

Draft

LAKE LEVEL CONTROL PROCEDURE

FOR

LAKE LEELANAU

Revision 1, 7/17/2024

DRAFT

Procedure:

- a. The lake level shall be maintained at the lower part of the Court Order to provide a 'cushion' for significant rain events (589.1 ft above mean sea level... Apr 15—Nov 15).
- b. The water level sensors should be looked at daily, and action taken as necessary to maintain the proper water level.
- c. If there is a significant precipitation event, i.e. heavy rain or rapid ice melt, and the gate flow is wide open, 'boards' should then be pulled to bring lake levels down as soon as practical.
- d. On a periodic basis, the dam gate should be fully upright, and all sensors should be checked and compared to the staff gages at each location. If needed the sensors should be recalibrated to correlate with the staff gauges.
- e. The dam operator shall log the water levels at the dam and the narrows, approximately weekly, when checking out operations. The staff gages and bubble gage shall be used for these readings. The hardcopy of the readings shall be kept in the dam control room.
- f. The standby backup power generator shall be functionally tested annually and a record logged verifying this action.
- g. All questions, phone calls, and communications regarding lake level concerns, should be directed to a County employee.

Drain Commissioner or designee _____
Dam Operator _____

Attachment #1 Response to Climate Conditions/Rain Events:

Attachment #2 Historical Information

NOTE: The operating procedures and maintenance of the dam is defined elsewhere.

Lake Levels Requiring Action

Climate Condition _____ Events _____
Response

Normal _____ < 1" rain in 24 hrs _____ Operate
Auto

Rain event/snow melt 1-3.2" per 24hrs _____ Operate
Auto
(minor)

Rain event/snow melt 3.2 -4.5" per 24hrs _____
Manual Operation
(major)

Large Rain Event _____ 4.5" ++ per 24hrs _____
Manual Operation and
(historic) _____ Pull boards

Reference and Basis

- a. On February 14, 1978, the Board of Commissioners adopted a resolution requesting the proper level of the waters of Lake Leelanau. In their resolution they deemed it to do this “...for the purpose of maintaining and promoting the public health, welfare and safety, the conservation of the natural resources of said county and state, and to preserve property values around Lake Leelanau.”
- b. Circuit Court order October 1978 established a lake level, and also established a special assessment district.
- c. The Court ordered “...that a level of 589.21 feet ‘Mean Sea Level Datum’, with a maximum fluctuation of plus 0 inches and minus 2 inches, shall be maintained from April 15 of each year or at ice break-up on said lake, whichever occurs later, until November 15 of each year; on November 15 of each year said lake level shall be reduced to 588.21 feet ‘Mean Sea Level Datum’ until the following April 15 or ice break-up, whichever occurs later at which time it shall be increased to the previous above stated level until further Order of this Court. These levels shall be maintained at the site of the dam located in the Village of Leland, County of Leelanau, and State of Michigan.”
- d. On December 11, 1997 the Department of Environmental Quality issued a letter stating that the design discharge for the dam is for a 200 yr. flood with a discharge of 1200 cfs. *(This was in a letter to Otwell Mawby engineer consultant hired by the County. This is the basis for the design of the dam.)*
- e. *The Leland Dam Authority was created by the County Board of Commissioners per Resolution #2004-007. (The powers and duties of a dam authority are defined in Part 307 of NREPA-MCL, 324.30701).*

- f. The Leland Dam Authority has the responsibility for the maintenance of the lake level and the dam.
- g. After months of legal concerns about property, ownership, and easements, a new dam was constructed 2005-2006 under the auspices of the Dam Authority.
- h. In letter dated 2/18/2005 from Thomas Prehoda (*the design engineer of dam*) it states that both hydraulic rams would be necessary to lift the gate during flood conditions.
- i. The staff gage mounted on the south concrete abutment was surveyed on 5/4/2017 by transit-level-loop from the US Corp. Eng. Disc on break wall, and also was surveyed by GPS the same day. The top of the gage is 589.98' and 589.92' respectively, NGVD29. These are the levels and datum to use.
- j. There are three (3) electronic water level sensors that provide readouts...at the dam, the narrows, and at Birch Point. They were purchased by the Lake Association and given to the County in 2016. These sensors are used as a tool to help provide real-time information, and can be accessed on-line. (*The graph readouts have full historical information since installation*).
- k. Due to questions about the northern part of the lake, a stake was set and surveyed at Seltzer Park on the north end of the lake. Readings were taken over the course of several months and compared to the narrows and Birch Point. It turns out that the lake waters are essentially level within an inch or so at any time during calm, normal, conditions.
- l. During various water flows over the dam, the inlet to the Leland River, and river flow frictional forces, can cause discrepancies between the gage at the narrows, and the gage at the dam.

- m. The cross section at the M-204 bridge, and the narrows itself, is several times the cross section at the dam, and there is no flow impediment at those locations. The flow at the narrows is less than 1 ft/sec and per hydraulic calculations, is considered 'flat'.
- n. The dam gate should be in the full upright position, and let the river flow stabilize, for an exact Court Order reading of lake water level at the dam.