Green Lake Water Power Co.
120 Hatchery Way, Ellsworth, ME 04605-3501

July 6, 2023

VIA E-FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N. E.
Washington, DC 20426

Re: Green Lake Hydroelectric Project FERC No. 7189-015
Response to the Maine Department of Marine Resource Comments, Recommendations, Terms and Conditions, and Prescriptions

Dear Secretary Bose,

On March 23, 2023 the FERC issued a Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions.

On May 22, 2023 the Maine Department of Marine Resources (MDMR) submitted their response.

This filing is Green Lake Water Power Company's (GLWP) response to the MDMR filing of May 22, 2023.

Quoted content from MDMR's filing is indented in this document.

Initial section of MDMR's filing

MDMR states:

> "The Final License Application (FLA) for the Project was filed by Green Lake Water Power Company (GLWP; Applicant) on March 31, 2022 however FERC filed Additional Information Requests (AIRs) and GLWP filed revised Exhibits to the FLA on September 12, 2022. MDMR has reviewed the FLA including the revised documents."

GLWP Comment: The Federal Energy Regulatory Commission (Commission) filed 3 AIRs on the FLA. GLWP filed revised Exhibits to the FLA on 27-Jul-2022, 12-Sep-2022, and 10-Feb-2023.[1]

Comments on the Final License Application

"Appendix A"

GLWP assumes this is referring to Exhibit A.

> MDMR comments that the U.S. Fish and Wildlife Service (USFWS, Interior) stated: "The current infrastructure and biosecurity procedures at Green Lake NFH provide risk mitigation for fish pathogens regardless of the source (e.g., resident fish, stocked fish, bait fish, or migratory fish)."

GLWP notes that the "infrastructure and biosecurity procedures" against pathogens in Green Lake water depend on water treatment with ultraviolet lights, which require electricity. GLWP believes that during at least one recent power failure, the emergency generator at the Hatchery filtration plant failed to start, resulting in a period of untreated water passing through the filtration plant. This period potentially lasted several hours.

GLWP also notes that mitigate, a noun form of which is used here is defined as "1. To make less severe or intense; moderate or alleviate."[2] Thus, USFWS is claiming a reduction in risk from pathogens, not a complete elimination of it.

> "MDMR recommends the Licensee correct the information in the FLA to reflect the accurate position and recommendations of USFWS. Current best practices for husbandry of aquatic organisms recommend specific practices to monitor and sanitize open water sources to prevent spread and the potential for amplification of diseases that are naturally occurring."

GLWP Comment: MDMR neglects to include data from GLWP's reply to USFWS's DLA comments:

"GLWP: The statement above about the current infrastructure of the NFH is overly simplistic and somewhat naive. GLWP has a large amount of experience with the hatchery, extending back 37 years [f]or the Project as a whole, and more than 15 years for the current management team. During this time, we have observed regular disinfection routines for transport vehicles, step-through disinfectant pans on hatchery doors, and alarms related to the water disinfection systems at the NFH treatment plant. We understand that such measures are in place to exercise due caution to avoid as much possibility of danger to the NFH fish.

"In a recent consultation with the NFH manager, it was mentioned that bulb failure sometimes occurred. Within the last couple of weeks, GLWP experienced an alarm at the hatchery or water filter/treatment plant that started during a power failure (roughly two hours long), but then the alarm continued to sound all night. GLWP suggests that accomplishing what the NFH is doing is a difficult task, and it is unwise to blindly ignore the possibility that there could be gaps in the armor. Introducing a high-volume flow of new fish into a lake that has been in its current

[1] Accession Nos. 20220727-5023, 20220912-5163, and 20230210-5069
[2] American Heritage Dictionary, Fifth Edition, 2016

configuration for over 100 years and has proven to provide a reliable water supply for the NFH is bound to involve some risk. Pretending a risk does not exist is a step toward being bit by it."[3]

Further, it should be noted that MDMR has ignored the fact that Exhibit-A Section 2.1.8 changed between the DLA and the FLA. Section 2.1.8 of the latest Exhibit-A includes a mention and discussion of potential effects of upstream fish passage on resident fish and potential mechanical problems at the Hatchery filtration plant from large numbers of out-migrating alewives. These issues do not appear to have been addressed by MDMR.

"Appendix E"

GLWP Comment: This is assumed to be Exhibit-E of the FLA, rather than Exhibit-E, Appendix E, which contains "FLOW DURATION CURVES."

"Section 5.4.5.1 Eel:"

> MDMR states: "American eels are known to be present in Green Lake and it is therefore known that juvenile eels approach the Green Lake Project dam, though the number of eels is not known."

GLWP Comment: There are at least two problems with this statement:

1. It ignores and does not explain the additional data, from the Eel Passage Survey study performed as dictated in the approved study plan (which did not find any juvenile eels).[4]
2. It assumes that the only reason eels could be in Green Lake is because juvenile eels approach the dam. This ignores the possibility that the eels present in Green Lake were introduced there by other means, such as by unknown or illicit stocking. Illegal stocking has been a problem in Maine. It should also be noted that American Eel are permitted as live fresh water bait in Maine.

More extensive GLWP comments on eel passage are located below and in GLWP's recent response to DOI.[5]

"Section 5.4.5.8 Sea lamprey: 'Sea lamprey have gotten a bit of a bad reputation...'."

> MDMR states: "This section continues to misrepresent Sea Lamprey. Please refer to our comments on the DLA. Sea Lamprey are an important native species."

GLWP Comment: GLWP believes that MDMR has grossly mischaracterized GLWP's statement on Sea Lamprey in both the DLA and FLA. FLA Section 5.4.5.8 is included in Appendix-A of this document. The DLA contained the same information on sea lamprey.

"**1.1 MDMR statutory authority**"

GLWP Comment: MDMR has overstated its authority here. The Maine State law establishing MDMR does not state MDMR was established to "regulate" fish resources nor that "MDMR is the lead state agency in the restoration and management of diadromous [...] species of fishes." It should also be noted that MDMR's purpose is related to marine and estuarine resources and

[3] Accession No. 20220331-5449, FLA Exhibit E, Appendix A, Page 32
[4] Accession No. 20220331-5449, FLA Exhibit E, Appendix C Study 1, Page 91
[5] Accession No. 20230621-0001

coastal activities. This is distinct from fresh water resources and activities. In case there is any uncertainty on the relevant Maine law, here is 12 MRSA, §6021:[6]

"§6021. Purpose

"The Department of Marine Resources is established to conserve and develop marine and estuarine resources; to conduct and sponsor scientific research; to promote and develop the Maine coastal fishing industries; to advise and cooperate with local, state and federal officials concerning activities in coastal waters; and to implement, administer and enforce the laws and regulations necessary for these enumerated purposes, as well as the exercise of all authority conferred by this Part."[7]

While MDMR is "to advise and cooperate with local, state and federal officials concerning activities in coastal waters" it clearly was not established to dictate requirements in these other agencies' areas of jurisdiction that do not fall within MDMR's jurisdiction.

It should also be noted that, while the main stem of the Union River does have an estuarine section, Green Lake and Reeds Brook do not. GLWP believes that MDMR does not have statutory authority for much of what is prescribed in its Terms and Conditions filing.

> MDMR states "MDMR has been an active participant throughout the licensing process. In 2021, the MDMR provided written comments on the Interim *[sic]* Study Plan (ISR). In 2022, the MDMR provided written comments on the Draft License Application. In addition, we have participated in meetings and conference calls with the Licensee to discuss study results."

This is MDMR's Involvement in the Project Relicensing Process thus far:

Jan-2019 – MDMR did not respond to the original stakeholder questionnaire sent to Casey Clark & Randy Spencer

Jun-2019 – MDMR did not attend the Site Visit or the Scoping Meeting

Sep-2019 – MDMR did not request any studies

24-Feb-2021 – MDMR's first involvement with the Project was at the Initial Study Report Meeting on Zoom. This was MDMR's only participation in meetings and conference calls with the Licensee

MDMR's filings on the Green Lake Project to date:

20210416-5114 – Comments on Initial Study Report

20220128-5461 – Response to DLA

20230522-5113 – Request to Intervene

20230522-5121 – Response to FERC's Notice of Application Accepted and Ready for Environmental Analysis

[6] MDMR's Motion to Intervene (Accession No. 20230522-5113) does not quote Maine law accurately.
[7] https://legislature.maine.gov/statutes/12/title12sec6021.html

MDMR has had many opportunities to learn about and participate in the relicensing which they did not choose to take advantage of. GLWP believes this has resulted in a lack of Project knowledge on the part of MDMR that is apparent in their filings.

We have had great assistance from Todd Burrowes at the MDMR on matters relating to the Coastal Zone Management Act consistency certification, and from Gail Wippelhauser when we had questions on the Eel Survey.

"**2.0 Goals and objectives for the Union River**"

Referring to the 2015 version of the Comprehensive Fishery Management Plan for the Union River Drainage Plan (2015 Plan)[8] filed by the Ellsworth Project Licensee and the Department of the Interior: "Management objectives for the Union River watershed are out of date. MDMR looks forward to the conclusion of the Ellsworth relicensing and updating the 2015 Plan. In the interim, the goals and objectives contained in this letter represent the most up-to-date position on the resources under the authority of MDMR. The goals and objectives in this letter pertain only to the resources under the authority of MDMR and were coordinated with commenting state and federal resource agencies so as to not conflict."

GLWP notes several issues with this:

1. MDMR states that the 2015 Plan has not been updated, and asserts that MDMR now represents "the most up-to-date position" on the goals and objectives that would be contained in an update to the 2015 Plan. This assertion is made despite MDMR being just one of more than 8 members of the Union River Fisheries Coordinating Committee (URFCC), which developed the 2015 Plan. GLWP believes the members of the URFCC represent a much wider range of knowledge and interests than any one resource agency.
2. MDMR further asserts that "[t]he goals and objectives in [its] letter pertain only to the resources under the authority of MDMR". This partly sidesteps the issue of affects on freshwater fish of MDMR's proposed license conditions.
3. MDMR "coordinated with commenting state and federal resource agencies so as to not conflict." One thing GLWP will show is that MDMR's goals and objectives ***do*** conflict with other resource agency's goals and objectives.

MDMR's consultation with other agencies is mentioned in several filings that are part of the record of the Project relicensing, but the nature, participation and descriptions of such consultations are not in the record. GLWP sent a message to MDMR on 14-Feb-2022 requesting that MDMR document these consultations as part of the Project record.[9] MDMR neither responded to nor took action on GLWP's request. The content of statements of MDMR and the other agencies that are substantiated, on record, and clearly within an agency's authority should be used in the relicensing proceedings. Unsubstantiated, vague, generalized statements ***characterizing*** these consultations, such as "being in agreement", "supporting", or "not conflicting with" another agency, while potentially valid things to say, should not be used to assume a specific viewpoint or opinion on facts on the part of another agency.

