

# Dams and Reservoirs in the Souris River Basin

The Souris River Project includes the Boundary Dam, Rafferty Dam, Grant Devine Dam, and Lake Darling Dam. The Saskatchewan Water Security Agency operates Rafferty, Boundary and Grant Devine Dams under the 1989 International Agreement for Water Supply and Flood Control. The US Fish and Wildlife Service operates North Dakota's Lake Darling Dam, except in floods when it falls under the responsibility of the US Army Corps of Engineers. Together, these structures provide a reliable supply of water and flood protection for Saskatchewan and North Dakota.



**In total, the Souris River is about 1173 km (729 mi), including about 576 km (358 mi) in North Dakota. The total basin area is about 61,770 square kilometres (23,850 square miles).**

## A shared spirit of cooperation

In the 1980s, Canada was planning the construction of dams in the Province of Saskatchewan to ensure water supply in the Souris River basin. Through binational cooperation and funding, the US and Canada provided reservoir storage capacity to serve water supply and flood storage needs for the whole basin. It's this spirit of balancing interests in a whole-systems approach that forms the basis of the 1989 International Agreement on Water Supply and Flood Control.

## The Souris River

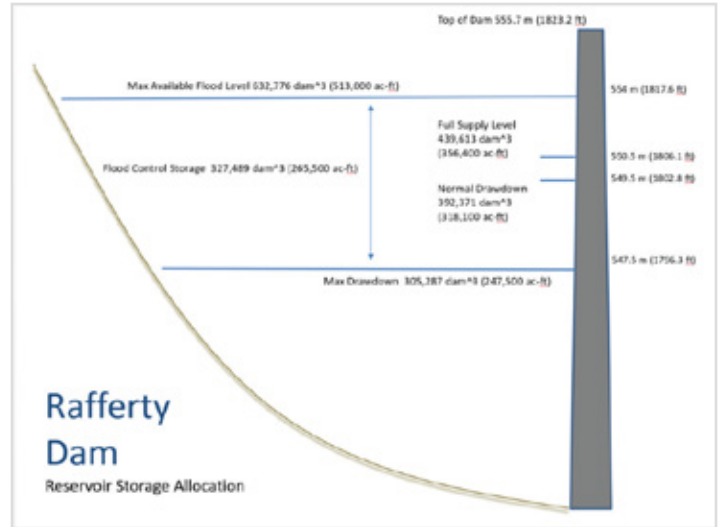
The Souris River in Canada rises near Weyburn, Saskatchewan, and flows in a southeasterly direction for approximately 349 kilometres (km) / 217 miles (mi) where it enters the United States near Sherwood, North Dakota.

The river continues on a southeasterly course through Minot. At Velva, the river forms a loop and turns northeast to Towner. Gradually, it assumes a northwesterly direction before flowing back into Canada at Westhope, North Dakota. The Souris River continues its journey in Canada, finally emptying into the Assiniboine River near Wawanessa, Manitoba.

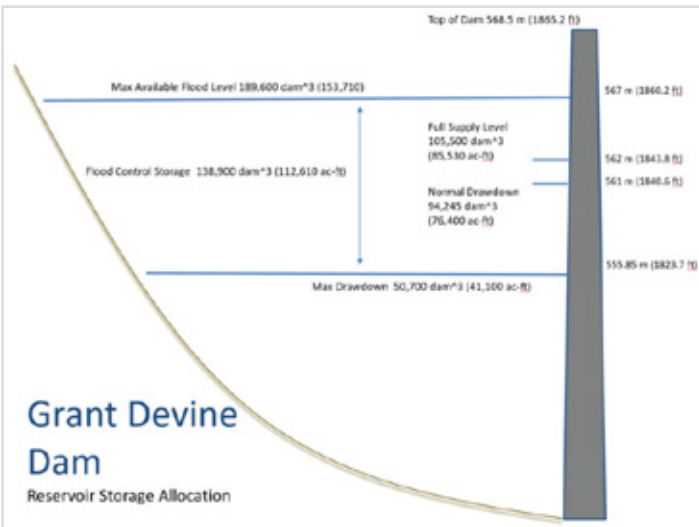


## Rafferty Reservoir and Dam

Rafferty Reservoir is located on the main stem of the Souris River approximately 4.8 km (3 mi) upstream of Estevan, Saskatchewan. The dam has a surface area of 4,881 hectares (12,048 acres) at full supply level. A 10 km (6.2 mi) long channel connects Rafferty and Boundary Reservoirs, allows excess water from Long Creek to be diverted into Rafferty Reservoir.



