Green Lake Hydroelectric Project

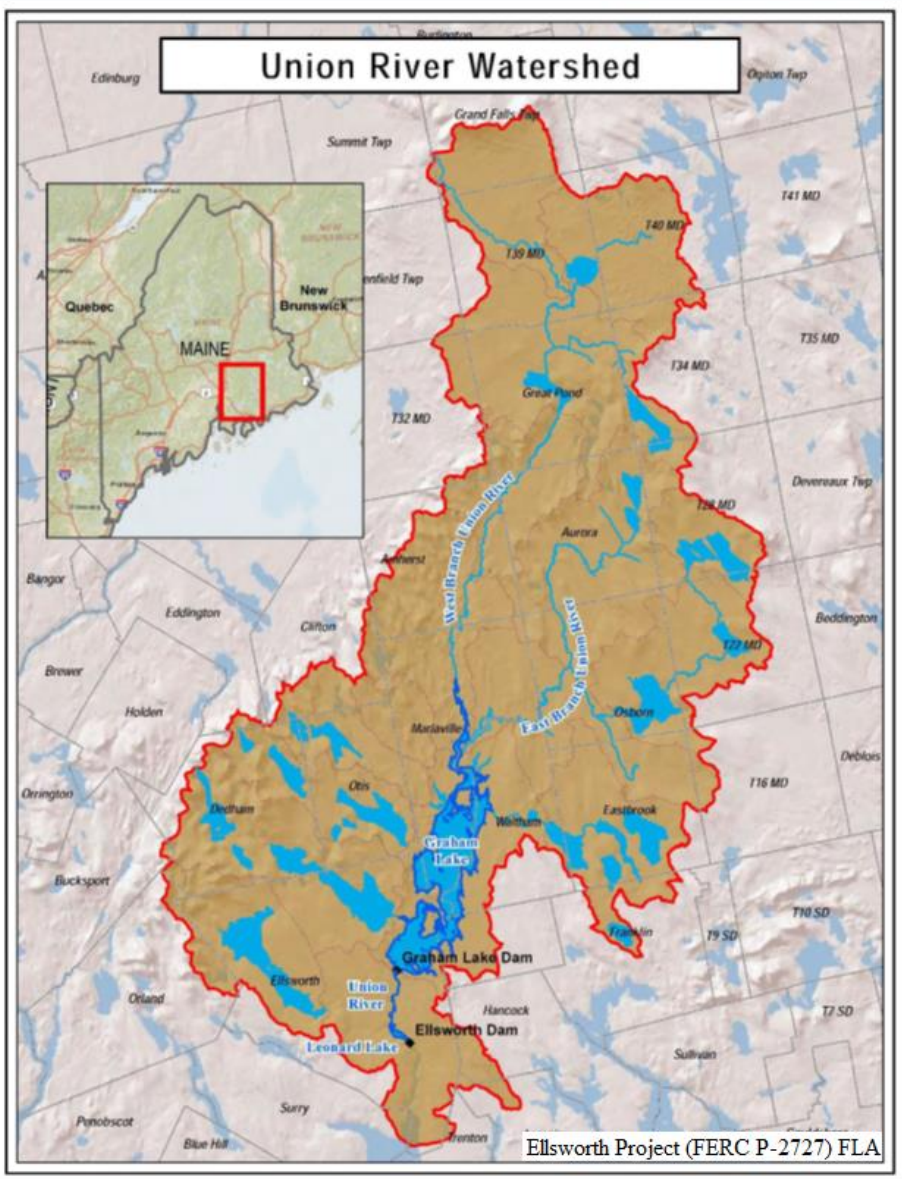
FERC Project Number P-7189

Bert Kleinschmidt – President

Green Lake Water Power Company

Scoping Meeting Presentation

27-Jun-2019



Ellsworth Project (FERC P-2727) FLA

Green Lake Project Overview

General Project Location

- Town of Ellsworth, ME
- Green Lake and Reeds Brook
- Part of the 547 square mile Union River basin
- Project drainage area is approximately 45 square miles