[8] Accession No. 20150227-5321
[9] Accession No. 20220331-5449, FLA Appendix-B , Page 127

MDMR states:

> "The Atlantic States Marine Fisheries Commission (ASMFC) has developed three documents related to the management of American eel and hydropower facilities:
>
> "1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
>
> "2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.
>
> "3. Addendum III to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved August 2014. 19 pp."

GLWP Comment:

Addendum III was approved August 2013 (not August 2014), and a fourth Addendum was approved October 2014.

> MDMR states: "Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission's relicensing process."

GLWP Comments:

Addendum II states the following:

"The [ASMFC] recognizes that many factors influence the American eel population, including harvest, barriers to migration, habitat loss, and natural climatic variation. The [ASMFC]'s authority, through its member states, is limited to controlling commercial and recreational fishing activity; however, to further promote the rebuilding of the American eel population, the [ASMFC] strongly encourages member states and jurisdictions, as well as the U.S. Fish and Wildlife Service, to consider and mitigate, if possible, other factors that limit eel survival. Specifically, the Commission requests that member states and jurisdictions request special consideration for American eel in the Federal Energy Regulatory Commission relicensing process. This consideration should include, but not be limited to, improving upstream passage and downstream passage, and collecting data on both means of passage."

Addendum IV, in its *EXECUTIVE SUMMARY* contains a much broader list of causes for decline in eel stock:

"The assessment found the stock is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease."

MDMR, in describing Addendum II emphasizes eel passage, misrepresenting the meaning of the ASMFC use of "specifically" in the process. The ASMFC's statement is much broader than MDMR's statement about it.

MDMR states:

> "The goals and objectives represented in this letter incorporate relevant interstate fisheries management plans. Specifically, the Atlantic States Marine Fisheries

> Commission (ASMFC) is an Interstate Compact, ratified by the member states and approved by the U.S. Congress in 1942, to manage the states' shared migratory fishery resources and to cooperate in promoting and protecting Atlantic coastal fishery resources."

After listing the plans mentioned above, MDMR states:

> "Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel. Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission's relicensing process."

MDMR states:

> "MDMR's management goal is to restore American eel to their historic habitat in the Union River. The waters upstream of [sic] Project represents [sic] currently occupied and historic habitat for American eel. The protection, enhancement, and restoration of all life stages of this species relies on safe, timely, and effective upstream and downstream fish passage at the Project."

GLWP Comments:

MDMR has not shown that the waters upstream of the Project are natural historic habitat for American eel. Nor have they shown that "The protection, enhancement, and restoration of all life stages of this species relies on safe, timely, and effective upstream and downstream fish passage at the Project." MDMR knows that three eels are known to have been entrained in the Project penstock and have been affected.[10] MDMR knows that no eels were encountered at the dam nor in Reeds Brook downstream of the Green Lake dam during the Eel Passage Survey[11].

MDMR states:

> "The waters upstream of Project represents currently occupied and historic habitat for American eel."

GLWP suspects this statement is meant to say waters upstream of the Green Lake dam, (though that is not actually what the statement says) since the Project area includes Green Lake. Either way, merely stating this does not make it true. As pointed out above, the eels in Green Lake currently and historically have been ***assumed*** by MDMR to be there naturally. Reeds Brook is an intermittent stream.[12] American eel background information in ASMFC's Interstate Fishery Management Plan for American Eel, April 2000[13] points out the following:

[10] Accession No. 20220331-5449, Exhibit E, Appendix A, Page 64
[11] Accession No. 20220331-5499 Exhibit E, Appendix C, Study-1, Page 91
[12] Accession No. 20230522-5074 Page 20 of 67
[13] ASMFC (Atlantic States Marine Fisheries Commission). 2000. Interstate Fishery Management Plan for American eel. Washington, DC. 79 pages.

- "American eel are classified as a warmwater species [...] that are most abundant in relatively warm streams and shallow lakes or embayments [...], while relatively scarce in deep, steep gradient cold-water lakes."
- "Current research shows extensive use and home-range development of shallow lakes (<17meters) by American Eel."
- "Elvers orient to river currents for their upstream migration [...] and are strongly attracted to the odor of decaying leaf detritus."

Green lake is a deep, cold-water lake, as described in the FLA. Its average depth is 44 ft and its maximum depth is 170 ft per Lakes of Maine.[14] With a large maximum depth, and a long, narrow shape, much of it is characterized by steep, bold shores[15] and near-shore littoral zone areas.[16] GLWP believes that while MDMR looks at Green Lake from a total lake surface area point of view for fish issues, Green Lake in practice, does not match their assumptions. Green Lake contains relatively little preferred American eel habitat.

Access to and from Green Lake via Reeds Brook is also in question. Appendix-B contains part of a USGS map from 1911 that shows the SE end of Green Lake, Reeds Brook, and the area now occupied by Graham Lake. This map is from before the Graham Lake dam was built so it represents a picture of what "historic habitat" conditions would have been in the Project vicinity. This map shows the lower part of Reeds Brook traveled through marsh until it started to climb up out of the basin that would become Graham Lake. Near the edge of the marsh a branch of the brook turns north and runs along the edge of the marsh. The marshy section of Reeds Brook was considerably longer than the section of brook that rises toward Green Lake. The basin that would become Graham Lake is a very large section of marsh.

Appendix-E contains a map showing Green Lake from around 1828.

American eel are bottom dwellers while in estuaries, rivers, and lakes. The presence of soft, undisturbed bottom sediments may be important to migrating elvers for shelter.[17] The habitat described above in the lower part of Reeds Brook and the area that would become Graham Lake, combined with a strong attraction on the part of elvers to the odor of decaying leaf detritus (present in a marsh, but not the upper section of Reeds Brook), strongly suggests that migrating eels would have been attracted to the main branch of the Union River and its low lying tributaries, rather than traveling into the upper section of Reeds Brook and into the somewhat inhospitable, deep, cold-water Green Lake. GLWP believes Green Lake was not significant historic habitat for American eel and that it would not provide significant American eel habitat now.[18]

The ASMFC Interstate Fishery Management Plan for American Eel (Eel Plan) Addendum IV states:

"Any state or jurisdiction can request an allowance for commercial harvest of glass eels based on stock enhancement programs implemented after January 1, 2011. Examples of stock

[14] https://www.lakesofmaine.org/lake-overview.html?m=4294
[15] Accession No. 20220331-5449, Exhibit E, Appendix C, Study 1, Page 96
[16] Accession No. 20220331-5449, Exhibit E, Appendix C, Study 1, Page 31
[17] ASMFC (Atlantic States Marine Fisheries Commission). 2000. Interstate Fishery Management Plan for American eel. Washington, DC. 79 pages.
[18] Accession No. 20230621-0001

enhancement programs include, but are not limited to, habitat restoration projects, fish passage improvements, or fish passage construction. Fish passage projects may focus on upstream or downstream passage or both. Stock enhancement programs must show a measurable increase in glass eel passage and/or glass eel survival. Harvest shall not be restricted to the basin of restoration (i.e. harvest may occur at any approved location within the state or jurisdiction). Harvest requests shall not exceed 25% of the quantified contribution provided by the stock enhancement program."

"The stock contribution percentage may be based on, for example, the amount of available suitable habitat that will become accessible, passage numbers, or other appropriate metrics."

"**Monitoring Requirements**

"Any states or jurisdiction with a commercial glass eel fishery must implement a fishery independent life cycle survey covering glass, yellow, and silver eels within at least one river system."

GLWP notes that MDMR can increase its glass eel allowance based on a claim of increased habitat, and then "prove it is effective" by monitoring another river system that increases independently.

The Eel Plan and its Addendums are primarily concerned with restoration of American eels for commercial harvesting. While GLWP believes that increasing stocks of American eels and harvesting them is a good thing to do, when it conflicts with other commercial interests (such as hydropower development) it must be weighed on a cost benefit basis. If the only motivation was the "benefit of the species," harvest of American eels would not be allowed if the future of the species were in doubt. Maine is one of only two states that allows the harvest of, and issues licenses (through MDMR) for, the harvest of glass eels. Eel Plan Addendum IV states: "In recent years, Maine is the only state reporting significant harvest [of glass eels]." MDMR clearly has a vested interest in the harvest of American eels.

Also, when increasing stocks of American eels or other diadromous fish conflicts with resident species in targeted habitat, the conflict must be weighed on a cost benefit basis. If the restoration or improvement of a fish species conflicts with the restoration of an endangered species, the evaluation is more one sided. It is likely that fish passage measures requested by MDMR threaten the viability of the Project. This threatens the benefits to the Green Lake National Fish Hatchery water supply that the Project provides, and therefore threatens Atlantic Salmon essential habitat.

MDMR states:

> "The Atlantic States Marine Fisheries Commission (ASMFC) has also developed four documents related to the management of Shad and River Herring (Alewife and Blueback Herring) and hydropower facilities:"

GLWP notes that while the referenced ASMFC documents do refer to hydropower facilities in several places, they tend to mention overharvesting first in their reasons for stock level declines. ASMFC refers to these documents as fishery management plans, and does not mention the management of hydropower facilities as such. Most of their content has to do with the management of commercial fisheries.

MDMR states:

> "The waters upstream of the Project represents significant habitat for Alewife, Sea Lamprey, and potentially other diadromous species."

GLWP notes this statement has the same problems as the similar statement on American eels above. The claim of significant habitat is based on unsubstantiated assumptions.

MDMR continues:

> "The protection, enhancement, and restoration of these diadromous species relies on safe, timely, and effective upstream and downstream fish passage at the Project."

GLWP believes this is based on unsubstantiated assumptions by MDMR.

"**2.1 Diadromous species and specific management goals**"

More GLWP comments on much of the content in this section are above.

MDMR states:

> "At this time, we have no estimate for the potential abundance of American Eel."
>
> ...
>
> "We estimate that, once accessible, habitat within the Green Lake subdrainage would annually produce [...] an unknown number of Blueback Herring, American Shad, and Sea Lamprey."

GLWP notes that this statement is inconsistent with MDMR's statements earlier in the document that "water upstream of the Project represent significant habitat for" for American Eel, Sea Lamprey, and "potentially other diadromous species", as well as the statement that "The protection, enhancement, and restoration of these diadromous species [Atlantic salmon, American shad, American eel, Alewife, Blueback herring, and sea lamprey] relies on safe, timely, and effective upstream and downstream fish passage at the Project."

