## Envirothon 2006 - Winnipeg Manitoba

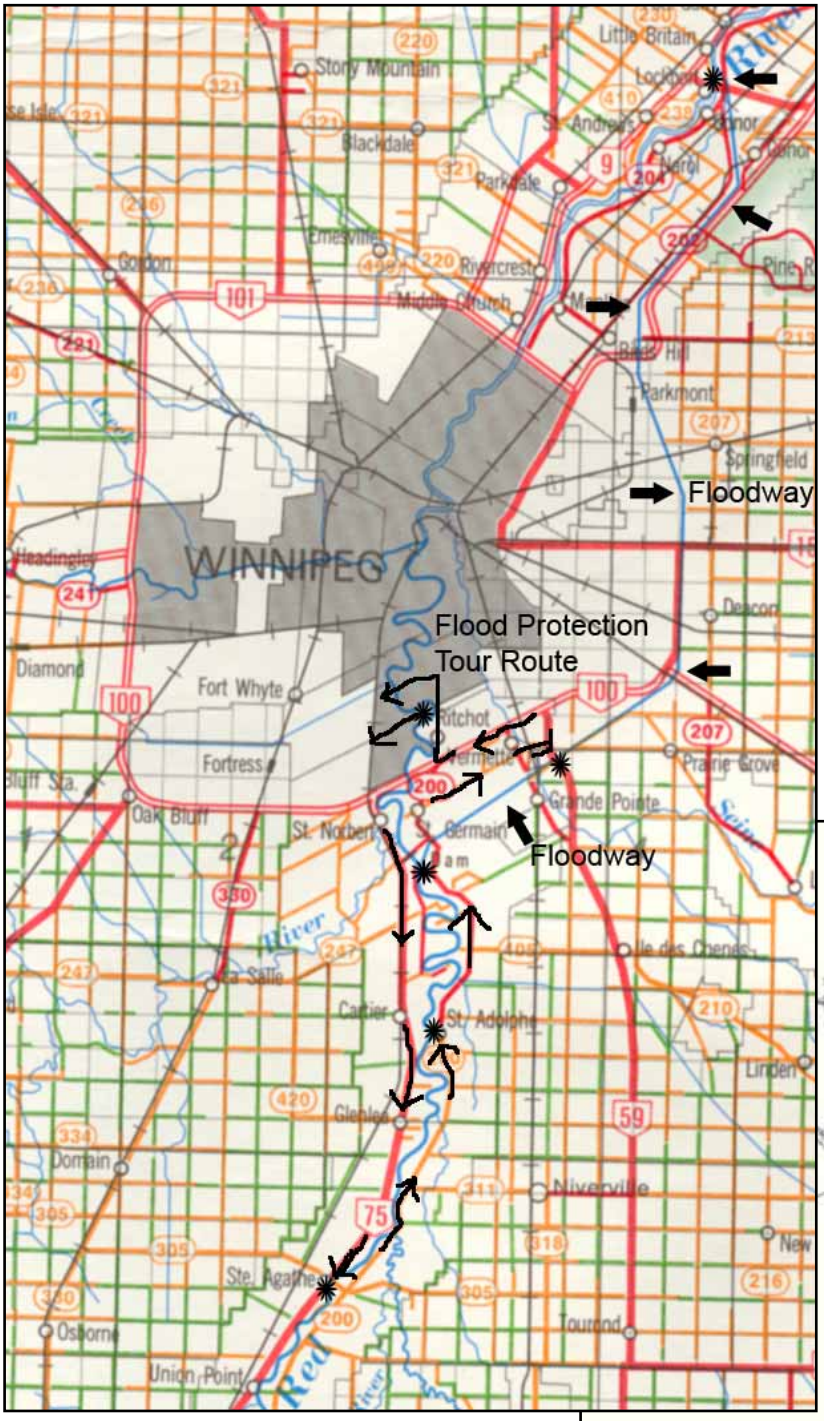
# Water, Water Everywhere, Red River Flood Protection Advisors Tour

**Monday July 24th, 2006**
**8:30 am – 12:30 pm**

Red River Valley south of Winnipeg During the 1997 Flood of the Century.

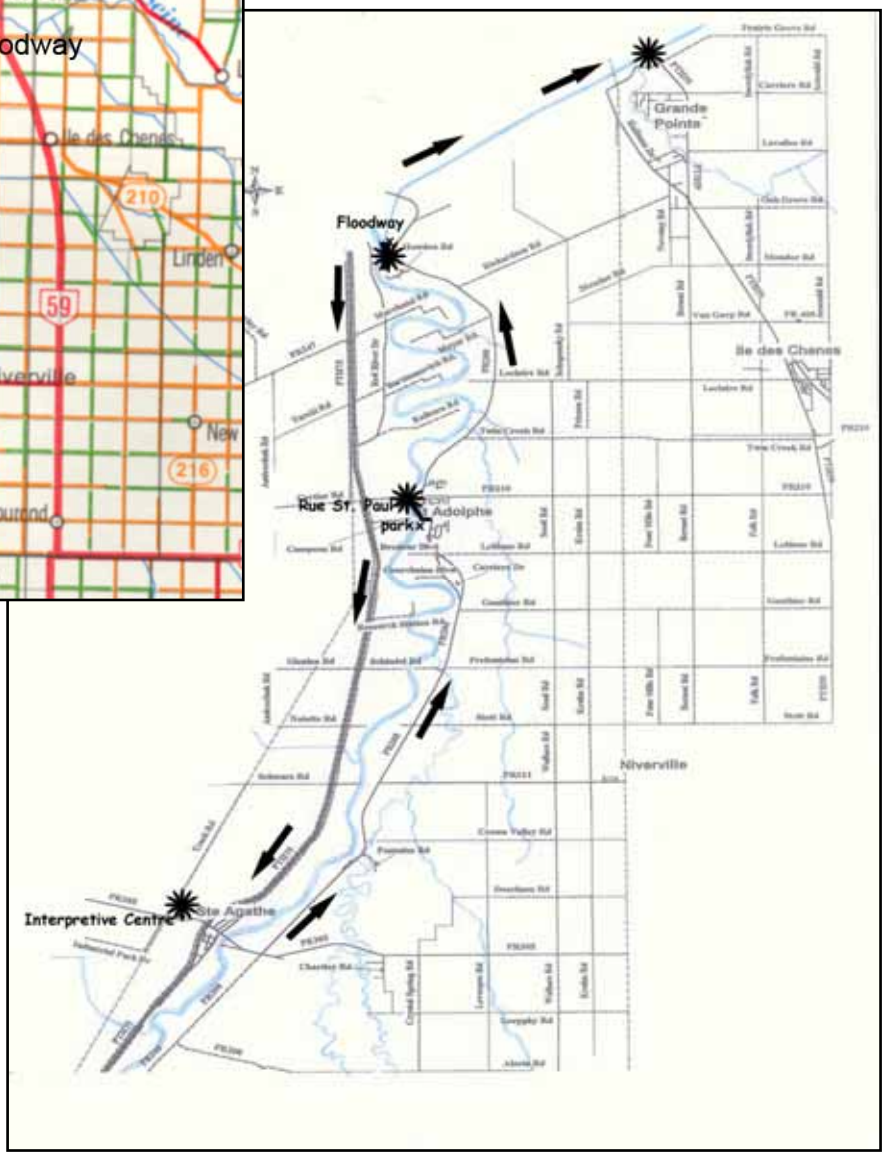
Prepared by
Ed Ledohowski, Manitoba Historic Resources

Tour Guides and Assistants
Bus #1: & Sherry Dangerfield & Nicole Megarry
Bus #2: Ed Ledohowski & Lorna Hendrickson




Left: Detail from a road map showing provincial and municipal roads. The location of the Floodway and the tour route is noted on the map.

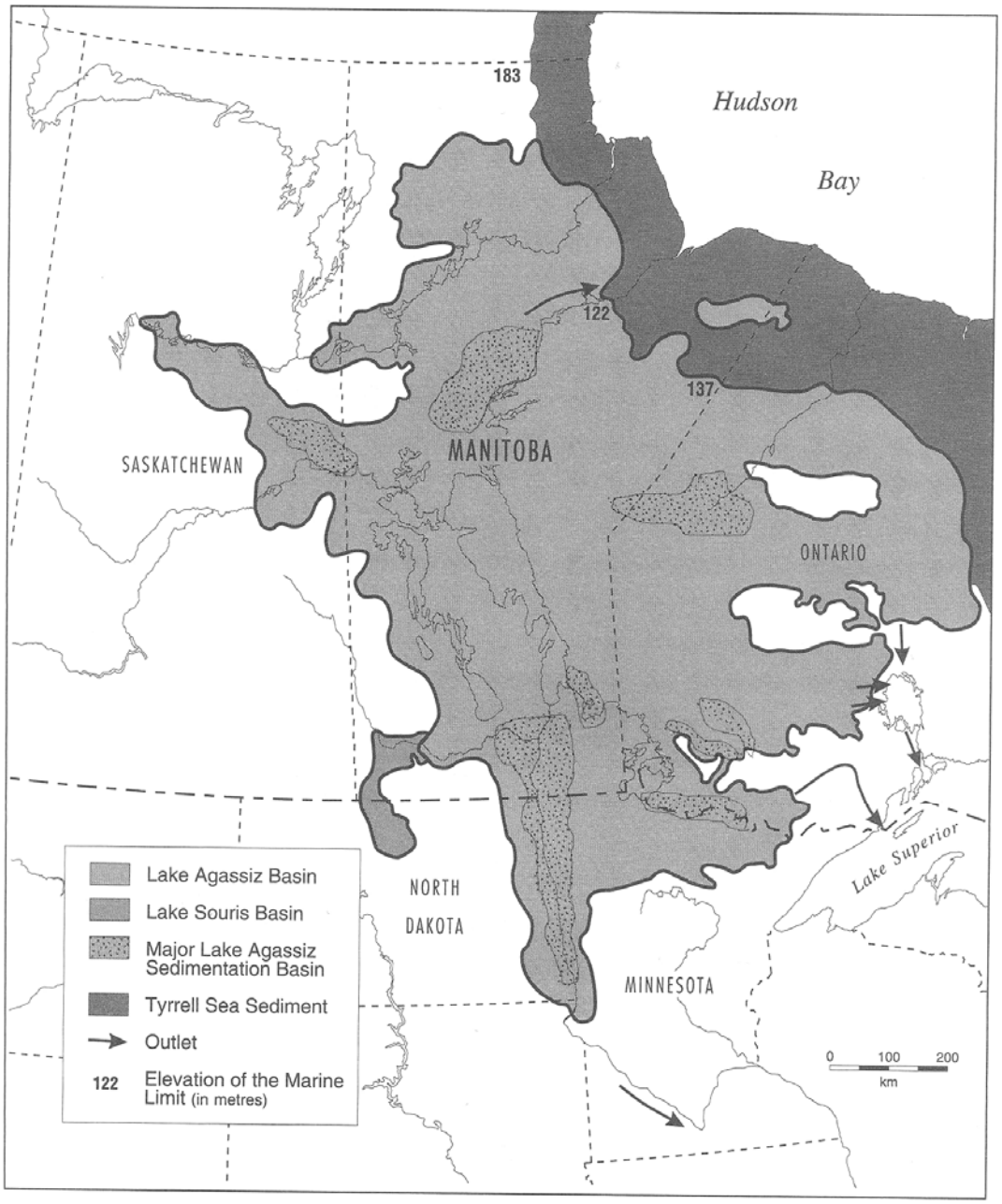
Below: Map showing the Rural Municipality of Ritchot Road Structure. The tour route and stops are also indicated. Note the ‘switchback’ nature of the course of the Red River and local tributaries. Note also the ‘grid’ nature of the roads of the township survey system in the areas away from the Red and Assiniboine Rivers, and the ‘parallel’ nature of the main roads in the riverlot survey in the near river areas.