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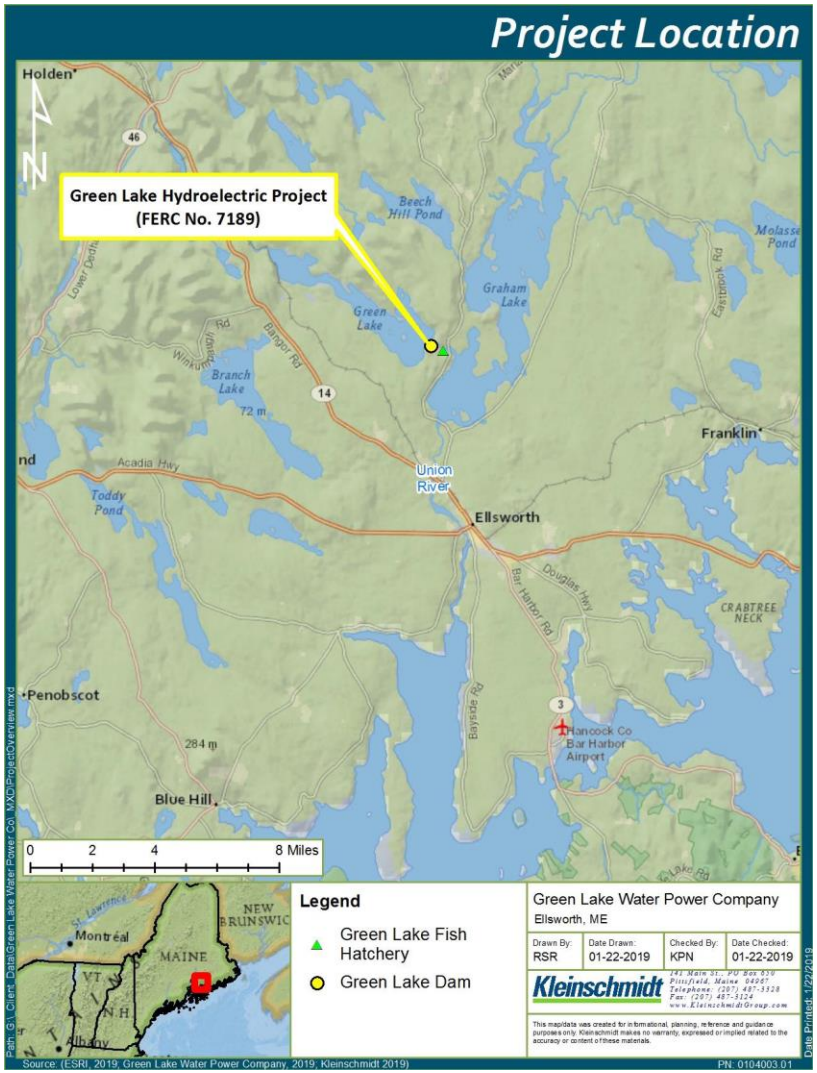
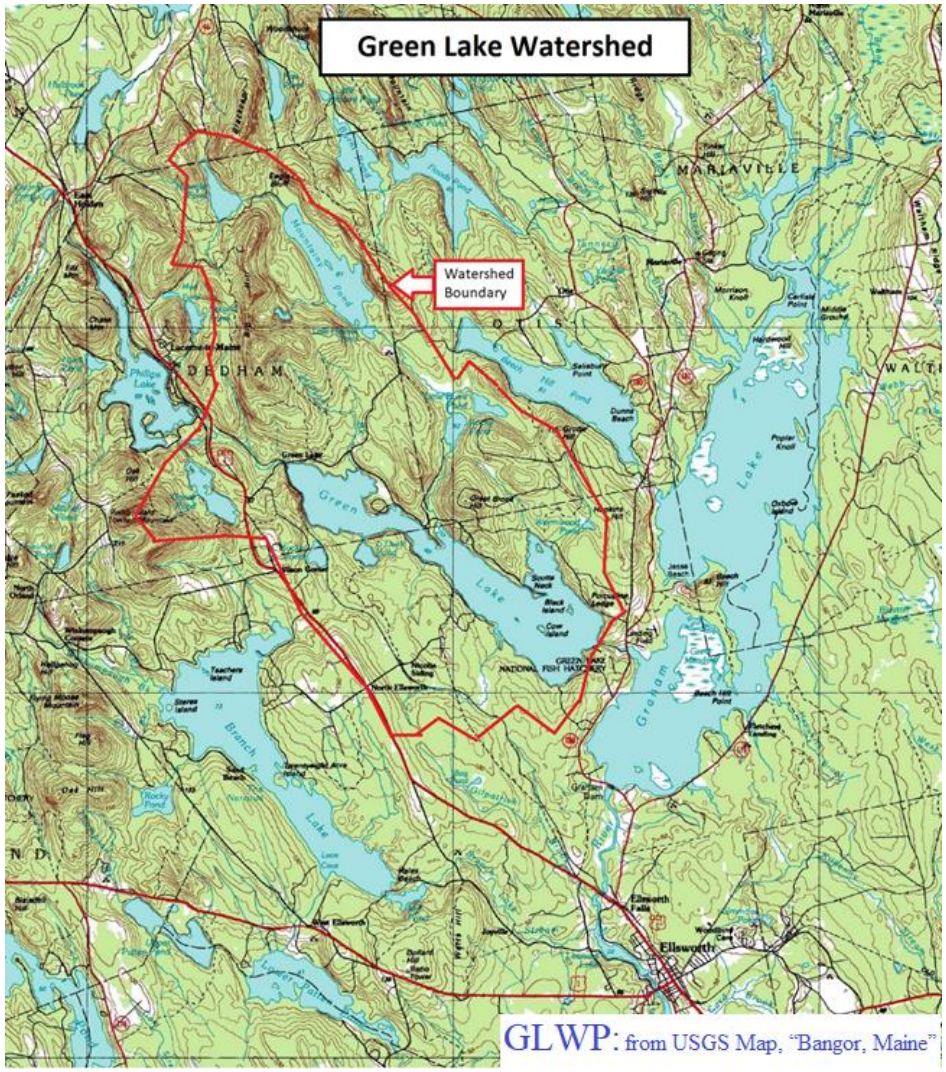