MDMR states:

> "We estimate that, once accessible, habitat within the Green Lake subdrainage would annually produce 736,090 - 1,252,920 adult Alewife (Green Lake habitat only)"

GLWP did an analysis of how much spawning habitat was available in Green Lake for alewives.

From the ASMFC document, *Atlantic Coast Diadromous Fish Habitat: A Review of Utilization, Threats, Recommendations for Conservation, and Research Needs*, Chapter 4:[19]

"Alewife select slow-moving sections of rivers or streams to spawn, where the water may be as shallow as 30 cm (Jones et al. 1978). The species may also spawn in lakes or ponds, including freshwater coves behind barrier beaches (Smith 1907; Belding 1921; Leim and Scott 1966; Richkus 1974; Colette and Klein-MacPhee 2002)"

"Pardue (1983) evaluated studies of cover component in alewife spawning areas, suggesting that substrate characteristics and associated vegetation were a measure of the ability of a habitat to provide cover to spawning adults, their eggs, and developing larvae. In high flow areas, there is

[19] http://cybrary.fomb.org/pages/hms9_diadro_habitat_2009_5.pdf

little accumulation of vegetation and detritus, while in low flow areas, detritus and silt accumulate and vegetation has the opportunity to grow (Pardue 1983). Pardue (1983) suggested that substrates with 75% silt (or other soft material containing detritus and vegetation) and sluggish waters are optimal for alewife."

"Water depth in spawning habitat may be a mere 15 cm deep (Bigelow and Schroeder 1953; Rothschild 1962), or as deep as 3 m (Edsall 1964); however, spawning typically occurs at less than 1 m (Murdy et al. 1997)"

Much of the Green Lake shore has a moderate to steep slope, is covered with boulders or large cobble above the normal full-pond level and in the drawdown zone, and is subjected to significant wave action. Since alewives spawn in the spring and early summer, the lake should to be near full-pond level. The fall drawdown is very close to one meter, so the lake habitat study provided useful areas.

Using Bing Maps and Google Maps, GLWP identified areas that appeared at least somewhat protected and have vegetation. These areas generally fell within the 1m fall drawdown zone, so had depths of 0-1m. This gave, GLWP believes, a credible identification of potential high quality Alewife spawning habitat in Green Lake. The total area of this habitat measured out to 23.4 acres. This may be slightly larger than actual because any included areas 0-15cm deep were not estimated and subtracted from the total.

Green Lake tributaries would make little contribution to this since they do not contain much area that is as deep as 15cm.

With the figure for alewife production potential for spawning habitat of 235 per acre used by MDMR in the Androscoggin River watershed, 23.4 acres of spawning habitat would result in an adult alewife production of 5499 from Green Lake. This estimate is far below MDMR's estimate of "736,090 - 1,252,920 adult Alewife (Green Lake habitat only)". At a production of 235 adult alewives per acre, MDMR's estimated alewife production for Green Lake would require between 3132 and 5331 acres of alewife ***spawning habitat*** in Green Lake. Green Lake has a total area of about 3312 acres, and much of that is deeper than 3m.

MDMR has a history of exaggerating river herring measure effectiveness. The *COMPREHESIVE FISHERIES MANAGEMENT PLAN FOR THE UNION RIVER DRAINAGE, 2015-2017* stated "An increase in the annual river herring runs to two million fish is anticipated 4-5 years after the 2015 escapement increase is implemented."[20] Historic trap counts for river herring in the Union River for 2019 and 2020 were 320,320 and 301,860, about 1/6th of MDMR's predicted amount.[21]

GLWP does not believe expensive fish passage measures for alewife passage are justified for the Project.

Blueback herring, American Shad and Sea Lamprey spawn in rivers. GLWP does not believe expensive fish passage for these species is justified at the Project.

[20] Accession No. 20150227-5321
[21] https://www.maine.gov/dmr/sites/maine.gov.dmr/files/inline-files/Trap%20Count%20Archive%202022.pdf

Blueback herring spawn in free-flowing riverine habitat, which was not historically present in the Green Lake watershed. Blueback herring may have spawned further downstream in the Union River. [22]

American shad also spawn in free-flowing riverine habitat; thus, it is extremely doubtful American shad spawned in Green Lake or its historic habitat. The Maine Department of Marine Resources American Shad Habitat Plan (2014) identifies the Union River as current American shad habitat but does not identify the Green Lake watershed as either historic or current habitat.[23]

Sea lampreys migrate up rivers to spawn. Females deposit a large number of eggs in nests made by males in the substrate of streams with moderately strong current. [24] Spawning occurs in fast-flowing highly oxygenated areas with gravel, pebbles and sand bottoms.[25] The Project area contains little of this habitat. What little there is would be in Reeds Brook. For more information on Reeds Brook habitat, see the Brook Habitat study.[26] The historical and current range of sea lamprey in the Union River is unknown.[27]

Fish Passage concerns:

In a letter dated June 26, 2019 from John Perry at MDIFW, John said:[28]

"MDIFW actively manages Green Lake for both landlocked salmon and lake trout, and while lake trout do not spawn in the lake there is a large contribution of wild landlocked salmon from the tributaries. Additionally, there is also a popular smallmouth bass fishery in the lake. Should upstream passage be installed at Green Lake, MDIFW is concerned that the introduction of largemouth bass, which are present downstream in Graham Lake, may negatively impact these managed fisheries. Largemouth bass are an aggressive top predator that have negatively impacted fisheries in other Maine waters. Future threats from other species not yet present are also a concern. Green Lake also has an indigenous population of Arctic char and is currently only one of the fourteen waters in Maine which supports the species.

"In addition to invasive fish concerns associated with fish passage, density dependent interactions between anadromous alewives and landlocked rainbow smelt remains an ongoing concern of our Agency and is a focus of an interagency interactions workgroup to coordinate research that will support restoration management goals. Smelt are an established fishery in Green Lake as well as the preferred forage species of landlocked salmon. To be clear, MDIFW continues to be supportive of the restoration of searun species to Maine waters within the historic ranges of these species; however, our Agency does have density dependent concerns regarding possible negative interactions between anadromous alewives and landlocked smelts that could decrease year-around smelt forage for managed game species in certain waterbodies, including Green Lake."

[22] Accession No. 20230621-0001
[23] MDMR American Shad Habitat Plan 2014
[24] https://en.wikipedia.org/wiki/Sea_lamprey
[25] https://fishbase.mnhn.fr/summary/Petromyzon-marinus.html
[26] Accession No. 20220331 FLA Exhibit E, Appendix C Study-1, Page 56
[27] Accession No. 20190729-3018, Page 195
[28] Accession No. 20190626-5053

MDMR states:

> "Upstream passage will be designed with consideration of preventing the upstream spread of Aquatic Invasive Species, as reviewed and approved by the resource agencies."

GLWP notes that there is no mention of the density dependent concerns as noted by MDIFW.

GLWP also notes that, based on the likely small contribution this watershed made to the overall migratory fish population, lack of fish or eel passage at the project dam will have minimal adverse effects on the recovery of fish and eel populations in the larger watershed.

Finally, during most summer and fall periods, the Project does not have enough flow into Green Lake to support the specified design criteria for fish passage facilities. During 7 out of 10 summers analyzed, the flow into the lake limited the flow into Reeds Brook to less than 1 cfs. See Appendix C below. This lack of water was covered in an NMFS Study Dispute.[29]

Increased minimum flows have a direct impact on GLWP profitability if such flows come from storage in Green Lake. GLWP knows that the Project is not a big money maker, but believes it is worth doing because it benefits the Green Lake National Fish Hatchery, generates renewable electric power, and manages Green Lake to the benefit of the lake and its residents. In their response to the GLWP DLA, MDMR expressed concern about the profitability of the company and asked:

> "MDMR would like to understand the likelihood that the project will continue to operate through the license term, will be able to carry out proposed measures, and will be able to carry out environmental protection measures adequately."

GLWP is currently viable. Research is underway to obtain improved income in the future. Increased income will be needed for penstock improvements at a minimum. However, GLWP does not anticipate having sufficient discretionary funds or manpower to implement the long list of open ended fish passage measures that MDMR demands.

GLWP knows that past electric rates would not pay for a new penstock. Appendix-D shows the yearly average energy only electric rates paid to GLWP by Bangor Hydro, Emera, and then Versant, adjusted to 2023 dollars. Effective electric rates have fallen over time.

There is much uncertainty about future electric rates, but GLWP expects that once it is done with the original power purchase agreement (from 1984) income can be improved. If too much uncertainty remains about future income, even the cheapest potential long-term penstock repairs will be too risky for GLWP to stay in business. The fish passage measures specified by MDMR, while potentially appropriate for a large project, do not appear to have been scaled appropriately for a project of this size.

GLWP believes that modifying the trash racks to avoid the 2" space at the edge of the racks, modifying at least one wastegate fish screens to have a 2" clear space, and modifying one wastegate to have a gap large enough to pass siler eels at the required minimum flow, provides sufficient downstream passage for eels given the size of this Project and the fact that there are some adult eels in Green Lake. GLWP is not confident it is understood how eels got into Green Lake, but GLWP is willing to take reasonable measures to avoid them getting entrained in the penstock and to give them a route to travel downstream.

[29] Accession No. 20220331 FLA Exhibit E, Appendix D, Page 198, 22 pages

As covered earlier in this document, GLWP does not believe that Green Lake is either attractive to or provides much habitat for eels. If young eels are in fact climbing the dam, it is likely that the measures described above will handle them adequately.

The suggestion in the FLA to use the existing 1 inch clear space on the trash racks is not without justification. From the ASMFC Interstate Fishery Management Plan for American Eel, Apr-2000:

"Timing of sexual maturity in the yellow eel has been correlated with specific size ranges. Most sexually mature males are over 28.0 cm and, in the northern populations, they are older than Age 3 (Hardy 1978, Fahay 1978). Most sexually mature females are over 46.0 cm and they are older than Age 4 in the northern populations (Hardy 1978, Fahay 1978)."

"...numerous studies have found the St. Lawrence River-Lake Ontario eel to be exclusively female (Dutil 1987; Vladykov 1966). J. Casselman (OMNR pers. com.) also found them to be relatively older and larger. McCleave (1996) found that females are more abundant in the northern part of their range, males are more abundant in the southern part of their range, and that females grow larger and mature later than males. However, Foster and Brady (1982) found only females in Maryland where sex could be determined (N=1,000); Helfman et al. (1984) found in a Georgia river that 64% of estuarine eel were female and 94% of freshwater eel were female; Hansen and Eversole (1984) noted that females outnumbered males 23 to 1 in South Carolina. Some data suggest that there is a further isolation of the sexes by salinity. Females were found to be more prevalent in freshwater systems while males more frequently inhabit estuaries (Facey and LaBar 1981). Recent work indicates that sex determination might be influenced by density (K. Olivera, U. of Maine pers. com.). If this is the case, sex ratios may be changing towards more females throughout their range due to lower numbers of eel."

