Water Management at Thief Lake & other State Managed Impoundments in Marshall County, Minnesota

Minnesota Department of Natural Resources

Thief Lake WMA

December, 2005

Thief Lake - Physical setting

- 7100 acres at normal pool
- 15th largest lake in Minnesota
- 4’ max depth at normal lake level
- 215.2 square mile watershed
- Inlet is Moose River
- Outlet is Thief River

Historical perspective (Thief Lake)

- Natural lake basin prior to European settlement
- Dredged for agriculture between 1914-1916
- Dam installed by Department of Conservation in 1931

- In essence very large wetland restoration
- Intended purpose was to restore waterfowl habitat
- Lake did not fill until 1937
- Sill of dam lowered and vertical lift gates installed in 1968

Thief Lake Water Management Capabilities

- Two 10.5’ wide vertical lift gates that can be raised 3’, with a sill elevation of 1155’ above MSL
- 61’ of stoplog bays with an operating range from 1158.5-1163.0’ above MSL

Thief Lake Annual management cycle

- Normal summer lake level 1158.5' above MSL
- Normal winter pool level of 1157.5' above MSL (1 foot of drawdown from normal lake level)
- Fall drawdown at freezeup to provide for spring runoff storage and to recreate normal winterkill conditions
- Spring runoff refills lake
- Water released as conditions downstream allow to get back to normal summer level and provide optimal habitat conditions

Water Management - coordination

- Releases downstream coordinated with Agassiz NWR and Red Lake Watershed District
- Annual and ongoing coordination with the Red Lake Watershed District and ANWR for management of and releases from Moose River Impoundment
- Stream flow maintenance
- Releases ramped up and down to avoid impacts to downstream interests including wildlife

Variations from normal water level management

•Growing season partial drawdowns to enhance emergent vegetation and submersed vegetation

•Timing opportunistic

•Summer 2005 example

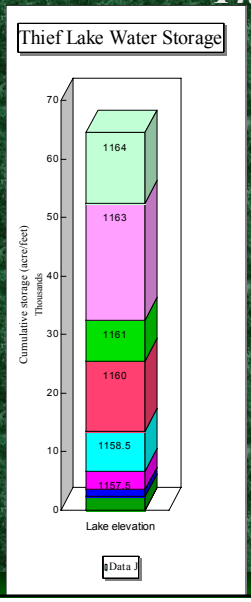
Thief Lake Water Management – Flooding Events

•Some runoff events exceed channel capacity downstream

•Management coordinated with RLWD and ANWR

•Often hold water and release after conditions improve downstream

Thief Lake Storage capacity



- Providing wildlife habitat is the primary purpose of Thief Lake
- We provide a lot of storage in major runoff events
- Gated versus ungated storage
- 1164.5 historical peak in 1948
- 1163.6 1950 peak
- 1162.9 peak of 2002 summer event

Thief Lake Water Management – Flooding Events continued

- Balancing act between impacts upstream and impacts to downstream areas
- Whenever possible – releases are ramped up and ramped down

