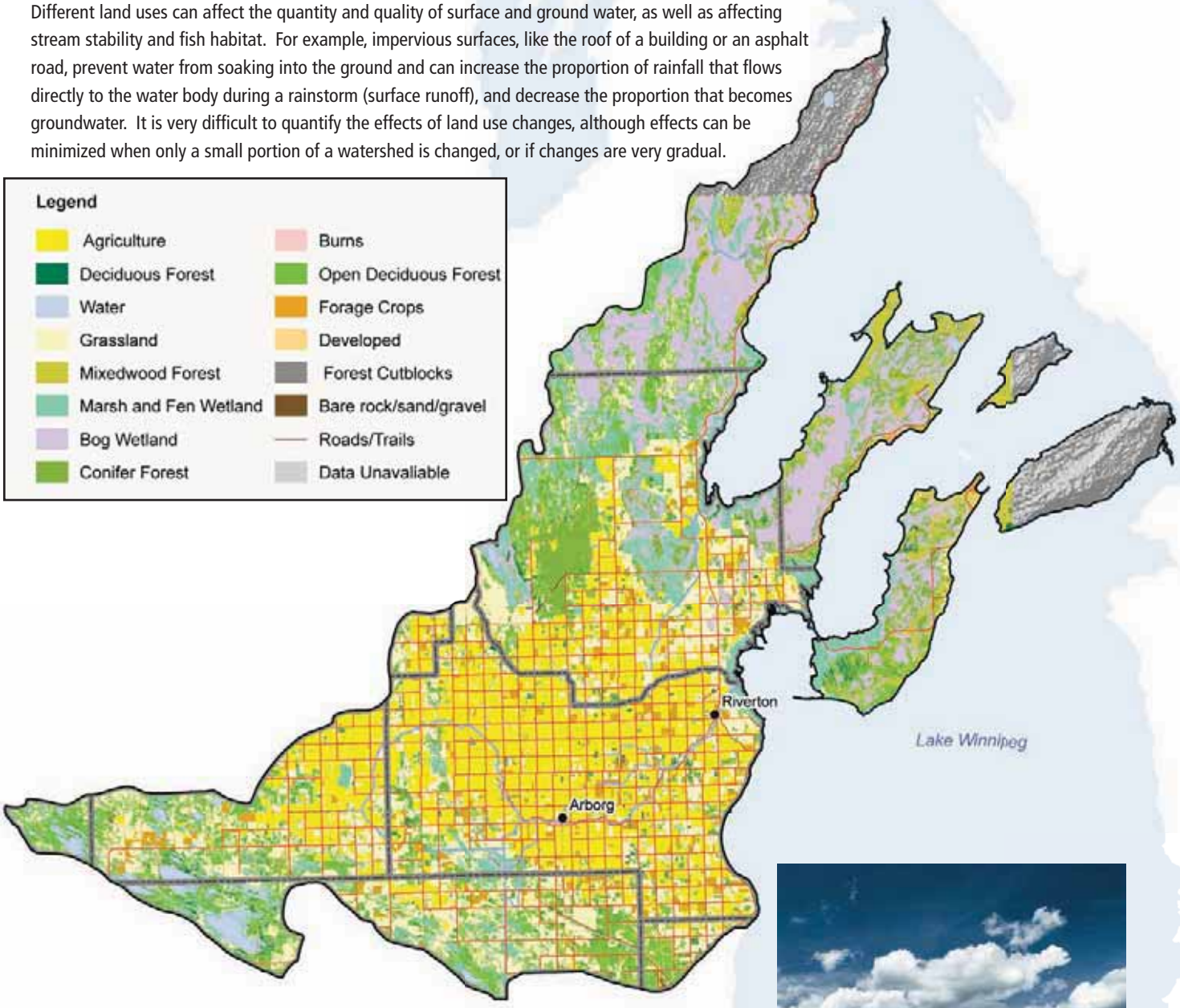
Information about preventing shoreline erosion is available from Manitoba Water Stewardship and the "Lake Winnipeg Shoreline Management Handbook", which was produced in 2001.



Land Use

The main land use within the IRWBC watershed is agriculture, including pasture, crops, and hay. However, there are also aggregate and peat mines, highways and communities, and crown lands (such as provincial parks), within the district.