Project Location
Green Lake Hydroelectric Project
(FERC No. 7189)
Holden
Franklin
Ellsworth
Penobscot
Blue Hill
Union River
Graham Lake
Green Lake
Beech Hill Pond
Molasses Pond
Branch Lake
Toddy Pond
CRABTREE NECK
Hancock Co Bar Harbor Airport
Acadia Hwy
Bangor Rd
Bar Harbor Rd
Douglas Hwy
Bayside Rd
0 2 4 8 Miles
Legend
Green Lake Fish Hatchery
Green Lake Dam
Green Lake Water Power Company
Ellsworth, ME
Drawn By: RSR
Date Drawn: 01-22-2019
Checked By: KPN
Date Checked: 01-22-2019
Kleinschmidt
Source: (ESRI, 2019; Green Lake Water Power Company, 2019; Kleinschmidt 2019)
PN: 0104003.01


Green Lake Watershed
Watershed Boundary
DEDHAM
MARIAVILLE
Ellsworth
GLWP: from USGS Map, "Bangor, Maine"

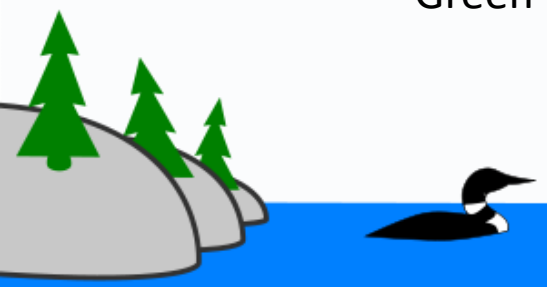
Green Lake Project Overview

Other Hydroelectric Projects on the Union River

Name: Ellsworth Project
Owner/Operator: Black Bear Hydro
FERC Project Number: P-2727
Approximate Capacity: 8.9 MW
Graham Lake Dam:
- Location: 3.5 Miles NNW of Ellsworth
- Storage Area: 10,000 Acres

Ellsworth Dam:
- Location: Lake Leonard In Ellsworth
- Storage Area: 90 Acres

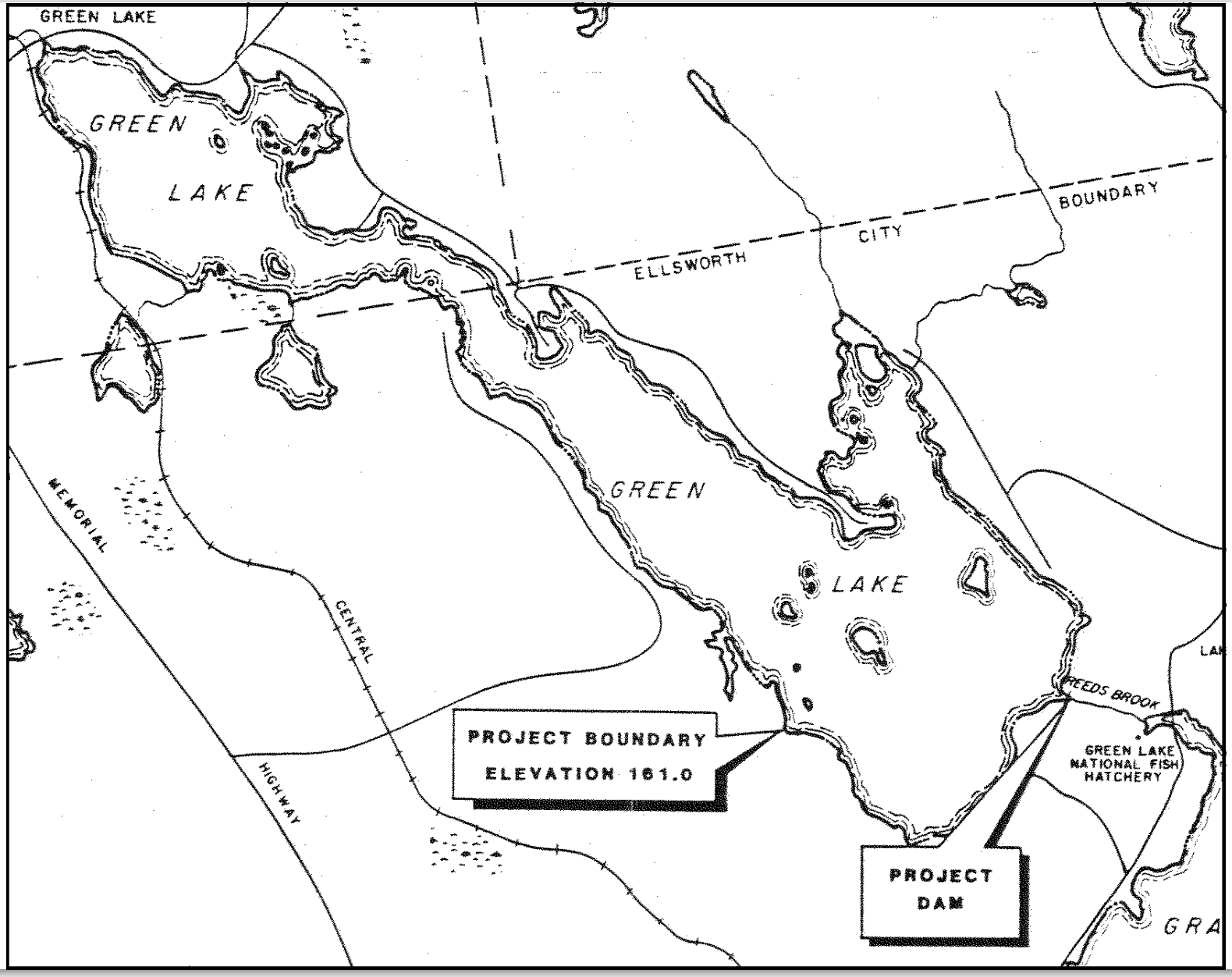
Major Water Sources:
- Union River
- Green Lake drainage