Operating levels for Rafferty Dam



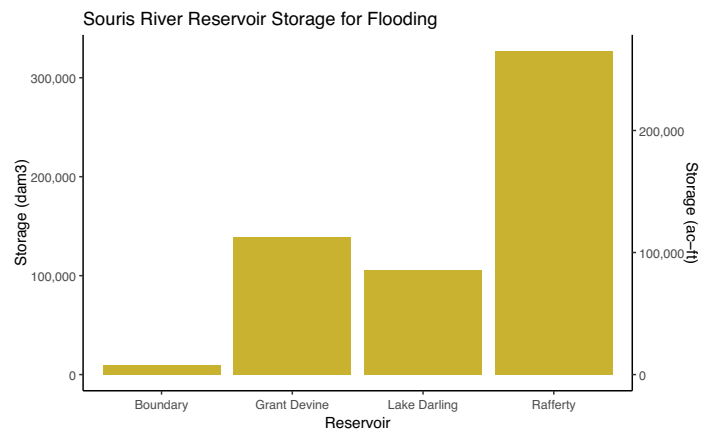
Operating levels for Grant Devine Dam



## Grant Devine Reservoir and Dam

Grant Devine Dam is located on Moose Mountain Creek 5 km (2.5 mi) northwest of Oxbow, Saskatchewan. Moose Mountain Creek joins the Souris River 56 km (35 mi) downstream of Rafferty Dam.

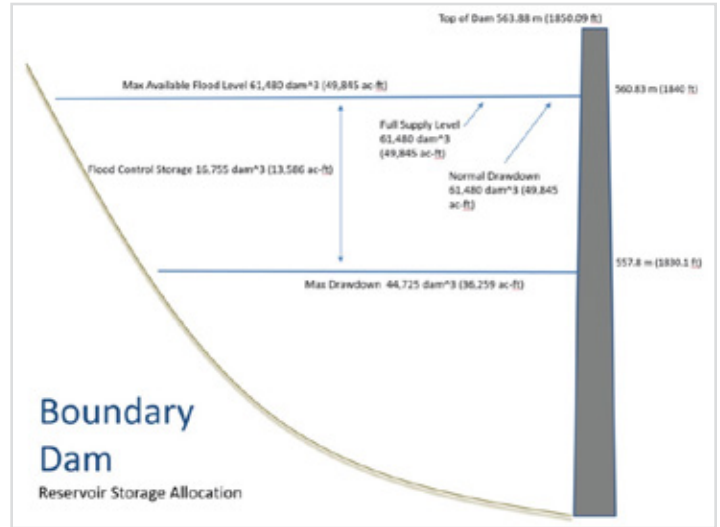
This graph shows the differences in volumes between Maximum Allowable Flood Level and Maximum Required Drawdown (available flood storage) in each of the reservoirs on the Souris River. Storing water in reservoirs and regulating its release during flooding can help prevent flood damage downstream of the reservoirs during high water events.