"Maturation occurs in 8 to 24 years in the Chesapeake Bay Region, but may occur earlier in southern regions and later in northern regions. In the southern regions, females older than eight years old or longer than about 70 cm were rare and males older than five years old or longer than 40 cm were also rare. In contrast, maturing females in the Newfoundland study averaged 13 years of age and more than 70 cm long (Bouillon and Haedrich 1985). Female eel from Lake Champlain averaged 16 years old and nearly 70 cm long (Facey and LaBar 1981). Eel greater than age 20 were found in Lake Champlain. Males were not present, or were not captured, in the two northern studies. There is evidence that males are rarer at higher latitudes and in inland waters (Helfman et al. 1987). The size and distributional differences between the sexes led Helfman et al. (1987) to hypothesize that male and female American eel experience different natural selection pressures which result in different life history traits. They suggested that males tend to be found in the more productive habitats, closer to the spawning area, favoring rapid growth and maturity at a small size. This is a time-constrained life history strategy. Females are distributed over all suitable habitats dispersed widely through the geographic range, and slower growth to greater size and age is favored."

The above data suggests that at Green Lake, the eels migrating downstream are likely to be older, larger females. The ¾" minimum bar spacing for American Eel exclusion is from a USFWS fish passage design criteria document. The USFWS, as a federal agency, would be responsible for American eel measures all along the Atlantic coast, including the complete range of the US coast from south to north. This would mean that if ¾" bar spacing is sufficient to exclude a high

percentage of eels in southern areas (including smaller males), then a high percentage of the females in Green Lake would be excluded by a 1" clear bar spacing. The 2" gap at one side of the racks is clearly too large, but GLWP has proposed in the FLA to reduce that gap to at most 1".

"**2.2 Migration periods for diadromous species**"

MDMR states:

> "These dates are based on migration periods observed in the Saco, Androscoggin, Kennebec, and Penobscot River and may change based on new information, evaluation of new literature, and agency consultation."

GLWP comment:

Any and all open ended requirements, such as this, add risk to the Project.

"**3.0 Project description**"

GLWP notes that this section does not match the information in the final, approved FLA.

"**3.1 Project fishways**"

MDMR states: "The Green Lake Project has no existing upstream or downstream fish passage facilities."

GLWP comment: The current trash racks and fish screens on the spillway and on the waste gates are fish passage facilities. They may not be what MDMR would like, but they are fish passage facilities at the dam with explicit requirements with respect to fish passage.

"**3.2 Project Impacts**"

MDMR states:

> "The Green Lake Project impacts diadromous species in several ways. Alewife, blueback herring, and other anadromous species will not be able to migrate upstream to historic spawning habitat. An unknown number of American eels will not be able to migrate upstream to historic growth habitat or the migration will be delayed. Post-spawn adult river herring that may be stocked by MDMR, their offspring, and adult American eels on their spawning migration will be delayed, injured, or be killed when attempting to migrate downstream past the Project."

As covered in earlier sections of this document, GLWP does not believe MDMR has established their claims of "historic spawning habitat" in the project area. They also have not established that American eels attempt to migrate past the dam in any significant numbers, nor that Green Lake contains sufficient river herring spawning habitat to justify upstream alewife passage. Stocking river herring into a lake that has not been exposed to river herring for 200 years, that contains a unique combination of desirable resident species which may be impacted through competition and other risks from river herring, and which is crucial to critical habitat for endangered Atlantic salmon would be, in GLWP's opinion, reckless.

"**4.0 Section 10(j) Recommendations**"

MDMR states:

> "Section 10(j) of the FPA requires that each license issued for a hydropower project contain conditions to adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife affected by the development, operation, and management of a project (16 U.S.C. § 803(j)). Therefore, each license issued shall include such conditions, based on recommendations of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and state fish and wildlife agencies."

GLWP does not believe that MDMR has met the "adequately and equitably" requirements on Section 10(j) conditions. As covered above and below in the document, MDMR has assumed impacts to fish species and not balanced their recommendations to the realities of the Project.

GLWP notes that, with the exception of a USFWS prescription for eel passage, which is being challenged by GLWP[30], no other resource agencies have recommended fish passage at this time.

GLWP suspects the recommendations in MDMR's Section 4 were taken from some much large project with minimal changes of some project specifics.

GLWP also notes that this section introduces open ended requirements, which add considerable uncertainty and risk to the project.

MDMR appears to be ignoring the fact that the Project does not have sufficient flow available to operate a fish passage as described in the USFWS design criteria.[31]

"**4.1 Section 10(j) Recommendation #1**"

As discussed above in this document, GLWP does not believe major fish passage is warranted at the Project. Requiring significant fish passage measures is likely to make the Project nonviable.

GLWP notes, that MDMR's fish passage recommendation #1 does not agree with other conditions in the license, its own requirements D and E, nor with the physical and monetary realities of the Project.

GLWP believes the use of the term "three surface spillway" is referring to an ogee spillway. This is not the type of spillway in use at the Project. MDMR recommendation B(c) discusses requirements for modification of the spillway that are clearly at odds with the details of the Project dam.

MDMR recommendation B(e) discusses modifying operations at the Project when "the surface elevation of Green Lake exceeds 160.7" despite the license restriction that this condition only occurs for conditions beyond GLWP's control.

GLWP notes that the **Downstream passage efficiency** section is impractical for a project of this size, the **Fishway Operation and Maintenance** section contains open ended requirements, and the **Justification** section makes the case that the species addressed here are not endangered.

[30] Accession No. 20230621-0001
[31] Accession No. 20220331 FLA Exhibit E, Appendix D, Page 198, 22 pages

Atlantic Salmon, which GLWP believes will be impacted by MDMR's recommendations, are endangered.

GLWP notes that there is no electricity at the dam and the Project has an operator on-site for about 30 minutes per day. Any studies that assume either power at the dam or the presence of an operator for extended periods of time are likely to be unexpectedly expensive.

The above issues are just highlights of problems with MDMR's Recommendation #1. Other sections of this document provide background and supporting information.

"**4.3 Section 10(j) Recommendation #2**"

This section imposes open-ended requirements on the Project.

As written, this section would require GLWP install upstream passage for anadromous fish (which may not technically be "invasive species") from warm, shallow Graham Lake that are not wanted in cold deep Green Lake. With this requirement, GLWP believes MDMR shows a blatant disregard for fragile, resident species in Green Lake managed by other resource agencies.

Imposing requirements on the Project based on "projects on the Kennebec, Presumpscot, and Penobscot Rivers" does not address the size and scope of the Project in a realistic way.

Many of GLWP's comments for **Recommendation #1** above apply to this section. Much further information and reasoning is described in the earlier sections of this document.

"**4.3 Section 10(j) Recommendation #3**"

This section imposes open-ended requirements on the Project.

Imposing requirements on the Project based on "projects on the Kennebec, Presumpscot, and Penobscot Rivers" does not address the size and scope of the Project in a realistic way.

Many of GLWP's comments for **Recommendation #1** above apply to this section. Much further information and reasoning is described in the earlier sections of this document.

Conclusion:

GLWP believes staff at MDMR responsible for the main Project relicensing work have not involved themselves sufficiently with the Project during the relicensing process. This has likely resulted in a lack of understanding of the project, which has led to the use of a "slightly rewarmed" one-size-fits-all set of comments and 10(j) Recommendations. Given the unique nature of the Project and the related habitat and fish species, GLWP believes this has resulted in a set of out of touch and unrealistic recommendations for the Project.

GLWP is not run by a medium-sized staff, or even a small one. It is run by two people and a part-time operator who helps out about 30 minutes each day to perform routine Project duties. While holding full-time professional jobs, we have run the Project largely remotely for 10 years, and then full-time on the relicensing work for about the last 5 years. When anything on the Project has required unusual attention or other non-routine work, we have figured it out and either done the work ourselves or engaged others to help us as needed.

The reality of the situation is that if the Project is stressed too hard financially, we will not be able to continue. Personal money has carried us through some of the very tough times in the past, but since we have been on the relicensing work full time, we no longer have some of that flexibility. There is hope for significantly increased electric rates going forward, but that is not guaranteed.

We believe the Project is worthwhile and has a lot to contribute. We believe this strongly enough to want to shepherd it through the relicensing process and eventually on to a new owner. Fish passage measures, if applied blindly and severely enough, have the ability to put GLWP out of business. We believe that results in no fish passage, and likely no effective maintenance or operation of the dam, with effects on the Green Lake National Fish Hatchery and on people around the lake. We do not believe this would be a good result for any of the people involved in this relicensing.

If you have any questions regarding this filing, please contact me by phone at (207) 667-3322 or by email at caroline@greenlakewaterpower.com

Sincerely,

Caroline Kleinschmidt
Relicensing Coordinator
Green Lake Water Power Co.

cc: Distribution List

Appendices are included below:

- Appendix A – Sea Lamprey
- Appendix B – Section of USGS Map, Ellsworth, June 1911
- Appendix C – Summer Lake Level
- Appendix D – Electric Rates in 2023 Dollars
- Appendix E – 1828 map of Green Lake

Appendix-A

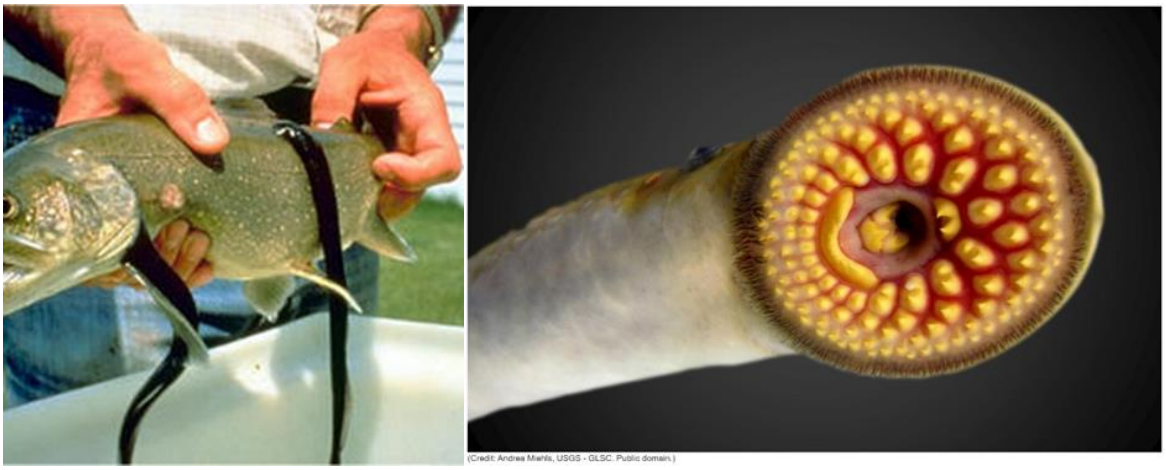
FLA Page 5-28

5.4.5.8 Sea lamprey

Sea lamprey have gotten a bit of a bad reputation for a couple of reasons:

1) Their physical appearance bothers many people.