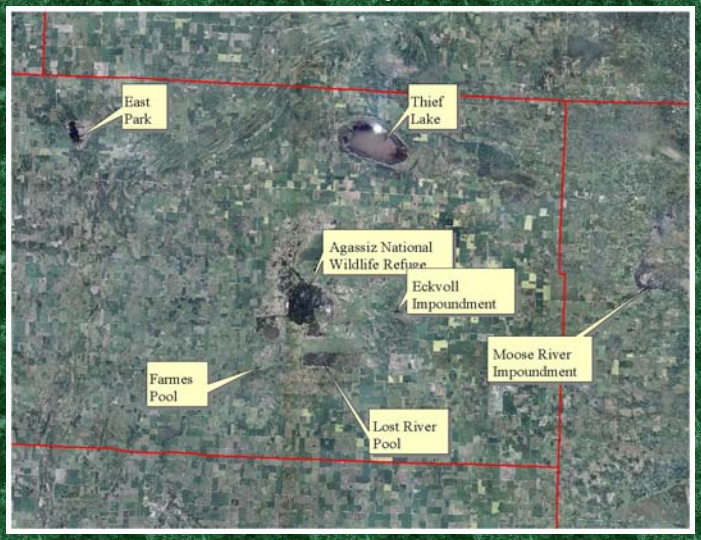
Thief Lake - monitoring

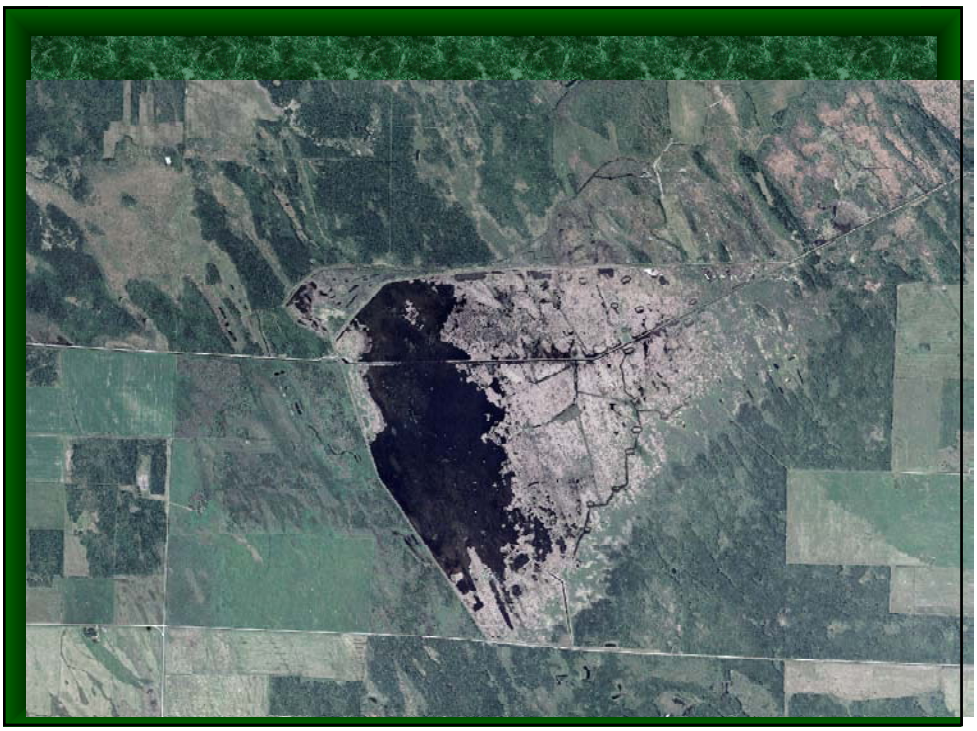
Variety of wildlife surveys

- Aerial waterfowl surveys in the fall
- Spring breeding pair and production surveys
- Invertebrate sampling
- Shallow lakes surveys
- Lake level and discharge monitoring

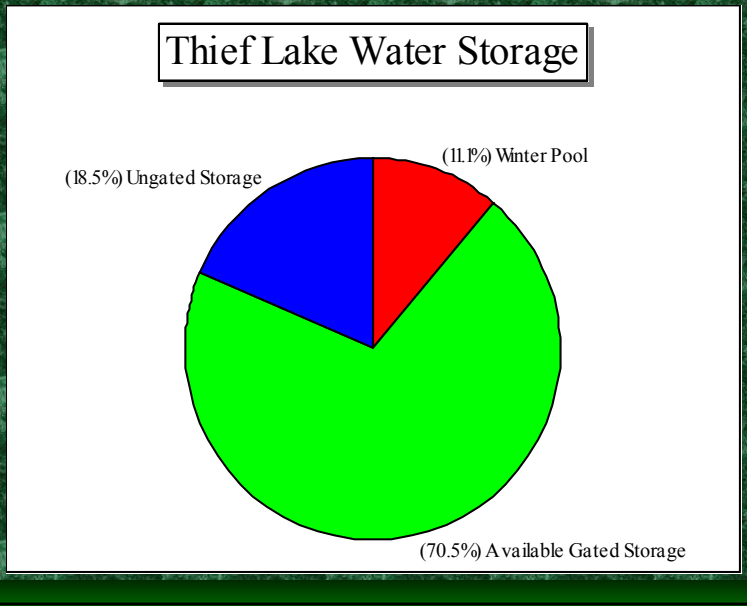
Thief Lake – sediments and suspended solids

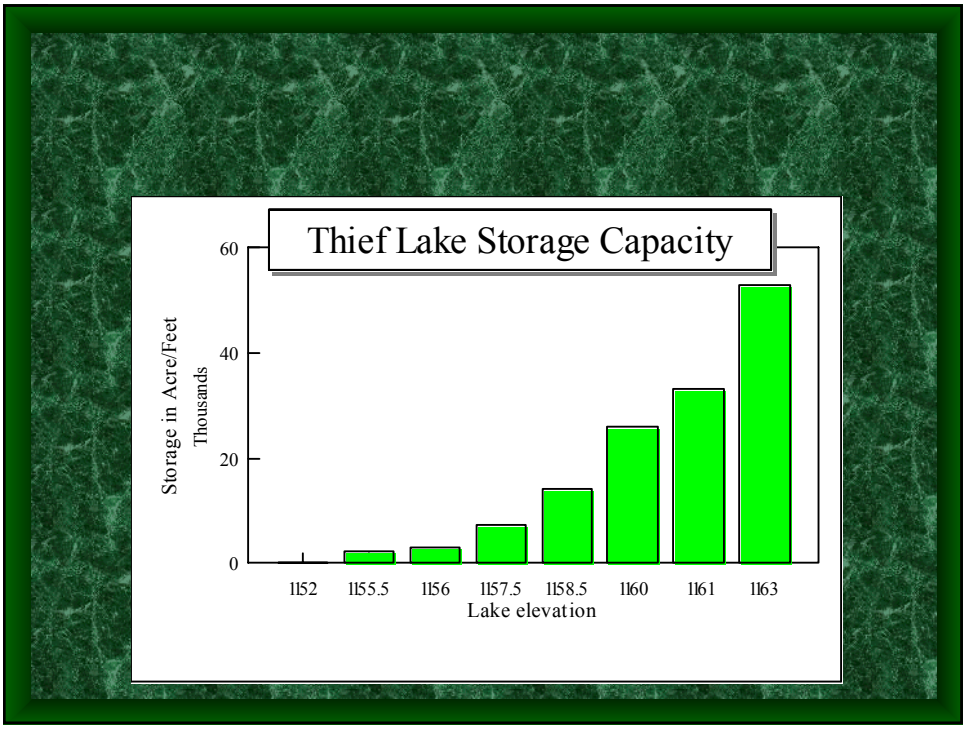
Other managed impoundments – Eastern Marshall County





Questions?


Thief Lake Water Storage
(11.1%) Winter Pool
(18.5%) Ungated Storage
(70.5%) Available Gated Storage


Thief Lake Storage Capacity
Storage in Acre/Feet
Thousands
60
40
20
0
1152
1155.5
1156
1157.5
1158.5
1160
1161
1163
Lake elevation