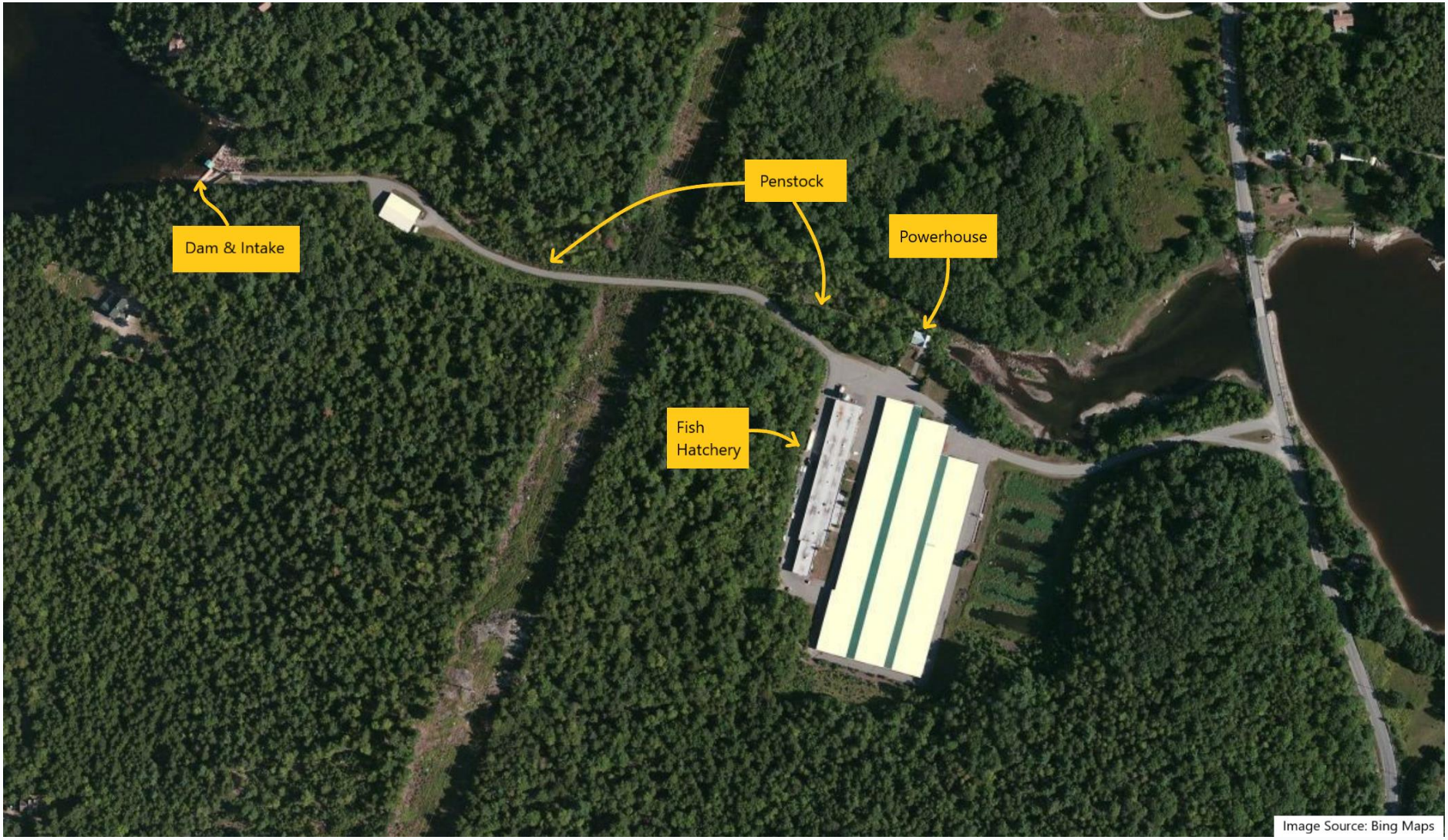


Green Lake Project Overview

Project Boundary

- Extends approximately 6.2 miles upstream of the dam, and approximately 1500 feet downstream of the dam
- Above the dam, the boundary follows the impoundment at the elevation of 161.0 feet USGS, 0.3 feet above the normal water surface elevation.
- Below the dam, the boundary includes two acres of GLNFH land on the SW side of Reeds Brook.


GREEN LAKE
GREEN
LAKE
ELLSWORTH
CITY
BOUNDARY
GREEN
LAKE
MEMORIAL
CENTRAL
HIGHWAY
REEDS BROOK
GREEN LAKE
NATIONAL FISH
HATCHERY
PROJECT BOUNDARY
ELEVATION 161.0
PROJECT
DAM



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Green Lake Project Overview

Impoundment

- The Project impoundment is 2989 acres at a normal full pond elevation of 160.7 feet USGS