The land use activities within a watershed have a significant potential effect on rivers and lakes. Different land uses can affect the quantity and quality of surface and ground water, as well as affecting stream stability and fish habitat. For example, impervious surfaces, like the roof of a building or an asphalt road, prevent water from soaking into the ground and can increase the proportion of rainfall that flows directly to the water body during a rainstorm (surface runoff), and decrease the proportion that becomes groundwater. It is very difficult to quantify the effects of land use changes, although effects can be minimized when only a small portion of a watershed is changed, or if changes are very gradual.



Agriculture

Agricultural activities are key to the economy of the watershed. These activities include annual crop production, forage production, livestock (dairy, beef, hogs, poultry), and specialty operations.

Surface runoff from agricultural land with applied fertilizers or from farm land with livestock can affect the quality of water.

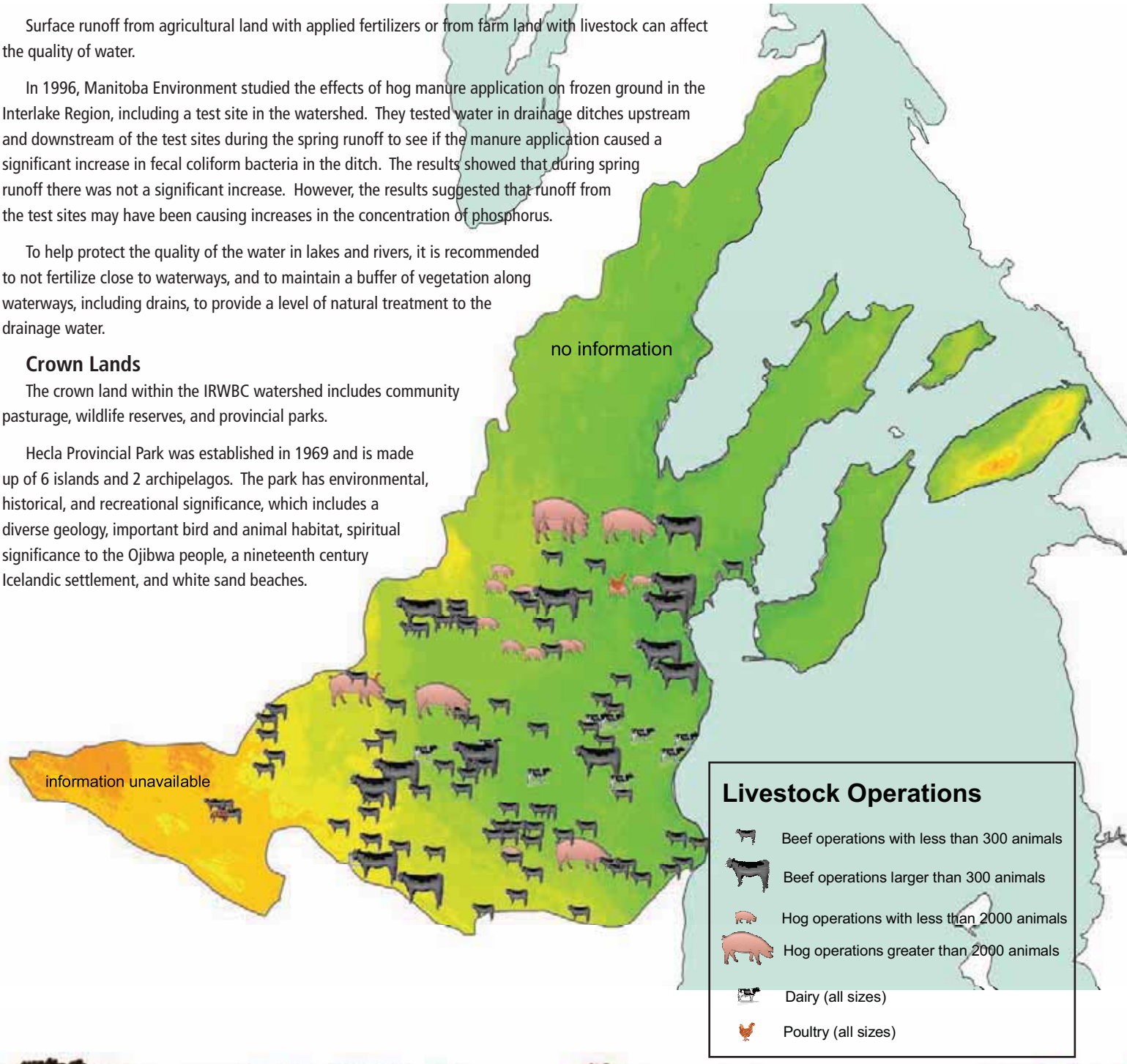
In 1996, Manitoba Environment studied the effects of hog manure application on frozen ground in the Interlake Region, including a test site in the watershed. They tested water in drainage ditches upstream and downstream of the test sites during the spring runoff to see if the manure application caused a significant increase in fecal coliform bacteria in the ditch. The results showed that during spring runoff there was not a significant increase. However, the results suggested that runoff from the test sites may have been causing increases in the concentration of phosphorus.