RadarSat image showing the Red River Valley and surrounding landforms.

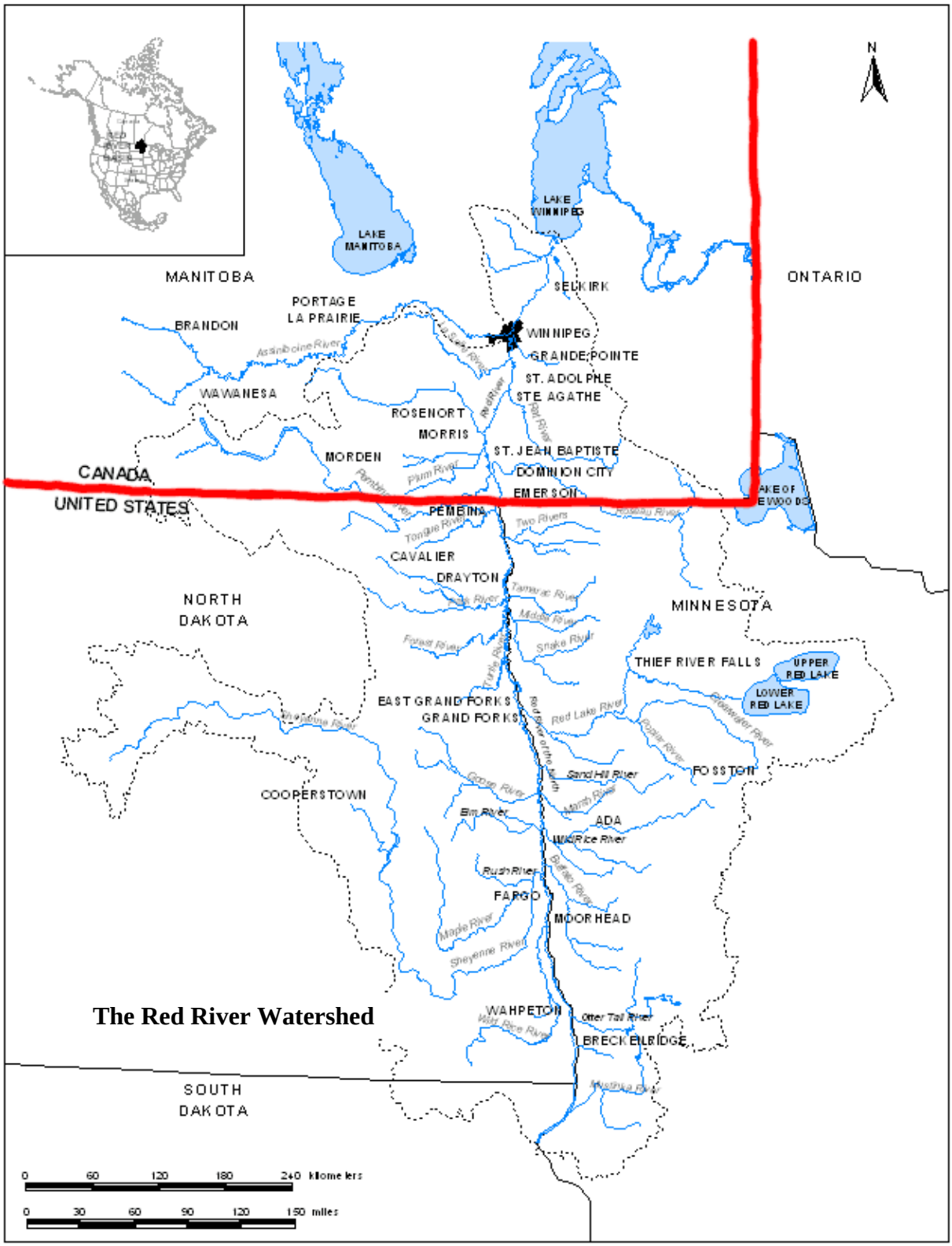
**THE RED RIVER VALLEY**

The Red River Valley. Also known as Valley of the Red River of the North to distinguish it from the southern Red River bordering Texas and Oklahoma. The Red River of the North flows sluggishly north down the center of the Valley, which is not a valley but rather the level bed of an ancient glacial lake. The Valley is many things. Where the West begins. The borderland tallgrass prairie between forest and the dryer land west of the hundredth meridian. Flat level land, where the earth curves away beneath an endless empty sky. Rich land, deep lake silt soil with a fertility equaled only by the valley of the Nile. A climate shared with the rest of the great plains--extremes of heat and cold and sudden changes. And the wind, as much a part of the Valley as the sky and soil.




**GLACIAL LAKE AGASSIZ**

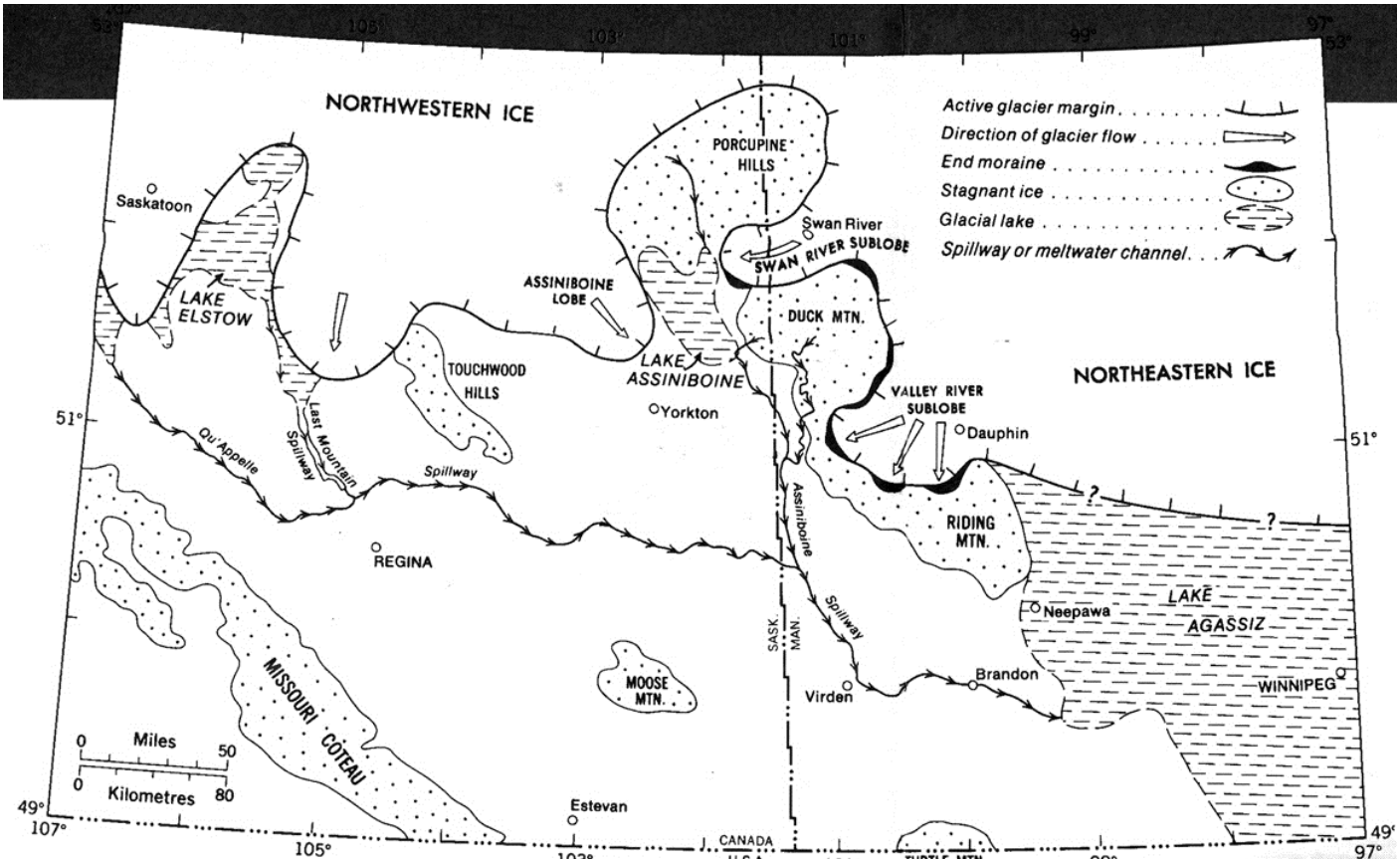
The Red River Valley is young, born of ice and water of the last continental glaciation some 14,000 years ago. One lobe of the Laurentide ice sheet thrust south along what is now the course of the Red River, stripping away the older rock layers of the past, in places scouring down to the ancient bedrock of the Precambrian. As the ice began to retreat about 10,000 years ago, the meltwaters pooled to form the glacial lake known as Agassiz. Hemmed by high ground to the south and the ice to the north, Agassiz grew to spread across the Valley into northern Minnesota and far north into Canada. A giant, larger than the five Great Lakes combined. Agassiz's waves thundered against beaches to raise sand and gravel ridges that now mark the boundaries of the Valley. The torrents of mighty rivers flowed into and out of Agassiz, carving the Minnesota River Valley, the Pembina and Assiniboine River gorges, and forming the Sheyenne and Assiniboine sand deltas. With inflowing waters came silt deposited as level sediment on the lake bottom, sometimes scores of feet thick, burying the rock and glacial debris under what would become some of the richest soil on earth.



