The Dam Facts:
Water Levels in the
Antrim Chain of Lakes

Prepared by
Mark Stone, Antrim County Operator of Dams
& Antrim County Drain Commissioner
Antrim Chain Of Lakes

Part 1.
How Antrim County Got Into The Lake Level Business
The Elk Rapids Hydroelectric Dam – Circa 1940
Elk and Skegemog Lakes
Court-Ordered Lake Level (1973)

• Summer Lake Level at 590.8
  (April 15–November 1)
• Winter Lake Level at 590.2
  (November 1–April 15)
Turbine Chamber #2
Elk Rapids Hydro
View of the Turbine Housing with Wicket Gates Open
Turbine Chamber #2 at Elk Rapids Hydro
View of Closed Vertical Gates While De-Watered
Elk Rapids Hydro Generating Unit #2
Antrim County Takes Direct Control of the Hydro - 2001
Plat Showing Several Dams at Current Site in Bellaire in 1897
Plat Showing Hydraulic Light & Power Co. Dam at Current Site in Bellaire in 1910
Charlevoix Light Plant

Dam and plant were built in 1906 by Henry Richardi. 1000 poles were strung over the 25 miles to Charlevoix to supply city street lighting.
Dam Rebuilt
1974

Westward View Of Bellaire Dam from East End Of Earthen Dam Embankment
Intermediate Lake Court-Ordered Lake Level (1990)

- Summer Lake Level at 607.15 (May 15–November 1)
- Winter Lake Level at 606.54 (November 1–May 15)
Lake Level Sight Gauge
Intermediate Lake
History of County Dam Policy

• **1974–2012**, Drain Commissioner Delegated the Operation of Bellaire Dam, Maintenance of ER
• **1982–2007**, Traverse City Light & Power Operates & Manages the Elk Rapids Hydro Dam
• **1974–1999**, County Administrator/Public Works Handles Oversight of Dams & FERC License
• **1999–2012**, Drain Commissioner Assumes FERC Duties and ER Dam Administration
• **2007–Present**, Elk Rapids Hydroelectric Power, LLC Operates Elk Rapids Dam
• **2012–Present**, Consolidation under Operator of Dams
Operator of Dams—Job Description

- Administrator of the Dams Department
- Operator of the Bellaire Dam
- Supervisor of Operations at the ER Dam
- County Administrator of the FERC License
- Contact Person for Lake Level Inquiries
Antrim Chain Of Lakes

Part 2 Lake Level Tour
Aerial View of the Elk River and Elk Rapids Dam Location
Aerial Showing the Configuration of Channels and Flow at Elk Rapids
Elk Lake
Lake Skegemog
Regulated, Stable
Torch Lake
Clam Lake
Lake Bellaire

Unregulated,
Mostly Stable
Intermediate Lake
Regulated, Unstable
Complications at the Bellaire Dam

1) Separated from Intermediate Lake By a Long, Shallow River

2) Located Below The Confluence of Intermediate and Cedar Rivers
2013 Water Levels on Intermediate Lake
Showing Periods when All Gates Are Open
Intermediate Lake Level

USGS Recorded Extremes

- Records Span: November, 1945 – February, 1975
  January, 2001 – Present

- Maximum Gauge Height: 609.55 (April 6, 1963)
- Minimum Gauge Height: 606.05 (September 12, 1973)
Upper Chain of Lakes

Unregulated, Unstable
Antrim Chain of Lakes

Part 3
Dams Dept.
Management Objectives
Ongoing Public Outreach

A Constant Education Process in All Media with one Underlying Principle:

• Lake levels remind us that the Antrim Chain of Lakes is a complex dynamic environment and we need to act accordingly—with sound judgement and flexibility.
FERC License
Issued
December, 2014(?)
Continued Improvements on the Elk Rapids Dam
New Pedestrian Suspension Bridge behind the Elk Rapids Dam
(Dedication Ceremony April 1, 2014)
Dams are prone to deterioration. Owning a dam assumes a long-term commitment to an upkeep that will never be cheap, but could be enormously expensive if not cared for properly.

Bellaire Dam Improvements and Maintenance
**Proposal:**
To Install Hydroelectric Power at the Bellaire Dam

*Main Obstacle:* Requires a FERC License

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<th>At Dam</th>
<th>At Bridge St</th>
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<td>Engineering</td>
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**Net Savings**

- Less O&M: $-13,000
- Annual Savings: $66,203
- Payback in years: 15.5
ECO-SIPHON PACKAGED HYDRO STATION

"Good things come in small packages."

Eco-Siphon Packaged Hydro Station

Siphon Type Turbine

Budgetary Estimate: $595,000
Antrim Chain Of Lakes

Addressing Navigation And Flowage Improvements
Grass River Large Woody Debris Demonstration Overview

Proposed Work on Two Sites:

Site 1—6 Structures

Site 2—2 Structures
Grass River
Large Woody Debris
Demonstration

Site 1

6 LWD Structures

Scale
100 Ft.
Grass River
Large Woody Debris Demonstration

Site 2

Scale
100 Ft.

2 LWD Structures
LWD Structures Photographed
The day After Installation

Photo by Art Hoadley
Volunteers Worked for Two Days Cutting and Shuttling Trees to Building Sites
LWD Supporters

Managed by
• Antrim County Dams
• Antrim Conservation Dist.
• Grass River Natural Area
• Three Lakes Association

Funding Provided by
• Antrim County
• Butch’s Tackle & Marine
• Dewitt Marina
• Dockside Restaurant
• Moon Electric
• Northaire Resort
• Three Lakes Association
• Friends of Clam Lake