

PRINCETON DAM OPERATION PLAN – MAY 2023 THROUGH JUNE 2026

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A. BACKGROUND

Dams are part of a dynamic system comprised of the river, the dam itself, and precipitation across the contributing watershed. In general, dam operators need to monitor flow conditions and precipitation rates and operate the dam accordingly. Under certain conditions some dam owners will need to notify downstream dams of changes in operation.

The Princeton Dam does not have ordered pool levels established under Ch. 31.02, Stats. From 1960 to 2018, water levels had historically been seasonally adjusted by placement of flashboards across the long crest of the dam in the spring, and their removal in the fall. Due to the construction of a permanent concrete cap on the crest of the dam that replaced the board system, water levels can only be manipulated by operating the gates in the old lock channel.

Due to the presence of the long, ungated overflow crest, the Princeton Dam has very limited ability to manage levels during periods of high flows, and elevations may fluctuate significantly following rain events. However, levels can be reasonably managed during periods of normal, steady flows.

Water level readings are based on the staff gage mounted on the left (north) end of the gated lock channel section near the Public Access and Fishery area at the end of Lock Road south of State Highway 23 east of Princeton, WI. For reference:

- The crest of the dam is at an elevation of 7.23' on the staff gage. At this level there would be no flow over the dam, and 6" of flow in the fish ladder.
- The North American Vertical Datum of 1988 (NAVD88) can be obtained by adding 754.64 to the staff gage reading. The crest of the dam is elevation 761.87 in this datum.

In the interest of navigation and recreation, it is desirable to have higher lake levels maintained in the summer. In the interest of shoreline stability, water quality, wetland conservation, and agricultural uses, it is desirable to have lower lake levels maintained in the winter. In the interest of fish passage through the dam it is desirable to have an adequate amount of flow through the fish ladder and/or through the lock channel gates at all times. In the interest of protecting hibernating herptile species, it is desirable to begin seasonal transitions to targets before overnight freeze conditions are common.

B. SEASONAL SETTINGS

To meet the general goals presented above, the following settings during specified date ranges for the Princeton Dam will be used:

- **LATE FALL SEASON: October 1 to November 1**
 - Preliminary seasonal gate openings may occur, if water level readings are above 8.1'. This may involve incrementally opening one or more gates to move the level toward a reading of 8.1'.
- **WINTER SEASON: November 1 to March 1**
 - Dam will be set to three gates open during this time period, and will not be adjusted unless the following situations occur:
 - If the staff gage reading at the dam would be below 7.3' if three gates remained open, one or more gates will be closed to maintain a level no lower than 7.3'.
 - If the staff gage reading at the dam would be above 8.1' if only three gates were open, additional gate(s) will be opened to maintain a level no higher than 8.1.
- **SPRING SEASON: March 1 to the week before Memorial Day**
 - Dam will be set to all five gates open during this time period, and will not be adjusted unless the following situation occurs:
 - If the staff gage reading at the dam would be below 7.3' if all gates remained open, one or more gates will be closed to maintain a level no lower than 7.3.'
- **TRANSITION FROM SPRING TO SUMMER: Week before Memorial Day to Third Week in June**
 - Early in the week prior to Memorial Day: Adjust to 4 gates open, if not already at this setting
 - Right after Memorial Day: Adjust to 3 gates open, “ “
 - Early in the 1st full week of June: Adjust to 2 gates open, “ “
 - Early in the 2nd full week of June: Adjust to 1 gate open, “ “
 - Early in the 3rd full week of June: Closed for Summer Season
- **SUMMER/EARLY FALL SEASON: Third Week in June to October 1**
 - All gates closed, no adjustment.

C. GATE ADJUSTMENT PROCEDURE

Procedures for operating gates is described in the paragraphs below. Visitation by DNR staff is anticipated to occur infrequently, as it is expected that monitoring via the USGS gage will be effective and flows generally do not vary rapidly.

To determine the appropriate gate setting, use the following procedure:

- Read the current river flow rate from the USGS gage at Princeton:
https://waterdata.usgs.gov/nwis/uv/?site_no=04073365&agency_cd=USGS
- Using the rating curve developed for this dam, find the flowrate along the horizontal axis. From that flow rate, follow a vertical line up to the curved line representing the number of gates currently open at the dam.
- At the intersection of flow rate and gate setting, follow a horizontal line over to the left-hand axis. This represents an estimate of the staff gage reading for a given flow rate and gate setting.

- If the estimated staff gage reading is near the bounds established by the seasonal levels described above, DNR staff should plan a visit to the dam to obtain an actual reading. If elevation is out of range, open or close gates as necessary.
- Open Gate #3 (middle) first, Gates #2 and #4 next, and Gates #1 (southerly end) & #5 (northerly end) last. Closures should follow the reverse order. Gates #1 and #5 should be opened last and closed first, in order to avoid turbulence along the lock channel walls.
- To avoid sudden downstream depth changes, avoid closing more than one gate per day and avoid opening more than two gates per day. If greater adjustment is needed, allow three days for the river to come to equilibrium and complete the additional adjustment in a separate visit.