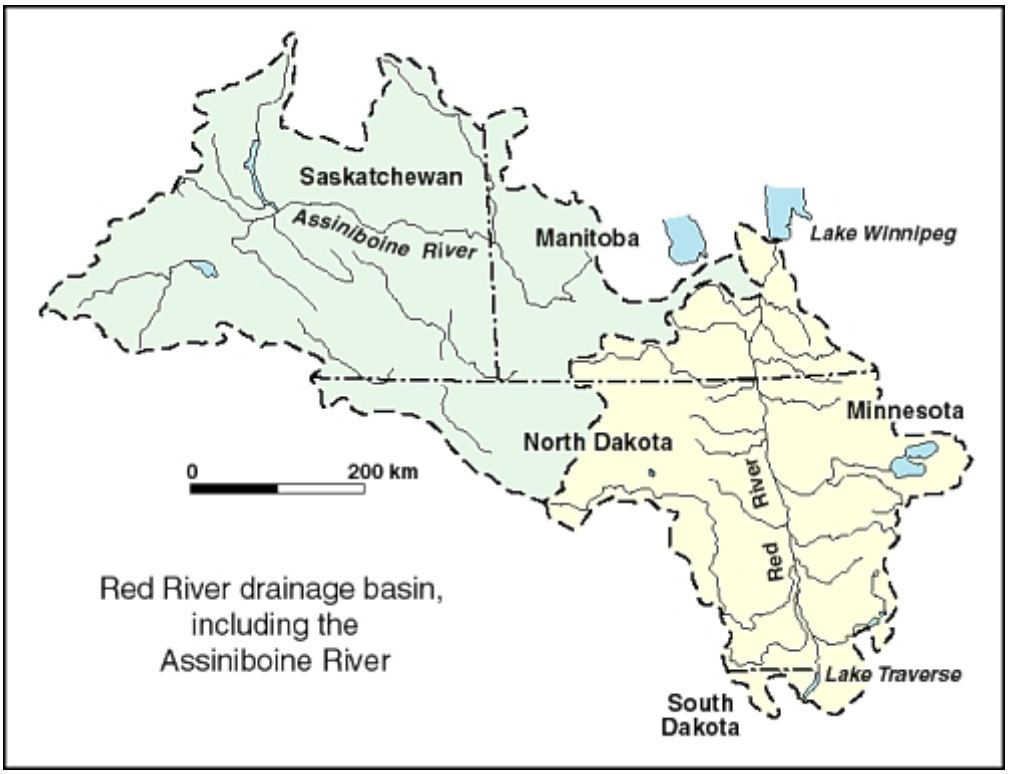

Glacial Lake Agassiz and the Red River Valley

The Red River Valley exists in what was the southwestern portion of Glacial Lake Agassiz, and what is now the center of the Red River Basin. The Red River Valley extends over 315 miles from Lake Traverse in the south to Lake Winnipeg in the north. It is 60 miles wide at its widest point.

The elevation of the Red River falls 233 feet from the headwaters of the Red River to its mouth 545 river miles away, for an average slope of only about one-half foot per mile. The slope is greater near the headwaters and flattens toward the mouth. The elevation of the Valley in the south is 943 feet mean sea level, while at the northern end, the elevation is 714 msl -- a change in elevation of 229 feet over its 315 mile length.




Map showing the major landforms, meltwater channels , and glacial lakes formed by the retreating ice sheet, 10,000 years ago.




Map showing the vast water shed that funnels through the City of Winnipeg. Large spring melts or wet years involving both the Assiniboine and Red river basins at the same time, can and has, completely overwhelmed the area at The Forks with floodwaters. For this reason flood protection projects are located on both rivers.

**RED RIVER FLOODS**

Few rivers in North America are as prone to flooding as the Red River. In fact the physical circumstances of the Red River almost guarantee a yearly spring flood The average grade in the Red River Valley is a mere three inches per kilometer, therefore the waters from even a minor flood can spread far and wide across the valley.

The Red begins at Lake Travise in South Dakota and flows north, eventually passing through the City of Winnipeg and into Lake Winnipeg. The Red River basin often receives deep snow in winter. With the onset of spring, the melting snow infuses the river with huge volumes of water. The many tributaries and the northward direction contribute to the problem. Snowmelt begins in the south, sometimes long before it occurs in the north. Flowing north, the swollen river often encounters the still frozen lower reaches. Flow is restricted and the Red surges over its banks. Spring rains can make the situation even worse.

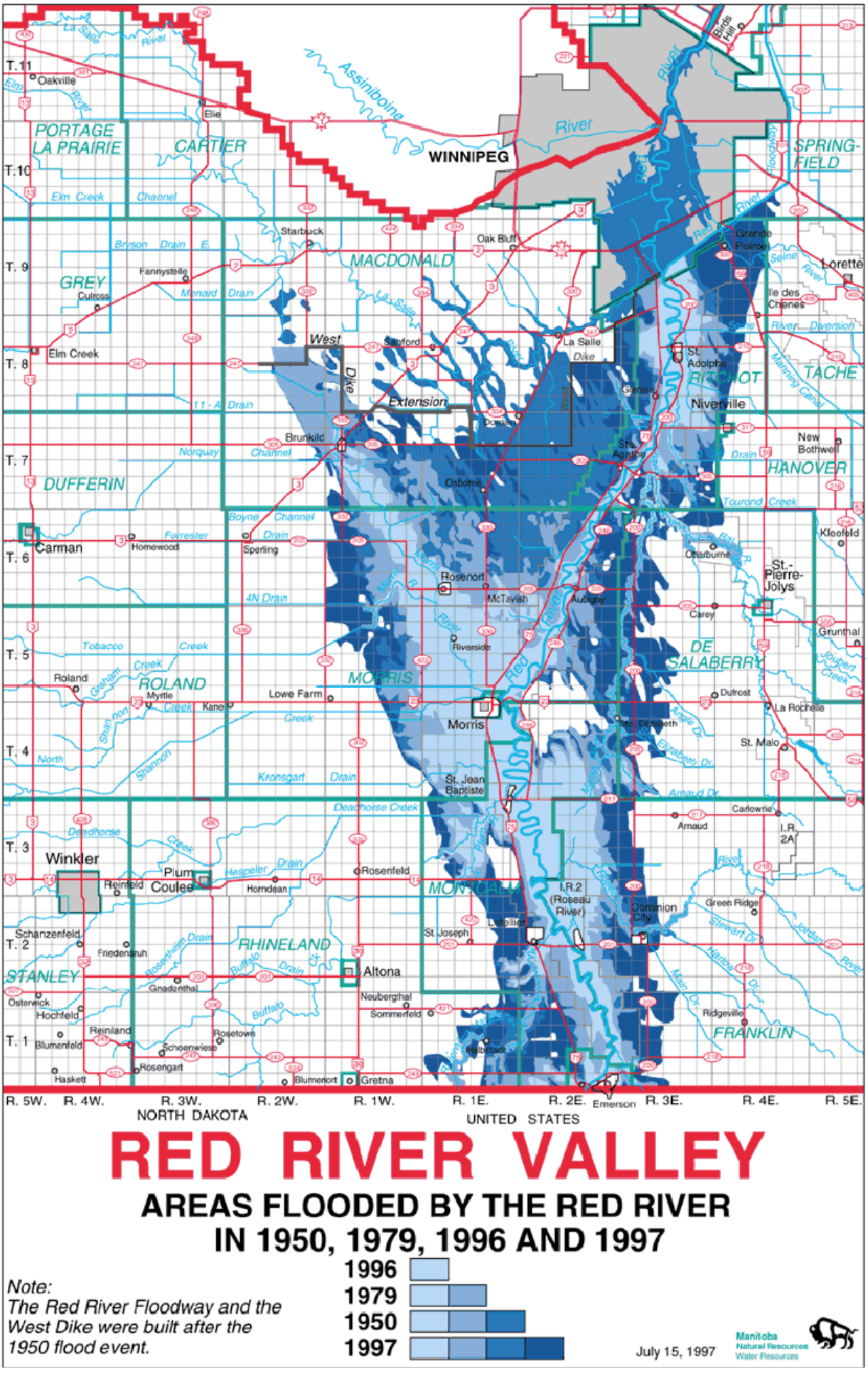
The largest known flood was in 1826, but the population in the region was very small at the time. As the population of the Red River Valley grew, so did the flood related problems. Floods in 1950 and 1997 created mass evacuations and great property damage. In 1997 over 28,000 Manitobans were evacuated, and the damages exceeded $150 million. This flood covered 202,500 hectares, or about five percent of Manitoba's farmland

| | **Natural Flow** (Flow in CFS) | **Controlled Flow** (Flow in CFS) |
|---|---|---|
| 1826 | 229 000 | |
| 1852 | 165 000 | |
| 1997 | 163 000 | 80 000 |
| 1861 | 125 000 | |
| 1950 | 108 000 | |
| 1996 | 108 000 | 58 500 |
| 1979 | 107 000 | 55 200 |
| 1974 | 96 000 | 56 000 |
| 1966 | 88 200 | |
| 1916 | 85 700 | |

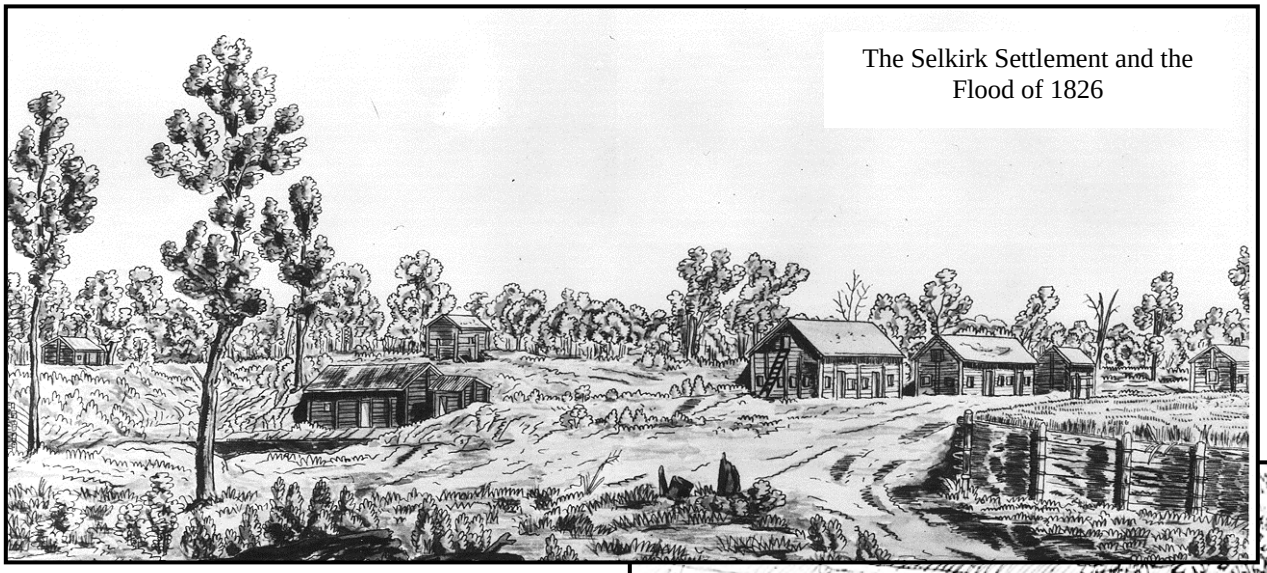
The constant threat of floods led to the construction of the massive Red River Floodway in 1968, which now protects the city of Winnipeg A number of towns, including Morris and Emerson, are completely ringed by dikes in effort to protect the towns in the event of floods.

