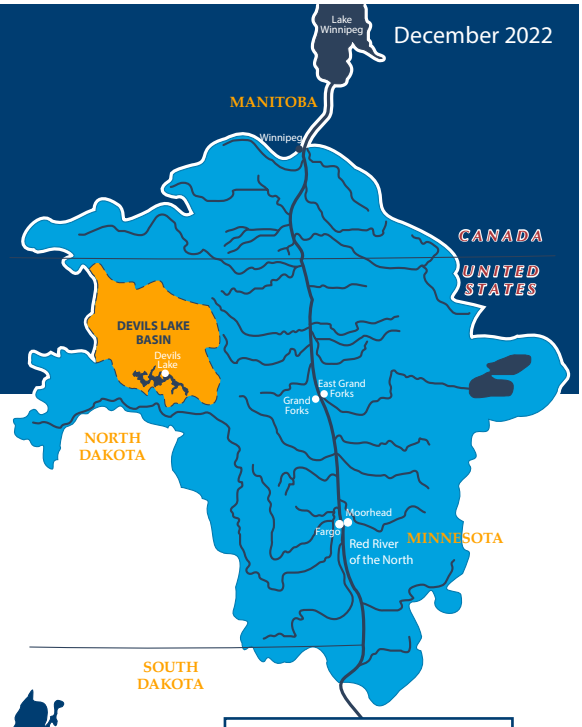
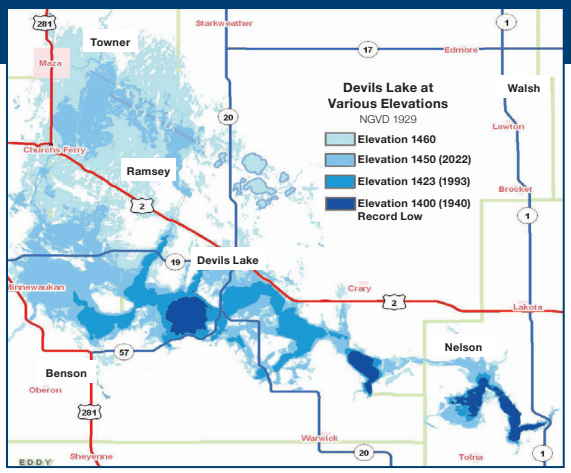
FLOOD HISTORY & RESPONSE

DEVILS LAKE

December 2022





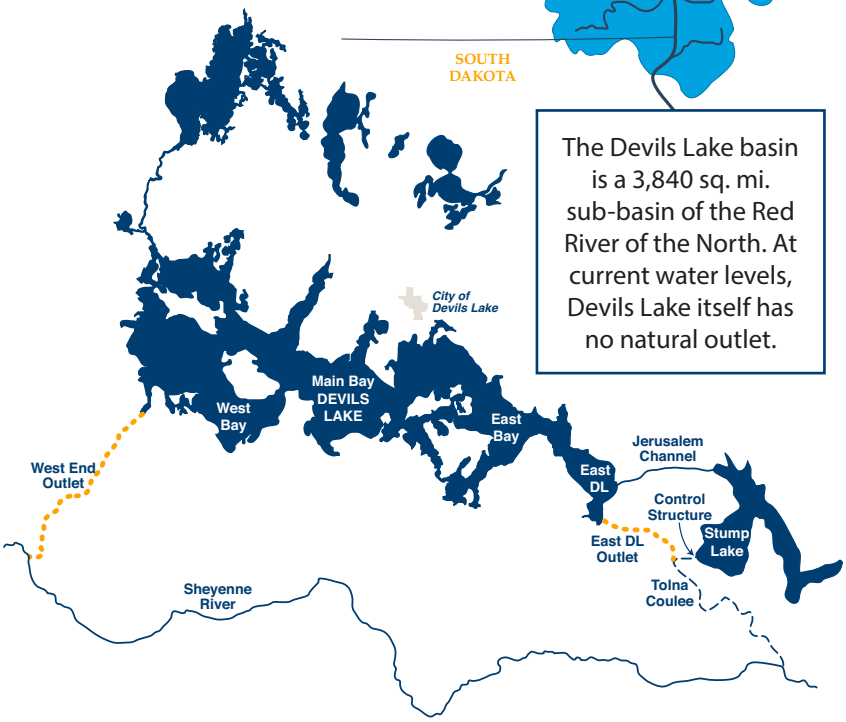
The Devils Lake basin is a 3,840 sq. mi. sub-basin of the Red River of the North. At current water levels, Devils Lake itself has no natural outlet.