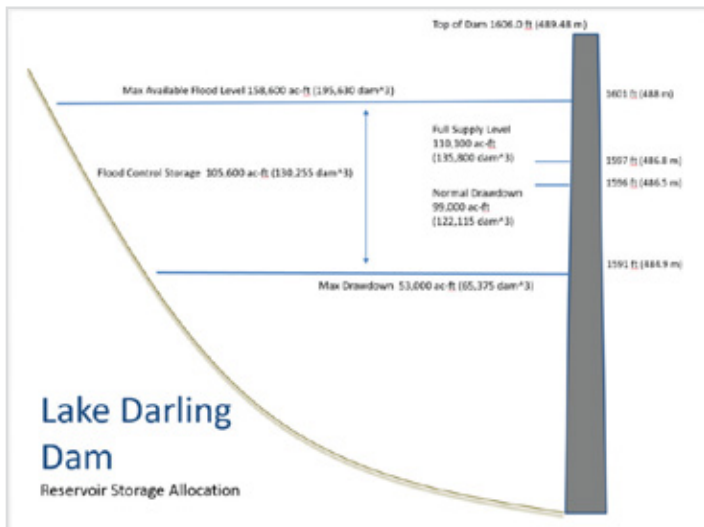


## Boundary Reservoir and Dam

Boundary Reservoir is located on Long Creek, 5.5 km (3.4 mi) upstream of Estevan, Saskatchewan. It has a surface area of 688 hectares (1,698 acres) at full supply level. Important for water supply, Boundary Reservoir has limited flood control storage. To compensate for this, the Saskatchewan Water Security Agency completes additional drawdowns of Rafferty Reservoir when required. Boundary Dam is owned, operated, and maintained by the Saskatchewan Power Corporation.



Operating levels for Boundary Dam



Operating levels for Lake Darling Dam



## Lake Darling Reservoir and Dam

Lake Darling Reservoir is located on the Souris River (Mouse River) in northwest North Dakota 43 km (27 mi) northwest of Minot, and has a surface area of 11,270 acres (4,566 hectares) at full supply level. The dam is operated by the US Fish and Wildlife Service. The US Army Corps of Engineers is responsible for flood control.

## DEFINITIONS

**Maximum Allowable Flood Level (MAFL)** - highest level to which dam safety engineers are comfortable temporarily surcharging the reservoir.

**Full Supply Level (FSL)** - highest level to which dam safety engineers are comfortable holding the reservoir over the long term.

**Normal Drawdown Level (NDL)** - maximum level the reservoirs can reach on February 1.

**Maximum Required Drawdown (MRD)** - lowest level the agreement requires for drawdown, though further drawdown is possible.

## Non-flood operations

Under Annex B of the 1989 Agreement, Grant Devine and Rafferty Dams are operated by the Saskatchewan Water Security Agency, and Lake Darling Reservoir is operated by the US Fish and Wildlife Service. The reservoirs are usually held at near full supply level after spring runoff and during the summer. In the fall and winter, usually by February 1, the reservoirs are lowered to their target drawdown levels.

During non-flood conditions, Boundary Reservoir is operated by SaskPower as a water supply reservoir, and is maintained as closely as possible to full supply level.

### What is a drawdown?

Drawdown means lowering the elevation of the reservoir pool. This is done, for example, to increase capacity for flood storage, provide water supply downstream during a drought, for environmental reasons, support of law enforcement, and other purposes.

### How flood operations are declared

Flood conditions are declared by the International Souris River Board if one or two conditions are met within Annex A prior to the spring melt. Those conditions are met when the Saskatchewan Water Security Agency and the US National Weather Service issue a:

- » 30-day local runoff volume forecast at Sherwood, North Dakota that equals or exceeds 216,100 cubic decametres (175,200 acre-feet), or a
- » 30-day local runoff volume forecast between the Canadian reservoirs and Sherwood, North Dakota that equals or exceeds 37,000 cubic decametres (30,000 acre-feet).

## Flood operations

When flood operations are declared at Grant Devine and Rafferty reservoirs, the target level is based on forecasted inflow and rules in the 1989 Agreement. The target drawdown level can vary according to updated runoff forecasts, and allows for additional drawdown prior to snowmelt runoff.

When flood operations are declared for Lake Darling, the US Army Corps of Engineers takes over the regulation of the reservoir. The drawdown levels are based on the snow water content in the basin and rules in the Agreement.

Additional drawdown may be conducted prior to snowmelt runoff.

During flood operations at Boundary Reservoir, the Water Security Agency may conduct drawdown to target levels.

However, given the importance of water supply to the province of Saskatchewan, the Agency typically completes an additional drawdown at Rafferty Reservoir in lieu.

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