**Five Factors Warn of Severe Floods**

- Wet autumn which saturates the ground
- Severe cold before first show fall causing deep frost
- Heavy winter snowfall with little thawing
- Late spring followed by rapid melting
- Above normal amount of rain or snow near spring breakup
- And how many of these are present together.




Map showing the area flooded in Manitoba during four of the most recent serious occurances.



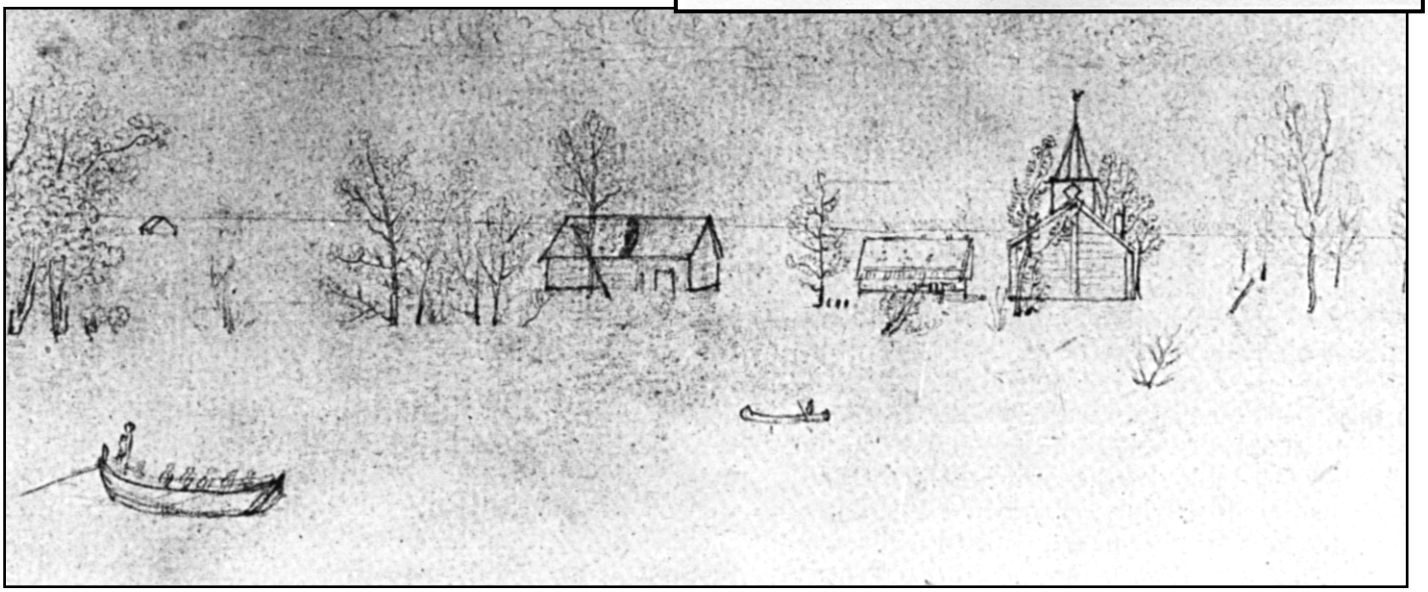
The Selkirk Settlement and the Flood of 1826


## 1826 – The Flood Unequaled.

The largest floor on record occurred in 1826. – its recurrence rate is once in 300 years. Governor George Simpson reported that the Red River Settlement, now downtown Winnipeg, was under 11.5 feet of water. The classic conditions for a large flood were all present in 1826. Given the extend of the flood it is miraculous that only five people perished.

The Red River Journal:

*May 5; About 2 P.M. the ice in the Red River at length broke up in an awful rush, carrying away cattle, houses, trees and every thing else that came in its way. The river overflowed its banks every where, and carried the ice with great velocity to a greater distance from its course, than had every been seen by the oldest inhabitants…Forty-seven dwelling houses were thus carried off by the first rush, in the short space of half an hour, and many others afterwards from which the wretched inhabitants, barely escaped with their lives.*



## 1852 – The Second Largest.

The flood of 1852 is the second largest flood on record, just slightly larger than the 1997 flood. Bishop David Anderson reported in his journal on May 21, 1852. *The height on th whole is certainly not so geat as in the former flood, perhaps by about 18 inches…Delighted to find that the water had sunk an inch in my own house…the river was like that of a vast lake studded with houses, many of which the projecting gable was the only part visible…*

## 1861 – Third in the Cycle.

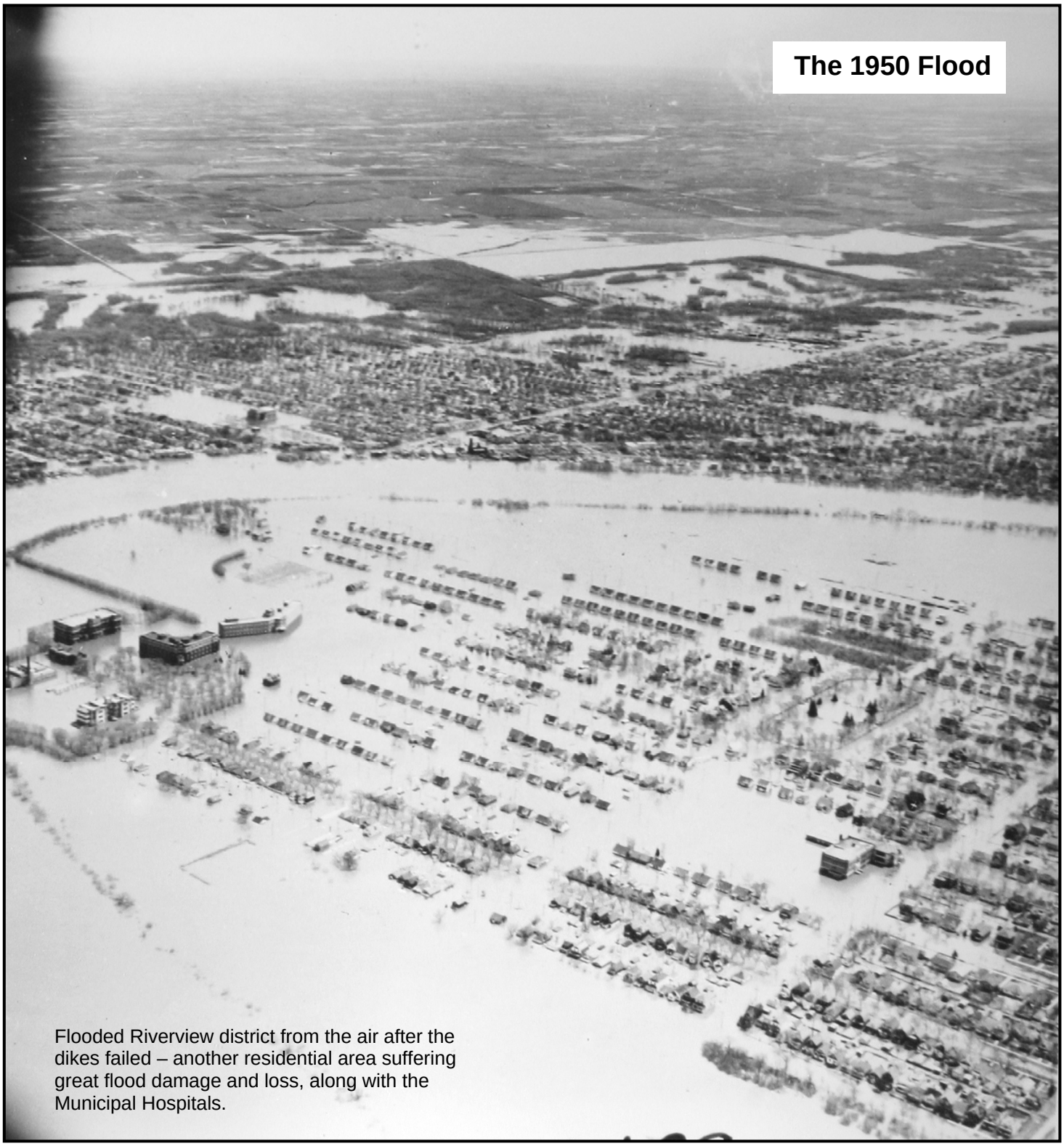
Not far behine the floods of 1826 and 1852 was the flood of 1961. The Nor'Wester newspaper reported on June 1: *In our last, we mentioned that a general flood was imminent. We can now say that it has come and gone. It fell short of former floods in quantity of water and consequent destructiveness, but was still sufficient to cause much loss of property and much suffering…*

A number of smaller floods flowed through the Red River Valley in the late 1880s and early 1900s. Manitoba's first boom town, Emerson located where the Red River crosses the International Boundary, lost much of its early commercial and residential buildings to flood damage over the years..


Above: The sternwheeler "Assinibone" cruises up Main Street in Emerson, Manitoba during the 1897 flood.

Right: Getting around by canoe during the 1916 flood, St. Boniface district of Winnipeg.

# The 1950 Flood



Flooded Riverview district from the air after the dikes failed – another residential area suffering great flood damage and loss, along with the Municipal Hospitals.

1950 – A Natural Disaster.

In 1950, the flood that surged through the Red River Valley was the worst natural disaster in Canadian history. The classic conditions warning of a great flood preceded it. That October was the wettest on record across much of the basin. It was a record cold winter with above normal precipitation, then a storm hit in late March and rains during the breakup. The valley was doomed. In Winnipeg the Assiniboine River enters the Red from the west and the Seine River from the east. There was no Floodway in 1950. As the city fell to flood waters, people were evacuated to Brandon, the beach communities and as far away as Regina and Thunder Bay. Over 100,000 people were evacuated from their homes. An eight year old boy fro Ste. Agathe arrived at the evacuation centre in Winnipeg and was herd to explain*. My name is Marcel…My mother is watching the house. My father is building bikes. I want to stay with him on the sandbags. He said it is dangerous. He sent me to the city. We have nothing to eat. I am hungry.*

FINAL EDITION

Winnipeg Free Press

VOL. 38 — No. 190 | 26 PAGES | PRICE 5 CENTS; WITH COMICS 10c | WINNIPEG, THURSDAY, MAY 11, 1950 | FORECAST: LITTLE CHANGE

Winnipeg: Friday clear except for afternoon cloudiness. Little change in temperature. Winds east at 15 mph Friday. Low tonight and high Friday, 30 and 50.