2) They have decimated native fisheries in some lakes where they are an invasive species.



Source: NOAA

#1 is not very surprising given the above Sea Lamprey images.

#2 refers to sea lamprey in the Great Lakes where they are a serious invasive species which has impacted lake trout.

Sea lamprey are native to Maine waters. They may still have a public relations problem in Maine, but in their natural area they do not cause invasive species problems. This is because they are an anadromous fish that feeds in salt water during most of its growth to maturity. During the first 4-8 years of their lives, they burrow into the muddy bottoms of streams, rivers and lakes, filter feeding upon planktonic drift. After emerging from their burrows, they metamorphose into their migration life stage which is similar to the final adult form. Unlike the sea lamprey in the Great Lakes, Maine's sea lamprey do not typically prey on fish while in fresh water. If migrating sea lamprey attach to a fresh water fish, it is rarely fatal for the fish (unlike in salt water). (Kircheis 2004[32])

Adult sea lamprey that return to fresh water die soon after spawning. Native Maine anadromous sea lamprey cannot survive in freshwater as adults. Sea lamprey are seen as a beneficial part of their native aquatic ecosystem. (Kircheis 2004)

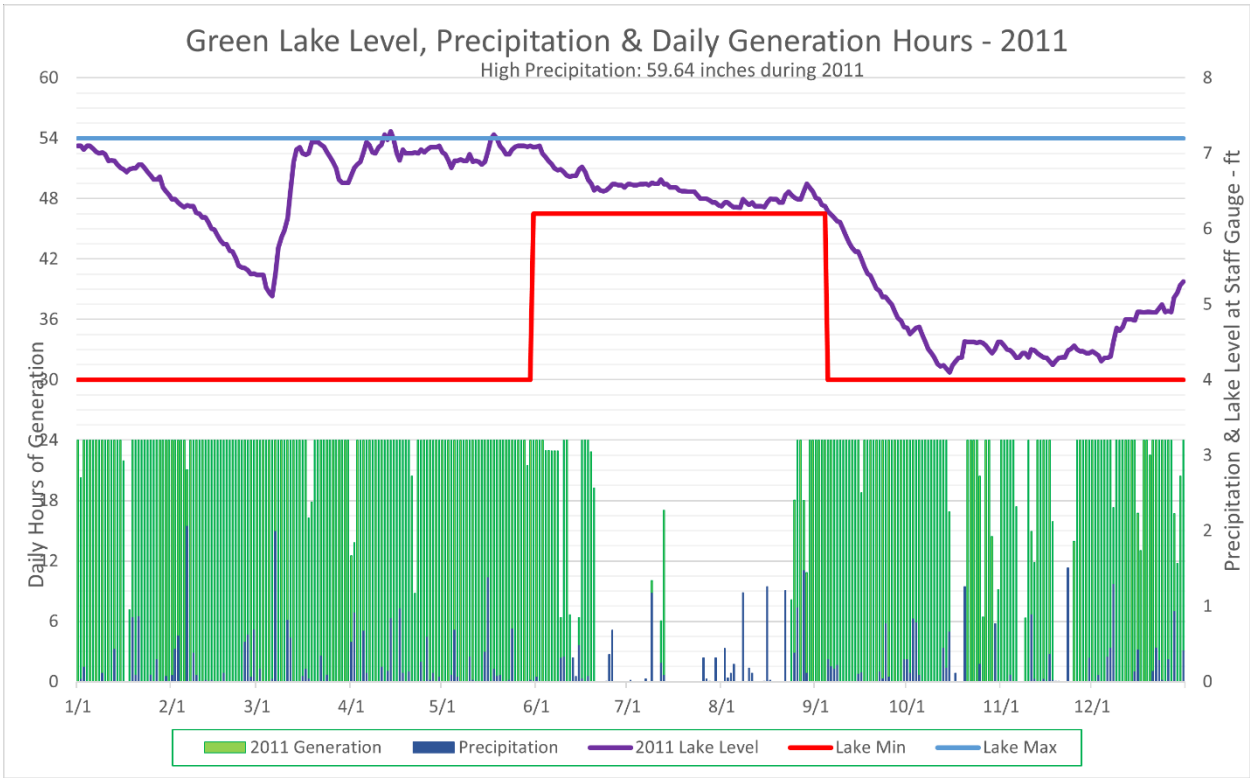
Future fish passage for sea lamprey past the Ellsworth and Graham Lake dams, and even the future presence of these dams, are unknown at this point. (Ellsworth FLA 2015) Downstream fish passage of sea lamprey is facilitated by their lack of a swim bladder. In most situations they can pass through a turbine without suffering decompression damage. (Colotelo 2012[33])

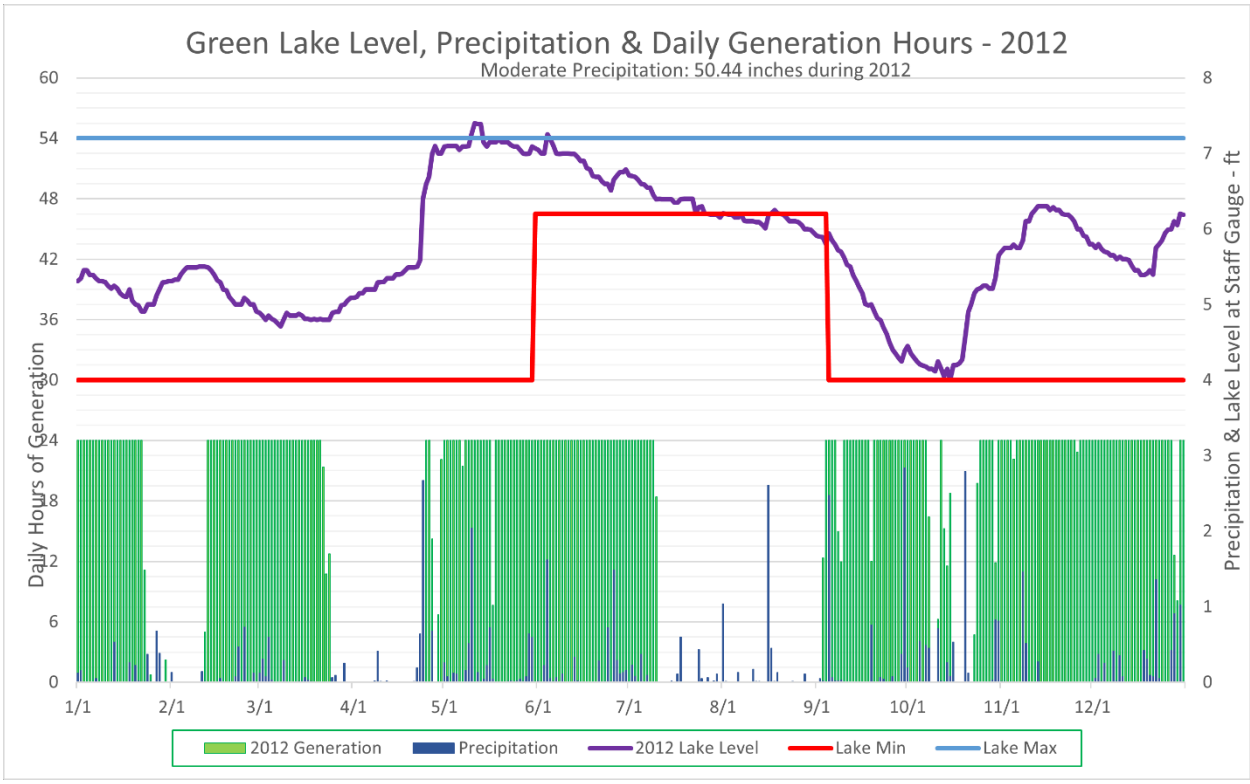
[32] Kircheis 2004 - https://www.fws.gov/GOMCP/pdfs/lampreyreport.pdf
[33] Colotelo 2012 - https://doi.org/10.1016/j.fishres.2012.06.001