To help protect the quality of the water in lakes and rivers, it is recommended to not fertilize close to waterways, and to maintain a buffer of vegetation along waterways, including drains, to provide a level of natural treatment to the drainage water.

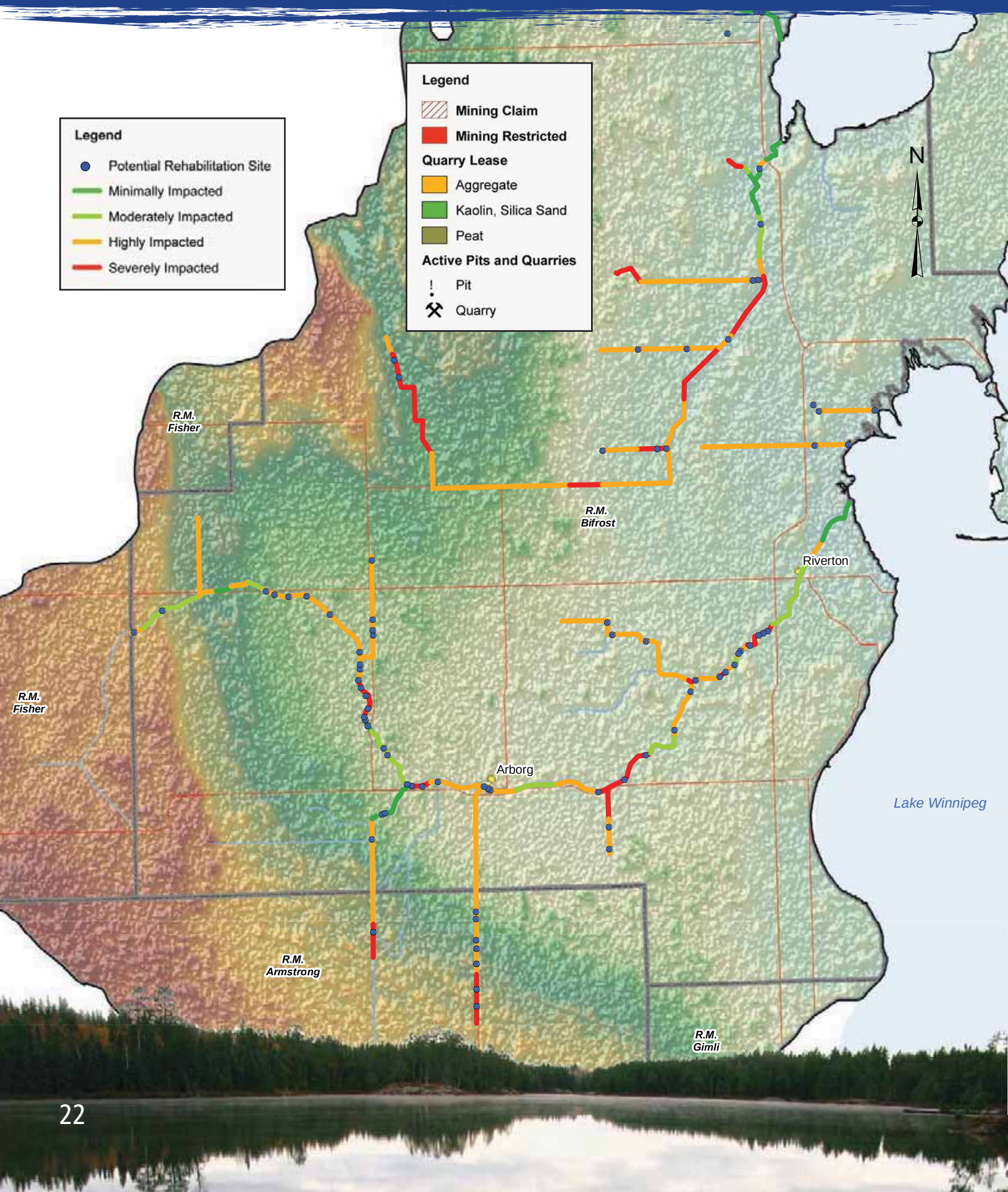
Crown Lands

The crown land within the IRWBC watershed includes community pasturage, wildlife reserves, and provincial parks.

Hecla Provincial Park was established in 1969 and is made up of 6 islands and 2 archipelagos. The park has environmental, historical, and recreational significance, which includes a diverse geology, important bird and animal habitat, spiritual significance to the Ojibwa people, a nineteenth century Icelandic settlement, and white sand beaches.



Fisheries


Legend
Potential Rehabilitation Site
Minimally Impacted
Moderately Impacted
Highly Impacted
Severely Impacted
Legend
Mining Claim
Mining Restricted
Quarry Lease
Aggregate
Kaolin, Silica Sand
Peat
Active Pits and Quarries
Pit
Quarry
N
R.M. Fisher
R.M. Bifrost
Riverton
R.M. Fisher
Arborg
Lake Winnipeg
R.M. Armstrong
R.M. Gimli

Both the Icelandic River and Washow Bay Creek offer quality spring habitat for fish, and both watercourses have historically been important walleye spawning runs.

Some of the factors that affect the quality of aquatic habitat include: water quality, depth, and velocity; channel morphology; bank vegetation and stability; and, migration barriers. Different fish species have a range of preferences and tolerances within these factors, which also vary based on their lifecycle and by season.

Polluting, straightening and channelizing streams and rivers and removing vegetation from the river banks (i.e., riparian zone) can all negatively affect fish habitat. Drains constructed to reduce flooding and remove water more quickly from the land also affect the habitat quality of a watershed in several ways. The drains usually do not have enough vegetation along their banks to stop and filter out pollutants and sediment in storm water and irrigation runoff, they