# THOUSANDS FLEE CITY

## Norwood Bridge In Pincers Fight

### Evacuation Of Valley Forced To Halt

Canadian National railways' fight to evacuate the Red river valley ended Thursday. The decision went to the flood.

It was one of many that went the same way as R.C.M.P. patrol boats maintained almost lone vigilance over the 500 square miles of flooded Manitoba where water levels rise hourly.

More than 10 towns had been isolated and deserted. Communications were wiped out entirely for many villages.

Desolation was the keyword.

**For 72 hours the railway had run its trains, for the most part, through six inches of water covering the steel. It had warned flood headquarters the evacuation operation would be on an hour-to-hour basis. The last hour came early Thursday.**

Since May 4 more than 2,000 persons had been taken from their flooded homes by Canadian National "evacuation specials." They hauled 100 cars of livestock under rapidly worsening conditions as the flood crest rolled north. It had been a night and day effort for 21 days.

The last train ran into a washout less than seven miles from Winnipeg Thursday morning.

Spotted on a spur track which

See VALLEY page 18

### City Winning Fight To Maintain Power

The city was making headway [illegible] gas plant at Bever avenue and Gateland street, Thursday in its fight to prevent

### Rivers Threaten 'Short Cut' Move

**BULLETIN: Truck traffic over Norwood bridge was stopped at 1 p.m. because water seeping through a weak spot of the dike at the north-west side, reached a level on Main street deep enough to swamp vehicle engines. Officials in charge of the diking expected the bridge would be impassable for at least two hours.**

Army and civilian flood fighters at noon Thursday were battling to keep the Red and Assiniboine rivers from joining at Norwood bridge.

If the two flood-swollen rivers should join at this point, one of the main links for emergency vehicles to St. Boniface and Norwood would be cut.

Convoys of trucks carrying flood workers, material and food supplies were still being towed through the low spot at River and Main at 2 p.m.

Diking is being carried out along Mayfair street and parallel to Main street between the two rivers in an effort to keep the road open. Water is now up to headlights on the highest trucks going through.

Water level at the James avenue pumping station at 1 p.m. Thursday was 29.5 feet above datum a rise of .4 feet in 24 hours.

One of the city's last major defences, the three-quarter-mile long East Kildonan dike, was breached at 8.30 p.m. Wednesday, inundating another large section of the metropolitan area. No one was injured.

**One Huge Rampart**

Most of the city of St. Boniface and all of Norwood Wednesday was behind a huge dike surrounding the whole area (see map).





### Mass Evacuation Plans Prepared

Thousands upon thousands of evacuees left the Greater Winnipeg flood area Thursday. They left by train, bus, plane and private car. No exact estimate of the numbers was available — the movement in and out of the city was too heavy to tabulate. One unofficial source, however, estimated that 30,000 will have left by Friday.

Precautionary measures were being taken in case the number of flooded homes became so great that a mass exodus was required.

**The population flowed out to Brandon, Kenora, resort towns, to Toronto and Montreal, to Saskatchewan and points farther west. Everyone was in a hurry but movement was under control.**

Roads leading out of the city were jammed with cars. Airlines reported capacity loads. The homeless milled about the railway stations, and the railways themselves rushed in extra equipment for the large-scale exodus.

Here are some of the developments Thursday:

1. Brig. R. B. Malone, acting chairman of the emergency committee on planning, said at flood control headquarters that evacuation of women and children had been orderly to date. This evacuation was prompted by an appeal from Brig. R. E. A. Morton Wednesday that the city's population be "thinned out."
2. The Winnipeg flood control committee designated the community clubrooms in six city areas as reception halls for evacuees.
3. William Courage, director of the city's emergency housing division, said all factors in the housing situation are "better than at any time since the emergency occurred."
4. The Canadian National and

### Assiniboine Routs Citizens Along Roslyn

The Assiniboine river really began to assert itself Thursday, when rising waters drove from their homes almost all residents on the river side of Roslyn road east of Osborne street.

The exodus, initiated Wednesday by the evacuation of aged persons from a nursing home, had by Thursday noon affected about 200 persons.

Army personnel are laboring behind the home to strengthen a dike holding back five feet of water. Two soldiers were attempting to bail out with large tin cans a pool that had formed between the dike and building.

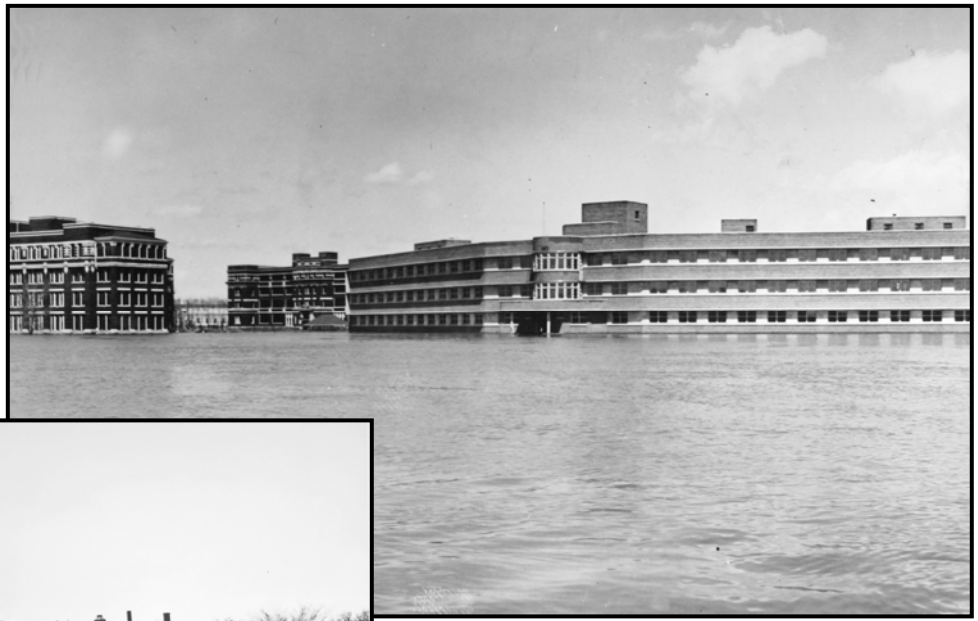
**Residents on Roslyn crescent are preparing for evacuation. "There is no use my building a dike," said one. "If the river rises any higher We will just have to leave everything and get out."**

Triple-layered sandbag dikes on Wellington crescent at the foot of Maryland bridge were still holding, at noon Thursday.

Troops and other workers in the area had early Thursday morning switched their labors to buttressing the dike protecting the Shriners hospital for crippled children against water from the rapidly rising Assiniboine river.

Above: Front page of May 11, 1950 edition of the Winnipeg Free Press.

Right: Close up of the Municipal Hospitals – King George, King Edward, and the newly constructed Princess Elizabeth. All Patients and staff were evacuated.



Left: A street of roof tops - stark evidence of the River's destructive flood waters. – over 1900 houses were flooded over the first floor.

**The 1950 Flood**

Distress Signal

BALTIMORE, May 8 (AP)—The Baltimore municipal radio station said it had received urgent distress signals at 7:45 p.m. EST Monday from the S.S. Joseph Lykes. The ship radioed it was "alive at sea" in the Atlantic.

# THE WINNIPEG TRIBUNE

The Weather

FORECAST: CLOUDY, DRIZZLE

61st Year — Price 5 cents With colored comics, 10 cents — WINNIPEG, TUESDAY, MAY 9, 1950 — 24 PAGES — NO. 110

## 200 Square Miles of Province Flooded

### Survey Reveals Increase

The destructive Red River has now flooded more than 200 square miles of southern Manitoba.

This estimate came today from George Wallace, provincial drainage engineer, who flew over flood areas Monday.

Mr. Wallace said heavy overnight rainfall would increase the river's already-expansive spread.

"This rain means further disaster for the province," said Mr. Wallace.

He reported a new flood crest is now due to smash the border town of Emerson Friday. Peak is expected to be 47 feet, not 48 as previously reported.

Trucks, cars and other equipment move through inches of water to and from the C.N.R. freight sheds behind the railway's Winnipeg Main St. station.

## 1,000 MORE LEAVE FLOOD-HIT HOMES

### Allarie, Lusanko Hanged

Two men paid the supreme penalty for murder in the early hours of this morning in a double hanging at Headingly jail.

Camille (Bijou) Allarie, 32-year-old farm hand went to the

### Sandbag Supplies To Meet Demand

Supply of sandbags in the Winnipeg area was expected to equal demand by today.

Flood fighters now are using 275,000 bags daily, of which 200,000 are arriving from outside Greater Winnipeg, with local companies producing from 50,000 to 75,000 sandbags daily.

Shipments by air from Regina and eastern Canada were expected to bring the situation into balance by today. An air shipment of 60,000 bags from Minneapolis was grounded Monday because of bad weather.

### Rain Hits Dikes; River 28.3 Feet

One thousand more Greater Winnipeg residents were forced from their homes in two areas early today while a grim battle was being waged on a five-mile front to protect the homes and property of thousands more.

**Dikes vital to the existence of Norwood, St. Boniface, West Kildonan and large areas of Winnipeg still held despite the onslaught of a five-hour rain and a rise in the Red River to 28.3 feet by 6 a.m. today.**

Little hope for relief from the attack on the dikes was held for today as weather officials predicted drizzle to noon with winds up to 20 miles an hour.

**About half an inch of rain fell and flood control officials said the key to the whole situation is in the amount of rain and wind which is to come.**

Close to 700 residents of the Grandin school district of Fort Garry, including University of Manitoba students and King's Park dwellers were ordered from their homes late Monday when flood waters threatened to isolate them.

Earlier, 200 residents of Glenwood Crescent were instructed to leave their homes. The order came from army flood control headquarters, who said the move was dashed when water rose to a height of two feet four inches.

More Troops

As the lower half of the province

Above: Front page of May 8, 1950 edition of the Winnipeg Tribune.


Left: Workers fought desperately to keep the gigantic dikes protecting the evacuated St. Boniface Hospital holding.

Right: Forced to evacuate by canoe when the Red's waters surged in over the Riverview dikes – adding to the already mounting flood toll.