BACKGROUND

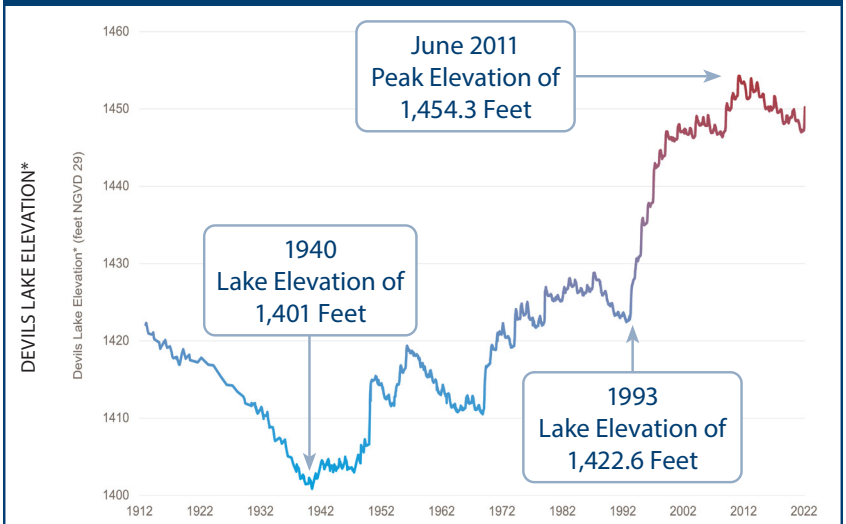
Since glaciation, Devils Lake water levels have been under constant fluctuation, from overflowing to dry - mirroring long-term climate patterns in the region. Devils Lake reached its lowest level in recorded history in 1940 at an elevation of 1,401 feet. Then, from a more recent low point of 1,422.6 feet in 1993, the lake rose 31.68 feet to an elevation of 1,454.3 feet in 2011.

At elevation 1,458, Devils Lake naturally overflows through Tolna Coulee, into the Sheyenne River. The Sheyenne River is a tributary of the Red River of the North, which flows into Canada. A natural overflow of Devils Lake would adversely affect downstream communities and rural areas alike due to flooding and water quality impacts. For that reason, the mitigation efforts outlined in this fact sheet have been actively pursued through local, state, and federal cooperative efforts.

Since 1993, the Devils Lake Basin has experienced a wet cycle that has flooded communities and tens of thousands of acres of agricultural land - forcing the abandonment of homes, roads, and other facilities. These conditions led to the State of North Dakota taking an active role in flood prevention and mitigation in the basin. Specifically, the State constructed and operates two outlets to the Sheyenne River; cooperated with the federal government on completion of a control structure at Tolna Coulee; implemented basin water management; and raised roads, bridges, and other critical infrastructure out of harm's way.



WATER SURFACE ELEVATION, DEVILS LAKE, NORTH DAKOTA



*All elevations referenced in this document are given in NGVD 29.