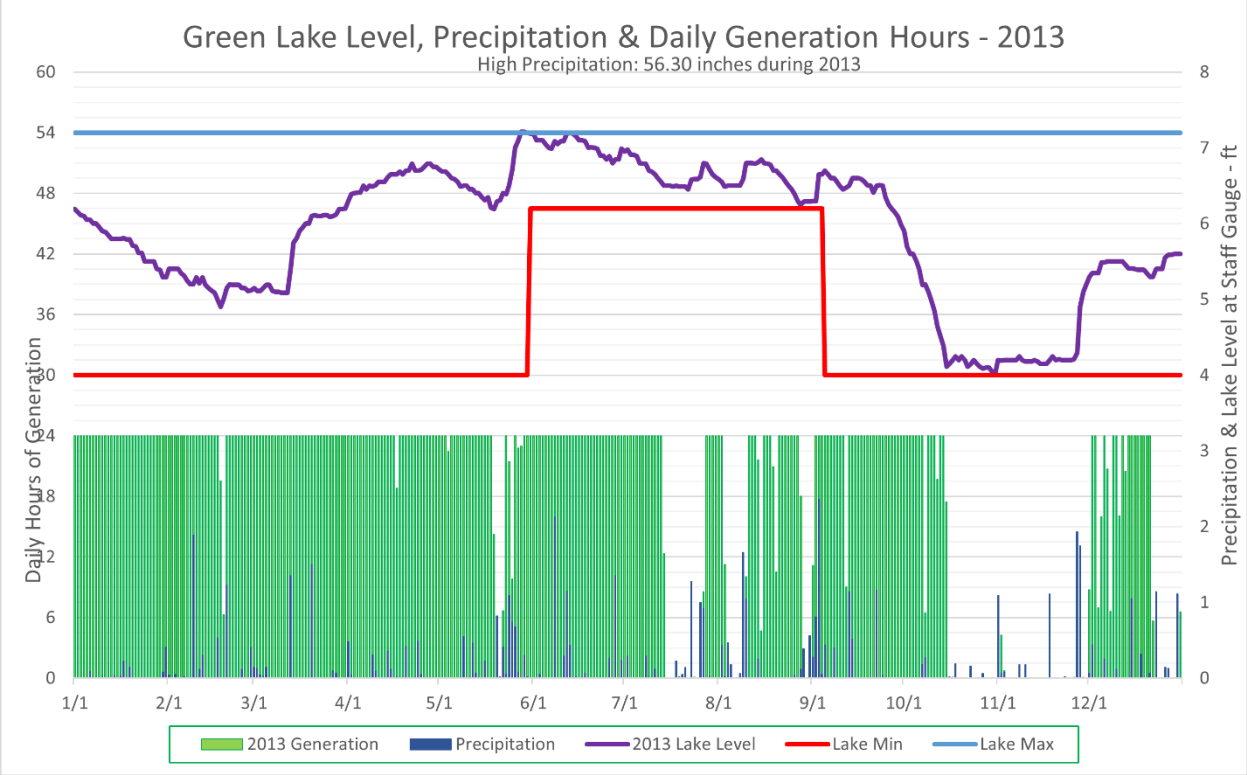
Appendix-B

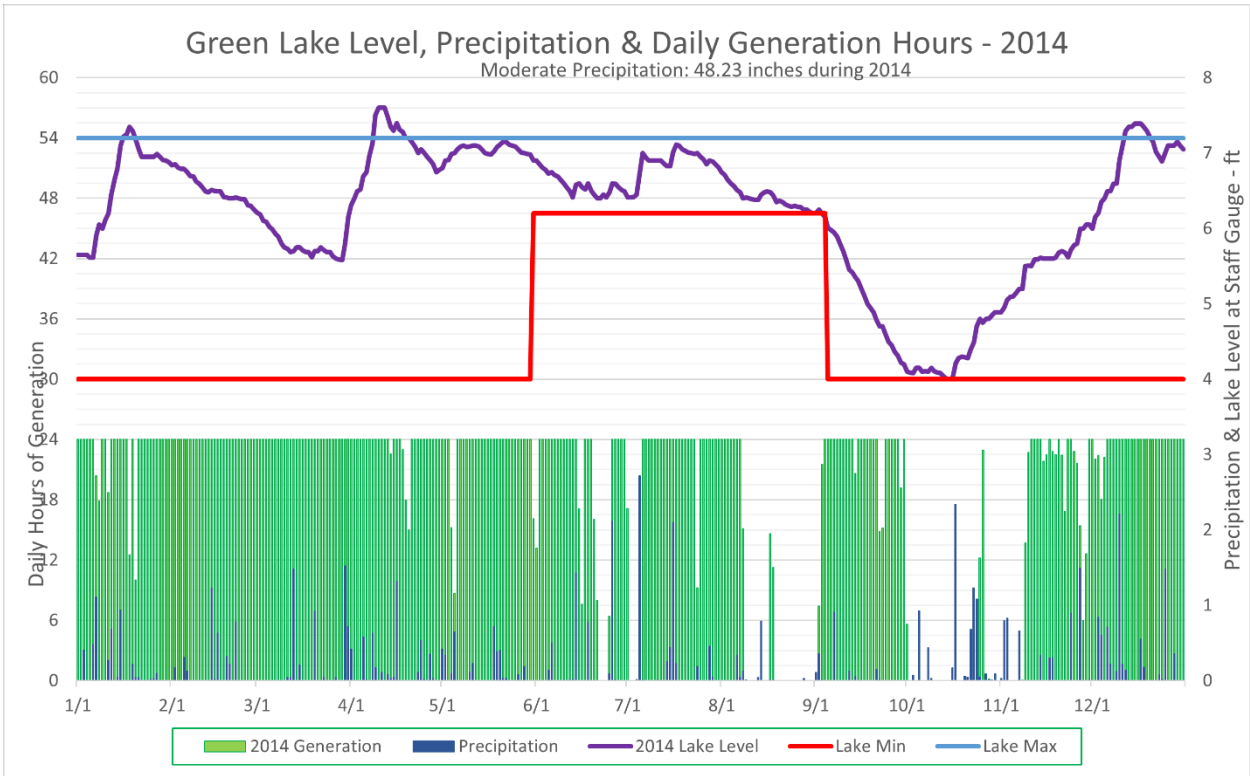
Section of USGS Map, Ellsworth, June 1911

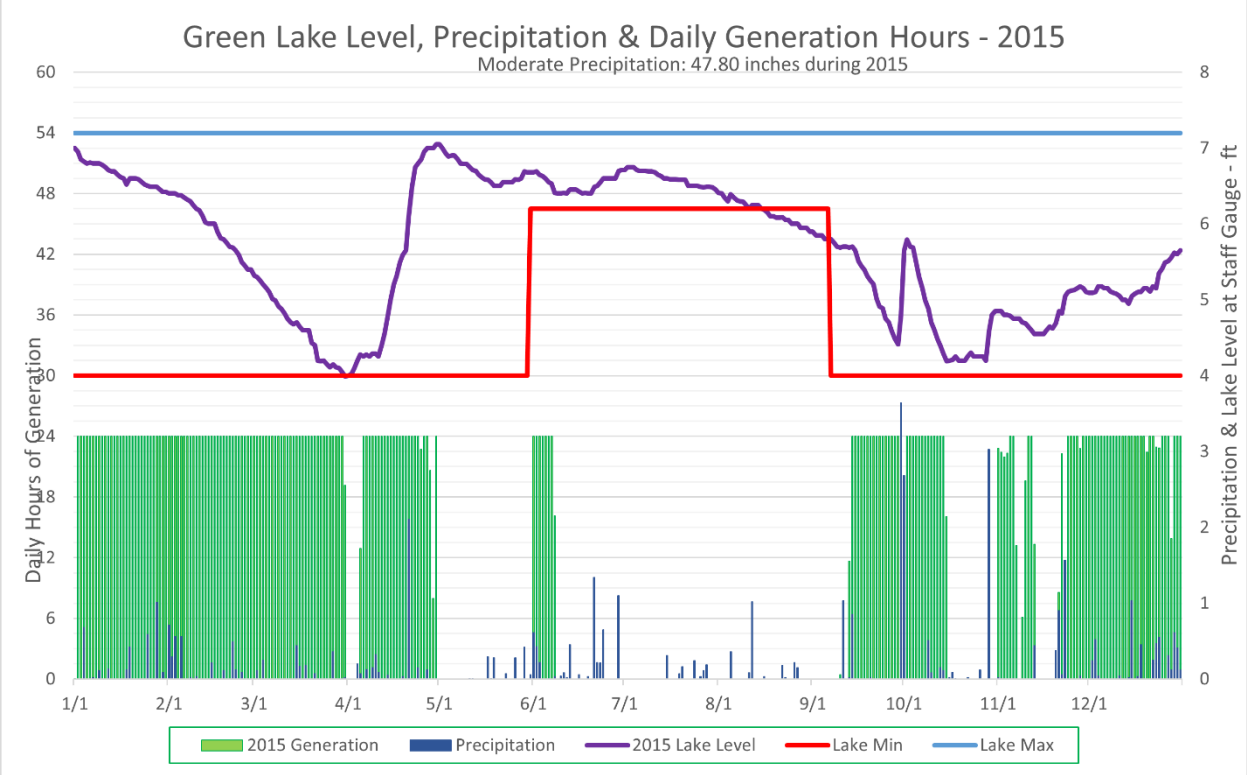
Appendix-C – Summer Lake Level: These graphs show that 6 or 7 out of 10 seasons analyzed the net flow into the lake was less than 1 cfs. This was despite the fact that the turbine was shut down well before this occurred.