**The 1950 Flood**

Left: A bulldozer packs dirt to bolster a sand-bag dike. Small storage building, garages, and sometimes even houses were sacrificed to allow builders a free hand. .

Right: When the water was too high for even a tractor to make it through, the Canadian Army used their DUKW vehicles (ducks) came to the rescue. The military's ducks could travel on both land and water and were used as a mean of communication between districts separated by the floodwaters.



Left: Morris, Manitoba.

The town of Morris at the junction of the Morris and Red rivers was hit hard. By May 10, 1950 the town was empty with the exception of two members of the RCMP. The water was 2.5 m deep in a lake 40 km wide and 95 km long.

## The 1950 Flood

## The Flood of the Century

The rainfall was above normal across the Red River Basin in the fall of 1996. In some areas it was more than twice the norm. Over the winter four blizzards dumped record amounts of snow. In the United States portion of the basin where 70% of the Red's water comes from, the snow cover was the highest on record. It was not looking good. At the end of March and the first few days of April, the situation improved. The weather warmed up and the snow was melting, but slowly so there was not a lot of sudden runoff. Hopes were raised that it might not be so bad. Then the blizzard hit, a big prairie blizzard that shuts everything down for days. April 5 and 6 it snowed across the basin dumping enough snow to raise the water in the Red by more than a metre. People knew what this meant – there was going to be a big flood. Now it was just a question of how big it would be.

Most Winnipegers were feeling safe in their homes with the knowledge that the Floodway would protect them again. In the thousands they threw they backs into sandbagging for those who were less fortunate. Thousands of people helped sandbag homes in the lower section of Winnipeg, in St. Norbert and along Scotia Street and Kingston Row. Then the city learned about its vulnerability – the backdoor. As the water flowed north it spread overland east and west, further than it had before. The overland flow on the southwest side of the city could reach the La Salle River which flows into the Red just north of the Floodway gate – inside the city's defenses. If the water reached the La Salle, it would pour into the city, circumventing the Floodway. With the water rising rapidly, this "backdoor' needed to be closed in 72 hours. Two things needed to be done. The existing 13 km West Dike had to be raised and reinforced and a 34 km extension had to be built. A survey seeking the high ground that should have taken two weeks was done in one day, and a Z-shaped route was chosen.

The Red River Valley south of Winnipeg, April 1997.

Work continued day and night. Military helicopters lit the night sky with phosphorus flares. One million cubic yards of earth were used to construct the Z-dike. On April 29 the rising water reached the dike at Brunkild, and rose to 779 feet above sea level. But the dike held. Manitoba's capital city was safe, but it could have easily gone the other way. If it had rained, if the Floodway could not withstand the capacity flow, if the determined dike builders had not succeeded in doing the impossible in only 72 hours.

Above: St. Jean Baptiste protected within its ring dike during Flood of the Century - 1997

Right: Looking west over Morris, Manitoba during the 1997 flood.

Left: The Floodway gate area during the 1997 flood. Note that Turnbull Drive is protected with its own ring-dike system. Note also the flooded low-lying areas north of the Floodway in St. Norbert. The Floodway was operating to its capacity and the excess water had to be directed into the city necessitating sandbagging in several areas of the city.

## 1997 - Flood of the Century

Left: Apartment towers along the Assiniboine River in downtown Winnipeg protected by sandbag dikes. Water from the Red River backed up the Assiniboine River, threatening many properties in downtown Winnipeg west of The Forks,

Right: Sandbag dikes protected many riverside residential district homes in Winnipeg, such as this one along Kingston Row. Thousands of Manitoban's flocked to Winnipeg to help in the effort to protect properties in Winnipeg and throughout the Red River Valley south of the city.

Below: Water lapping near the top of the permanent earthen dikes protecting the Wildwood district of Winnipeg.

**1997 - Flood of the Century**

Above: An aerial view of the Floodway gate area, looking towards the southest, and showing a section of the Z-dike which had to be strengthened and extended in a mere 72 hours to prevent floodwaters from inundating Winnipeg from the west.

Above: View of rural properties protected by individual ring-dikes.

Below: In some situations neighbours banded together to construct ring dikes around a concentration of rural residential properties..

**1997 - Flood of the Century**


Views of the riverside community of St. Adolphe.

Above: the town's ring dike protecting the community as the snow melts and the water srise.

Left: A vertical aerial photo of the Rue St. Paul section of St. Adolphe with the property line superimposed. Although the homes survived the 1997 flood, severe riverbank erosion necessitated the 'buying out' and removal of the homes by the provincial government.

Below: A detail of St. Adolphe showing the Rue St. Paul subdivision area from the south.


**1997 - Flood of the Century**

# Post-1950 Flood Protection Developments

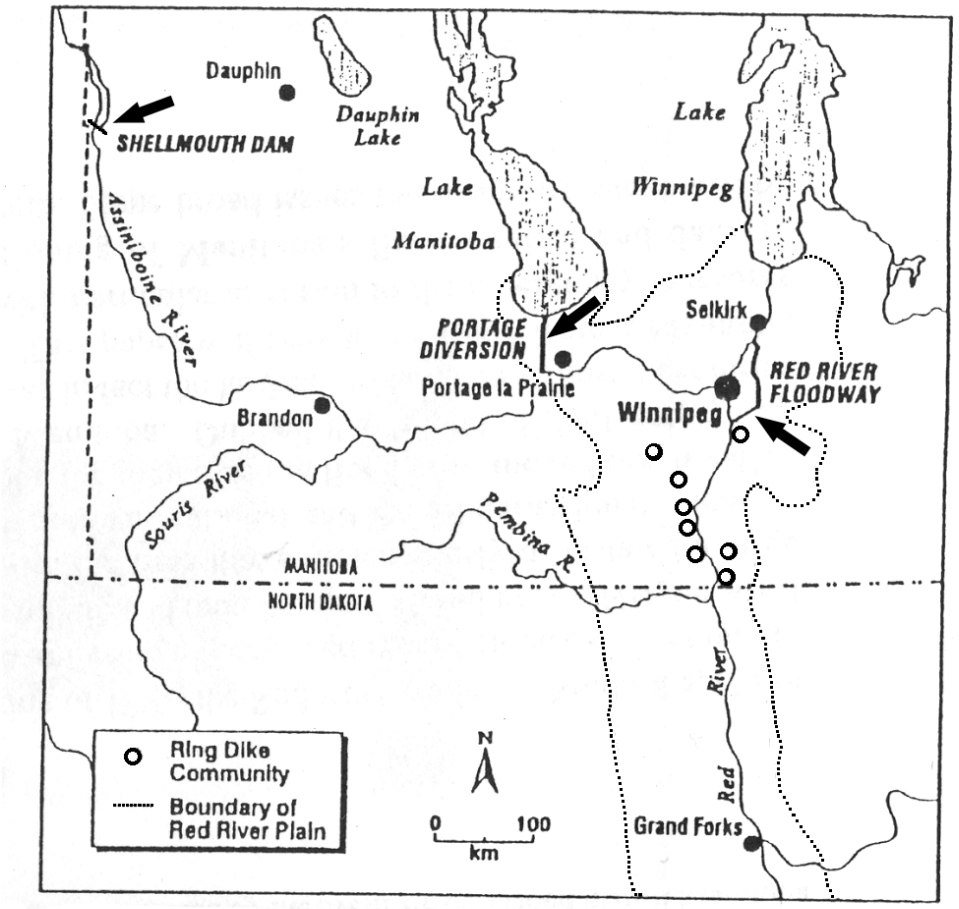
1950 was a disastrous year for Winnipeg. The Red River, which [flows through the city had flooded again, but on a scale that had not been seen for over a hundred years. Over 80,000 people were evacuated from Winnipeg proper, with another 20,000 forced to leave nearby rural areas. Total damage to property and crops was over $125 million dollars.

The citizens wanted a remedy. Solving the flooding problem fell into the hands of the Manitoba Provincial Government and debate over the best solution continued for years. Premier Dufferin "Duff" Roblin – in office from 1958 to 1967 – decided to proceed with a bold plan cost shared with the federalgovernment. A massive diversion would be built around Winnipeg. This “floodway” would divert part of the Red River's floodwaters in a semi-circle around the city and then back into the main channel well north of the city. As well, the Shellmouth Dam was built on the upper Assiniboine River, creating Lake-of-the-Prairies, and a diversion channel was cut to Lake Manitoba from the Assiniboine River, near Portage la Prairie. The river would still rise in Winnipeg, but not enough to damage property.

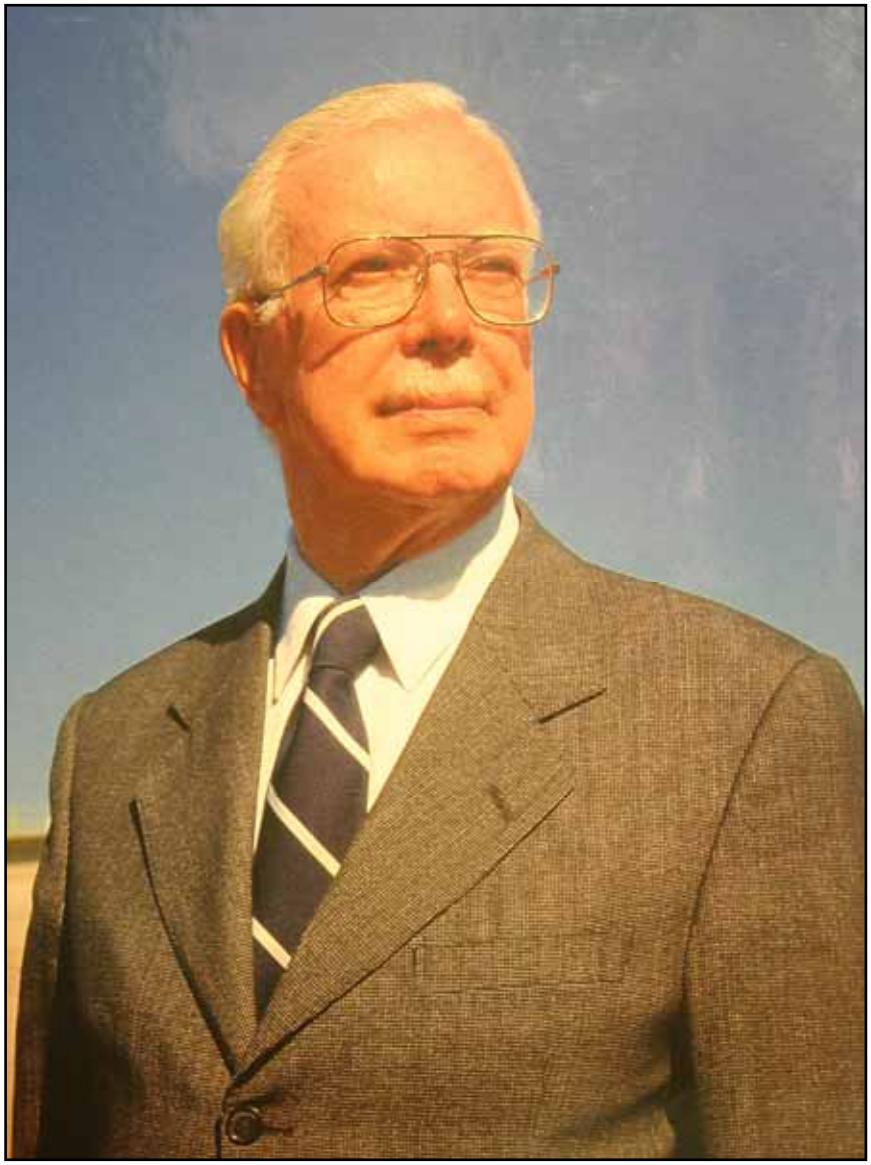
A large control structure with hydraulically powered gates was built across the Red near St. Norbert. These gates allow a normal flow through the Red River, but during floods they are closed, diverting much of the water into the floodway. A total of 48 kilometres long, 213 to 305 metres wide at the top, it is designed to have a flow depth of 8 metres. It was the largest public works project in Manitoba's history. Over 76 million cubic metres (100 million cubic yards) of earth were moved, more than for the Panama Canal. The excavated earth was used to build a 6 metre high embankment on each side of the Floodway. The Floodway discharges the water back into the Red River near Lockport.  Construction began in 1962 and was completed in 1968 at a cost of $63 million.