- The impoundment extends upstream approximately 6.1 miles from the dam
- Net storage capacity about 10,000 acre-feet, gross storage capacity (to sill of waste gates) about 16,000 acre-feet

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Green Lake Project Overview

Dam

- The Green Lake Dam is a dry rock, timber, and sheet steel structure originally built in the early 1900s, with upgrades in the 1960s, and 1980s.
- The dam is 270 feet long and a maximum of 7 feet high.
- From the SE end to the NW end, the dam includes an 80’ main spillway, a penstock intake structure, two 6x7’ waste gates, and a 157’ sheet steel faced section.
- Waste gates, intake and spillway have screens to avoid fish passage.

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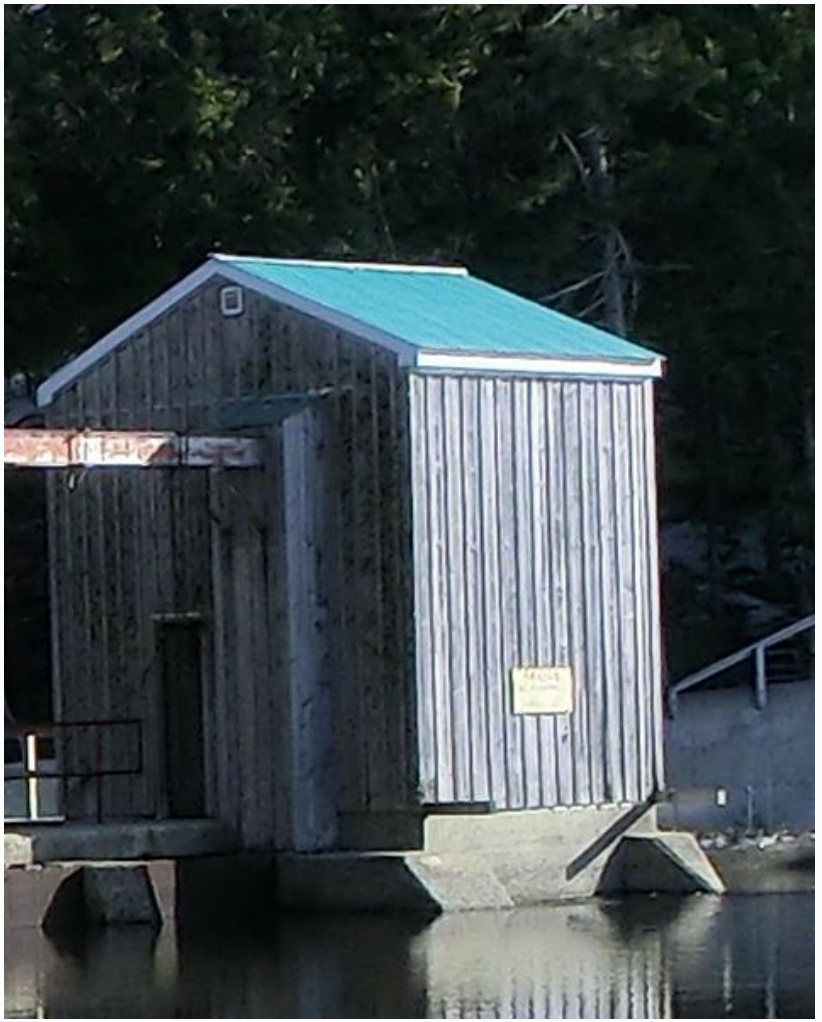
Green Lake Project Overview
Headworks