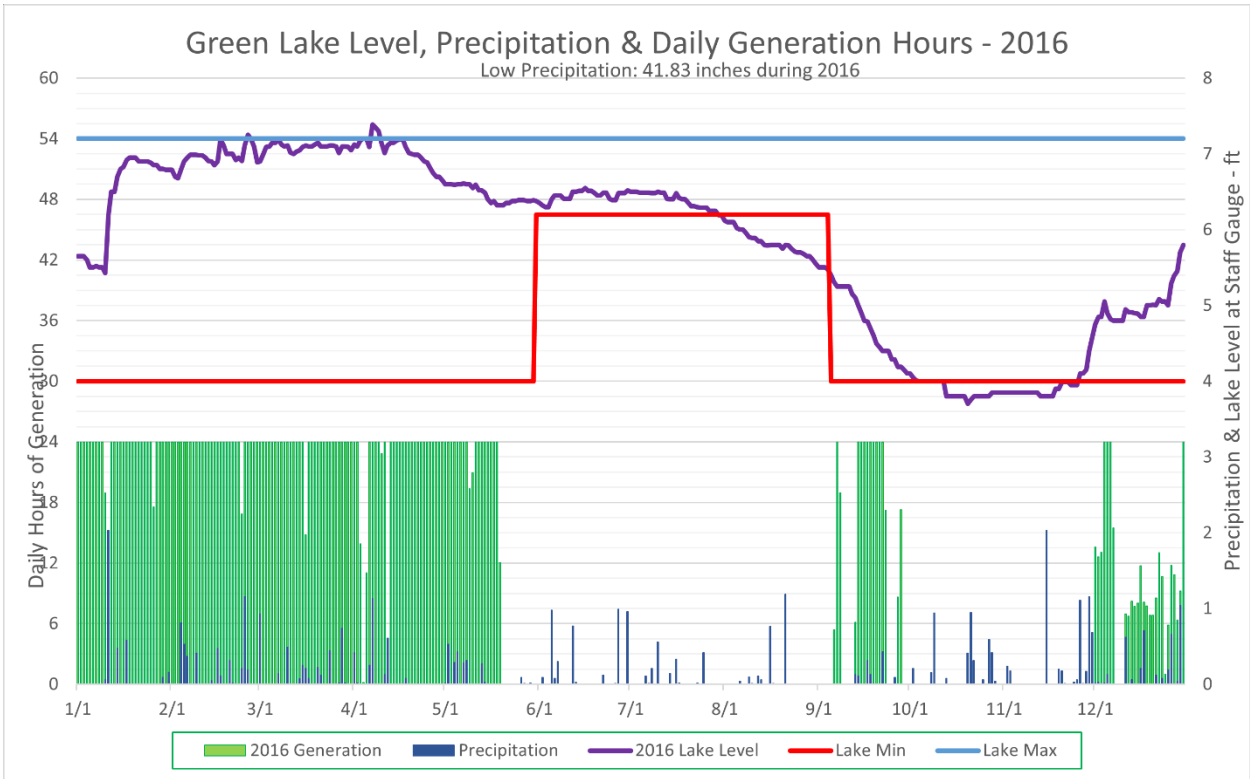


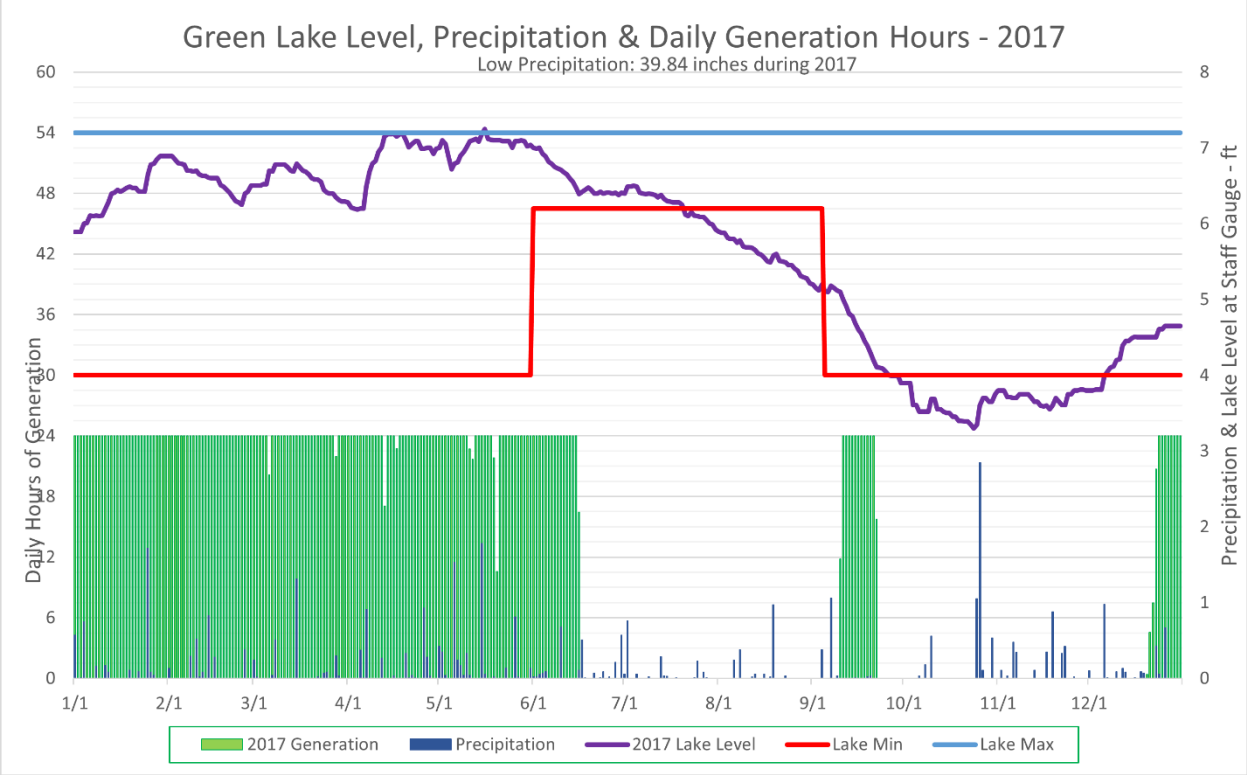



Green Lake Level, Precipitation & Daily Generation Hours - 2013
High Precipitation: 56.30 inches during 2013
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
7
6
5
4
3
2
1
0
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
2013 Generation
Precipitation
2013 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2014
Moderate Precipitation: 48.23 inches during 2014
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
7
6
5
4
3
2
1
0
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
2014 Generation
Precipitation
2014 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2015
Moderate Precipitation: 47.80 inches during 2015
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
2015 Generation
Precipitation
2015 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2016
Low Precipitation: 41.83 inches during 2016
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
2016 Generation
Precipitation
2016 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2017
Low Precipitation: 39.84 inches during 2017
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
7
6
5
4
3
2
1
0
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2/1
3/1
4/1
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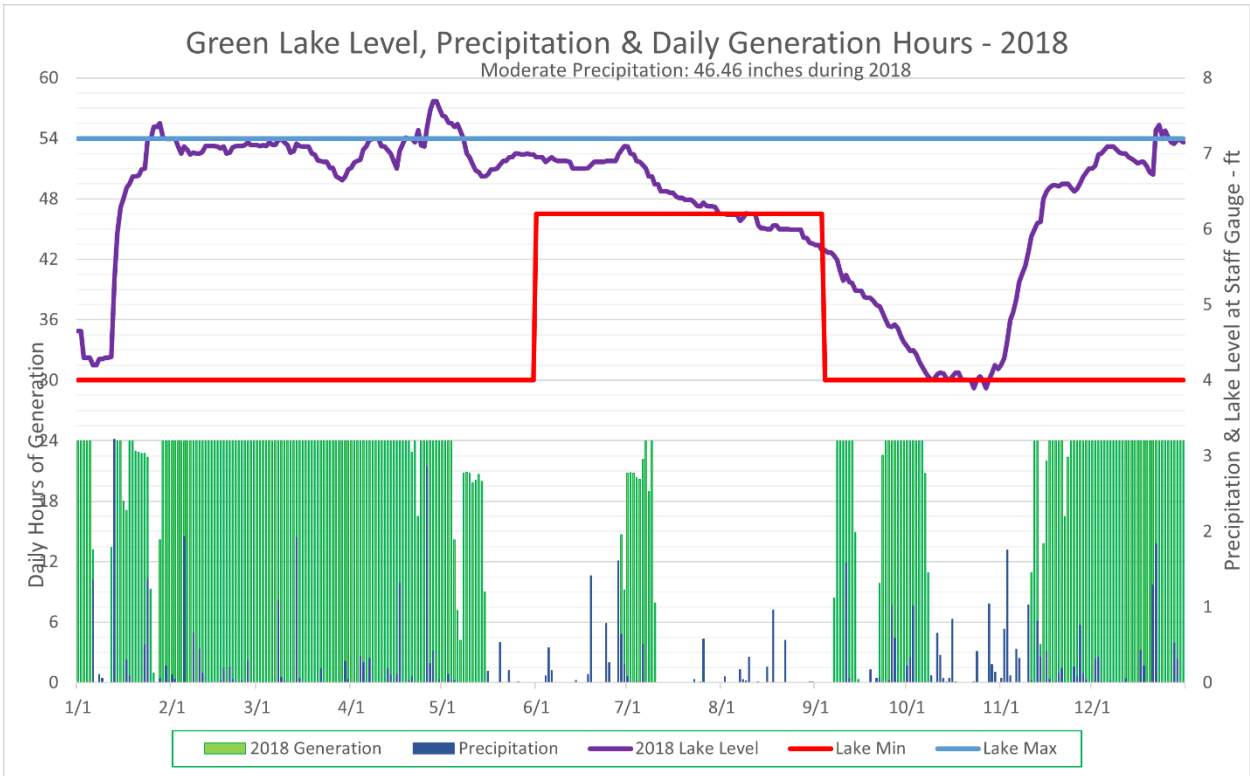
7/1
8/1
9/1
10/1
11/1
12/1
2017 Generation
Precipitation
2017 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2018
Moderate Precipitation: 46.46 inches during 2018
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
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5
4
3
2
1
0
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2/1
3/1
4/1
5/1
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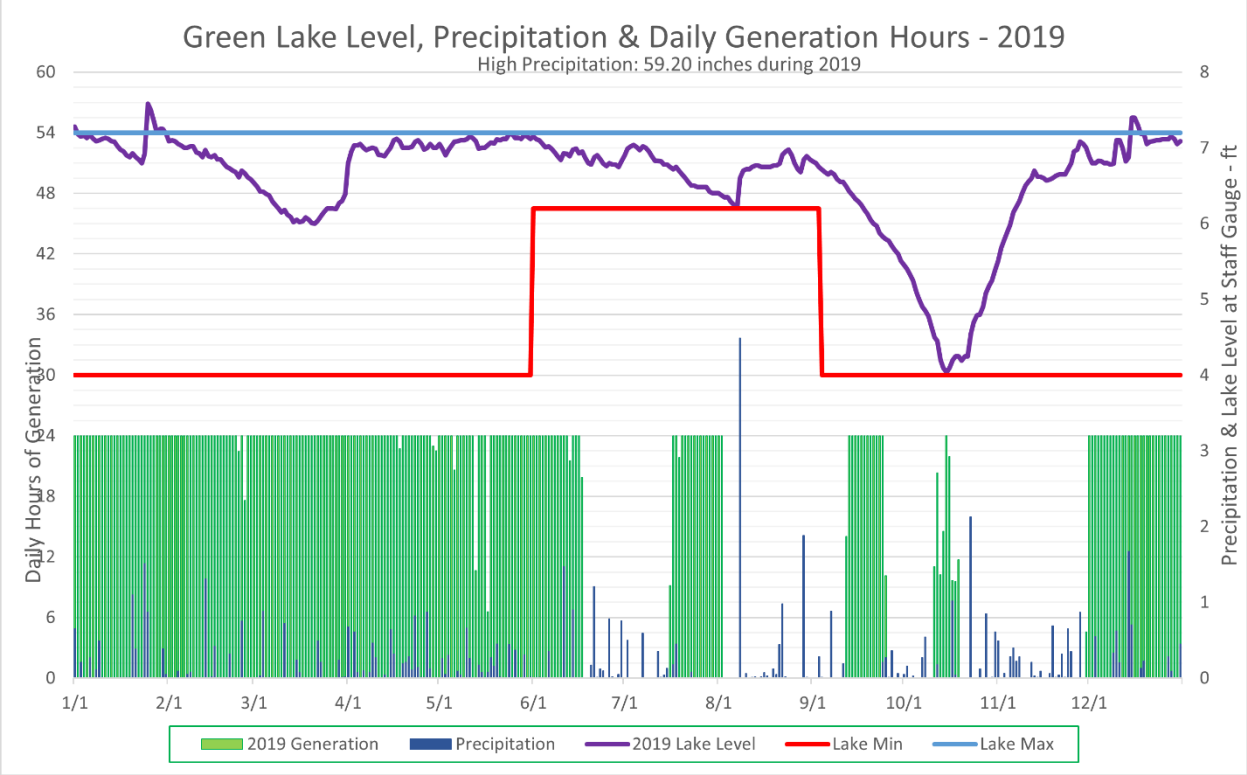
7/1
8/1
9/1
10/1
11/1
12/1
2018 Generation
Precipitation
2018 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2019
High Precipitation: 59.20 inches during 2019
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
7
6
5
4
3
2
1
0
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2/1
3/1
4/1
5/1
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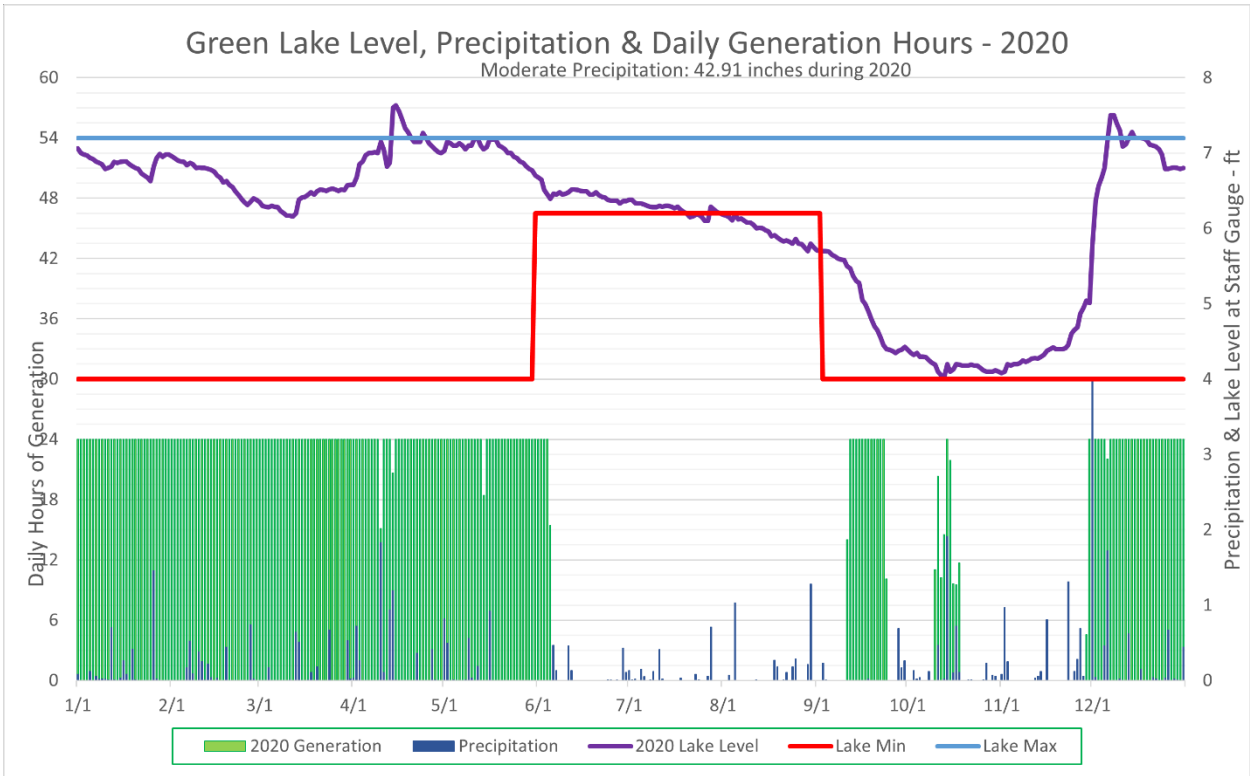
7/1
8/1
9/1
10/1
11/1
12/1
2019 Generation
Precipitation
2019 Lake Level
Lake Min
Lake Max