During the debate over the floodway the political opponents of Roblin attacked the plan as an unwise expenditure of taxpayer’s money. Through this debate the Red River Floodway picked up its most commonly known local name - "Duff's Ditch", which persists today.

Despite controversy during its construction, the Red River Floodway has proven to ~~be very~~ successful a huge success. For instance, without the Floodway it is estimated that the 1997 Flood of the Century could have forced the evacuation of upwards of 500,000 residents and put 80% of Winnipeg underwater, which would have possibly been the largest natural disaster in Canadian history had it not been for the protection afforded by “Duff’s Ditch”.



# Duff's Ditch



Right: "Duff" Roblin

Charles Dufferin Roblin had been recently elected premier of Manitoba when a new proposal for a Floodway crossed his desk. The cost at the time was estimated at from $29 to $82 million depending on the depth. After the bill for the 1950 flood came in at $100 million, the Floodway became a serious option. In 1959 he fought a provincial election and the Floodway was part of his platform. He won with a clear mandate to build the Floodway. Roblen then went to Ottawa and convinced Prime Minister Diefenbaker to share the costs. It took three years to plan and six years to build.

Some called it Roblin's Folly, until it saved the city from the flood of 1969 one year after completion. It had protected the city from more than 18 floods. Preventing one Flood fo the Century, from entering the city paid for the Floodway more than twice over. Today the Floodway is affectionately called Duff's Ditch.

Left: Floodway Construction.
One of a series of railway and roadway bridges constructed across the route of the Floodway. June 1963
The floodway diverts water from the Red River at St. Norbert, around the city in a channel 28 km long , up to 20m deep and 165m wide, and empties it back in to the Red at Lockport.

# Ring Dikes and Berms

Photos of residential ring dikes and raised berms. Many rural residential properties south of Winnipeg now possess large and deep swimming holes/fish ponds as ‘borrow pits’ were dug to obtain fill for the dikes and berms. During floods the ring dikes are heightened with temporary sandbag dikes.

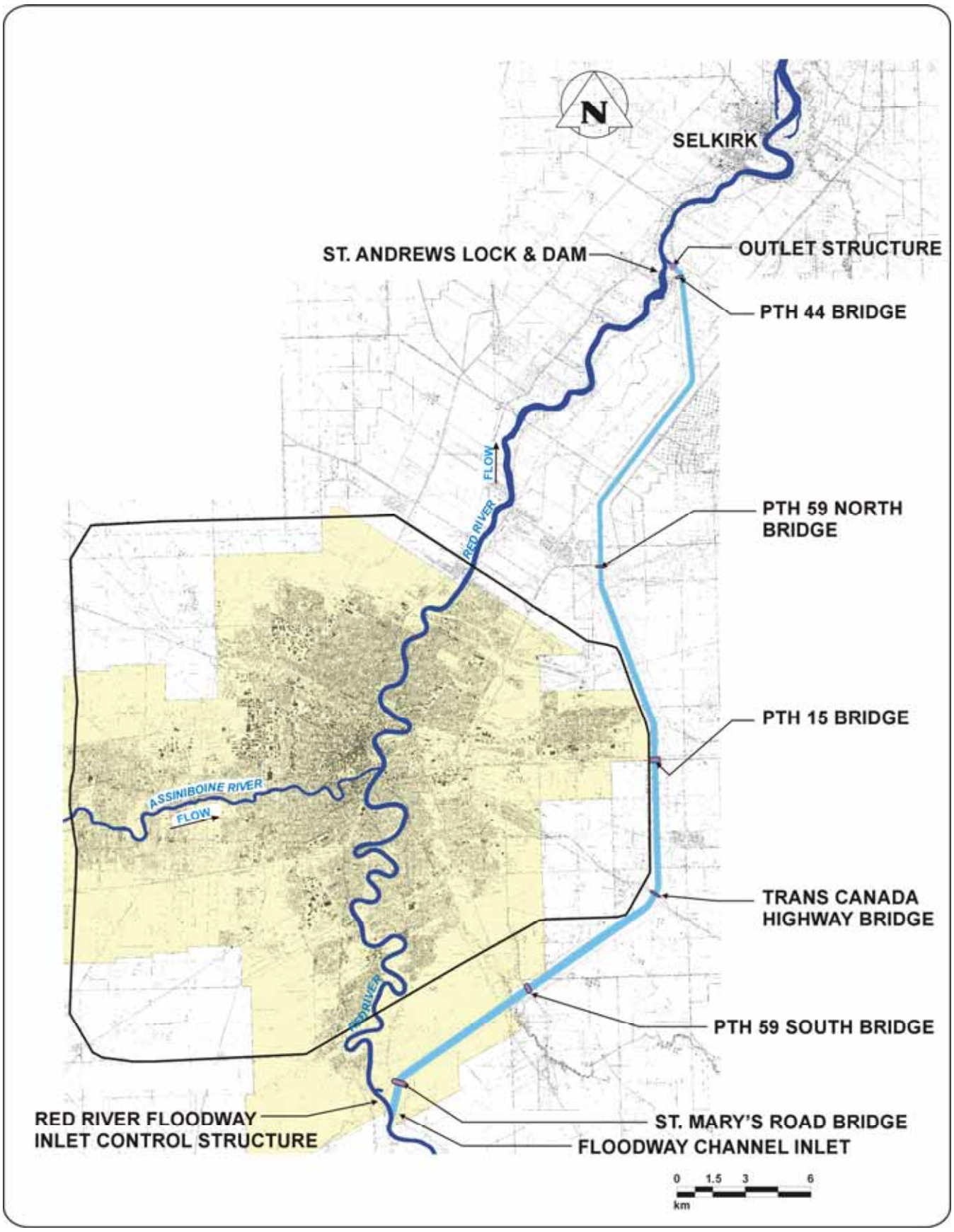
# Shellmouth Dam – Lake of the Prairies

The construction of the Shellmouth Dam on the Upper Assiniboine River controlled the waters flowing into Manitoba from Saskatchewan and created  Lake of the Prairies, now a popular fishing and vacation destination.

# The Portage Diversion

Views of the intake and exit areas of the Assiniboine River Diversion at Portage la Prairie The Portage Diversion is a 29km channel that can divert water from the Assiniboine River to Lake Manitoba. Together the Shellmouth Dam and the Portage Diversion assist the Floodway in protecting Winnipeg as well as communities and agricultural land along the Assiniboine River Valley.

# The Red River Floodway

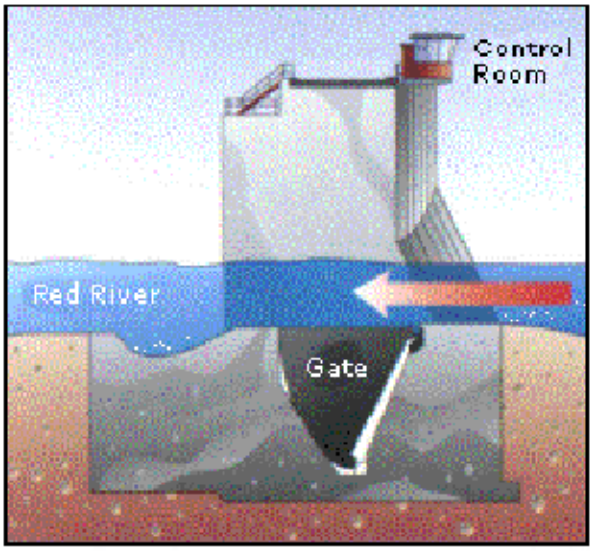


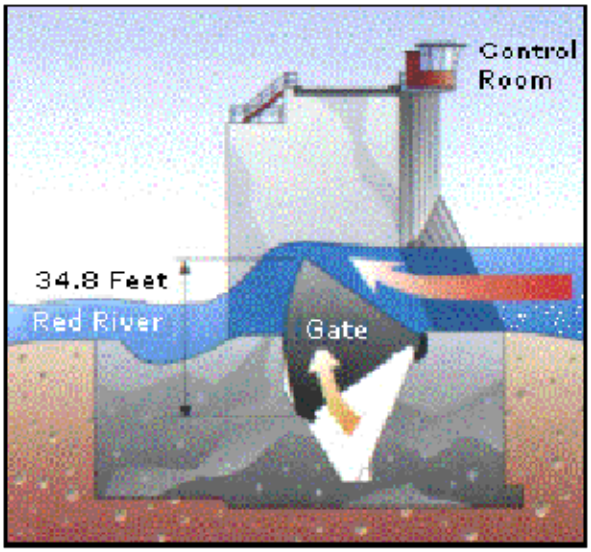
# Flood Inlet Control Structure

Left: The Red River Floodway inlet control structure under construction, with the waters of the diverted Red River surrounding the construction site on three side.

Right: The Red River Floodway inlet control structure in operation.

Below: To divert water from the Red River into the Floodway the Control Structure gate is lifted from the below, damming the water downstream down stream from the gate. The rising water then spills over the floodway 'lip' and into the Floodway Channel. Some downstream flooding unavoidable occurs as a result.