- Project headworks consist of an intake structure at the dam.
- The intake consists of a steel trashrack and a 5’ x 5’ gate.
- The trashrack is approximately 8’ wide by 12’ high with a one-inch clear bar spacing



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Green Lake Project Overview

Penstock

- Water flows from the headworks to the powerhouse via a 1740’ penstock.
- The first 740’ of the penstock are reinforced concrete (54” and 48” diameter) at or beneath grade. The final 1000’ are 48” wood stave penstock supported above ground.
- The penstock has a 24” tap installed 480’ from the dam to supply water for the Green Lake National Fish Hatchery.

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Green Lake Project Overview

Powerhouse

- The powerhouse is a reinforced concrete structure 27’ by 35’ in plan, built into the bank along Reeds Brook. The operator’s quarters, a wood frame structure built on top of the powerhouse, are the only part of the powerhouse visible from the Hatchery parking lot.
- The powerhouse contains two turbines and generators.

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Green Lake Project Overview

Turbines & Generators

- Main Turbine & Generator:
  - Vertical tube turbine directly coupled to 400 KW induction generator.
  - Fixed operating point of about 96 cfs with a net head of about 50’.
- Second Turbine and Generator:
  - 8’ x 6” centrifugal pump as a turbine, belt coupled to a 25 HP (motor rating) induction generator.
  - Estimated flow of 7 cfs at 50’ net head.

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Green Lake Project Overview

Grid Connection

- The generator produces 480v 3-phase power.
- A 500 KVA Project transformer converts the station output to 12.47 KV. The transformer is coupled to the Emera 12.47 KV transmission line via a 650’ underground cable.
- The Project can not generate power without a grid connection because of its fixed operating point turbines and induction generators.

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Green Lake Project Overview
Project Recreation

- There are no specific Project recreation facilities.
- The project supports recreational uses of Green Lake:
  - Boat access
  - Fishing
  - Swimming

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Green Lake Project Overview

Existing Project Operation

- The Green Lake National Fish Hatchery (GLNFH) has priority access to up to 30 cfs of flow from the lake.
- The GLNFH uses water from the Project's penstock tap from late spring through early fall.
- A minimum flow of 1 cfs is maintained in Reeds Brook.
- During the summer (01-Jun through Labor Day Weekend) recreation on the lake is the guiding factor for Project operation. Lake level is maintained from 159.7' to 160.7' USGS.
- The fall drawdown usually begins Labor Day and is completed by 15-Oct. The lowest drawdown level allowed is 157.5' USGS.
- The lake is maintained in the range of the 15-Oct level to 160.7' until 01-Jun.
- The turbine is run when water is available to do so.
- If needed to avoid the lake going over 160.7', the waste gates are opened.
- Daily records are kept.

Questions?

Contact Information

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