Green Lake Level, Precipitation & Daily Generation Hours - 2020
Moderate Precipitation: 42.91 inches during 2020
Daily Hours of Generation
Precipitation & Lake Level at Staff Gauge - ft
60
54
48
42
36
30
24
18
12
6
0
8
7
6
5
4
3
2
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0
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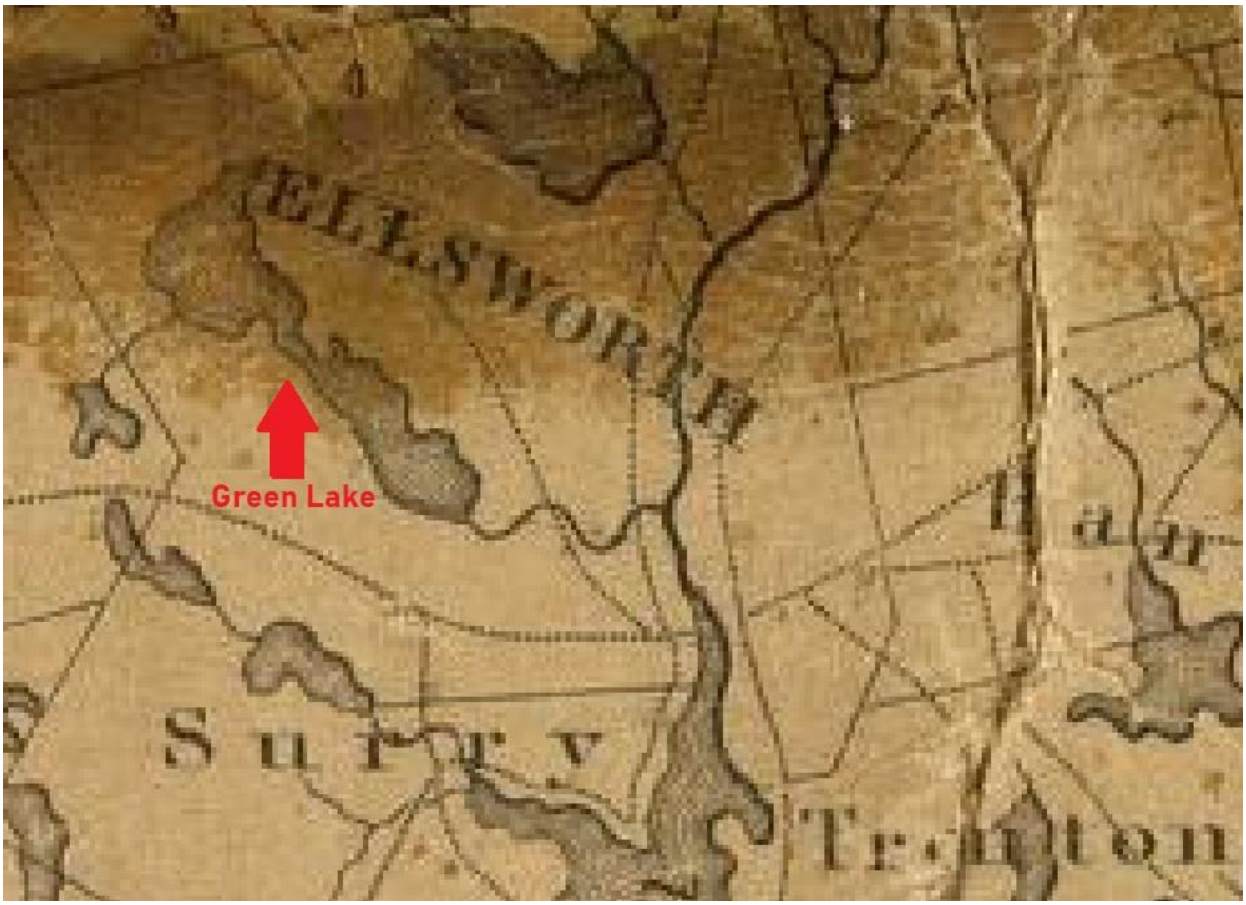
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
2020 Generation
Precipitation
2020 Lake Level
Lake Min
Lake Max

Appendix-D – Energy Only Electric Rates in 2023 Dollars

	Year	Gov CPI vs. 2023	KWH Rate in 2023 Dollars	KWH Rate	Years
1	1985	2.83	0.2122500	0.075	1-5
2	1986	2.79	0.2092500	0.075	1-5
3	1987	2.69	0.2017500	0.075	1-5
4	1988	2.59	0.1942500	0.075	1-5
5	1989	2.46	0.1845000	0.075	1-5
6	1990	2.35	0.1762500	0.075	6-10
7	1991	2.24	0.1680000	0.075	6-10
8	1992	2.18	0.1635000	0.075	6-10
9	1993	2.11	0.1582500	0.075	6-10
10	1994	2.06	0.1545000	0.075	6-10
11	1995	2.00	0.1500000	0.075	11-15
12	1996	1.94	0.1455000	0.075	11-15
13	1997	1.90	0.1425000	0.075	11-15
14	1998	1.87	0.1402500	0.075	11-15
15	1999	1.83	0.1372500	0.075	11-15
16	2000	1.77	0.0708000	0.04	16-30
17	2001	1.71	0.0684000	0.04	16-30
18	2002	1.69	0.0676000	0.04	16-30
19	2003	1.66	0.0664000	0.04	16-30
20	2004	1.61	0.0644000	0.04	16-30
21	2005	1.56	0.0624000	0.04	16-30
22	2006	1.50	0.0600000	0.04	16-30
23	2007	1.46	0.0584000	0.04	16-30
24	2008	1.40	0.0560000	0.04	16-30
25	2009	1.42	0.0568000	0.04	16-30
26	2010	1.39	0.0556000	0.04	16-30
27	2011	1.35	0.0540000	0.04	16-30
28	2012	1.32	0.0528000	0.04	16-30
29	2013	1.31	0.0524000	0.04	16-30
30	2014	1.28	0.0512000	0.04	16-30
31	2015	1.28	0.0443008	0.03461	2015
32	2016	1.27	0.0456057	0.03591	2016
33	2017	1.24	0.0373240	0.0301	2017
34	2018	1.21	0.0510862	0.04222	2018
35	2019	1.19	0.0518721	0.04359	2019
36	2020	1.19	0.0425068	0.03572	2020
37	2021	1.13	0.0357645	0.03165	2021
38	2022	1.04	0.0719368	0.06917	2022
39	2023	1.00	0.0835800	0.08358	2023
40	2024				
		Average	0.0999789		

Appendix-E

For further historical information, here is a map of Green Lake which was published in 1844 by J.H. Young and E. Dankworth of Philadelphia. It was authored by Moses Greenleaf, who is stated by the publisher to have submitted it in Feb-1828. This map shows a surprising amount of detail of the lake compared to other maps of the time. GLWP does not know if there was a dam on Green Lake in 1828. The map offers a glimpse of the recognized form of the lake about 195 years ago. The form of Green Lake in or before 1828 appears to be very similar to its form today.



Green Lake Project 7189 – MDMR Response – Distribution List July 6, 2023

Federal Energy Regulatory Commission

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Green Lake Project 7189 – MDMR Response – Distribution List July 6, 2023

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