At a spill elevation of

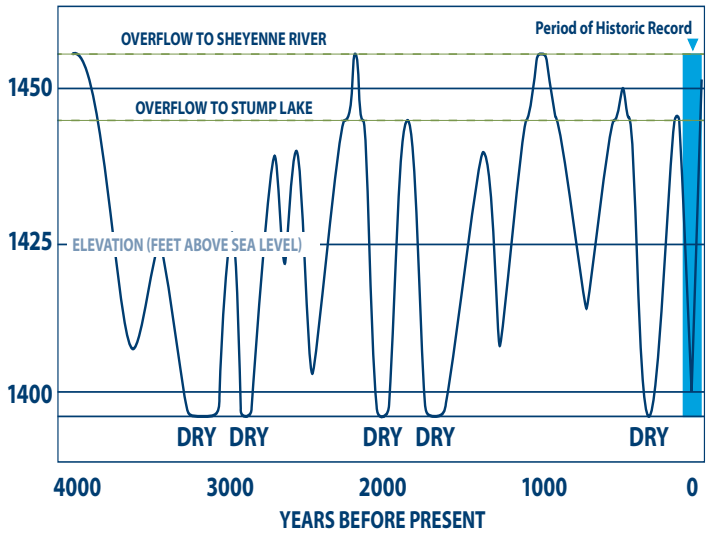
1,458.0 Feet

Devils Lake has overflowed through Tolna Coulee and into the Sheyenne and Red Rivers at least twice during the past 4,000 years. The last Devils Lake spill into the Sheyenne River occurred less than 2,000 years ago.

At its spill elevation, the lake would cover more than.

261,000 Acres

DEVILS LAKE SPILL LEVEL CHART



TIMELINE FACTS

1993

Devils Lake falls to an elevation of 1,422.62 feet (covering 44,230 acres) - prompting concerns about low water levels. As the summer goes on, the basin begins to receive tremendous amounts of moisture.

2005

The State of North Dakota completed construction of an outlet from the west end of Devils Lake to the Sheyenne River. Devils Lake reaches a peak elevation of 1448.9 feet.

2009

Record spring inflows caused a lake rise of over 3.5 feet, prompting the state to prioritize outlet capacity increases. Devils Lake reaches a peak elevation of 1450.7 feet.

Devils Lake rose 31.68 feet, an increase of 167,070 inundated acres, or about 261 square miles. During that same time period, the volume of water in Devils Lake had grown by more than seven times.

DEVILS LAKE OUTLETS AND TOLNA COULEE CONTROL STRUCTURE

OUTLETS

600 cfs
Cubic Feet Per Second (cfs)

Combined discharge capacity

WEST END

Original 100 cfs outlet construction in 2005 expanded in 2010 to

250 cfs

1,445 Feet
Minimum Intake Elevation

EAST END

In 2012, a new outlet was constructed with

350 cfs
maximum capacity

1,446 Feet
Minimum Intake Elevation

Outlet-related information can be referenced from the Devils Lake section of the Department of Water Resources' website at www.DWR.nd.gov (click on Basins).

TOLNA COULEE

The control structure allows natural erosion of the divide between Stump Lake and Tolna Coulee, while protecting downstream areas from an uncontrolled release of Devils Lake floodwater.

The control structure was constructed by the U.S. Army Corps of Engineers in 2012. Today it is owned and operated by the North Dakota Department of Water Resources.

2011

Devils Lake reached a record elevation of 1,454 feet in June 2011 and covered about 211,300 acres.

2012

The state completed an outlet from East Devils Lake. This outlet has a maximum operating capacity of 350 cfs.

In addition to the outlets, the U.S. Army Corps of Engineers constructed a control structure at Tolna Coulee to prevent a catastrophic over-flow of Devils Lake. In May, the control structure was completed and ready for operation.