have highly erosive banks that put sediment into the water and block up the spaces between rocks on the bottom of the river where fish like to lay their eggs, and they change the flow patterns by quickly transporting runoff to rivers, whereas before the water might have moved slowly or infiltrated into the groundwater instead of contributing to the flood peak.

Much of the Icelandic River has been highly impacted by channelization, migration barriers, and constructed drains within the watershed.

A study is currently underway within the IRWBC watershed that will look at the existing and available aquatic habitat conditions within the watershed watercourses and waterbodies, which fish species are currently using the existing and available aquatic habitats, when and where they are using these habitats, what threats exist to the habitats, and recommendations to protect and improve fish habitat. This report will be completed by winter 2007.

Tell Us What You Think!

The East Interlake Conservation District needs your input to ensure this plan addresses the issues and needs of watershed residents. The watershed management plan will only be successful if it is prepared with input from people who live, work and value this watershed.

The EICD is hosting an open house on Thursday

April 19th, 2007

from 5:30 pm to 9:00 pm
at the Arborg-Bifrost Community Center, in Arborg, MB

Presentations start at 6:00 pm and everyone in attendance will receive a free container of phosphorus-free dishwasher detergent as well as complementary coffee and doughnuts. We encourage everyone to attend to provide us with your ideas and issues of concern.

If you cannot attend the meeting, please submit your ideas and concerns to our office through our online questionnaire at

www.eicd.ca

Arborg	Rockwood
Armstrong	Rosser
Bifrost	St. Andrews
Dunnottar	Stonewall
Fisher	Teulon
Gimli	Winnipeg Beach
Riverton	Province of Manitoba

eicd
East Interlake Conservation District
Box 1740 Gimli, MB R0C 1B0
ph: (204) 642-7578 fx: (204) 642-7581 email: eicd@mts.net website: www.eicd.ca