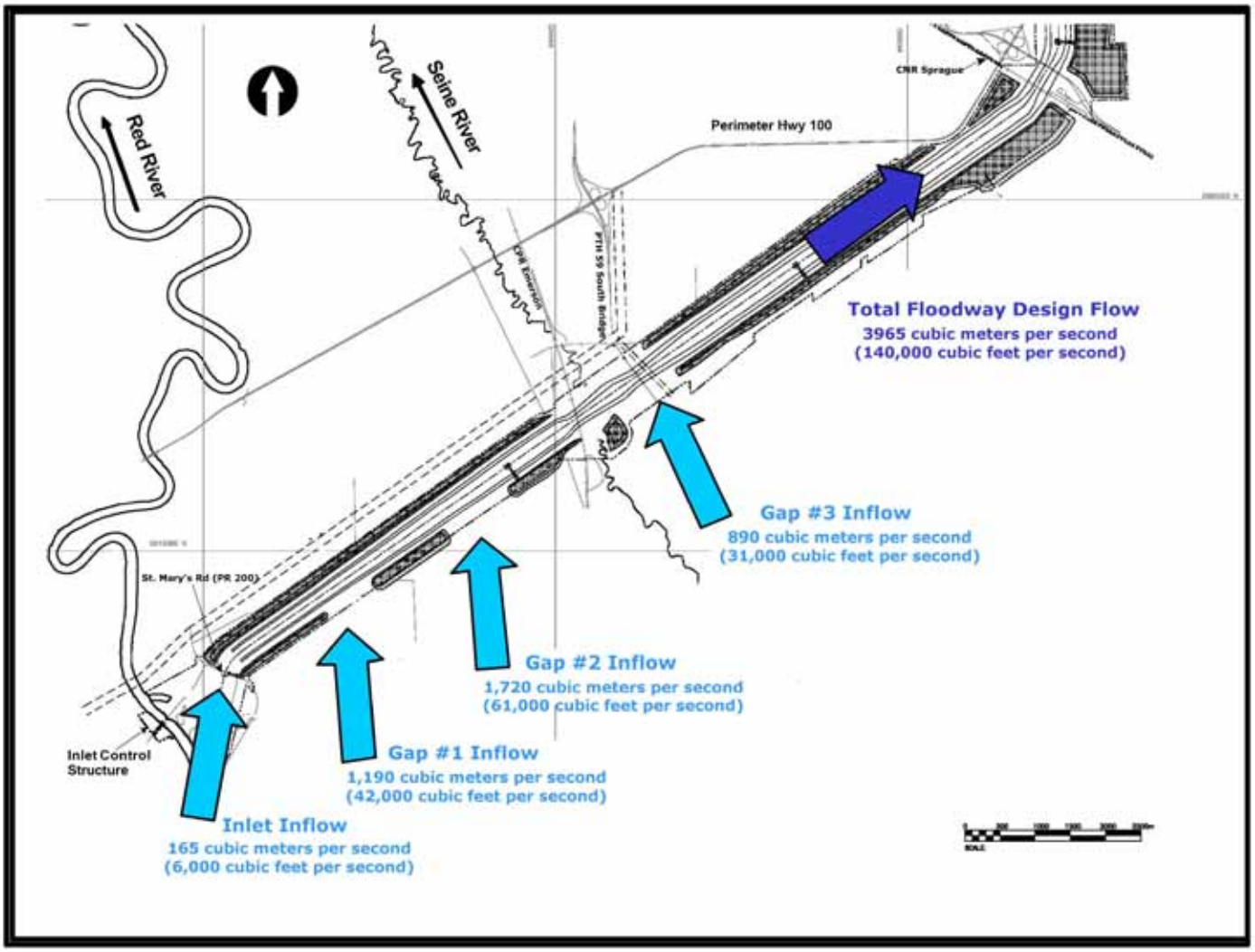
# Red River Floodway Expansion

Floodway Entrance at St. Norbert, 1997

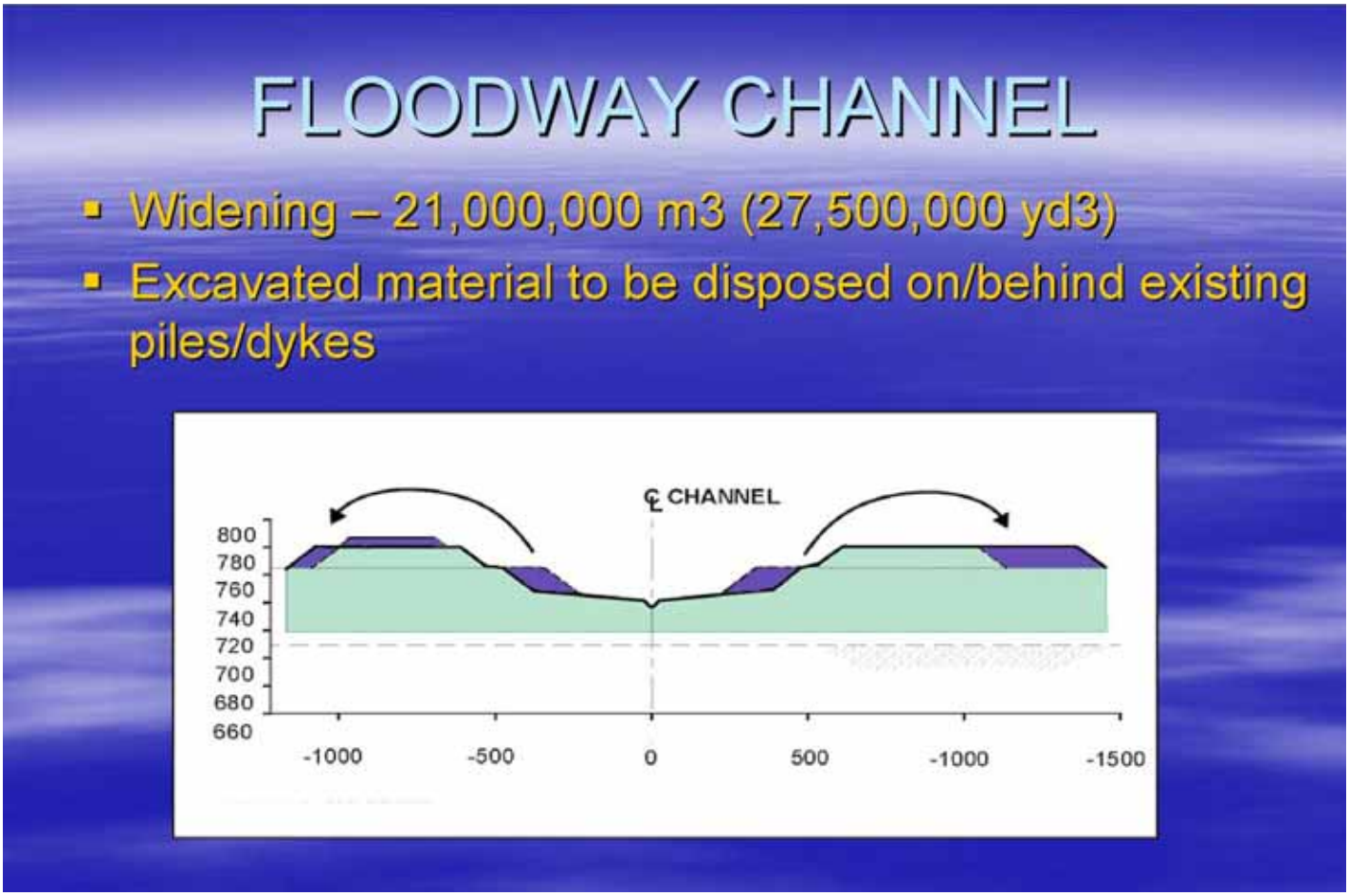
Floodway Exit at Lockport, 1997

# Red River Floodway Expansion


Red River Floodway Expansion commenced in 2006.

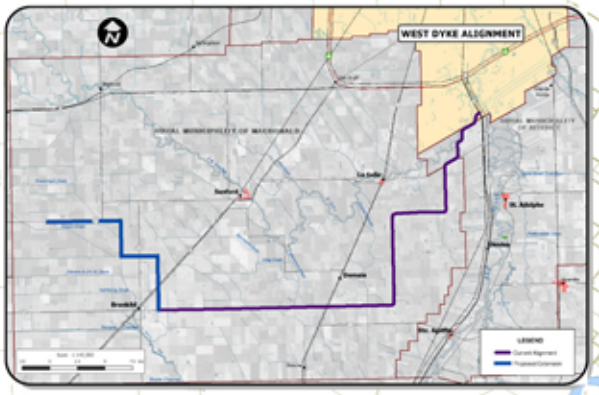


# Red River Floodway Expansion




Floodway expansion commence in 2006. The project involves widening rather than deepening the Floodway channel. In addition to widening of the channel, over 30 new roadway bridges, railway trestles, pipeline, drains, transmission lines, and control structures also have to be constructed across the new channel. The new Floodway will have sufficient capacity to protect Winnipeg from once in 700 year flood levels.

# Floodway Components




Outlet Control Structure

PTH 44 Highway Bridge

CEMR Pine Falls Railway Bridge

Ashfield Road Drain
Drop Structure (East)

Shkolny Drain
Drop Structure (East)

Dunning Road
Low Level Crossing

Country Villa Estates
Drain (West)

PTH 59 North Bridge

Hydro Transmission Lines

Springfield Road Drain
Drop Structure (East)

CP Keewatin Railway Bridge

Hydro Transmission Lines

Hydro Transmission Lines

Cooks Creek Diversion
Drop Structure (East)

Kildare Drain (West)

CN Redditt Railway Bridge

PTH 15 Highway Bridge

North Bibeau Drain
Drop Structure (East)

Hydro Transmission Lines

Greater Winnipeg Water District
Railway Bridge

Aqueduct Branch 1

Aqueduct Branch II

Prairie Centerline Drain
Drop Structure (East)

Trans-Canada Highway Bridge

CN Sprague Railway Bridge

Oil Pipelines

Grande Pointe
Embankment Gap

Hydro Transmission Lines

PTH 59 South Bridge

Seine River Siphon

CP Emerson
Railway Bridge

City of Winnipeg

RED

RED

RED

RED

WEST DYKE

East Embankment Gap (East)

East Embankment Gap (West)

PR 200 - St. Mary's Road Bridge

Inlet Control Structure

LEGEND

- Bridges and Transportation
- Drain and Drop Structures
- Main Channel Structures
- Embankment Gap
- Hydro Transmission Lines

Scale 1:40,000

0 1 2 3 4 Kilometers

Manitoba
Floodway Authority