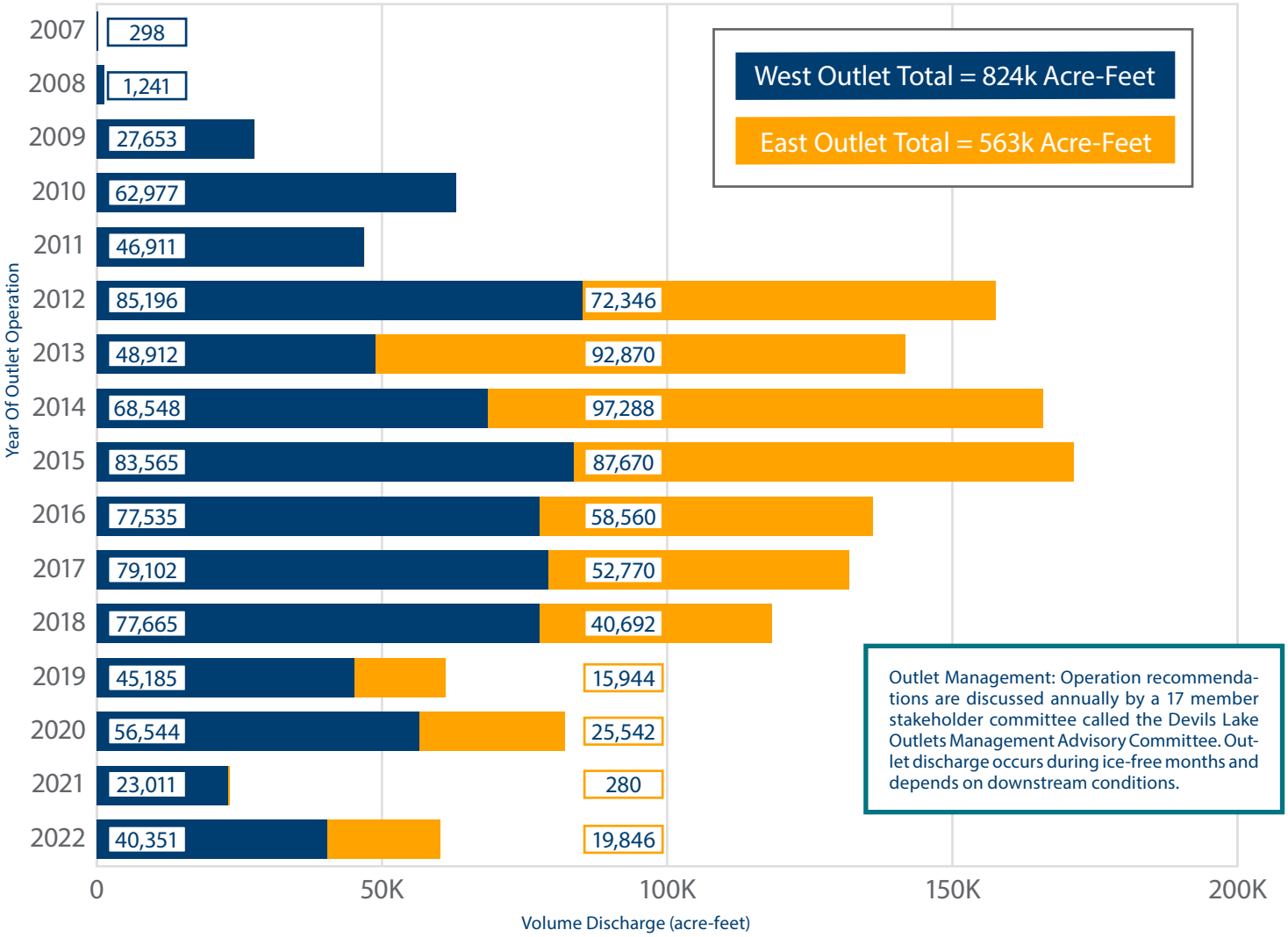
2014

After many years of construction, the levee protecting the City of Devils Lake was completed, protecting the city from future lake level rises.

2021

Cumulative outlet discharges have exceeded 1.3 million acre-feet since operations began in 2007.

OUTLET DISCHARGES FROM 2007-2022



Outlet Management: Operation recommendations are discussed annually by a 17 member stakeholder committee called the Devils Lake Outlets Management Advisory Committee. Outlet discharge occurs during ice-free months and depends on downstream conditions.

West Devils Lake Outlet

Tolna Coulee Control Structure

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